Department of Defense
Fiscal Year (FY) 2020 Budget Estimates

March 2019

Missile Defense Agency

Defense-Wide Justification Book Volume 2a of 5

Research, Development, Test & Evaluation, Defense-Wide

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Volumes

Defense Advanced Research Projects Agency..... Volume 1

Missile Defense Agency..... Volume 2

Office of the Secretary Of Defense..... Volume 3

Chemical and Biological Defense Program.....Volume 4

Defense Contract Management Agency..... Volume 5

DoD Human Resources Activity..... Volume 5

Defense Information Systems Agency.....Volume 5

Defense Logistics Agency.....Volume 5

Defense Security Cooperation Agency.....Volume 5

Defense Security Service..... Volume 5

Defense Technical Information Center.....Volume 5

Defense Threat Reduction Agency.....Volume 5

The Joint Staff..... Volume 5

United States Special Operations Command.....Volume 5

Washington Headquarters Service.....Volume 5

Operational Test and Evaluation, Defense..... Volume 5

National Geospatial-Intelligence Agency.....(see NIP and MIP Justification Books)

Defense Intelligence Agency..... (see NIP and MIP Justification Books)

National Security Agency.....(see NIP and MIP Justification Books)

Defense Contract Audit Agency..... Volume 5

Space Development Agency..... Volume 5

Volume 2a Table of Contents

Introduction and Explanation of Contents.....Volume 2a - v

Comptroller Exhibit R-1..... Volume 2a - vii

Program Element Table of Contents (by Budget Activity then Line Item Number).....Volume 2a - xxvii

Program Element Table of Contents (Alphabetically by Program Element Title).....Volume 2a - xxxi

MDA Overview.....Volume 2a - xxxv

MDA Appropriation Summary..... Volume 2a - lvii

Congressional Reporting Requirements.....Volume 2a - lxi

Acronyms..... Volume 2a - lxix

Exhibit R-2s.....Volume 2a - 1

THIS PAGE INTENTIONALLY LEFT BLANK

Introduction & Explanation of Contents

The Department of Defense Fiscal Year (FY) 2020 Budget Estimates Submission RDT&E (Includes Procurement, O&M, and MILCON), Defense-wide Volume 2, Missile Defense Agency (MDA) justification materials consists of two books titled Volume 2a and 2b. Justification documents are provided in the books as listed below.

Volume 2a

- R-1 Comptroller Exhibit
- MDA FY 2020 Budget Estimates Overview
- MDA Appropriation Summary
- Acronyms
- RDT&E Exhibits in BA-03, BA-04, and BA-06

Volume 2b

- P-1 Comptroller Exhibit
- MDA Operations and Maintenance Exhibit
- MDA MILCON Exhibits
- MDA Procurement Exhibits

THIS PAGE INTENTIONALLY LEFT BLANK

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
Research, Development, Test & Eval, DW	7,749,461	7,248,720		7,248,720
Total Research, Development, Test & Evaluation	7,749,461	7,248,720		7,248,720

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)
Research, Development, Test & Eval, DW	7,369,585				7,369,585
Total Research, Development, Test & Evaluation	7,369,585				7,369,585

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Summary Recap of Budget Activities	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
Advanced Technology Development	125,904	125,735		125,735
Advanced Component Development And Prototypes	7,478,332	7,090,959		7,090,959
Management Support	145,225	32,026		32,026
Total Research, Development, Test & Evaluation	7,749,461	7,248,720		7,248,720

Summary Recap of FYDP Programs				
Intelligence and Communications	964	985		985
Research and Development	7,638,419	7,087,670		7,087,670
Administration and Associated Activities	29,947	28,626		28,626
Space	80,131	131,439		131,439
Total Research, Development, Test & Evaluation	7,749,461	7,248,720		7,248,720

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Summary Recap of Budget Activities	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)
Advanced Technology Development	58,482				58,482
Advanced Component Development And Prototypes	7,284,038				7,284,038
Management Support	27,065				27,065
Total Research, Development, Test & Evaluation	7,369,585				7,369,585
Summary Recap of FYDP Programs					
Intelligence and Communications	1,138				1,138
Research and Development	7,277,968				7,277,968
Administration and Associated Activities	27,065				27,065
Space	63,414				63,414
Total Research, Development, Test & Evaluation	7,369,585				7,369,585

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Summary Recap of Budget Activities	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
Advanced Technology Development	125,904	125,735		125,735
Advanced Component Development And Prototypes	7,478,332	7,090,959		7,090,959
Management Support	145,225	32,026		32,026
Total Research, Development, Test & Evaluation	7,749,461	7,248,720		7,248,720

Summary Recap of FYDP Programs				
Intelligence and Communications	964	985		985
Research and Development	7,638,419	7,087,670		7,087,670
Administration and Associated Activities	29,947	28,626		28,626
Space	80,131	131,439		131,439
Total Research, Development, Test & Evaluation	7,749,461	7,248,720		7,248,720

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Summary Recap of Budget Activities	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)
Advanced Technology Development	58,482				58,482
Advanced Component Development And Prototypes	7,284,038				7,284,038
Management Support	27,065				27,065
Total Research, Development, Test & Evaluation	7,369,585				7,369,585
Summary Recap of FYDP Programs					
Intelligence and Communications	1,138				1,138
Research and Development	7,277,968				7,277,968
Administration and Associated Activities	27,065				27,065
Space	63,414				63,414
Total Research, Development, Test & Evaluation	7,369,585				7,369,585

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
Missile Defense Agency	7,749,461	7,248,720		7,248,720
Total Research, Development, Test & Evaluation	7,749,461	7,248,720		7,248,720

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)
Missile Defense Agency	7,369,585				7,369,585
Total Research, Development, Test & Evaluation	7,369,585				7,369,585

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
29	0603176C	Advanced Concepts and Performance Assessment	03	17,683	13,017		13,017	U
30	0603178C	Weapons Technology	03	28,894	13,400		13,400	U
31	0603180C	Advanced Research	03	23,765	42,565		42,565	U
38	0603294C	Common Kill Vehicle Technology	03	55,562	56,753		56,753	U
		Advanced Technology Development		125,904	125,735		125,735	
74	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	454,147	388,273		388,273	U
75	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,153,263	803,359		803,359	U
77	0603884C	Ballistic Missile Defense Sensors	04	290,289	385,375		385,375	U
78	0603890C	BMD Enabling Programs	04	533,993	620,831		620,831	U
79	0603891C	Special Programs - MDA	04	356,560	422,348		422,348	U
80	0603892C	AEGIS BMD	04	798,395	741,076		741,076	U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	449,985	507,817		507,817	U
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	48,574	48,767		48,767	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	51,905	58,125		58,125	U
84	0603906C	Regarding Trench	04	8,898	16,916		16,916	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	173,988	136,715		136,715	U
86	0603913C	Israeli Cooperative Programs	04	373,800	300,000		300,000	U

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)	Sec
29	0603176C	Advanced Concepts and Performance Assessment	03	14,208				14,208	U
30	0603178C	Weapons Technology	03	10,000				10,000	U
31	0603180C	Advanced Research	03	20,674				20,674	U
38	0603294C	Common Kill Vehicle Technology	03	13,600				13,600	U
		Advanced Technology Development		58,482				58,482	
74	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	302,761				302,761	U
75	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,156,506				1,156,506	U
77	0603884C	Ballistic Missile Defense Sensors	04	283,487				283,487	U
78	0603890C	BMD Enabling Programs	04	571,507				571,507	U
79	0603891C	Special Programs - MDA	04	377,098				377,098	U
80	0603892C	AEGIS BMD	04	727,479				727,479	U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	564,206				564,206	U
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	51,532				51,532	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	56,161				56,161	U
84	0603906C	Regarding Trench	04	22,424				22,424	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	128,156				128,156	U
86	0603913C	Israeli Cooperative Programs	04	300,000				300,000	U

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
87	0603914C	Ballistic Missile Defense Test	04	406,806	515,897		515,897	U
88	0603915C	Ballistic Missile Defense Targets	04	512,838	561,352		561,352	U
92	0604115C	Technology Maturation Initiatives	04	163,947	316,822		316,822	U
95	0604181C	Hypersonic Defense	04	63,032	130,944		130,944	U
102	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04		62,221		62,221	U
103	0604673C	Pacific Discriminating Radar	04	59,564	15,926		15,926	U
108	0604873C	Long Range Discrimination Radar (LRDR)	04	370,516	166,543		166,543	U
109	0604874C	Improved Homeland Defense Interceptors	04	742,842	421,820		421,820	U
110	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	35,738	61,017		61,017	U
111	0604878C	Aegis BMD Test	04	128,757	92,160		92,160	U
112	0604879C	Ballistic Missile Defense Sensor Test	04	88,840	77,405		77,405	U
113	0604880C	Land-Based SM-3 (LBSM3)	04	29,652	27,692		27,692	U
114	0604881C	AEGIS SM-3 Block IIA Co-Development	04	9,531				U
115	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	85,030	72,634		72,634	U
116	0604894C	Multi-Object Kill Vehicle	04	6,347	6,500		6,500	U
119	0305103C	Cyber Security Initiative	04	964	985		985	U
121	1206893C	Space Tracking & Surveillance System	04	35,008	36,955		36,955	U

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)	Sec
87	0603914C	Ballistic Missile Defense Test	04	395,924				395,924	U
88	0603915C	Ballistic Missile Defense Targets	04	554,171				554,171	U
92	0604115C	Technology Maturation Initiatives	04	303,458				303,458	U
95	0604181C	Hypersonic Defense	04	157,425				157,425	U
102	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04	274,714				274,714	U
103	0604673C	Pacific Discriminating Radar	04	6,711				6,711	U
108	0604873C	Long Range Discrimination Radar (LRDR)	04	136,423				136,423	U
109	0604874C	Improved Homeland Defense Interceptors	04	412,363				412,363	U
110	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	25,137				25,137	U
111	0604878C	Aegis BMD Test	04	169,822				169,822	U
112	0604879C	Ballistic Missile Defense Sensor Test	04	105,530				105,530	U
113	0604880C	Land-Based SM-3 (LBSM3)	04	38,352				38,352	U
114	0604881C	AEGIS SM-3 Block IIA Co-Development	04						U
115	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	98,139				98,139	U
116	0604894C	Multi-Object Kill Vehicle	04						U
119	0305103C	Cyber Security Initiative	04	1,138				1,138	U
121	1206893C	Space Tracking & Surveillance System	04	35,849				35,849	U

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
122	1206895C	Ballistic Missile Defense System Space Programs	04	45,123	94,484		94,484	U
		Advanced Component Development And Prototypes		7,478,332	7,090,959		7,090,959	
160	0605502C	Small Business Innovation Research - MDA	06	115,278				U
177	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06		3,400		3,400	U
193	0901598C	Management HQ - MDA	06	29,947	28,626		28,626	U
		Management Support		145,225	32,026		32,026	
Total Research, Development, Test & Eval, DW				7,749,461	7,248,720		7,248,720	

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)	Sec
122	1206895C	Ballistic Missile Defense System Space Programs	04	27,565				27,565	U
		Advanced Component Development And Prototypes		7,284,038				7,284,038	
160	0605502C	Small Business Innovation Research - MDA	06						U
177	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06						U
193	0901598C	Management HQ - MDA	06	27,065				27,065	U
		Management Support		27,065				27,065	
Total Research, Development, Test & Eval, DW				7,369,585				7,369,585	

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Missile Defense Agency
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
29	0603176C	Advanced Concepts and Performance Assessment	03	17,683	13,017		13,017	U
30	0603178C	Weapons Technology	03	28,894	13,400		13,400	U
31	0603180C	Advanced Research	03	23,765	42,565		42,565	U
38	0603294C	Common Kill Vehicle Technology	03	55,562	56,753		56,753	U
	Advanced Technology Development			125,904	125,735		125,735	
74	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	454,147	388,273		388,273	U
75	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,153,263	803,359		803,359	U
77	0603884C	Ballistic Missile Defense Sensors	04	290,289	385,375		385,375	U
78	0603890C	BMD Enabling Programs	04	533,993	620,831		620,831	U
79	0603891C	Special Programs - MDA	04	356,560	422,348		422,348	U
80	0603892C	AEGIS BMD	04	798,395	741,076		741,076	U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	449,985	507,817		507,817	U
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	48,574	48,767		48,767	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	51,905	58,125		58,125	U
84	0603906C	Regarding Trench	04	8,898	16,916		16,916	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	173,988	136,715		136,715	U
86	0603913C	Israeli Cooperative Programs	04	373,800	300,000		300,000	U

Missile Defense Agency
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)	Sec
29	0603176C	Advanced Concepts and Performance Assessment	03	14,208				14,208	U
30	0603178C	Weapons Technology	03	10,000				10,000	U
31	0603180C	Advanced Research	03	20,674				20,674	U
38	0603294C	Common Kill Vehicle Technology	03	13,600				13,600	U
		Advanced Technology Development		58,482				58,482	
74	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	302,761				302,761	U
75	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,156,506				1,156,506	U
77	0603884C	Ballistic Missile Defense Sensors	04	283,487				283,487	U
78	0603890C	BMD Enabling Programs	04	571,507				571,507	U
79	0603891C	Special Programs - MDA	04	377,098				377,098	U
80	0603892C	AEGIS BMD	04	727,479				727,479	U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	564,206				564,206	U
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	51,532				51,532	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	56,161				56,161	U
84	0603906C	Regarding Trench	04	22,424				22,424	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	128,156				128,156	U
86	0603913C	Israeli Cooperative Programs	04	300,000				300,000	U

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Missile Defense Agency
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
87	0603914C	Ballistic Missile Defense Test	04	406,806	515,897		515,897	U
88	0603915C	Ballistic Missile Defense Targets	04	512,838	561,352		561,352	U
92	0604115C	Technology Maturation Initiatives	04	163,947	316,822		316,822	U
95	0604181C	Hypersonic Defense	04	63,032	130,944		130,944	U
102	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04		62,221		62,221	U
103	0604673C	Pacific Discriminating Radar	04	59,564	15,926		15,926	U
108	0604873C	Long Range Discrimination Radar (LRDR)	04	370,516	166,543		166,543	U
109	0604874C	Improved Homeland Defense Interceptors	04	742,842	421,820		421,820	U
110	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	35,738	61,017		61,017	U
111	0604878C	Aegis BMD Test	04	128,757	92,160		92,160	U
112	0604879C	Ballistic Missile Defense Sensor Test	04	88,840	77,405		77,405	U
113	0604880C	Land-Based SM-3 (LBSM3)	04	29,652	27,692		27,692	U
114	0604881C	AEGIS SM-3 Block IIA Co-Development	04	9,531				U
115	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	85,030	72,634		72,634	U
116	0604894C	Multi-Object Kill Vehicle	04	6,347	6,500		6,500	U
119	0305103C	Cyber Security Initiative	04	964	985		985	U
121	1206893C	Space Tracking & Surveillance System	04	35,008	36,955		36,955	U

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Missile Defense Agency
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)	Sec
87	0603914C	Ballistic Missile Defense Test	04	395,924				395,924	U
88	0603915C	Ballistic Missile Defense Targets	04	554,171				554,171	U
92	0604115C	Technology Maturation Initiatives	04	303,458				303,458	U
95	0604181C	Hypersonic Defense	04	157,425				157,425	U
102	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04	274,714				274,714	U
103	0604673C	Pacific Discriminating Radar	04	6,711				6,711	U
108	0604873C	Long Range Discrimination Radar (LRDR)	04	136,423				136,423	U
109	0604874C	Improved Homeland Defense Interceptors	04	412,363				412,363	U
110	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	25,137				25,137	U
111	0604878C	Aegis BMD Test	04	169,822				169,822	U
112	0604879C	Ballistic Missile Defense Sensor Test	04	105,530				105,530	U
113	0604880C	Land-Based SM-3 (LBSM3)	04	38,352				38,352	U
114	0604881C	AEGIS SM-3 Block IIA Co-Development	04						U
115	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	98,139				98,139	U
116	0604894C	Multi-Object Kill Vehicle	04						U
119	0305103C	Cyber Security Initiative	04	1,138				1,138	U
121	1206893C	Space Tracking & Surveillance System	04	35,849				35,849	U

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Missile Defense Agency
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
122	1206895C	Ballistic Missile Defense System Space Programs	04	45,123	94,484		94,484	U
	Advanced Component Development And Prototypes			7,478,332	7,090,959		7,090,959	
160	0605502C	Small Business Innovation Research - MDA	06	115,278				U
177	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06		3,400		3,400	U
193	0901598C	Management HQ - MDA	06	29,947	28,626		28,626	U
	Management Support			145,225	32,026		32,026	
Total Missile Defense Agency				7,749,461	7,248,720		7,248,720	

R-120PB: FY 2020 President's Budget (Published Version), as of March 11, 2019 at 12:39:07

Missile Defense Agency
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

11 Mar 2019

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Base	FY 2020 OCO for Base Requirements	FY 2020 OCO for Direct War and Enduring Costs	FY 2020 Total OCO	FY 2020 Total (Base + OCO)	Sec
122	1206895C	Ballistic Missile Defense System Space Programs	04	27,565				27,565	U
Advanced Component Development And Prototypes				7,284,038				7,284,038	
160	0605502C	Small Business Innovation Research - MDA	06						U
177	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06						U
193	0901598C	Management HQ - MDA	06	27,065				27,065	U
Management Support				27,065				27,065	
Total Missile Defense Agency				7,369,585				7,369,585	

Program Element Table of Contents (by Budget Activity then Line Item Number)

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
29	03	0603176C	Advanced Concepts and Performance Assessment	Volume 2a - 1
30	03	0603178C	Weapons Technology	Volume 2a - 9
31	03	0603180C	Advanced Research	Volume 2a - 15
38	03	0603294C	Common Kill Vehicle Technology	Volume 2a - 23

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
74	04	0603881C	Ballistic Missile Defense Terminal Defense Segment	Volume 2a - 29
75	04	0603882C	Ballistic Missile Defense Midcourse Defense Segment	Volume 2a - 61
77	04	0603884C	Ballistic Missile Defense Sensors	Volume 2a - 95
78	04	0603890C	BMD Enabling Programs	Volume 2a - 131
79	04	0603891C	Special Programs - MDA	Volume 2a - 249
80	04	0603892C	AEGIS BMD	Volume 2a - 251

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
81	04	0603896C	Ballistic Missile Defense Command and Control, Battle Management & Communication	Volume 2a - 317
82	04	0603898C	Ballistic Missile Defense Joint Warfighter Support	Volume 2a - 385
83	04	0603904C	Missile Defense Integration and Operations Center (MDIOC)	Volume 2a - 423
84	04	0603906C	Regarding Trench	Volume 2a - 451
85	04	0603907C	Sea Based X-Band Radar (SBX)	Volume 2a - 453
86	04	0603913C	Israeli Cooperative Programs	Volume 2a - 469
87	04	0603914C	Ballistic Missile Defense Test	Volume 2a - 491
88	04	0603915C	Ballistic Missile Defense Targets	Volume 2a - 533
92	04	0604115C	Technology Maturation Initiatives	Volume 2a - 571
95	04	0604181C	Hypersonic Defense	Volume 2a - 615
102	04	0604672C	Homeland Defense Radar-Hawaii	Volume 2a - 631
103	04	0604673C	Pacific Discriminating Radar	Volume 2a - 645
108	04	0604873C	Long Range Discrimination Radar (LRDR)	Volume 2a - 663
109	04	0604874C	Improved Homeland Defense (HLD) Interceptors	Volume 2a - 683
110	04	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	Volume 2a - 699
111	04	0604878C	Aegis BMD Test	Volume 2a - 713
112	04	0604879C	Ballistic Missile Defense Sensor Test	Volume 2a - 737
113	04	0604880C	Land Based SM-3 (LBSM3)	Volume 2a - 755

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
114	04	0604881C	AEGIS SM-3 Block IIA Co-Development	Volume 2a - 777
115	04	0604887C	Ballistic Missile Defense Midcourse Defense Segment Test	Volume 2a - 791
116	04	0604894C	Multi Object Kill Vehicle	Volume 2a - 811
119	04	0305103C	Cyber Security Initiative	Volume 2a - 823
121	04	1206893C	Space Tracking and Surveillance System (STSS)	Volume 2a - 829
122	04	1206895C	Ballistic Missile Defense System Space Programs	Volume 2a - 853

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
160	06	0605502C	Small Business Innovation Research - MDA	Volume 2a - 883
177	06	0606942C	Assessments and Evaluations of Cyber Vulnerabilities	Volume 2a - 887
193	06	0901598C	Management HQ - MDA	Volume 2a - 891

THIS PAGE INTENTIONALLY LEFT BLANK

Program Element Table of Contents (Alphabetically by Program Element Title)

Program Element Title	Program Element Number	Line #	BA	Page
AEGIS BMD	0603892C	80	04	Volume 2a - 251
AEGIS SM-3 Block IIA Co-Development	0604881C	114	04	Volume 2a - 777
Advanced Concepts and Performance Assessment	0603176C	29	03	Volume 2a - 1
Advanced Research	0603180C	31	03	Volume 2a - 15
Aegis BMD Test	0604878C	111	04	Volume 2a - 713
Assessments and Evaluations of Cyber Vulnerabilities	0606942C	177	06	Volume 2a - 887
BMD Enabling Programs	0603890C	78	04	Volume 2a - 131
Ballistic Missile Defense Command and Control, Battle Management & Communication	0603896C	81	04	Volume 2a - 317
Ballistic Missile Defense Joint Warfighter Support	0603898C	82	04	Volume 2a - 385
Ballistic Missile Defense Midcourse Defense Segment	0603882C	75	04	Volume 2a - 61
Ballistic Missile Defense Midcourse Defense Segment Test	0604887C	115	04	Volume 2a - 791
Ballistic Missile Defense Sensor Test	0604879C	112	04	Volume 2a - 737
Ballistic Missile Defense Sensors	0603884C	77	04	Volume 2a - 95
Ballistic Missile Defense System Space Programs	1206895C	122	04	Volume 2a - 853
Ballistic Missile Defense Targets	0603915C	88	04	Volume 2a - 533
Ballistic Missile Defense Terminal Defense Segment	0603881C	74	04	Volume 2a - 29

Program Element Title	Program Element Number	Line #	BA	Page
Ballistic Missile Defense Terminal Defense Segment Test	0604876C	110	04	Volume 2a - 699
Ballistic Missile Defense Test	0603914C	87	04	Volume 2a - 491
Common Kill Vehicle Technology	0603294C	38	03	Volume 2a - 23
Cyber Security Initiative	0305103C	119	04	Volume 2a - 823
Homeland Defense Radar-Hawaii	0604672C	102	04	Volume 2a - 631
Hypersonic Defense	0604181C	95	04	Volume 2a - 615
Improved Homeland Defense (HLD) Interceptors	0604874C	109	04	Volume 2a - 683
Israeli Cooperative Programs	0603913C	86	04	Volume 2a - 469
Land Based SM-3 (LBSM3)	0604880C	113	04	Volume 2a - 755
Long Range Discrimination Radar (LRDR)	0604873C	108	04	Volume 2a - 663
Management HQ - MDA	0901598C	193	06	Volume 2a - 891
Missile Defense Integration and Operations Center (MDIOC)	0603904C	83	04	Volume 2a - 423
Multi Object Kill Vehicle	0604894C	116	04	Volume 2a - 811
Pacific Discriminating Radar	0604673C	103	04	Volume 2a - 645
Regarding Trench	0603906C	84	04	Volume 2a - 451
Sea Based X-Band Radar (SBX)	0603907C	85	04	Volume 2a - 453
Small Business Innovation Research - MDA	0605502C	160	06	Volume 2a - 883
Space Tracking and Surveillance System (STSS)	1206893C	121	04	Volume 2a - 829
Special Programs - MDA	0603891C	79	04	Volume 2a - 249

Program Element Title	Program Element Number	Line #	BA	Page
Technology Maturation Initiatives	0604115C	92	04	Volume 2a - 571
Weapons Technology	0603178C	30	03	Volume 2a - 9

THIS PAGE INTENTIONALLY LEFT BLANK

Missile Defense Agency
Fiscal Year (FY) 2020
Budget Estimates
OVERVIEW

Approved for Public Release

MDA Overview 19-C-0166

Vol2a RDT&E 19-C-0146

Vol2b O and M 19-C-0144

Vol2b MILCON 19-C-0148

Vol2b Procurement 19-C-0145

The Missile Defense Agency (MDA) mission is "to develop and deploy a layered Ballistic Missile Defense System to defend the United States, its deployed forces, allies, and friends from missile attacks of all ranges and in all phases of flight." MDA's budget request is $9.431 billion in Fiscal Year (FY) 2020, a decrease of $1.06 billion from the FY 2019 enacted budget of $10.491 billion.

In FY 2020, MDA will aim to strengthen and expand the deployment of defenses for our Nation, deployed forces, allies, and international partners against increasingly capable missile threats. The missile defense program will support the Warfighter and the needs of the Combatant Commanders by developing, integrating, testing, and deploying interceptors, sensors, and the command and control, battle management and communications (C2BMC) system for the Ballistic Missile Defense System (BMDS). MDA's priorities for missile defense development and fielding are as follows: 1) continue to focus on increasing system reliability to build warfighter confidence; 2) increase engagement capability and capacity; and 3) address the advanced threat. This budget request maintains operational missile defense capabilities for existing homeland and regional defense forces and will continue to increase interceptor inventory capacity and use existing technologies to improve sensors, battle management, fire control, and kill vehicle capabilities to address evolving threats. MDA is cognizant of the growing cyber threat and is working to ensure the Nation's missile defenses are resilient and able to operate in a highly contested cyber environment. MDA remains focused on supporting the DoD Cybersecurity Campaign through implementation of the DoD Cybersecurity Discipline Implementation Plan - Four Lines of Effort. The four lines of effort are Strong Authentication, Hardening of Systems, Reducing the DoD Attack Surface, and Alignment to

Cybersecurity / Computer Network Defense Service Providers across all networks; all are critical to the reliability of the MDA networks.

I. Missile Threat

Current global trends indicate ballistic and cruise missiles are becoming more capable, due in part to the proliferation of advanced technologies, resulting in systems with global reach, increasing speed, and greater accuracy. Nearly all of our adversaries are concerned with U.S. missile defenses and have devised various means to complicate missile defense operations. Many foreign ballistic and cruise missile systems are progressively incorporating advanced countermeasures, including maneuverable reentry vehicles, multiple independent reentry vehicles, and electromagnetic jamming, all intended to defeat our missile defense capabilities. Future supersonic/hypersonic powered cruise missiles may be launched by large rocket boosters that have traditionally been associated with ballistic missiles. Hypersonic glide vehicles are being developed as a new type of ballistic missile payload. The combination of high speed, maneuverability, and relatively low altitude makes them challenging targets for missile defense systems.

The United States remains vigilant to the pursuit of missile capabilities and nuclear weapons by potential adversaries. North Korea continues to develop a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States. In 2016 and 2017, North Korea conducted over 40 launches of short- medium-intermediate-submarine-launched, and intercontinental-range systems.

Iran has ambitious ballistic missile and space launch development programs and continues to attempt to increase the lethality of its ballistic missile force. Iran is fielding increased numbers of theater ballistic missiles and improving its existing inventory. Its progress on space launch vehicles could shorten a pathway to an Intercontinental Ballistic Missile (ICBM). Iran's ballistic missiles are capable

of striking targets throughout the region, ranging as far as southeastern Europe. It has used these missiles in the region, conducting retaliatory strikes on ISIS targets in Syria. Iran has steadily increased its regional ballistic missile force, deploying next-generation short- and medium-range ballistic missiles (SRBMs and MRBMs) with increasing accuracy and new submunition payloads. Iran is developing, and has publicized the testing of, SRBMs with anti-ship payloads. Iran also continues to proliferate ballistic missiles to states and non-state groups.

To combat the current threat, this budget request maintains operational homeland and regional missile defense capabilities and continues to increase interceptor inventory capacity. This budget request funds the use of existing technologies to improve sensors, battle management, fire control, and kill vehicle capabilities to address evolving threats, while pursuing game-changing technologies to address the advanced threat.

The following discussion provides a summary of highlights of the major Program Elements, but does not necessarily examine all funding and activities included within each Program Element.

II. Homeland Defense

MDA remains committed to operating, sustaining, and improving the nation's homeland missile defenses. The budget request includes:

- **Ground-based Midcourse Defense (GMD) *(PE 0603882C).*** MDA is requesting $1.2 billion in FY 2020. MDA continues the development and expansion of long-range homeland missile defense capabilities, with 44 currently emplaced Ground Based Interceptors (GBIs) and efforts underway to expand the fielded GBI fleet to 64 in response to the rapidly advancing North Korean threat. MDA continues the efforts to field 20 additional GBIs equipped with the Redesigned Kill Vehicle, 20 silos in Missile Field

4 in Fort Greely, Alaska, and two additional silos in Missile Field 1. This will improve protection against North Korean and other ICBM threats as they emerge. To further improve Homeland Defense, MDA will complete the construction, manufacturing, and delivery of an In-Flight Interceptor Communication System (IFICS) Data Terminals (IDT) to be co-located with the Homeland Defense Radar – Hawaii (HDR-H) in FY 2023. MDA will add a Communications Facility at Fort Greely by FY 2024 to ensure Homeland Defense Fire Control redundancy. MDA will also upgrade the capability of key Ground Systems and Fire Control systems components such as the GMD Fire Control (GFC) equipment, and the GMD Communications Network (GCN). Capability upgrades will include On-Demand Communications (ODC) required for the Redesigned Kill Vehicle (RKV); GMD implementation of BMDS System Track; 2-or/3-stage selectable GBI battle management; Mid-Term Discrimination; enhancements to the Buffer Zone; cybersecurity implementations; and other GFC-Warfighter interface and logic improvements. Technology modernization will mitigate obsolescence issues, improve cybersecurity resilience, reduce life-cycle cost, increase system reliability and operational availability, and simplify the insertion of future technologies.

- **Improved Homeland Defense Interceptors *(PE 0604874C)*.** MDA is requesting $412.4 million in FY 2020. The Redesigned Kill Vehicle (RKV) will improve reliability and make homeland defenses more robust. The RKV will also help address the evolving threat, improve in-flight communications to better utilize off-board sensor data, and heighten Combatant Commanders' situational awareness via hit/kill assessment messages. The RKV program is anticipated to be delayed by up to two years with a rescheduling of the RKV Critical Design Review (CDR) from late 2018 to the 2020 timeframe. While the overall RKV design is mature and robust, MDA does not want to enter the CDR until the complete RKV design meets all of the requirements. In accordance with the

Integrated Master Test Plan (IMTP) version 20.1, MDA will conduct the first controlled test vehicle flight test of the RKV in FY 2022. The first intercept flight test is planned for FY 2023 with a second intercept flight test in FY 2024. MDA anticipates emplacing 20 additional GBIs tipped with the RKV within the FY 2025 timeframe.

- **Ground-based Midcourse Defense Test *(PE 0604887C*).** MDA is requesting $98.1 million in FY 2020 for the GMD test program, which supports the IMTP version 20.1. This budget request funds developmental/operational ground test campaigns and flight test missions that are essential for system development and fielding interceptors with new capabilities. MDA will execute a non-intercept Ground-based Midcourse Defense Booster Vehicle Test-03 (GM BVT-03), in support of 2- or 3-Stage selectable boost vehicle software that will provide additional engagement battlespace to the warfighter using a GBI launched from VAFB, California in FY 2020. Other efforts also include the three RKV flight tests previously mentioned--one controlled test vehicle and two intercept missions in FY 2022-2024.
- **GMD Procurement.** MDA is requesting $9.5 million in FY 2020. This request funds the mitigation of GBI obsolescence-driven redesign and testing in support of GBI procurements.
- **GMD Maintenance and Sustainment**. MDA is requesting $153.2 million in FY 2020 for the Operation and Maintenance (O&M) of the GMD weapon system. In addition to operation, maintenance and sustainment of the GMD weapon system and operational and support facilities at Fort Greely, Alaska, Vandenberg Air Force Base (VAFB), Fort Drum NY, Schriever AFB, Colorado, and Eareckson Air Station, Alaska, it includes Warfighter training, wargames, and exercises to maintain readiness.

- **Sea-Based X-band (SBX) Radar *(PE 0603907C*).** MDA is requesting $128.2 million in FY 2020. The SBX radar provides precision midcourse tracking, debris mitigation, and discrimination capabilities, and the SBX is an integral component in flight tests to demonstrate discrimination and debris mitigation. To address the continued missile test activity in North Korea, the MDA budget request includes funds to extend time at sea and conduct contingency operations for defense of the homeland. Specifically, SBX would log approximately 305 days at sea and 60 days for in-port maintenance in FY 2020, and approximately 330 days at sea annually from FY 2021-2024. The budget request also continues the x86 X-Band Radar (XBR) superdome replacement to address obsolete equipment and increase the XBR processing capabilities. The replacement superdome will be fielded in the 2021 timeframe.
- **Long Range Discrimination Radar (LRDR) (*PE 0604873C*).** MDA is requesting $136.4 million in FY 2020. The LRDR provides an improved persistent midcourse BMDS discrimination capability in the Pacific sensor architecture. The LRDR will also increase the defensive capacity of the GMD interceptor inventory and address evolving threats. In FY 2020, MDA will complete assembly and installation of the LRDR and conduct system integration and power-up testing at Clear Air Force Station, AK. Initial fielding of the LRDR is planned for 2020 leading to an Operational Acceptance by the Warfighter in the 2022 timeframe. MDA's request includes funding for software Independent Verification and Validation (IV&V), Modeling and Simulation (M&S) efforts, and development of software for BMDS Increment 7 capability.
- **Home Defense Radar – Hawaii (HDR-H) (*PE 0604672C).*** MDA is requesting $274.7 million in FY 2020 for the Homeland Defense Radar – Hawaii. The HDR-H will provide a persistent capability, augmented by other sensors, to mitigate the effects of evolving threats to the BMDS, optimize discrimination capability in the Pacific architecture, and increase capability of GBIs in the

defense of Hawaii. MDA has awarded a fixed-price incentive contract to manage, develop, build, integrate, test, and field the radar prime mission equipment. The radar prime contractor will deliver a full technical data package that will enable the government to effectively and affordably sustain the system. The HDR-H radar is expected to complete development and initial fielding in FY 2023 for BMDS integration and testing. MDA will request military construction funding for the HDR-H in FY 2021. The radar will be constructed in two phases, Phase 1 in FY 2021 and Phase 2 in FY 2022.

- **Pacific Discriminating Radar (PE 0604673C).** MDA is requesting $6.7 million in FY 2020 for the Pacific Discriminating Radar. In FY 2020, MDA will complete program requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and M&S efforts for radar development. The Pacific Discriminating Radar will provide persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of the Homeland against long-range missile threats and defense against regional threats in the USINDOPACOM area of responsibility. The Pacific Radar is expected to complete fielding in the 2026 timeframe.

III. Regional Defense

There are hundreds of ballistic missiles within range of U.S. forces and its international partners and allies worldwide. MDA's FY 2020 budget request continues to resource and build integrated regional missile defenses that are interoperable with systems deployed by international partners to protect deployed forces, allies and international partners against SRBMs, MRBMs, and IRBMs.

The Aegis Ashore Missile Defense System in Romania currently protects U.S. deployed forces and NATO allies in Europe from ballistic missile threats from the Middle East. MDA will further enhance defensive coverage for NATO allies in Europe against medium and

intermediate range threats with the deployment of an Aegis Ashore site in Poland and the SM-3 Block IIA and associated Aegis BMD weapon system upgrades for Aegis BMD ships and Aegis Ashore sites. The Aegis Ashore site in Poland is projected to be delivered by 2020. The U.S. Navy will continue to operate the Aegis Ashore site in Romania as an integral part of NATO's BMD architecture, which includes a forward-based Army Navy/Transportable Radar Surveillance System (AN/TPY-2) in Turkey, BMD-capable Aegis Destroyers homeported in Rota, Spain, SM-3 interceptors, and a command-and-control node operated from Ramstein Air Base, Germany. MDA is using an incremental development approach integrated within the Aegis Baseline (BL) 9 architecture to develop and deliver an additional layer to Aegis BMD with a Sea Based Terminal (SBT) capability. By expanding the capability of the SM-6 missile and associated Aegis weapon system changes, we are delivering capability to maritime forces to protect against anti-ship ballistic missiles and provide a layered defense for forces ashore.

Continued provocations demonstrate the serious threat North Korea poses to the Republic of Korea (ROK), the Asia-Pacific region, and U.S. forward-deployed forces. MDA continues to provide training, maintenance and supply support of the THAAD batteries (including its Terminal Mode AN/TPY-2 radar) stationed in Guam and South Korea. MDA also supports U.S. forward deployed forces with Navy Aegis BMD ships stationed in Japan. This presence provides key defenses for Japan and Guam. MDA also supports Japanese's deployed Navy Aegis ships. MDA is strengthening the capability of this regional BMDS presence in response to a United States Forces Korea Joint Emergent Operational Need (USFK JEON) to increase integrated missile defense system interoperability and expand the defended area. This requirement is supported by United States Strategic Command (USSTRATCOM) and approved by the Chairman of the Joint Chiefs of Staff (CJCS).

Both the Aegis BMD and THAAD systems continue to be key component of the Nation's regional defense for our deployed forces, allies, partners and friends, and directly supports and expands our homeland defenses with long range surveillance and track capability. MDA proposes to continue funding the development, procurement, testing, operations and sustainment of these systems. The PB 20 request includes:

- **Aegis BMD *(PE 0603892C)*.** MDA requests $727.5 million in FY 2020. The program includes the integration of the SM-3 Block IIA into the Aegis BMD weapon system, transition of the Kinetic Warhead hardware commonality effort to system integration testing, and pre-production of all-up-rounds to support initial deployment. MDA is strongly committed to maintaining and enhancing the Aegis BMD weapon system capability alignment with Navy requirements to improve performance against SRBM, MRBM, and IRBM, as well as demonstrate capability against ICBM threats. Utilizing improved radar discrimination, Aegis BMD will increase capability against longer range and more sophisticated threats. MDA continues software development for Integrated Air and Missile Defense (IAMD) Baseline 9.C2 (BMD 5.1) in support of EPAA Phase 3 and the IAMD Baseline 10 (BMD 6.0). The BMD 6.0 computer upgrade will integrate BMD capability with data provided by the Advanced Air and Missile Defense Radar (AMDR), also known as the AN/SPY-6, for enhanced engagement capability and increased raid capacity. Additionally, MDA continues upgrading the SM-3 Block IB hardware and software to leverage the capability of the SM-3 Block IIA, which is also common with the GMD RKV.
- **Aegis BMD Testing *(PE 0604878C)*.** MDA is requesting $169.8 million in FY 2020 for the Aegis BMD test program, which supports IMTP version 20.1. Aegis BMD Flight Test Program performs comprehensive testing of Aegis BMD components and

demonstrates their interoperability with the BMDS. Using accredited Modeling and Simulation (M&S), the ground test program provides the evidence required for MDA and the Combatant Commanders to transition the capability to the Operational Capacity Baseline. On December 10, 2018, MDA and U.S. Navy sailors manning the Aegis Ashore Missile Defense Test Complex (AAMDTC) at the Pacific Missile Range Facility (PMRF) at Kauai, Hawaii, successfully conducted Flight Test Integrated-03 (FTI-03). The test was of great significance to the future of multi-domain missile defense operations and supports a critical initial production acquisition milestone for the SM-3 Block IIA missile program. MDA will also conduct a flight test to meet the 2018 NDAA requirement to demonstrate a SM-3 Block IIA capability against an ICBM-class target that, if proven, would add an additional layer of protection to augment the currently operational GMD system. As directed by the 2018 NDAA language, MDA will conduct this demonstration no later than December 2020.

- **Aegis Procurement**. MDA requests a total of $697.8 million in FY 2020 for SM-3 Procurement. The request procures 30 SM-3 Block IB and seven SM-3 Block IIA missiles. Each missile variant can be used on Aegis BMD ships and at the Aegis Ashore sites in Romania and Poland. The request provides a five-year Multiyear Procurement, for SM-3 Block IB missiles ending in FY 2023. The procurement budget also requests $124.9 million for Aegis BMD weapon systems consisting of Aegis shipset equipment, software, and installation materials. The budget also requests $25.7 million for the Aegis Ashore site in Poland.
- **Aegis BMD Maintenance and Sustainment.** MDA is requesting $75.2 million in FY 2020 in Operation and Maintenance (O&M) funding. The Aegis BMD program will perform missile recertification, repair efforts, and Ordnance Assessment/Surveillance. This funding supports BMD Computer Program, Ship Equipment, Aegis Ashore Romania sustainment, and Fleet integration support.

Also key to Regional Defense capability is the Terminal High Altitude Area Defense (THAAD) weapon system. THAAD is a globally transportable, ground-based missile defense system that defends against short-, medium-, and limited intermediate-range ballistic missiles in the terminal stage of flight both inside and outside the atmosphere. THAAD provides Combatant Commanders a rapidly deployable capability to deepen, extend, and complement BMDS homeland and regional defenses. MDA supports forward-deployment of one THAAD battery in Guam, one THAAD Battery in the Republic of Korea (ROK), and plans additional OCONUS THAAD Battery deployments in FY 2019 and FY 2020.

MDA PB 20 request includes:

- **BMD Terminal Defense *(PE 0603881C)*.** MDA is requesting $302.8 million for THAAD development efforts in FY 2020. MDA will continue the development of multiple, independent THAAD software upgrades to address the evolving threat, improve the Warfighter's defense planning and, improved capability to engage SRBM, MRBM, and limited IRBM threats. THAAD development and integration will provide enhanced debris mitigation capability and, improved interoperability with other BMDS elements, expand defended areas via remote operation of THAAD Launchers, and initiate development efforts to utilize the Terminal Mode radar to report hypersonic threats to the BMDS. Finally, MDA continues development efforts associated with USFK JEON that provides enhanced THAAD capability against specific USFK threats, integrates THAAD's capability to detect and track threat ballistic missiles at longer ranges with the Patriot Advanced Capability – 3 Missile Segment Enhancement (PAC-3 MSE) to take advantage of its full kinematic capability, integrate MSE launchers and missiles into the THAAD weapon system, and accelerates initial capability to remote launchers and increase defended area.

- **BMD Terminal Defense Testing (*PE 0604876C*)**. MDA requests $25.1 million for Terminal Defense Testing in FY 2020, which supports IMTP version 20.1. This includes THAAD support of Army's Lower Tier Project Office demonstration of Patriot Launch on Remote (THAAD) in two events as well as demonstration of THAAD's capability to intercept an Intermediate Range Ballistic Missile (IRBM) in FTO-03.
- **THAAD Procurement**. MDA is requesting $425.9 million for THAAD procurement in FY 2020 for 37 THAAD interceptors, obsolescence mitigation, production and training support, and procurement of tooling and equipment for the THAAD stockpile reliability and recertification program.
- **THAAD Operations and Maintenance.** MDA is requesting $99.8 million of Operations and Maintenance (O&M) in FY 2020 to support the maintenance and upkeep of all BMDS unique items of the fielded THAAD Batteries, as well as for all THAAD training devices. MDA will provide support to seven THAAD batteries, including the two forward batteries stationed in U.S. Indo-Pacific Command area of responsibility.

IV. Developing New Capabilities

MDA is investing in advanced technology today to prepare for tomorrow's threats by improving system performance and effectiveness. This budget request will continue development of technology improvements for the current BMDS, along with breakthrough technologies for integration into the future BMDS. These efforts include advanced discrimination techniques, hypersonic defense technology, high-powered lasers, and Neutral Particle Beam (NPB). MDA is investigating solutions that reduce the cost per kill while addressing BMDS performance gaps, to improve homeland performance at dramatically reduced cost.

- **Hypersonic Defense *(PE 0604181C)*.** MDA requests $157.4 million for FY 2020. MDA will develop near term sensor and command and control capability upgrades for defense from hypersonic threats in response to the Defense Science Board's recommendations to develop and deliver a set of material solutions to address and defeat hypersonic threats. MDA will then demonstrate incremental progress in integrated hypersonic defense development by modifying existing BMDS sensors and C2BMC; defining weapon concepts and investing in key technologies to enable a broad set of kinetic and non-kinetic solutions, and conducting ground, airborne, and space-based technology experiments to track representative hypersonic threats.
- **Technology Maturation Initiatives (*PE 0604115C*)**. MDA is requesting $303.5 million in FY 2020 for Technology Maturation Initiatives to demonstrate sensor capabilities against ballistic targets and advanced threats to improve tracking performance and operational utility. MDA will complete integration and begin flight testing of an advanced sensor system to improve tracking precision to Aegis engage-on-remote and discrimination performance levels with the goal of migrating this technology to a space sensor layer. Working with national laboratories and industry, MDA will address laser scaling by investing in the laser component technology required to demonstrate efficient electric lasers. MDA will conduct component demonstration to prove out laser capability. The addition of the Neutral Particle Beam effort will design, develop, and conduct a feasibility demonstration for a Space-Based Directed Energy intercept layer. NPB efforts will leverage past and current work on particle beam and related enabling technologies as well as laser scaling, pointing, and stability to provide a component technology to improve the cost-benefit and size, weight and power for an operational system. This future system will offer new kill options for the BMDS and adds another layer of protection for the homeland.

- **Advanced Research Program *(PE 0603180C)*.** MDA is requesting $20.7 million in FY 2020, to conduct innovative research and development with small businesses, universities, and international partners to seek emerging technology and advance future missile defense capability. MDA continues to capitalize on the creativity and innovation of the nation's small business community, academia, and other partners to enhance the BMDS.
- **Multi-Object Kill Vehicle *(Common Kill Vehicle Technology / PE 0603294C)*.** MDA is requesting $13.6 million in FY 2020, to establish the technology foundation for killing multiple lethal objects from a single interceptor. The more kill vehicles put on an interceptor, the greater the raid capacity of the Ground-based Midcourse Defense system. MOKV has the potential to significantly enhance homeland defense capabilities against the threat at a lower cost per engagement. MDA competitively awarded contracts to three major prime contractors in 2017 to reduce the technical risk for MOKV product development. The MOKV Technology Risk Reduction effort will culminate with component demonstrations specific to the three industry concepts.
- **Advanced Concepts & Performance Assessment *(PE 0603176C)*.** MDA is requesting $14.2 million in FY 2020, to centralize advanced technology concept modeling, simulation, and performance analysis. The program delivers independent assessments of government, university, and industry technology concepts that, along with systems engineering requirements, support acquisition strategy decisions and defines our technology focus areas. The request will fund independent government assessments of industry sensor, directed energy, and interceptor technology concepts and mature related tracking, discrimination, and sensor fusion algorithms. Assessment activities include development of Hypersonic Defense, Artificial Intelligence and Machine Learning Initiatives, and Left through Right Integration key technology areas. The innovative structured concept definition and assessment

methodology enables the MDA to validate focus areas, verify contractor technology solutions, and evaluate promising concepts in future Missile Defense System architectures.

V. Space

- **BMD Space Program *(PE 1206895C).*** MDA is requesting $27.6 million in FY 2020. This request funds the Spacebased Kill Assessment (SKA) experiment, which uses a network of fast frame rate and infrared sensors hosted on commercial satellites to deliver an experimental kill assessment capability tailored to homeland defense. As MDA's pathfinder program to host military payloads on commercial satellites, SKA proved that commercial hosting can deploy assets on orbit quickly – around half the time of the average traditional space program – and at a significant cost savings. To increase the Department's overall experience with commercial hosting, MDA collected and shared its SKA lessons learned with several organizations, including DARPA and the U. S. Air Force. SKA sensors on orbit today have performed a variety of MDA flight tests and engineering activities. FY 2020 will see a focus on steps necessary to potentially add the SKA system to the operational BMDS.
- **Space Tracking and Surveillance System (STSS) satellite operations and sustainment (*PE 1206893C*).** MDA is requesting $35.8 million in FY 2020. The satellites, which were launched in 2009, have far exceeded their life expectancy and have proven to be a very good investment. STSS consists of two satellites operating in Low Earth Orbit and provides risk reduction data for a potential operational BMDS tracking and surveillance constellation in the areas of sensor management, target signatures, discrimination, and fire control loop closure. STSS will continue participating in MDA test events and data collections providing battlespace awareness, technical intelligence, and space situational awareness to the Warfighter. This request also funds the Missile

Defense Space Center (MDSC), which provides a collaborative environment to exploit and integrate STSS and other national security space assets for ballistic missile defense. Both the STSS program and the MDSC are also supporting concept development activities for space sensor architecture studies and analyses to address advanced threats.

VI. Other Program Highlights

- **BMD Radars Program Maintenance and Sustainment** supports both homeland and regional defense missions. MDA is requesting $194.3 million in FY 2020 to sustain COBRA DANE, the Upgraded Early Warning Radars (UEWR), and the AN/TPY-2 radars. The Services and Combatant Commands, with logistical support from MDA, operate AN/TPY-2 (Forward Based Mode) radars in Japan (two radars), Israel, Turkey, and United States Central Command (USCENTCOM) in support of regional defense. MDA continues to support the AN/TPY-2 radar (Terminal Mode) as part of forward-deployed THAAD batteries in Guam and South Korea.
- **BMD Sensors *(PE 0603884C, Budget Project MD11*).** MDA is requesting $263.5 million in FY 2020 to provide periodic software updates for the AN/TPY-2, COBRA DANE, Sea-Based X-Band, and UEWR radars to counter evolving threats, and to develop future radar capabilities through system engineering, software development, and testing. This project includes development of advanced algorithms for the BMD Sensors to improve the ability to discriminate between lethal and non-lethal objects, as well as Modeling and Simulation (M&S) efforts that include enhanced sensor models, development of Radio Frequency scene generators, integration of digital simulations into the BMDS M&S architecture, and Verification, Validation, and Accreditation of radar models.

- **Sensors Test (*PE 0604879C)*.** MDA is requesting $105.5 million in FY 2020. This includes planning, analysis and execution of BMDS flight test events, including pre- and post-test efforts such as Digital and Hardware-in-the-Loop (HWIL) Pre-Mission Tests and Post-Flight Reconstruction. Sensors Test also provides planning, analysis and execution for BMDS-level ground tests identified in the IMTP version 20.1.
- **Command and Control, Battle Management and Communication (C2BMC) (PE 0603896C).** MDA is requesting $564.2 million in FY 2020 for C2BMC. C2BMC provides persistent acquisition, tracking, cueing, discrimination, and fire-control quality data to Aegis BMD, GMD, THAAD, Patriot, and coalition partners to support homeland and regional defense. MDA's C2BMC capabilities support Warfighter command, control and battle management needs across the globe by providing the Combatant Commander with the BMD planner, situational awareness tools, and battle management capability to support global BMD situational awareness, coalition operations, weapons release authority for homeland defense, and to control and task a variety of BMDS radars. C2BMC operators and maintainers deploy to some of the world's most threatening regions and continue to provide around-the-clock support to the local commanders. In FY 2020, MDA will sustain the C2BMC fielded capability (Spiral 8.2-3) in NORTHCOM, INDOPACOM, EUCOM and CENTCOM Areas of Responsibilities, which includes the following capability: Mobile Sensor Phase 1 and BMDS Overhead Persistent Infra-Red Architecture (BOA) 6.1 track data to the BMDS, support for Space Situational Awareness with AN/TPY-2 radars, and Aegis engage on remote, which can provide a five-fold increase in defended area coverage when compared to individual weapon system organic capability. MDA will continue development of Spiral 8.2-5, which integrates LRDR into the BMDS for support of homeland defense. This Spiral provides initial situational

awareness and tracking capability for Hypersonic threats, significantly expands Space Situational Awareness capabilities for the Air Force with LRDR, integrates the Army's IAMD Battle Management System into the BMDS, and develops Initial BMDS System Track for homeland defense. MDA will initiate development tasks for Robust Post Intercept Assessment supporting our regional defense focus and BMDS shoot-assess-shoot capability. MDA continues to improve the BMDS to keep pace with emerging threats worldwide by investing in the development, integration and testing of advanced algorithms to improve track and discrimination capabilities and enhance the use of space-based sensor data, using the BMDS OPIR architecture. Finally, MDA will continue to update its architecture to increase cybersecurity by assessing the risk of C2BMC architecture against possible attack. C2BMC capabilities will be involved in multi-agency cyber-focused tests and assessments planned for in FY20 to identify and correct cyber vulnerabilities.

- **MDA Engineering *(PE 0603890C, Budget Projects MD24, and MD31).*** MDA is requesting $252.8 million in FY 2020 to perform the system-level engineering required to design, build, test, assess and field the integrated BMDS. MDA Engineering defines BMDS architectures and functional requirements for integrated BMDS capabilities to defeat the evolving threats, analyzes architecture alternatives to address future threats, enables interoperability between U.S. forces and international partners, and drives future capability development from a system perspective to maximize the effectiveness of BMD technologies. MDA Engineering also performs pre- and post-mission analysis for BMDS tests, and assesses BMDS performance in order to deliver capabilities to the warfighter. In FY 2020, MDA will complete the engineering and technical assessment for the EPAA Phase 3 Technical Capability Declaration (TCD) to provide confidence to the Warfighter that the Aegis Ashore site in Poland will operate as designed. MDA

employs system-level and element-level models and simulations to verify BMDS performance and assess BMDS capability to engage and defeat complex threats across a spectrum of scenarios that cannot be demonstrated in flight tests. As a result, MDA is able to deliver to the Warfighter evolving, integrated, and layered BMDS performance and capabilities that have been thoroughly assessed and validated through testing and Modeling and Simulation. In this budget, MDA is pursuing improvements to both system-level digital simulation and integrated system-level ground test simulations.

- **MDA Testing**. MDA, in collaboration with our IMTP stakeholders, plans and executes a fully integrated test program that synchronizes the system under test with the Warfighters trained to operate the system under varying wartime conditions against current and emerging threats. Stakeholders, who are also IMTP signatories, include: Director, Operational Test & Evaluation (DOT&E); Director, Developmental Test and Evaluation (DT&E); Commander, Joint Functional Component Command for Integrated Missile Defense (JFCC IMD) representing Combatant Commands (CCMD); Service Operational Test Agencies (OTA); and Commander, Joint Interoperability Test Command (JITC). For flight testing, the Agency incorporates the nine operational realism criteria defined by the Ballistic Missile Defense System Response to National Defense Authorization Act Section 234, for Fiscal Year 2005, Increasing Operational Realism. Thirty-nine of the sixty-nine flight tests in the BMDS Test Program are currently planned to achieve these criteria. For system-level ground testing, all tests culminate in operational testing with Warfighters on console and independent operational assessments by the BMDS Operational Test Agency Team. This ensures that BMDS capabilities are credibly demonstrated and validated prior to delivery to the Warfighter. MDA, in conjunction with IMTP

stakeholders, works to identify and incorporate all testing requirements into the IMTP, which is a comprehensive, highly integrated, complex, cost-effective series of flight tests, ground tests, cybersecurity testing, exercises, and wargames.

- **Israeli Programs.** MDA's work with the Israeli Missile Defense Organization is a testament to the strong missile defense partnership we maintain with Israel. MDA is requesting $500 million for Israeli programs in FY2020. This funding level remains consistent with the Memorandum of Understanding that the United States and Israel signed in 2016. This budget continues MDA's longstanding support of U.S.-Israeli Cooperative BMD Programs, to include the co-development and co-production of the David's Sling Weapon System and Upper Tier Interceptor, and improvements to the Arrow Weapon System. The Department continues to support co-production efforts for the Iron Dome program to provide critical defense against short-range rockets and artillery. In FY 2020, the MDA budget will also support several flight tests across the Israeli portfolio. These continued joint efforts provide Israel with a three-tiered defense to defend from ballistic missiles, rockets, and cruise missiles and ensures Israel maintains its qualitative military edge against its advisories.

VII. Summary

MDA requests $9.431 billion in FY 2020 to strengthen and expand the deployment of defenses for our Nation, deployed forces, allies, and international partners against an increasingly proliferated and advanced missile threat.

THIS PAGE INTENTIONALLY LEFT BLANK

Missile Defense Agency
PB2020-BES Missile Defense Agency
FY 2020- FY 2024 Appropriation Summary
R-1 Exhibit
($ Thousands)

Appropriation Summary Based on OFFLINE PB20 FY20-24 R18 - 02/19/2019

Fiscal Year Amount Based on Business Rule CPS Version:					OFFLINE FY2018 Actuals Update R2	OFFLINE FY19-24 Updates	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	
Line Number	**Program Element**	**Budget Project**	**Program**	**Budget Activity**	**FY18 Actual**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY20-24**
O&M												
11A	0208866C		O&M	NA	491,179	472,473	522,529	502,337	552,596	573,723	657,706	2,808,891
		MD08	Ground Base Midcourse	NA	138,751	139,204	153,218	146,614	159,376	165,746	165,790	790,744
		MD07	THAAD	NA	70,044	87,560	99,819	97,801	101,010	99,504	107,618	505,752
		MD09	AEGIS	NA	74,208	78,074	75,237	83,366	88,832	86,040	88,786	422,261
		MD11	BMDS AN/TPY-2 Radars	NA	208,176	167,635	194,255	174,556	203,378	222,433	295,512	1,090,134
			Budget Activity 00 Total	NA	491,179	472,473	522,529	502,337	552,596	573,723	657,706	2,808,891
			O&M Total	NA	491,179	472,473	522,529	502,337	552,596	573,723	657,706	2,808,891
Procurement												
38	0208866C		PROCUREMENT	01	3,052,841	2,572,400	1,493,793	1,670,987	1,834,709	1,971,280	1,822,396	8,793,165
		MD07	THAAD	01	1,125,732	1,014,068	425,863	430,719	381,628	417,431	432,831	2,088,472
		MD08	Ground Based Midcourse	01	268,000	532,600	9,471	323,466	532,975	467,001	244,663	1,577,576
		MD09	AEGIS BMD	01	1,083,353	700,490	697,768	615,778	634,542	785,573	805,558	3,539,219
		MD26	Arrow 3 Upper Tier System	01	120,000	80,000	55,000	77,000	62,000	90,000	90,000	374,000
		MD11	BMDS Sensors	01	11,947	13,185	10,046	0	0	0	9,654	19,700
		MD73	Aegis Ashore Phase III	01	74,739	15,000	25,659	12,000	0	0	0	37,659
		MD34	Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon S	01	120,000	50,000	50,000	50,000	30,000	30,000	30,000	190,000
		MD83	Iron Dome	01	92,000	70,000	95,000	73,000	108,000	80,000	80,000	436,000
		MD90	Aegis BMD Hardware and Software	01	157,070	97,057	124,986	89,024	85,564	101,275	129,690	530,539
			Budget Activity 01 Total	01	3,052,841	2,572,400	1,493,793	1,670,987	1,834,709	1,971,280	1,822,396	8,793,165
			Procurement Total	01	3,052,841	2,572,400	1,493,793	1,670,987	1,834,709	1,971,280	1,822,396	8,793,165
RDT&E												
29	0603176C		Advanced Concepts and Performance Assessment	03	17,683	13,017	14,208	14,904	15,142	16,262	16,574	77,090
		MD71	Advanced Concepts and Performance Assessments	03	13,958	11,628	11,552	11,768	12,016	12,243	12,488	60,067
		MD40	Program-Wide Support	03	816	605	605	699	673	802	805	3,584
		MC71	Cyber Operations	03	2,909	784	2,051	2,437	2,453	3,217	3,281	13,439
30	0603178C		Weapons Technology	03	28,894	13,400	10,000	10,000	10,000	0	0	30,000
		MD69	Directed Energy Research	03	28,894	0	0	0	0	0	0	0
		MD72	Interceptor Technology	03	0	13,400	10,000	10,000	10,000	0	0	30,000
31	0603180C		Advanced Research	03	23,765	42,565	20,674	21,154	21,521	22,041	22,465	107,855
		MD25	Advanced Technology Development	03	22,897	41,661	19,793	20,160	20,563	20,951	21,371	102,838
		MD40	Program-Wide Support	03	868	904	881	994	958	1,090	1,094	5,017
38	0603294C		Common Kill Vehicle Technology	03	55,562	56,753	13,600	13,475	16,187	18,232	22,949	84,443
		MD85	Common Kill Vehicle Technology	03	52,599	50,713	10,941	10,941	10,940	10,950	10,950	54,722
		MD40	Program Wide Support	03	2,963	6,040	2,659	2,534	5,247	7,282	11,999	29,721
			Budget Activity 03 Total	03	125,904	125,735	58,482	59,533	62,850	56,535	61,988	299,388
119	0305103C		Cyber Security Initiative	04	964	985	1,138	1,160	1,184	1,206	1,230	5,918
		MDCS	Cyber Security Initiative	04	964	985	1,138	1,160	1,184	1,206	1,230	5,918
74	0603881C		Ballistic Missile Defense Terminal Defense Segment	04	454,147	388,273	302,761	234,679	227,921	179,248	197,459	1,142,068
		MD07	THAAD	04	292,088	225,932	194,752	187,780	208,121	163,980	180,975	935,608
		MC07	Cyber Operations	04	7,220	6,149	9,580	10,580	7,608	4,770	4,872	37,410
		MD06	Patriot Advanced Capability-3 (PAC-3)	04	144,735	147,459	90,404	26,228	1,252	1,276	1,302	120,462
		MD40	Program-Wide Support	04	10,104	8,733	8,025	10,091	10,940	9,222	10,310	48,588
75	0603882C		Ballistic Missile Defense Midcourse Defense Segment	04	1,153,263	803,359	1,156,506	829,451	766,237	834,533	776,671	4,363,398
		MD08	Ground Based Midcourse	04	1,103,288	739,895	1,065,322	741,269	686,536	748,655	686,405	3,928,187
		MC08	Cyber Operations	04	18,399	33,754	37,870	40,161	34,857	36,450	37,265	186,603
		MD40	Program-Wide Support	04	31,576	29,710	53,314	48,021	44,844	49,428	53,001	248,608
77	0603884C		Ballistic Missile Defense Sensors	04	290,289	385,375	283,487	296,098	263,681	276,092	351,607	1,470,965
		MD11	BMDS Radars	04	275,144	366,335	263,491	281,044	249,504	260,982	309,225	1,364,246
		MC11	Cyber Operations	04	3,894	6,079	8,212	1,555	1,586	1,617	24,618	37,588
		MD41	Homeland Defense Radar - Hawaii (HDR-H)	04	2,078	0	0	0	0	0	0	0
		MD40	Program-Wide Support	04	9,173	12,961	11,784	13,499	12,591	13,493	17,764	69,131
78	0603890C		BMD Enabling Programs	04	533,993	620,831	571,507	603,672	541,667	574,553	553,969	2,845,368

Missile Defense Agency
PB2020-BES Missile Defense Agency
FY 2020- FY 2024 Appropriation Summary
R-1 Exhibit
($ Thousands)

Appropriation Summary Based on OFFLINE PB20 FY20-24 R18 - 02/19/2019

			Fiscal Year Amount Based on Business Rule CPS Version:		OFFLINE FY2018 Actuals Update R2	OFFLINE FY19-24 Updates	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	
Line Number	**Program Element**	**Budget Project**	**Program**	**Budget Activity**	**FY18 Actual**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY20-24**
		MD24	System Engineering & Integration	04	208,588	204,853	164,291	160,729	147,305	154,875	159,575	786,775
		MT23	Enabling - Test	04	22,758	39,288	59,029	36,658	52,208	58,268	36,538	242,701
		MD28	Intelligence & Security	04	41,448	44,078	43,851	45,048	45,315	46,062	46,969	227,245
		MD30	BMD Information Management Systems	04	82,507	79,979	84,525	87,524	90,302	92,513	94,357	449,221
		MC30	Cyber Operations	04	62,622	98,912	66,212	65,381	68,046	68,891	69,889	338,419
		MD31	Modeling & Simulation	04	55,185	83,186	88,487	115,556	71,841	80,727	73,117	429,728
		MC31	Engineering Cyber Operations	04	6,466	20,666	11,564	34,665	10,697	13,383	13,651	83,960
		MD32	Quality, Safety, and Mission Assurance	04	30,291	29,319	29,986	30,528	30,976	31,738	32,373	155,601
		MD40	Program-Wide Support	04	24,128	20,550	23,562	27,583	24,977	28,096	27,500	131,718
79	0603891C		Special Programs - MDA	04	356,560	422,348	377,098	357,650	343,919	277,106	277,157	1,632,930
		MD27	Special Programs	04	356,560	422,348	377,098	357,650	343,919	277,106	277,157	1,632,930
80	0603892C		AEGIS BMD	04	798,395	741,076	727,479	718,949	703,473	505,529	527,720	3,183,150
		MD09	Aegis BMD	04	285,052	227,223	292,462	341,861	336,405	285,224	287,994	1,543,946
		MG09	Aegis BMD SM-3 Development Articles	04	194,018	120,217	0	0	0	0	0	0
		MM09	Aegis BMD SM-3 Development	04	117,179	161,958	232,714	162,708	143,663	14,672	18,509	572,266
		MC09	Cyber Operations	04	2,718	10,886	10,827	11,748	10,679	9,165	10,816	53,235
		MX09	Aegis BMD Development Support	04	157,811	185,742	163,628	172,649	182,454	170,658	182,767	872,156
		MD40	Program-Wide Support	04	41,617	35,050	27,848	29,983	30,272	25,810	27,634	141,547
81	0603896C		Ballistic Missile Defense Command and Control, Battle Management &	04	449,985	507,817	564,206	534,988	502,581	525,742	535,636	2,663,153
		MD01	Command & Control, Battle Management, Communications (C2BMC)	04	259,457	302,038	346,862	306,370	280,549	300,559	298,605	1,532,945
		MC01	Cyber Operations	04	5,421	17,651	14,162	16,173	15,916	12,398	14,377	73,026
		MT01	C2BMC Test	04	60,607	54,100	64,624	63,956	60,569	61,907	62,943	313,999
		MX01	Command & Control, Battle Management, Communications (C2BMC) D	04	106,449	112,910	114,876	123,815	123,051	125,377	133,555	620,674
		MD40	Program-Wide Support	04	18,051	21,118	23,682	24,674	22,496	25,501	26,156	122,509
82	0603898C		Ballistic Missile Defense Joint Warfighter Support	04	48,574	48,767	51,532	51,411	53,932	53,600	54,646	265,121
		MD03	Joint Warfighter Support	04	13,720	15,279	16,904	15,937	17,683	16,577	16,905	84,006
		MT03	Joint Warfighter Support Test	04	32,538	31,142	32,278	32,902	33,578	34,212	34,891	167,861
		MC03	Cyber Operations	04	146	154	156	159	161	164	167	807
		MD40	Program-Wide Support	04	2,170	2,192	2,194	2,413	2,510	2,647	2,683	12,447
83	0603904C		Missile Defense Integration and Operations Center (MDIOC)	04	51,905	58,125	56,161	57,446	58,574	61,144	62,339	295,664
		MD22	Missile Defense Integration and Operations Center (MDIOC)	04	48,916	51,841	53,103	54,072	55,156	57,420	58,561	278,312
		MC22	Cyber Operations	04	598	610	634	646	659	672	685	3,296
		MD40	Program-Wide Support	04	2,391	5,674	2,424	2,728	2,759	3,052	3,093	14,056
84	0603906C		Regarding Trench	04	8,898	16,916	22,424	12,012	12,348	12,580	12,832	72,196
		MD35	Regarding Trench	04	8,898	16,916	22,424	12,012	12,348	12,580	12,832	72,196
85	0603907C		Sea Based X-Band Radar (SBX)	04	173,988	136,715	128,156	119,452	132,826	127,504	139,909	647,847
		MX46	Sea Based X-Band Radar Development Support	04	170,031	130,604	123,089	113,857	126,654	121,220	133,078	617,898
		MD40	Program-Wide Support	04	3,957	6,111	5,067	5,595	6,172	6,284	6,831	29,949
86	0603913C		Israeli Cooperative Programs	04	373,800	300,000	300,000	300,000	300,000	300,000	300,000	1,500,000
		MD20	Israeli Upper Tier	04	190,000	0	0	0	0	0	0	0
		MD26	Arrow Weapon System	04	82,300	163,000	159,000	173,000	173,000	173,000	173,000	851,000
		MD34	Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon S	04	101,500	137,000	141,000	127,000	127,000	127,000	127,000	649,000
87	0603914C		Ballistic Missile Defense Test	04	406,806	515,897	395,924	417,946	335,481	451,723	405,136	2,006,210
		MD04	BMDS Consolidated Test Center	04	0	0	0	31,710	0	95,000	73,700	200,410
		MT04	BMDS Test Program	04	383,821	472,673	371,710	360,921	306,746	326,575	306,066	1,672,018
		MC04	Cyber Operations	04	8,459	28,619	8,710	8,806	8,905	8,904	9,082	44,407
		MD40	Program Wide Support	04	14,526	14,605	15,504	16,509	19,830	21,244	16,288	89,375
88	0603915C		Ballistic Missile Defense Targets	04	512,838	561,352	554,171	513,964	439,826	358,018	276,108	2,142,087
		MC05	Cyber Operations	04	572	5,351	913	1,075	1,065	1,398	1,426	5,877
		MT05	BMDS Targets Program	04	494,055	539,537	532,413	491,747	420,753	341,426	260,278	2,046,617
		MD40	Program Wide Support	04	18,211	16,464	20,845	21,142	18,008	15,194	14,404	89,593
92	0604115C		Technology Maturation Initiatives	04	163,947	316,822	303,458	336,139	380,195	300,126	201,668	1,521,586
		MD98	Directed Energy Demonstrator Development	04	81,179	224,317	116,266	110,697	125,704	172,040	136,171	660,878

Missile Defense Agency
PB2020-BES Missile Defense Agency
FY 2020- FY 2024 Appropriation Summary
R-1 Exhibit
($ Thousands)

Appropriation Summary Based on OFFLINE PB20 FY20-24 R18 - 02/19/2019

Fiscal Year Amount Based on Business Rule CPS Version:					OFFLINE FY2018 Actuals Update R2	OFFLINE FY19-24 Updates	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	
Line Number	**Program Element**	**Budget Project**	**Program**	**Budget Activity**	**FY18 Actual**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY20-24**
		MD94	Neutral Particle Beam (NPB)	04	0	0	34,000	142,950	177,250	25,800	0	380,000
		MD99	Discrimination Sensor Demonstrator Development	04	71,111	78,608	132,187	73,619	65,914	92,394	56,045	420,159
		MT99	Technology Maturation Initiatives Test	04	4,974	1,982	11,262	1,684	4,145	824	0	17,915
		MC98	Cyber Operations	04	162	5,254	475	477	467	472	478	2,369
		MD40	Program Wide Support	04	6,521	6,661	9,268	6,712	6,715	8,596	8,974	40,265
95	0604181C		Hypersonic Defense	04	63,032	130,944	157,425	142,391	116,931	119,780	122,078	658,605
		MD29	Hypersonic Defense	04	63,032	125,554	150,727	135,716	111,735	113,871	116,148	628,197
		MD40	Program Wide Support	04	0	5,390	6,698	6,675	5,196	5,909	5,930	30,408
102	0604672C		Homeland Defense Radar-Hawaii	04	0	62,221	274,714	210,614	135,627	87,773	40,772	749,500
		MD41	Homeland Defense Radar - Hawaii (HDR-H)	04	0	62,221	267,901	197,867	125,382	80,789	36,330	708,269
		MD40	Program-Wide Support	04	0	0	6,813	12,747	10,245	6,984	4,442	41,231
103	0604673C		Pacific Discriminating Radar	04	59,564	15,926	6,711	59,800	53,444	279,349	398,573	797,877
		MD41	Homeland Defense Radar - Hawaii (HDR-H)	04	59,564	0	0	0	0	0	0	0
		MD40	Program Wide Support	04	0	0	1,555	2,839	15,716	15,859	13,619	49,588
		MD51	Pacific Radar (PAC Radar)	04	0	15,926	5,156	56,961	37,728	263,490	384,954	748,289
108	0604873C		Long Range Discrimination Radar (LRDR)	04	370,516	166,543	136,423	122,877	99,920	88,203	64,569	511,992
		MD96	Long Range Discrim Radar (LRDR)	04	354,735	158,597	131,446	114,141	94,952	83,729	60,987	485,255
		MC96	Cyber Operations	04	0	0	0	3,245	0	0	0	3,245
		MD40	Program Wide Support	04	15,781	7,946	4,977	5,491	4,968	4,474	3,582	23,492
109	0604874C		Improved Homeland Defense (HLD) Interceptors	04	742,842	421,820	412,363	326,922	197,386	137,553	86,423	1,160,647
		MD97	Improved HD Interceptors	04	725,478	399,940	398,944	322,554	193,811	135,848	83,646	1,134,803
		MD40	Program Wide Support	04	17,364	21,880	13,419	4,368	3,575	1,705	2,777	25,844
110	0604876C		Ballistic Missile Defense Terminal Defense Segment Test	04	35,738	61,017	25,137	32,124	48,087	61,224	22,584	189,156
		MT07	THAAD Test	04	32,863	57,892	24,417	31,011	46,216	58,579	21,840	182,063
		MD40	Program Wide Support	04	2,875	3,125	720	1,113	1,871	2,645	744	7,093
111	0604878C		Aegis BMD Test	04	128,757	92,160	169,822	76,270	149,764	137,058	147,923	680,837
		MT09	AEGIS BMD Test	04	119,715	88,937	163,861	73,148	144,099	132,646	141,902	655,656
		MD40	Program Wide Support	04	9,042	3,223	5,961	3,122	5,665	4,412	6,021	25,181
112	0604879C		Ballistic Missile Defense Sensor Test	04	88,840	77,405	105,530	114,698	99,088	112,943	96,526	528,785
		MT11	BMDS Radars Test	04	85,489	74,499	101,053	109,323	94,467	107,374	91,815	504,032
		MD40	Program Wide Support	04	3,351	2,906	4,477	5,375	4,621	5,569	4,711	24,753
113	0604880C		Land Based SM-3 (LBSM3)	04	29,652	27,692	38,352	36,348	28,029	22,733	30,463	155,925
		MD68	AEGIS Ashore	04	25,282	23,033	33,741	32,313	25,759	21,613	27,714	141,140
		MC68	Cyber Operations	04	2,724	3,255	2,980	2,618	970	0	1,258	7,826
		MD40	Program-Wide Support	04	1,646	1,404	1,631	1,417	1,300	1,120	1,491	6,959
114	0604881C		AEGIS SM-3 Block IIA Co-Development	04	9,531	0	0	0	0	0	0	0
		MD09	SM-3 Block IIA Co-Development	04	8,608	0	0	0	0	0	0	0
		MD40	Program-Wide Support	04	923	0	0	0	0	0	0	0
115	0604887C		Ballistic Missile Defense Midcourse Defense Segment Test	04	85,030	72,634	98,139	91,955	116,709	110,937	101,103	518,843
		MT08	Midcourse Test	04	81,776	69,011	95,231	88,351	113,656	107,317	97,553	502,108
		MD40	Program Wide Support	04	3,254	3,623	2,908	3,604	3,053	3,620	3,550	16,735
116	0604894C		Multi Object Kill Vehicle	04	6,347	6,500	0	0	0	0	0	0
		MD85	Multi Object Kill Vehicle	04	6,347	6,130	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	370	0	0	0	0	0	0
121	1206893C		Space Tracking and Surveillance System (STSS)	04	35,008	36,955	35,849	35,623	36,334	37,235	37,966	183,007
		MD12	Space Tracking and Surveillance System (STSS)	04	32,051	32,217	32,633	33,202	33,793	34,530	35,188	169,346
		MC12	Cyber Operations	04	1,424	2,997	1,690	750	851	868	916	5,075
		MD40	Program-Wide Support	04	1,533	1,741	1,526	1,671	1,690	1,837	1,862	8,586
122	1206895C		Ballistic Missile Defense System Space Programs	04	45,123	94,484	27,565	21,236	20,483	20,872	21,497	111,653
		MD33	MD Space Exp Center (MDSEC)	04	43,905	15,745	26,013	19,851	19,131	19,433	20,026	104,454
		MD37	Space Sensor Layer	04	0	73,000	0	0	0	0	0	0
		MC33	MD Space Exp Center (MDSEC)	04	469	5,000	380	390	400	410	420	2,000
		MD40	Program-Wide Support	04	749	739	1,172	995	952	1,029	1,051	5,199

Missile Defense Agency
PB2020-BES Missile Defense Agency
FY 2020- FY 2024 Appropriation Summary
R-1 Exhibit
($ Thousands)

Appropriation Summary Based on OFFLINE PB20 FY20-24 R18 - 02/19/2019

Fiscal Year Amount Based on Business Rule CPS Version:					OFFLINE FY2018 Actuals Update R2	OFFLINE FY19-24 Updates	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	OFFLINE PB20 FY20-24 R18	
Line Number	**Program Element**	**Budget Project**	**Program**	**Budget Activity**	**FY18 Actual**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY20-24**
			Budget Activity 04 Total	04	7,478,332	7,090,959	7,284,038	6,655,875	6,165,647	6,054,364	5,844,564	32,004,488
160	0605502C		Small Business Innovation Research - MDA	06	115,278	0	0	0	0	0	0	0
		MD45	Small Business Innovation Research	06	115,278	0	0	0	0	0	0	0
177	0606942C		Assessments and Evaluations of Cyber Vulnerabilities	06	0	3,400	0	0	0	0	0	0
		MC39	Assessment and Evaluation of Cyber Vulnerabilities	06	0	3,400	0	0	0	0	0	0
193	0901598C		Management HQ - MDA	06	29,947	28,626	27,065	27,446	28,164	28,698	29,271	140,644
		MD38	Management Headquarters	06	29,947	28,626	27,065	27,446	28,164	28,698	29,271	140,644
			Budget Activity 06 Total	06	145,225	32,026	27,065	27,446	28,164	28,698	29,271	140,644
			RDT&E Total	06	7,749,461	7,248,720	7,369,585	6,742,854	6,256,661	6,139,597	5,935,823	32,444,520
MILCON												
	0603882C		MID-COURSE MILCON	NA	200,000	8,000	0	137,710	0	0	0	137,710
		MM08	Missile Defense Complex, Ft. Greely, AK	NA	200,000	8,000	0	137,710	0	0	0	137,710
	0603884C		SENSORS MILCON	NA	0	174,000	0	0	0	0	0	0
		MM11	Long Range Discrimination Radar Cmplx, Clear AFS, AK	NA	0	174,000	0	0	0	0	0	0
	0603888C		BMD TEST and TARG MILCON	NA	0	0	0	0	259,791	0	0	259,791
		MM44	BMDS Test Infrastructure Building (BTB)	NA	0	0	0	0	259,791	0	0	259,791
	0604673C		Pacific Discriminating Radar	NA	0	0	0	138,000	183,000	0	365,970	686,970
		MM51	Homeland Defense Radar - Pacific (HDR-P)	NA	0	0	0	0	0	0	365,970	365,970
		MM41	Homeland Defense Radar - Hawaii (HDR-H)	NA	0	0	0	138,000	183,000	0	0	321,000
	22299902		MINOR MILCON	NA	3,000	10,000	10,000	10,000	10,000	10,000	10,000	50,000
		MM14	Minor MILCON	NA	3,000	10,000	10,000	10,000	10,000	10,000	10,000	50,000
	31299903		MILCON PLANNING and DESIGN	NA	0	6,184	35,472	20,848	30,185	42,000	19,543	148,048
		MM32	MILCON Planning Design	NA	0	6,184	35,472	20,848	30,185	42,000	19,543	148,048
			Budget Activity 00 Total	NA	203,000	198,184	45,472	306,558	482,976	52,000	395,513	1,282,519
			MILCON Total	NA	203,000	198,184	45,472	306,558	482,976	52,000	395,513	1,282,519
			Program Total		**11,496,480**	**10,491,777**	**9,431,379**	**9,222,736**	**9,126,942**	**8,736,600**	**8,811,438**	**45,329,095**

Missile Defense Agency Congressional Reporting Requirements			
FY14 National Defense Authorization Act (HR 3304), pg. 18	**SEC 231. IMPROVEMENTS TO ACQUISITION ACCOUNTABILITY REPORTS ON BALLISTIC MISSILE DEFENSE SYSTEM** (a) Improvement to Operations and Sustainment Cost Estimates- In preparing the acquisition accountability reports on the ballistic missile defense system required by section 225 of title 10, United States Code, the Director of the Missile Defense Agency shall improve the quality of cost estimates relating to operations and sustainment that are included in such reports under subsection (b)(3)(A) of such section, including with respect to the confidence levels of such cost estimates. (b) Operations and Sustainment Responsibility- Section 225 of title 10, United States Code, is amended by adding at the end the following new subsection: (e) Operations and Sustainment Cost Estimates- The Director shall ensure that each life-cycle cost estimate included in an acquisition baseline pursuant to subsection (b)(3)(A) includes-- (1) all of the operations and sustainment costs for which the Director is responsible; and (2) a description of the operations and sustainment functions and costs for which a military department is responsible.'. (c) Report- (1) IN GENERAL- Not later than one year after the date of the enactment of this Act, the Director of the Missile Defense Agency shall submit to the congressional defense committees a report outlining the plans of the Director to improve the quality of cost estimates pursuant to subsection (a). (2) ELEMENTS- The report under paragraph (1) shall include-- (A) a description of the actions planned to improve the quality of cost estimates included in the acquisition accountability reports on the ballistic missile defense system required by section 225 of title 10, United States Code; (B) the schedule for such planned actions, including the planned schedule for meeting the requirements of subsection (e) of such section 225, as added by subsection (b); (C) a description of any steps taken during the previous year to improve the quality of such cost estimates; (D) an assessment of how the planned improvements compare to the best practices and cost-estimation guidelines recommended by the Comptroller General of the United States for cost estimates of the ballistic missile defense system;	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.	

Missile Defense Agency Congressional Reporting Requirements			
	(E) any other matters the Director considers appropriate; and (F) the views of the Comptroller General of the United States with respect to the contents of the report. (3) FORM- The report under paragraph (1) shall be submitted in unclassified form.		
FY14 House Armed Services Committee National Defense Authorization Act (H.R. 1960) Report 113-02, pp. 67-68	**REPORT ON IMPROVEMENTS TO ACQUISITION ACCOUNTABILITY REPORTS ON BALLISTIC MISSILE DEFENSE SYSTEM** This section would amend section 225 of title 10, United States Code, to include a requirement that the Director, Missile Defense Agency include in the annual Ballistic Missile Defense System Accountability Report certain operation and support costs, and statements as to the quality estimate level of each cost estimate as well as the steps the Director will take to ensure these estimates reach the ''high-quality estimate'' level established by the Comptroller General of the United States. (a) In General.—Section 225 of title 10, United States Code, is amended— (1) in subsection (b)(3)(A), by inserting "comprehensive" before "life-cycle"; and (2) by adding at the end the following: (e) Quality of Cost Estimates.—(1) The Director shall ensure that each cost estimate included in an acquisition baseline pursuant to subsection (b)(3) includes all operation and support costs, regardless of funding source, for which the Director is responsible. (2) In each such baseline submitted to the congressional defense committees, the Director shall state whether the underlying cost estimates in such baseline meet the criteria of the Comptroller General of the United States to be considered a high-quality estimate. If the Director states that such estimates do not meet such criteria, the Director shall include in such baseline the actions, including a schedule, that the Director plans to carry out for the estimates to meet such criteria."	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.	
FY12 National Defense Authorization Act (S 1867) pp. 53-54	**SEC. 231. ACQUISITION ACCOUNTABILITY REPORTS ON THE BALLISTIC MISSILE DEFENSE SYSTEM** (a) BASELINE REQUIRED.—	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The	

Missile Defense Agency Congressional Reporting Requirements			
	(1) IN GENERAL.—Chapter 9 of title 10, United States Code, is amended by inserting after section 224 the following new section: 225. Acquisition accountability reports on the ballistic missile defense system (a) BASELINES REQUIRED.—(1) In accordance with paragraph (2), the Director of the Missile Defense Agency shall establish and maintain an acquisition baseline for— (A) each program element of the ballistic missile defense system, as specified in section 223 of this title; and (B) each designated major subprogram of such program elements. (2) The Director shall establish an acquisition baseline required by paragraph (1) before the date on which the program element or major subprogram enters— (A) engineering and manufacturing development; and (B) production and deployment. (3) Except as provided by subsection (d), the Director may not adjust or revise an acquisition baseline established under this section. (b) ELEMENTS OF BASELINES.—Each acquisition baseline required by subsection (a) for a program element or major subprogram shall include the following: (1) A comprehensive schedule, including— (A) research and development milestones; (B) acquisition milestones, including design reviews and key decision points; (C) key test events, including ground and flight tests and ballistic missile defense system tests; (D) delivery and fielding schedules; (E) quantities of assets planned for acquisition and delivery in total and by fiscal year; and (F) Planned contract award dates. (2) A detailed technical description of— (A) the capability to be developed, including hardware and software; (B) system requirements, including performance requirements; (C) how the proposed capability satisfies a capability identified by the commanders of the combatant commands on a prioritized capabilities list; (D) key knowledge points that must be achieved to permit continuation of the program and to	BAR fully satisfies the requirement.	

Missile Defense Agency Congressional Reporting Requirements			
	inform production and deployment decisions; and (E) how the Director plans to improve the capability over time. (3) A cost estimate, including— (A) a life-cycle cost estimate that separately identifies the costs regarding research and development, procurement, military construction, operations and sustainment, and disposal; (B) program acquisition unit costs for the program element; (C) average procurement unit costs and program acquisition costs for the program element; and (D) an identification of when the document regarding the program joint cost analysis requirements description is scheduled to be approved. (4) A test baseline summarizing the comprehensive test program for the program element or major subprogram outlined in the integrated master test plan. (c) ANNUAL REPORTS ON ACQUISITION BASELINES.— (1) Not later than February 15 of each year, the Director shall submit to the congressional defense committees a report on the acquisition baselines required by subsection (a). (2)(A) The first report under paragraph (1) shall set forth each acquisition baseline required by subsection (a) for a program element or major subprogram. (3) Each subsequent report under paragraph (1) shall include— (i) any new acquisition baselines required by subsection (a) for a program element or major subprogram; and (ii) with respect to an acquisition baseline that was previously included in a report under paragraph (1), an identification of any changes or variances made to the elements described in subsection (b) for such acquisition baseline, as compared to— (I) the initial acquisition baseline for such program element or major subprogram; and (II) the acquisition baseline for such program element or major subprogram that was submitted in		

Missile Defense Agency Congressional Reporting Requirements			
	the report during the previous year. (3) Each report under this subsection shall be submitted in unclassified form, but may include a classified annex. (d) EXCEPTION TO LIMITATION ON REVISION.—The Director may adjust or revise an acquisition baseline established under this section if the Director submits to the congressional defense committees notification of— (1) a justification for such adjustment or revision; (2) the specific adjustments or revisions made to the acquisition baseline, including to the elements described in subsection (b); and (3) the effective date of the adjusted or revised acquisition baseline.’’. (2) CLERICAL AMENDMENT.—The table of sections at the beginning of such chapter is amended by adding at the end the following new item: section 225. Acquisition accountability reports on the ballistic missile defense system.’’. (b) CONFORMING AMENDMENTS.— (1) FISCAL YEAR 2011 NDAA.—Section 225 of the Ike Skelton National Defense Authorization Act for Fiscal Year 2011 (Public Law 111–383; 124 Stat. 4170; 10 U.S.C. 223 note) is repealed. (2) FISCAL YEAR 2008 NDAA.—Section 223 of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181; 122 Stat. 39; 10 U.S.C. 223 note) is amended by striking subsection (g). (3) FISCAL YEAR 2003 NDAA.—Section 221 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107–314; 116 Stat. 2484; 10 U.S.C. 2431 note) is repealed.		
FY12 National Defense Authorization Act (H.R. 1540), Report 112-239, pp. 43-44	**SEC. 232. COMPTROLLER GENERAL REVIEW AND ASSESSMENT OF MISSILE DEFENSE ACQUISITION PROGRAMS** (a) Comptroller General Assessment— (1) IN GENERAL- The Comptroller General of the United States shall review the annual reports submitted under section 225(c) of title 10, United States Code, as added by section 231 of this Act, that cover any of fiscal years 2012	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.	

Missile Defense Agency Congressional Reporting Requirements			
	through 2015 and assess the extent to which the Missile Defense Agency has achieved its acquisition goals and objectives. (2) REPORTS- Not later than March 15, 2013, and each year thereafter through 2016, the Comptroller General shall submit to the congressional defense committees a report on the assessment under paragraph (1) with respect to the acquisition baselines for the preceding fiscal year. Each report shall include any findings and recommendations on missile defense acquisition programs and accountability therefore that the Comptroller General considers appropriate. (b) Annual Reports on Missile Defense Executive Board Activities- In each of the first three reports submitted under section 225(c) of title 10, United States Code, as added by section 231 of this Act, the Director shall include a description of the activities of the Missile Defense Executive Board during the fiscal year preceding the date of the report, including the following: (1) A list of each meeting of the Board during such year. (2) The agenda and issues considered at each such meeting. (3) A description of any decisions or recommendations made by the Board at each such meeting. (c) Repeal of Superseded Reporting Authority- Section 232 of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107; 115 Stat. 1037; 10 U.S.C. 2431 note) is amended by striking subsection (g).		
FY16 National Defense Authorization Act (HR 1735), pp. 1065	**SEC. 1688. EXTENSION OF REQUIREMENT FOR COMPTROLLER GENERAL OF THE UNITED STATES REVIEW AND ASSESSMENT OF MISSILE DEFENSE ACQUISITION PROGRAMS** Section 232(a) of the National Defense Authorization Act for Fiscal Year 2012 (Public Law 112–81; 125 Stat. 1339) is amended— (1) in paragraph (1), by striking ‘‘through 2015’’ and inserting ‘‘through 2020’’; and (2) in paragraph (2), in the first sentence, by striking ‘‘through 2016’’ and inserting **‘‘through 2021’’.**	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.	
FY04 National Defense Authorization Act (H.R.	**BUDGET JUSTIFICATION MATERIALS**	MDA to provide BMDS Accountability Report	

Missile Defense Agency Congressional Reporting Requirements			
1588) Report 108-354, pp. 30-31	In the budget justification materials submitted to Congress in support of the Department of Defense budget for any fiscal year (as submitted with the budget of the President under section 1105(a) of title 31), the Secretary of Defense shall specify, for each ballistic missile defense system element for which the Missile Defense Agency is engaged in planning for production and initial fielding, the following information: (1) The production rate capabilities of the production facilities planned to be used for production of that element. (2) The potential date of availability of that element for initial fielding. (3) The estimated date on which the administration of the acquisition of that element is to be transferred from the Director of the Missile Defense Agency to the Secretary of a military department.	(BAR) to Congressional Defense Committees. The BAR partially satisfies the requirement through its schedule baseline. **Exhibit P-21 – Budget Production Schedule**	
FY04 National Defense Authorization (H.R. 1588), Report 108-354, pp. 30-31	**FUTURE-YEARS DEFENSE PROGRAM** The Secretary of Defense shall include in the future-years defense program submitted to Congress each year under section 221 of this title an estimate of the amount necessary for procurement for each ballistic missile defense system element, together with a discussion of the underlying factors and reasoning justifying the estimate.	**Exhibit P-21 – Budget Production Schedule**	

THIS PAGE INTENTIONALLY LEFT BLANK

ACRONYMS	DEFINITION
A	
A&A	**Assessment and Authorization**
A&AS	Advisory and Assistance Services
AAEA	Aegis Ashore Engineering Agent
AAFTM	Aegis Ashore Flight Test Mission
AAMDS	Aegis Ashore Missile Defense System
AAMDSC	Aegis Ashore Missile Defense System Complex
AAMDTC	Aegis Ashore Missile Defense Test Complex
AAW	Anti-Air Warfare
ABEWS	Airborne Early Warning System
ABIR	Airborne Infrared Radar
ABMD	Aegis Ballistic Missile Defense
ABS	Airborne Sensors; American Bureau of Shipping
ABWO	Assistant Ballistic Missile Defense Watch Officer
ACB	Advanced Capability Build
ACB 12	Advanced Capability Build 12
ACD	Adversary Capability Document
ACD	**Advance Capability Development**
ACD&P	Advanced Component Development & Prototypes
ACL	Achievable Capabilities List
ACS	Aegis Combat System
ACS	**Attitude Control System**
ADP	Arrow Deployability Program; Automated Data Processing; Adversary Delta Package
AEDC	Arnold Engineering Development Center
AEI	Annual Integration Events
AEP	Analysis Execution Plans
AEU	Antenna Equipment Unit
AFB	Air Force Base
AFS	Avionics Flight Software
AFSPC	**Air Force Space Command**
AI&T	Assembly, Integration and Test
AIE	Annual Integration Event
AIE	**Annual Integration Event**
ALO	Aegis Light-Off
ALTB	Active Layered Theater Ballistic
AMCOM	Army Aviation and Missile Command
AMDR	**Air and Missile Defense Radar**
AMDWS	Air and Missile Defense Workstation
AMOD	Aegis Modernization (program)
AMRDEC	Aviation and Missile Research, Development and Engineering Center
AN/SPY-1	Joint Army-Navy equipment nomenclature: S -Water (surface ship), P - Radar, Y - Surveillance (target detecting and tracking) and Control (fire control and/or air control), 1 - model number [AN/SPY-1 is an equipment nomenclature, not an Acronym]
AN/TPY-2	Joint Army-Navy equipment nomenclature: T - Transportable (ground), P - Radar, Y - Surveillance (target detecting and tracking) and Control (fire control and/or air control), 2 - model number [AN/TPY-2 is an equipment nomenclature, not an Acronym]
AO	**Authorizing Official**
AOA	**Analysis of Alternatives**
AOC	Air Operations Center
AOR	Area of Responsibility
APEX	Assessment Parameter Extraction
APL	Applied Physics Laboratory
APLITS	**Approved Products List Integrated Tracking System**
ARAV	Aegis Readiness Assessment Vehicles
ARC	**Advanced Research Center**
ARST	Advanced Remote Sensor Technology
ARSTRST	(US) Army Forces Strategic Command
ASD(R&E)	**Assistant Secretary of Defense Research and Engineering**
ASDM	**Acquisition Strategy Decision Memorandum**
ASIP	Arrow System Improvement Program; Application Specific Integrated Circuit
AT&L	Acquisition, Technology and Logistics
ATD	Advanced Technology Development; Assistant to the Director; Assistant Test Directors
ATEC	Army Test and Evaluation Command
ATK	Alliant Techsystems, Inc.
ATO	**Authorization to Operation**
AUPP	**Average Unit Production Price**
AUR	All Up Round
AWS	Arrow Weapon System; AEGIS Weapon System

ACRONYMS	DEFINITION
B	
BAA	**Broad Agency Announcement**
BAM	**BMDS Asset Management**
BCA	Business Case Analysis; BMDS Capability Assessment
BCF	BCF Solutions, Incorporated
BCM	BMDS C2BMC Model
BCN	BMDS Communications Network
BCS	**Battle Command System**
BCSC-T	BMDS Communication System Complex Transportable
BDR	BMDS Discrepancy Reports
BER	Baseline Execution Reviews
BM	Battle Management; Ballistic Missile
BMC	**Battle Management Center**
BMD	Ballistic Missile Defense
BMDS	Ballistic Missile Defense System
BNOSC	BMDS Network Operations and Security Center
BOA	BMDS ONIR Architecture
BoD	Boards of Director
BORRS	BMDS Operational Readiness Reporting System
BOS	Base Operations Support
BSA	Budget Sub-Activity
BSC	Battery Support Center
BSO	BMDS Safety Officers
BSP	BMD Signal Processor
BTG	BCN Teleport Gateway
BTS	**BMDS Test Site**
BWO	BMDS Watch Officers
C	
C&A	Certification and Accreditation
C/FFP	Cost Fixed Firm Price
C2BMC	Command and Control, Battle Management, and Communications
C2P	Command and Control Processor
C4I	Command, Control, Communications, Computers and Intelligence
CA	**Certification Authority**
CAFM	Computer-aided Facilities Management
CAFS	**Clear Air Force Station**
CANES	**Consolidated Afloat Networks and Enterprise Services**
CARD	Cost Analysis and Requirements Document
CBAU	Consolidated Booster Avionics Upgrade
CCA	**Circuit Card Assemblies**
CCaR	**Comprehensive Cost and Requirements**
CCAS	Combat Capabilities Assessment Schedule
CCC	C2BMC Control Center
CCC	**C2BMC Command and Control Center**
CCLS	Centralized Contractor Logistics Support
CCM	Counter Counter-Measures
CCMD	Combatant Commander; **Combatant Commands**
CD	Concept Descriptions; Cobra Dane
CDCS	Coherent Doppler Collection System
CDIN	C2BMC Deployable Interface Node
CDLMS	Common Data Link Monitoring System
CDR	Critical Design Review
CDS	**Cross Domain Solution**
CDU	Cobra Dane Upgrade
CE	Capability Enhanced
CEC	Critical Engagement Condition
CECOM	Communications & Electronics Command
CENAU	Corps of Engineers European Division
CENTCOM	Central Command
CERT	**Computer Emergency Response Team**
CEU	Cooling Equipment Unit
CG	US Navy ship hull classification symbol for - Guided Missile Cruiser [CG is not an Acronym]
CI/CAT	**Continuous Integration/Continuous Agile Testing**
CIC	Counterintelligence in Cyberspace
CIDS	Critical Items Description Specifications
CIIA	Cyber, Identity, and Information Assurance
CIL	**Computer in the Loop**

ACRONYMS	DEFINITION
CIO	**Chief Information Officer**
CIRT	Computer Incident Response Team
CKV	**Common Kill Vehicle**
CLE	Command and Launch Equipment
CLS	Contractor Logistics Support
CND	Computer Network Defense
CNDSP	**Computer Network Defense Service Provider**
CNET	Classified Network
COCOM	Combatant Command
COMNET	Communications Network
COMSEC	Communication Security
CONOPS	Concept of Operations
CONPLAN	Concept Plan
CONPLANS	Contingency Plans
CONUS	Continental United States
COOP	Calibrated Orbiting Objects Program ; **Continuity of Operations**
CoS	Colorado Springs
COTS	Commercial off the Shelf
CP	Computer Program
CPAF	Cost Plus Award Fee
CPCR	Computer Program Change Request
CPFF	Cost Plus Fixed Fee
CPIF	Cost Plus Incentive Fee
CPRS	Computer Program Requirements Specifications
CR	Capability Release
CSC	Computer Sciences Corporation
CSCS	Center for Surface Combat Systems
CSEDS	Combat Systems Engineering Development Site
CSS	Contractor Support Services
CSSP	**Cyber Security Service Provider**
CTM	Core Truth Models
CTTO	Concurrent Test, Training and Operations
CTV	Control Test Vehicle
CTV-01	Controlled Test Vehicle-01
CU	Capability Upgrade
CUI	**Controlled Unclassified Information**
CVT	Controls Validation Testing
CY	Calendar Year
D	
DAA	Defense Appropriations Act; Designated Approving Authority
DAC	Divert Attitude Control
DACS	Divert and Attitude Control System
DARPA	Defense Advanced Research Projects Agency
DASA	German Aerospace. Member of the MEADS Program Team.
DASD(DT&E)	**Deputy Assistant Secretary of Defense, Developmental Test and Evaluation**
DASD(DT&E)	**Deputy Assistant Secretary of Defense, DT&E**
DAU	Defense Acquisition University
DDCS	Digital Data Collection System
DDG	US Navy ship hull classification symbol for - Guided Missile Destroyer [DDG is not an Acronym]
DDL	**Dual-band Data Link**
DECC	Defense Enterprise Computing Center
DEDD	**Directed Energy Demonstrator Development**
DEERS	Defense Enrollment Eligibility Reporting System
DESH	MDA/DESH - Missile Defense Agency (MDA)/Modeling & Simulation Huntsville (DESH) [office symbol within MDA Engineering Directorate, not an Acronym]
DESIM	Discrete Event Simulation
DFAR	Defense Federal Acquisition Regulation
DHP	Data Handling Plan
DIA	Defense Intelligence Agency
DIACAP	DoD Information Assurance Certification and Accreditation Process; DoD Information Assurance Certification and Accreditation Program
DIB	**Defense Industrial Base**
DISA	Defense Information Systems Agency
DISN	**Defense Information System Network**
DL	**Data Link**
DMETS	Distributed, Multi-Echelon Training System
DMIC	Digital M&S Integration Center
DMS	Diminished Manufacturing Support

ACRONYMS	DEFINITION
DMSM	Diminishing Manufacturing Sources Mitigation
DO	Delivery Order
DoD	Department of Defense
DODIC	DoD Identification Code
DODIN	DoD Information Network
DOT&E	Director of Operational Test and Evaluation
DOTMLPF	Doctrine, Organization, Training, Material, Leadership and Education, and Personnel and Facilities
DPALS	Diode Pumped Alkali Laser System
DPF	MDA Facilities, MILCON & Environmental Management Directorate
DR/COOP	Disaster Recovery and Continuity of Operations
DREN	Defense Research Engineering Network
DREX	Digital Receiver/Exciter
DRSN	Defense Red Switch Network
DSA	Digital Simulation Architecture
DSC	Development and Sustainment Contract
DSCS	Defense Satellite Communication System
DSDD	Discrimination Sensor Demonstrator Development
DSS	Defense Security Service
DSWS	David's Sling Weapon System
DT&E	Developmental Test and Evaluation
DTIC	Digital Test and Integration Center
DTLOMS	Doctrine, Training, Leadership, Organization, Materiel, Soldier
DTRA	Defense Threat Reduction Agency
DTS	Distributed Training System
DTSS	Directorate of Test Support System
DVSG	DISN Video Services Global
DW	Defense Wide
DWCF	Defense Working Capital Fund
E	
E/CCA	Element/Component Characteristics for Analysis
EA	Executing Agent; Engineering Assessment
EADSIM	Extended Air Defense Simulation
EAL	Evaluated Assurance Level
EAS	Eareckson Air Station
ECART	Electronic Content and Records Tool
ECE	Element Cybersecurity Experiments
ECP	Engineering Change Proposal
ECS	Element Capability Specification; Engineering Change Summary
EDISS	Enterprise Digital Integrated System Simulation
EDP	Evolutionary Development Program
EDP	Early Digital Product
EECS	Event Execution Control System
EEU	Electronics Equipment Unit
EGP	Exceedance Generation Processing
EHF	Extremely High Frequency
EKV	Exoatmospheric Kill Vehicle
E-LMS	Electronic Learning Management System
E-LRALT	Enhanced Long Range Air Launch Target
eMASS	Enterprise Mission Assurance Support Service
EMD	Engineering, Manufacturing, and Development
EMDR	Executive Mission Data Review
EME	Empirical Measurement Events
eMRBM	Extended Medium Range Ballistic Missile
EMRL	Engineering and Manufacturing Readiness Level
EO/IR	Electro-Optical/Infrared
EOQ	Economic Order Quantity
EoR	Engage-on-Remote
EPAA	European Phased Adaptive Approach
EQLB	Executive Quick Look Briefing
ERT	Element Review Team
ES	Elevated Sensor
ESD	Enterprise System Directorate
ESI	External System Interface; Enterprise Software Initiative
ESL	External Sensors Lab; Enterprise Sensors Laboratory
ESOH	Environmental, Safety and Occupational Health
ET	Embedded Test;

ACRONYMS	DEFINITION
ETEDDS	**End to End Distributed Development System**
ETR	**Element Technical Reviews**
EUCOM	European Command
EVMS	Earned Value Management System
EWR	Early Warning Radar
EWS	Enterprise Work Stations
F	
FAR	**Federal Acquisition Regulation**
FCS	Fire Control Section; Fire Control System (SPY/FCS - AN/SPY radar Fire Control System)
FDE	Force Developers Evaluation
FFP	Firm Fixed Price
FFPLOE	Firm Fixed Prices Level of Effort
FFRDC	Federally Funded Research and Development Center
FISMA	Federal Information Security Management Act
FLITES	Fast Line-of Sight Imagery for Target and Exhaust Plume Signatures
FMA	Foreign Material Acquisition; Foreign Military Asset
FMS	Foreign Military Sales
FOCI	Foreign Ownership, Control, and Influence
FOIA	Freedom of Information Act
FPA	Focal Plane Array
FPAF	Fixed Price Award Fee
FPEPA	**Fixed Price with Economic Price Adjustment**
FPIF	Fixed Price Incentive Firm
FPIS	Fixed Price Incentive Successive
FRACAS	**Failure Reporting, Analysis, and Corrective Action System**
FT	Flight Test
FTCN	**Flight Test Communication Network**
FTF	Flexibility Target Family
FTG	Flight Test GMD
FTM	Flight Test Mission
FTO-02	Flight Test Operational-02
FTT	Flight Test - THAAD
FY	Fiscal Year
FYDP	Future Years Defense Program; Fiscal Year Defense Plan
G	
GBI	Ground Based Interceptor
GBR-P	Ground Based Radar Prototype
GBSD	**Ground Based Strategic Deterrent**
GCC	Geographic Combatant Commander
GCC	**Geographic Combatant Commands**
GCCS-M	Global Command and Control System - Maritime
GCN	Global Command Network; GMD Communications Network
GD	Global Deployment
GDDT	Government Directed Down Time
GEM	Global Engagement Manager; Guidance Enhancement Missiles (PATRIOT)
GENSER	General Services
GEO	**Geosynchronous Earth Orbits**
GEOINT	Geospatial Intelligence
GEP	Ground Entry Point
GEU	**Guidance Electronics Unit**
GFC	GMD Fire Control
GFC / C	GMD Fire Control and Communications
GFE	Government Furnished Equipment
GFI	**Government Furnished Information**
GFS	Government Furnished Services
GIG	Global Information Grid
GM	Ground-based Midcourse
GMD	Ground-based Midcourse Defense
GMR	**Guided Missile Round**
GNC	**Guidance, Navigation and Control**
GOTS	**Government Off-The-Shelf**
GP	**Green Pine**
GPNTS	**GPS-Based Positioning, Navigation and Timing Service**
GPS	Global Positioning System
GS	Ground Systems
GSA	**General Service Administration**
GSOC	Global Security Operations Center

ACRONYMS	DEFINITION
GT	Ground Test
GTD	Ground Test Distributed
GTI	Ground Test Integrated
GTISS	**Ground Test Integrated System Simulation (GTISS)**
GTRI	Georgia Tech Research Institute
GTX	Ground Test (Element to Element)
GWS	GEM Work Stations
H	
HAENS	High Altitude Exoatmospheric Nuclear Survivability
HDAWG	**Homeland Defense Architecture Working Group**
HDR-H	**Homeland Defense Radar - Hawaii**
HEMP	High Altitude Electromagnetic Pulse
HEMTT	Heavy Expanded Mobility Tactical Truck
HEO	**Highly Elliptical Orbits**
HIL	Human-in-the-Loop; Hardware-in-the-Loop
HLD	**Homeland Defense**
HMI	**Human Machine Interface**
HMOC	Huntsville Mission Operations Center
HOSC	Huntsville Operations Support Center
HRTS	Human Resource Tracking System
HRTS/PTS	**Human Resource Tracking System/Personnel Tracking System**
HVAC	**Heating, Ventilation, and Air Conditioning**
HWIL	Hardware-in-the-loop
I	
I&T	Integration & Test
IA	Information Assurance
IAI	Israel Aircraft Industries; Israel Aerospace Industries
IAM	Information Assurance Manager
IAMD	Integrated Air and Missile Defense
IAR	**Intra-agency Acquisition Review**
IAS	Interocean American Shipping
IAVA	**Information Assurance Vulnerability Alerts**
IAW	In Accordance With
IBR	**Integrated Baseline Review**
IBS	**Integrated Broadcast Service**
ICBM	Intercontinental Ballistic Missiles
ICD	Interface Control Document
ICOFT	Institutional Conduct of Fire Trainer
ICP	Interface Change Proposal
ICTA	**Information Technology Networks and Systems**
IDIQ	Indefinite Delivery Indefinite Quantity
IDMP	Integrated Data Management Plan
IDS	**Interface Description Specifications**
IDT	In-Flight Interceptor Communications System Data Terminal
IEM	Integrated Electronics Module
IETM	Integrated Electronic Technical Manual
IETT	Integrated Event Test Team
IFICS	In-Flight Interceptor Communications System
ILP	Initial Lot Production
ILS	Integrated Logistics Support
IM	Insensitive Munitions
IMAP	Integrated Master Assessment Plan
IMD	Integrated Missile Defense
IMoD	Israeli Ministry of Defense
IMPACT	**Information Management Program Activity Control Tool**
IMTP	Integrated Master Test Plan
IMU	Inertial Measurement Unit
IMVP	Integrated Master VV&A Plan
INFOSEC	Information Security
INSURV	**Inspection and Survey**
IOM	**Inert Operational Missile**
IPA	Intergovernmental Personnel Act
IR	Infra-red
IRBM	Intermediate-Range Ballistic Missiles
IRES	**Integrated Research & Development for Enterprise Solutions**
ISA	**Installation Support Agreements**
ISA&I	Israeli System Architecture and Integration

ACRONYMS	DEFINITION
ISEA	**In-service Engineering Agent**
ISET	Integrated Systems Engineering Team
ISIM	International Simulation
ISSM	**Information Systems Security Manager**
IT	Integrated Test; Information Technology
IT&E	**Integration, Testing, and Evaluation**
ITB	Institutional Training Base; Israeli Test Bed
IV&V	Independent Verification and Validation
IWS	Indications and Warning System; Integrated Warfare Systems
J	
JAT	Joint Analysis Teams
JBTEC	Joint BMDS Training and Education Center
JEON	**Joint Emergent Operational Need**
JEWL	Joint Early Warning Laboratory
JFCC	Joint Functional Component Command
JFCC-IMD	Joint Functional Component Command - Integrated Missile Defense
JHU	John Hopkins University
JHU/APL	John's Hopkins University/Applied Physics Laboratory
JMOD	Japan Ministry of Defense
JNIC	Joint National Integration Center, Schriever AFB, CO
JPOW	Joint Project Optical Windmill
JRDC	JNIC Research and Development Contract
JRMET	Joint Reliability and Maintainability Engineering Team
JSIMTP	**Joint Service Insensitive Munitions Technical Panel**
JSP	**Joint Service Provider**
JTF-GNO	Joint Task Force-Global Network Operations
JTIDS	Joint Tactical Information Data System
JTOC	JNIC Target Operations Center
JWSP	Joint Warfighter Support Program
K	
KHILS	Kinetic Kill Vehicle hardware in-the-Loop Simulator
KIDD	Kinetic Impact Debris Distribution
KP	**Knowledge Points**
KV	Kill Vehicle
KW	Kinetic Warhead
L	
L&TSE	Launch and Test Support Equipment
LBSM3	Land Based SM-3 (early name for Aegis Ashore)
LCC	Launcher Control Center; **Local Control Center**
LES	**LRDR Equipment Shelter**
LHCT	Long Haul Communications Transport
LLNL	Lawrence Livermore National Laboratory
LM	Lockheed Martin
LMMT	**Link Monitoring and Management Tool**
LMSSC	Lockheed Martin Space Systems Company
LNA	**Low Noise Amplifiers**
LNO	Liaison Officer
LoR	Launch on Remote
LPLD	**Low Power Laser Demonstrator**
LRDR	**Long Range Discrimination Radar**
LRDS	Long Range Detection Suite
LRS&T	Long Range Surveillance and Tracking; Long Range Surveillance and Track
LRU	Line Replaceable Unit'
LSC	Launch Site Controller
LSE	Launch Support Equipment
LSS	Launch Support Systems
LTPO	Lower Tier Program Office
M	
M&S	Materials and Structure; Modeling and simulation
MAFIOT	**Mount Wilson Aerospace Facility for Integrated Optical Test**
MAIDIQ	**Multi-Awarded IDIQ**
MAIS	Major Automated Information System
MAJCOM	**Major Command**
MAP	MDA Assurance Plan; MDA Assurance Provisions
MAR	MDA Assurance Representative
MARAD	Maritime Administration
MARS	**Modular Analysis and Reporting Suite**

ACRONYMS	DEFINITION
MASINT	Measures and Signals Intelligence
MAX/MIF	Maximum (number of)/Missiles In Flight
MBRV	**Modified Ballistic Reentry Vehicle**
MCC-T	**Mission Control Center - Targets**
MCF	**Mission Control Facility**
MD	Missile Defense
MDA	Missile Defense Agency
MDAHQ	Missile Defense Agency Headquarters
MDAP	Major Defense Acquisition Program
MDDE	**Missile Defeat and Enhancements**
MDEB	Missile Defense Executive Board
MDIOC	Missile Defense Integrated Operations Center
MDR	Mission Data Review
MDSC	**Missile Defense Space Center**
MDSDC	Missile Defense Space Development Center
MDSE	Missile Defense System Exerciser
MDSEC	Missile Defense Space Experimentation Center
MDST	Missile Defense Space Warning Tool
MEDIC	**Multi-band Electronic attack Digital Injection Capability**
MEIT	**Multi-Element Integration and Test**
MET	Modernization Enterprise Terminal
MFRL	Modification and Fielding Request List
MFU	Missile Firing Unit
MHA	**Management Headquarters Activity**
MICS	MDA Integrated Communications Services
MiDAESS	Missile Defense Agency Engineering and Support Services
MIF	**Management Information Format**
MILCON	Military Construction; Military Construction funding (type of Appropriation)
MILSATCOM	**Military Satellite Communications**
MIL-STD	Military Standards
MIP	Master Integration Plan
MIPR	Military Interdepartmental Purchase Request
MIS	MDSDC Interchange System; MDSEC Interchange System
MISL	**Missile Intelligence Secure Link**
MIT	Miniature Interceptor Technology; Massachusetts Institute of Technology
MIT/LL	Massachusetts Institute of Technology, Lincoln Laboratory, Lexington, MA
MMR	Multi-Mission Radar
MOC	Missile Defense Agency Operations Center
MOKV	**Multi Object Kill Vehicle**
MoKVA	Modular open Kill Vehicle Architecture
MOU	Memorandum of Understanding
MPAT	Producibility and Manufacturing Technology
MPG	**Mission Processing Group**
MPL	ManPower Loading
MRA	Mission Readiness Assessment
MRBM	Medium-Range Ballistic Missiles
MRDR	**Medium Range Discrimating Radar**
MRT	Medium Range Target
MRTF	Major Range and Test Facilities
MSE	**Missile Segment Enhancement**
MSR	Minimum Sustaining Rate
MTOE	Modified Table of Organization and Equipment
MTS	Multi-Spectral Targeting System
MW/MD	**Missile Warning/Missile Defense**
N	
NASIC	National Air and Space Intelligence Center
NATO	North Atlantic Treaty Organization
NAVFAC	Naval Facility
NAVSEA	Naval Sea Systems Command
NAWC	Naval Air Warfare Center
NCR	National Capital Region
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NFIRE	Near Field Infrared Experiment
NGAS	Northrop Grumman Aerospace Systems
NGST	Northrop Grumman Space Technology
NICE	**National Initiative for Cybersecurity Education**
NIPRNET	Non-Secure Internet Protocol Router Network

ACRONYMS	DEFINITION
NIST	National Institute of Standards and Technology
NMR	**Network Management Resources**
NORAD	North American Aerospace Defense Command
NORTHCOM	Northern Command
NOSC	**Network Operations Security Center**
NOSSA	**Naval Ordnance Safety and Security Activity**
NRE	Non-Recurring Engineering
NRL	Naval Research Laboratory, Washington, DC
NRT	Navy Review Team
NSA	National Security Agency
NSWC	Naval Surface Warfare Center
NTD	Near-Term Discrimination
O	
O&M	Operations and Maintenance
O&S	Operations and Sustainment
OA	Open Architecture
OCB	**Operational Capacity Baseline**
OCO	Overseas Contingency Operations
OCONUS	Outside of CONUS
OGA	Other Government Agency
OMB	Office of Management and Budget
ONIR	Overhead Non-Imaging Infra-Red
OPIR	Overhead Persistent Infrared
OPLAN	Operations Plan
OPSCAP	Operations Capabilities
OPTISIG	Optical Signatures In-Line Generator
OQE	**Objective Qualitative Evidence**
ORNL	Oak Ridge National Laboratory
OSA	Open Systems Architecture
OSC	Operations Support Center; **Optical Signatures Code**
OSC/OPTISIG	**Optical Signatures Code/Optical Signature Inline Generator**
OSD	Office of the Secretary of Defense
OSF	Objective Simulation Framework
OSFC	Operations Forces Standing Committee
OSM	Object Sighting Message; Open Systems Architecture Sensor Models
OSPT	Operations Support Planning Team
OSS	Off-Shore Support; Optimistic Sensor Model
OTA	Operational Test Agencies
OUSD/AT&L	Office of Under Secretary of Defense/Acquisitions, Technology and Logistics
P	
P&P	Policy and Procurement
PA	Performance Assessments; Project Arrangement
PAA	Phased Adaptive Approach
PAAWNS	**Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System**
PAC-3	Patriot Advanced Capability-3
PACOM	Pacific Command
PAM	Planning Allocation Matrix
PATRIOT	**Phased Array Tracking Radar Intercept on Target**
PAV	**Performance Assessment and Verification**
PB	President's Budget
PBL	Performance Based Logistics
PCIL	**Prime Consolidated Integration Lab**
PCL	**Prioritized Capabilities List**
PCO	Procurement Contracting Office
PCRSS	**Pacific Collector Range Safety System**
PDR	Preliminary Design Review
PDSS	Post Deployment Software Support
PE	Program Element
PEELS	Parametric Endo/Exo-atmospheric Lethality Simulation
PEGEM	Post Engagement Ground Effects Model
PEO IWS	Program Executive Office - Integrated Warfare Systems
PFR	Post Flight Reconstruction
PHACIL	Phacil, Incorporated
PIA	**Post Intercept Assessment**
PIDS	Prime Item Development Specifications
PLET	Phenomenology, Lethality, Environment, Threat
PLT	Production Lead Time
PLUS	Plume Simulation

ACRONYMS	DEFINITION
PM	Program Manager
PM/IAM	Program Manager/Information Assurance Manager
PMAP	Process Mission Assurance Plan
PMDCATS	Program Manager - Communications and Transmission Systems
PME	Primary Mission Equipment
PMI	preventative maintenance inspection
PMP	Parts, Materials and Processes
PMRF	Pacific Missile Range Facility, Barking Sands, Kauai, HI
PMT	Pre-Mission Test
PNT	**Positioning, Navigation and Timing**
POA&M	Plan of Action and Milestones
POC	Point of Contact
PPR	Pre-Planned Responses
PPU	Prime Power Unit
PRIDE	**Program Resource Internet Database Environment**
PROCAP	Protection Capability
PSE	**Production Support Engineering**
PSEM	Patriot System Effectiveness Model
PSN	Parallel Staging Area
PTSS	Precision Tracking Space System
PWS	Program-Wide Support
PY	Prior Year
Q	
QLB	Quick Look Briefing
QoS	Quality of Service
QRT	Quick Response Team
QSMA	Quality Safety and Mission Assurance
R	
R&C	**Readiness and Control**
RAFU	Radar Field Upgrade
RAM	Reliability, Availability and Maintainability
RAM	**Reliability, Availability, and Maintainability**
RASP	RApid Scenario Prototype
RCS	Radar Cross Section
RDEC	Research, Development, and Engineering Center
RDECOM	Research, Development, Engineering Command
RDL	**RKV Development Laboratory**
RDT&E	Research, Development, Test & Evaluation
RF	Radio Frequency
RFA	Requests for Analysis
RFARFI	Request for Analysis Request for Information
RFI	Requests for Information
RFP	Request for Proposal
RKV	**Redesigned Kill Vehicle**
RMF	**Risk Management Framework**
RMOET	Radar March Order & Emplacement Trainer
ROI	Return on Investment
RPFM	Rocket Plume Flowfield Model
RPG	**Radar Processing Group**
RSC	Radar Sustainment Contract
RSO	Resident Space Object
RTI	Return to Intercept
RTS	Ronald Reagan Test Site, Kwajalein, Marshall Islands
RV	Reentry Vehicle
S	
SAP	**Special Access Programs**
SAS	**Sub-Array Suites**
SATCOM	Satellite Communications
SBIR	Small Business Innovative Research;
SBIR/STTR	Small Business Innovative Research/Small Business Technology Transfer
SBIRS	Space Based Infrared System; Space-Based Infrared Sensors
SBS	**Sea Based Systems**
SBT	Sea Based Terminal
SBX	Sea Based Test X-Band Radar
SCA	**Security Controls Assessment**
SCARE	**Software Change Analysis Review Environment**
SCD	SM-3 Cooperative Development; Standard Missile-3 Cooperative Development (Program)

ACRONYMS	DEFINITION
SCG	Security Classification Guides
SCN	System Change Notices
SCN	**Specification Change Notices**
SCORE	**System Coordination and Observation Reporting Environment**
SCOUT	**Simultaneous Correlation of Unambiguous Tracks**
SCR	SM-3 Cooperative Development; System Capability Review
SCRM	Supply Chain Risk Management
SDACS	Solid Divert Attitude Control System
SDD	System Description Document
SDL	Space Dynamics Laboratory
SDR	System Design Review; Software Design Review
SE&I	Systems Engineering and Integration
SEAR	System Engineering Assessment Report
SECDEF	**Secretary of Defense**
SED	Software Engineering Design
SEI	Systems Engineering & Integration
SEPM	System Engineering Program Management
SGP	Super Green Pine
SIAO	Senior Information Assurance Officer
SIAO/CA	Senior Information Assurance Officer (SIAO)/Certification Authority (CA)
SIGNIT	Signal Intelligence
SIM	Simulation
SIPRNET	Secret Internet Protocol Router Network
SISSO	**Senior Information Systems Security Officer**
SITE	**System Integration and Test Environment**
SIU	SSF Interface Unit
SIU	**System Interface Units; Simulation Interface Units**
SIV	silo interface vault
SKI	**Spacebased Kill Assessment**
SLEP	**System Life Extension Program**
SM	Standard Missile
SM-3	Standard Missile -3
SMAC	**Shot Management Analysis Cell**
SMDC	Space and Missile Defense Command, U.S. Army
SMDC/ARSTRST	Space and Missile Defense Command/Army Forces Strategic Command
SME	Subject Matter Expert
SMM	System Mission Manager
SNL	Sandia National Lab
SNWC	Space and Naval Warfare Command
SOLD	Simulation-Over-Live Driver
SPAWAR	Naval Space and Warfare Command; Space and Naval Warfare Systems Command
SPFR	System Post Flight Reconstruction
SPMT	System Pre Mission Test
SPPN	**Special Purpose Processing Node**
SPS	Standard Procurement System
SPURC	Standard Plume Ultraviolet Radiation Code
SRALT	Short Range Air Launch Target
SRBM	Short-Range Ballistic Missiles
SRBMD	Short Range Ballistic Missile Defense
SRHSM	Sensor Registration Health & Status Monitoring
SRP	Stockpile Reliability Program
SRR	System Requirements Review; Software Readiness Review
SS	Sole Source; Summary Screens; System Specification
SS/CPAF	Soul Source/ Cost Plus Award Fee
SS/CPFF	Soul Source/ Cost Plus Fixed Fee
SSA	Space Situational Awareness
SSC	System Security Concept
SSF	Single Stimulation Framework
SSL	**Space Sensor Layer**
STEM	**Science, Technology, Engineering, and Mathematics**
STOC	System Test and Operations Center
STRATCOM	Strategic Command
STSS	Satellite Tracking and Surveillance System; Space Tracking and Surveillance System
STTR	Small Business Technology Transfer
SUW	**Surface Warfare**
SWDC	**Specialized Warfighter Development Contract**
SYMP	Symposium
T	

ACRONYMS	DEFINITION
T&E	Test and Evaluation
TALSS	THAAD Active Leak Sensor System
TC	Targets and Countermeasures

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603176C *I Advanced Concepts and Performance Assessment*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	43.305	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
MD71: *Advanced Concepts and Performance Assessments*	41.702	13.958	11.628	11.552	-	11.552	11.768	12.016	12.243	12.488	Continuing	Continuing
MD40: *Program-Wide Support*	1.603	0.816	0.605	0.605	-	0.605	0.699	0.673	0.802	0.805	Continuing	Continuing
MC71: *Cyber Operations*	-	2.909	0.784	2.051	-	2.051	2.437	2.453	3.217	3.281	0.000	17.132
Program MDAP/MAIS Code: 362												

Note

N/A

A. Mission Description and Budget Item Justification

The Advanced Concepts and Performance Assessment (ACPA) Program Element delivers an integrated government concept definition, simulation, and analysis capability. It also centralizes assessment of advanced missile defense technology. Delivering insight into the performance of proposed concepts extends the Missile Defense Agency's (MDA) ability to address evolving threats for the warfighter.

Subject Matter Experts (SMEs) provide independent assessments of government, university, and industry technology concepts, used in concert with systems engineering requirements, to support acquisition strategy decisions and define technology focus areas. The innovative structured concept definition and assessment methodology enables MDA to quickly validate focus areas, verify contractor technology solutions, and evaluate promising concepts in future Ballistic Missile Defense System (BMDS) architectures. This methodology significantly enhances MDA's ability to assess technology concepts while decreasing the cost of development through:

- Independent model-based simulations of industry technology concepts to inform the systems engineering process
- Digital simulation and hardware-in-the-loop performance assessments of algorithms and hardware concepts prior to expensive live fire test events
- End-to-end testing of technology concepts integrated with weapon systems and Command, Control, Battle Management and Communications (C2BMC)

Performance assessment of advanced concepts incorporates Better Buying Power philosophy in the earliest stages of technology development to maximize the efficiency of technology investments. Performance assessment supports evaluation of advanced threats and analysis of capabilities left through right of launch integration.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603176C *I Advanced Concepts and Performance Assessment*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	12.996	13.017	14.267	-	14.267
Current President's Budget	17.683	13.017	14.208	-	14.208
Total Adjustments	4.687	0.000	-0.059	-	-0.059
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	2.375	0.000			
• SBIR/STTR Transfer	-0.287	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	2.599	0.000	-0.059	-	-0.059

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 of $2.375M reflects the Above Threshold Reprogramming for compliance with cyber security requirements as required in the Department of Defense (DoD) Instruction Number 8510.01 which establishes Risk Management Framework (RMF) requirements for DoD information technology (IT).

Increase in FY 2018 from PB19 to PB20 of $2.599M reflects the investment in artificial intelligence (AI) infrastructure to develop, test, and demonstrate machine learning solutions.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603176C / *Advanced Concepts and Performance Assessment*	Project (Number/Name) MD71 / *Advanced Concepts and Performance Assessments*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD71: *Advanced Concepts and Performance Assessments*	41.702	13.958	11.628	11.552	-	11.552	11.768	12.016	12.243	12.488	Continuing	Continuing

Note

N/A

A. Mission Description and Budget Item Justification

ACPA centralizes advanced technology concept modeling, simulation, software, and analysis. Integrating models of promising technical solutions into BMDS system-level simulations enables leadership to make data driven acquisition and technology investment decisions. This funding capitalizes on the innovation of small businesses, universities, Federally Funded Research and Development Centers (FFRDCs), and University Affiliated Research Centers (UARCs) to pursue a broad range of hardware, software, models, algorithms, trade studies, and analysis. These innovations bring together government developed models representing existing and future missile defense architectures, technology concepts, and advanced algorithms to provide detailed assessments of concept performance and inform investment decisions. These innovations, combined with a robust high performance computing infrastructure, provide a unique in-house government capability to demonstrate and assess technology concepts for emerging technology risk reduction, to mature concepts with laboratory, ground, and flight test data, and where possible, apply concepts in simulated exercises with weapon systems across representative communication architectures.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Advanced Concepts and Performance Assessment	13.958	11.628	11.552
Description: Provide quantitative assessments that define the benefits of technology investments and inform requirements using an integrated concept definition, simulation, and performance analysis capability. A staff of diverse Subject Matter Experts (SMEs) deliver independent government performance evaluations which exercise kinetic and non-kinetic missile defense concept representations against the broad spectrum of evolving threats. - Assess forward-based airborne electro-optical infrared and advanced sensors - Provide independent government assessments of industry sensor (e.g. Advanced Sensor), directed energy (e.g. Low Power Laser Demonstrator), and kill vehicle technology concepts - Examine directed energy pathfinder solutions - Study low earth orbit satellite capabilities - Assess and identify promising boost phase intercept capabilities - Perform concept performance against emerging advanced threats including hypersonic threat testing scenarios - Mature advanced technology concepts through lab, ground, and flight test data - Apply concepts in simulated exercises with weapon systems			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MD71 / *Advanced Concepts and Performance Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
- Work with the BMDS Architect and MDA Systems Engineer to design concepts, build models and assess technology concepts for the future BMDS - Develop and extend modeling techniques - Focus research and engineering activities from university and small business partners to identify suitable technology and concepts that improve BMDS performance through a rapid innovation model based on an engineering test bed Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** In addition to efforts identified above, FY 2019 concept assessment activities will focus on development of key technology areas including: - Hypersonic Defense - AI and Machine Learning Initiatives - Left through Right of Launch Integration ***FY 2020 Plans:*** Due to the evolving nature of the threat, ACPA's diverse staff of SMEs develop advanced concepts across a broad spectrum of missile defense technology initiatives. FY 2019 concept assessment initiatives identified above will be matured and coupled with increased emphasis on the following: - Quantify the contribution of emerging concepts by integrating representative performance with C2BMC networks (eg. MDA C2BMC, Integrated Air and Missile Defense, Cooperative Engagement Capability, AI enabling end-to-end capability demonstrations with weapon systems) - Develop the computing infrastructure for AI Testbed and the development of deep neural networks to exercise advanced algorithms and assess potential applications to machine learning - Extend the Government's capability to evaluate engagement decision timelines and evaluate concept of operations that could possibly expand engagement opportunities - Develop an initial integrated modeling and analysis capability to assess new technology concepts associated with the complex interactions between left through right of launch integration - Address the capability gap in testing/simulation of advanced sensors in a credible environment by developing an advance photonics testbed capable of providing foundational truth for advanced sensor performance assessment of industry concepts ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MD71 / *Advanced Concepts and Performance Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
N/A			
Accomplishments/Planned Programs Subtotals	13.958	11.628	11.552

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	55.562	56.753	13.600	-	13.600	13.475	16.187	18.232	22.949	Continuing	Continuing

Remarks

D. Acquisition Strategy

Employ various contracting strategies in a flexible manner to maximize the contribution to MDA. Execute through utilization of small businesses, leverage the Nation's engineering centers of excellence (FFRDCs and UARCs); generate cooperatives with other Government Agencies to provide concept modeling and assessment capability. This strategy uses agency and partner SMEs and government model-based assessments to inform Better Buying Power acquisition decisions.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	1.603	0.816	0.605	0.605	-	0.605	0.699	0.673	0.802	0.805	Continuing	Continuing

A. Mission Description and Budget Item Justification

Program Wide Support (PWS) contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore, fluctuates by year based on the adjusted RDT&E profile.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603176C / *Advanced Concepts and Performance Assessment*	Project (Number/Name) MC71 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC71: *Cyber Operations*	-	2.909	0.784	2.051	-	2.051	2.437	2.453	3.217	3.281	0.000	17.132

Note

The increase from FY 2019 to FY 2020 re-establishes the baseline requirement to meet Risk Management Framework (RMF) requirements which map to the Office of Management and Budget (OMB) and Office of the Secretary of Defense (OSD) vision of improved management of cybersecurity risk and on the ability to provide actionable and timely cybersecurity performance information. This provides resources to sustain and improve IT toolsets, maintain hardware currency, and sustain the IT and information assurance (IA) workforce.

A. Mission Description and Budget Item Justification

This project supports the monitoring and tracking of Cybersecurity mitigations as required in the Department of Defense (DoD) Instruction Number 8510.01 which establishes RMF requirements for DoD IT. Funds in this project implement and sustain DoD-required RMF and associated Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance System Security Manager (ISSAM) Plans of Action and Milestones for enabling modeling and simulation mission systems. This project captures the RMF documentation (artifacts, validation results, IA risk assessment results, and MDA authorizing official and chief information officer accreditation decisions) into the Defense Information Systems Agency's Enterprise Mission Assurance Support Service system. Hardware and software upgrades required to meet DoD standards are supported by funding in this project. Independent verification and validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the project are necessary to comply with the Federal Information Security Management Act.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Information Assurance/Cyber Network Defense	2.909	0.784	2.051
Description: Funds network defense and ISSAM activities including: - Conduct cybersecurity/IA engineering and architecture planning - Plan and test IA controls - Develop DoD RMF certification and accreditation packages - Conduct controls validation testing of systems and provide plan of action and milestones to mitigate IA deficiencies - Conduct annual IA reviews to assess compliance in implementing and maintaining IA controls Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** In addition to baseline efforts identified above, primary emphasis in FY 2019 will be to sustain the IT and IA workforce. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MC71 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
In addition to baseline efforts identified above emphasis in FY 2020 will be expanded to: - Explore cyber effects on emerging technology concepts - Sustain and improve IT toolsets, maintain hardware currency, and sustain the IT and IA workforce ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 re-establishes the baseline requirement to meet RMF requirements which map to the OMB and OSD vision of improved management of cybersecurity risk and on the ability to provide actionable and timely cybersecurity performance information. This provides resources to sustain and improve IT toolsets, maintain hardware currency, and sustain the IT and IA workforce.			
Accomplishments/Planned Programs Subtotals	2.909	0.784	2.051

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603178C / *Weapons Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	96.493	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
MD69: *Directed Energy Research*	96.493	28.894	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD72: *Interceptor Technology*	-	0.000	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	0.000	43.400
Program MDAP/MAIS Code: 362												

Note

Directed Energy Research (MD69) laser scaling efforts transferred to the Technology Maturation Initiatives (TMI) Program Element (PE) (0604115C) under the Directed Energy Demonstrator Development project (MD98) in FY 2019.

A. Mission Description and Budget Item Justification

Through FY 2018, the Weapons Technology PE developed and tested a high-powered directed energy laser to build the foundation of the next-generation laser system on a high altitude unmanned airborne platform. The Missile Defense Agency's (MDA) High Energy Laser (HEL) investment incrementally develops scalable, efficient, and compact HEL technology in the laboratory before beginning a high power laser flight test program. The technology required for tracking the target, aiming the laser, and building flight demonstrators is being developed under the TMI PE (0604115C).

In FY 2019, this PE provides the Hypersonic Defense Weapon Systems Concept Definition efforts to enable the Warfighter to counter the growing global hypersonic threat. The concept architectures must provide a kill chain that is highly maneuverable and agile, yet able to engage the hypersonic threats at much greater ranges during the threat's glide phase.

The Phase I Concept Definition effort will contract with twenty-one industry partners to start development of weapon systems concept architectures through a multi-phased approach to provide a near term capability to defeat hypersonic glide vehicles.

For FY 2020, MDA in coordination with the United States Air Force (USAF) is developing engineering and test requirements to support joint USAF/MDA program oversight and verification of a USAF system under development to provide a missile defense capability. Additional details on the USAF system are available at higher classification levels.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603178C *I Weapons Technology*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	5.495	0.000	0.000	-	0.000
Current President's Budget	28.894	13.400	10.000	-	10.000
Total Adjustments	23.399	13.400	10.000	-	10.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	20.000	13.400			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.601	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	4.000	0.000	10.000	-	10.000

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustment of $20.000 million and an increase of $4.000 million for directed energy.

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustment of $13.400 million for the acceleration of Hypersonic Defense.

Increase in FY 2020 from PB19 to PB20 provides MDA joint efforts with the USAF to develop engineering and test requirements to support program oversight and verification of a USAF system under development to provide a missile defense capability.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603178C / *Weapons Technology*	Project (Number/Name) MD69 / *Directed Energy Research*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD69: *Directed Energy Research*	96.493	28.894	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

Directed Energy Research (MD69) laser scaling efforts transferred to the TMI PE (0604115C) under the Directed Energy Demonstrator Development project (MD98) in FY 2019.

A. Mission Description and Budget Item Justification

Through FY 2018, the Directed Energy Research project funded the laboratory development of two high energy laser technologies, the Diode Pumped Alkali Laser (DPAL) with Lawrence Livermore National Laboratory (LLNL)and the Fiber Combined Laser (FCL) with the Massachusetts Institute of Technology Lincoln Laboratory (MIT/LL). These laser technologies have considerable promise for scaling to very high average power while simultaneously achieving high system electrical-to-optical efficiencies, exceeding 40 percent, and very low system weight and volume.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Directed Energy Research	28.894	0.000	0.000
Description: Directed Energy Research funded two promising laser technologies: LLNL's DPAL and MIT/LL's FCL. Each technology takes a unique approach to attaining high power. The DPAL scales in power by increasing the size of a single laser gain cell. This approach has the benefit of simplicity of design, but must address very high energy levels within the single cell. LLNL successfully demonstrated over 16 kilowatts (kW) in FY 2016. MDAs key fiber laser investments are targeted at driving the weight per kW of power in the fiber amplifier system down while increasing the individual fiber amplifier power output. MDA joined with the Defense Advanced Research Projects Agency (DARPA) and the USAF to demonstrate 44 kWs in a room-sized, 40 kilogram per kW configuration in FY 2015, to a packaged 7 kilograms per kW, 30 kW system in FY 2018. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603178C / *Weapons Technology*	**Project (Number/Name)** MD69 / *Directed Energy Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Directed Energy Research (MD69) laser scaling efforts transferred to the TMI PE (0604115C) under the Directed Energy Demonstrator Development project (MD98) in FY 2019.			
Accomplishments/Planned Programs Subtotals	28.894	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0604115C: *Technology Maturation Initiatives*	163.947	316.822	303.458	-	303.458	336.139	380.195	300.126	201.668	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for Directed Energy Research (MD69), consists of partnering with Industry, DARPA, USAF, FFRDCs, and UARCs. MDA will leverage Agency and partner subject matter experts and use government model based assessments to inform Better Buying Power philosophy acquisition decisions. The MDA will then award contracts to industry and universities via the Advanced Technology Innovation Broad Agency Agreement (BAA) and competitive procurements to develop and demonstrate promising components and integrated systems in realistic test environments.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603178C / *Weapons Technology*	Project (Number/Name) MD72 / *Interceptor Technology*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD72: *Interceptor Technology*	-	0.000	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	0.000	43.400

Note

FY 2019 reflects the congressional adjustment for acceleration of Hypersonic Defense. Other Hypersonic Defense efforts are funded in PE 0604181C in FY 2020 and out years.

A. Mission Description and Budget Item Justification

In FY 2019, MDA along with industry partners will develop Hypersonic Defense Weapon Systems concept architectures (weapon and kill chain) that are able to engage the hypersonic threats at much greater ranges during the threat's glide phase and in terminal phase for layered defense.

The weapon systems concepts will provide MDA insight into architecture performance, cost, and schedule for future development efforts.

Hypersonic Defense Weapon Systems Concept Definition seeks investigation of a broad trade space for innovative concepts that can provide affordable, reliable, and robust capabilities to negate hypersonic vehicle threats.

For FY 2020, MDA in coordination with the United States Air Force (USAF) is developing engineering and test requirements to support joint USAF/MDA program oversight and verification of a USAF system under development to provide a missile defense capability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Hypersonic Defense Weapon Systems Concept Definition	0.000	13.400	0.000
Description: This effort conducts Hypersonic Defense Weapon Systems Concept Definition with industry to develop weapon systems concepts through a multi phased approach to provide a near term capability to destroy hypersonic vehicle threats. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Complete industry Phase I Concept Definition for a Hypersonic Defense Weapon Systems architecture with the delivery of initial contractor concepts for further concept refinement of performance, operational employment, cost, and schedule. ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY2019 to FY2020 reflects the FY2019 congressional plus up for acceleration of Hypersonic Defense.			
Title: USAF/MDA Missile Defense Capability	0.000	0.000	10.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603178C / *Weapons Technology*	**Project (Number/Name)** MD72 / *Interceptor Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Description: For FY 2020, MDA in coordination with the United States Air Force (USAF) is developing engineering and test requirements to support joint USAF/MDA program oversight and verification of a USAF system under development to provide a missile defense capability. ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** Develop engineering and test requirements in support of a joint USAF/MDA missile defense capability. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the initiation of a joint USAF/MDA missile defense capability. Additional details on the USAF system are available at higher classification levels.			
Accomplishments/Planned Programs Subtotals	0.000	13.400	10.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604181C: *Hypersonic Defense*	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581

Remarks

D. Acquisition Strategy

To optimize Missile Defense System (MDS) performance, MDA leverages the nation's engineering centers of excellence at government agencies, Military Services, FFRDC, UARCs and industry. The executing agents use varying contracting strategies in a flexible manner to maximize their contribution to the MDS. MDA acquires products and services by competitive means to the extent that is possible, practical and uses the BAA process to award concept definition contracts.

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603180C / *Advanced Research*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	85.177	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
MD25: *Advanced Technology Development*	83.430	22.897	41.661	19.793	-	19.793	20.160	20.563	20.951	21.371	Continuing	Continuing
MD40: *Program-Wide Support*	1.747	0.868	0.904	0.881	-	0.881	0.994	0.958	1.090	1.094	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Increase in FY 2019 reflects the congressional adjustment ($22.200 million) to accelerate Hypersonic Defense (HD) technologies to raise the technology readiness levels (TRL) of new hypersonic components and to integrate into the HD architecture to include: kinetic, non-kinetic, sensors, communications, command and control (C2), and modeling and simulation (M&S).

Other Hypersonic Defense efforts are funded in PE 0604181C in FY 2020 and outyears.

A. Mission Description and Budget Item Justification

The Advanced Research program element (PE) conducts leading edge advanced research and development to create and enable future missile defense capabilities. The Missile Defense Agency (MDA) executes this mission by capitalizing on the creativity and innovation of the brightest minds in our Nation's universities and small businesses, collaborative research partnerships between allied countries, academic institutions, and innovative ideas from industry. This includes a focus on facilitating the transition of technology to the Ballistic Missile Defense System (BMDS) through a Commercialization and Transition Office and the execution of the Rapid Innovation Fund Program.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	20.184	20.365	20.778	-	20.778
Current President's Budget	23.765	42.565	20.674	-	20.674
Total Adjustments	3.581	22.200	-0.104	-	-0.104
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	22.200			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.455	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency					Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*		R-1 Program Element (Number/Name) PE 0603180C *I Advanced Research*			
• Other Adjustment	4.036	0.000	-0.104	-	-0.104

Change Summary Explanation

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustment to accelerate Hypersonic Defense technologies.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / *Advanced Research*	Project (Number/Name) MD25 / *Advanced Technology Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD25: *Advanced Technology Development*	83.430	22.897	41.661	19.793	-	19.793	20.160	20.563	20.951	21.371	Continuing	Continuing

Note

Increase in FY 2019 reflects the congressional adjustment ($22.200 million) to accelerate Hypersonic Defense (HD) technologies to raise the technology readiness levels (TRL) of new hypersonic components and to integrate into the HD architecture to include: kinetic, non-kinetic, sensors, communications, command and control (C2), and modeling and simulation (M&S).

Other Hypersonic Defense efforts are funded in PE 0604181C in FY 2020 and outyears.

A. Mission Description and Budget Item Justification

MDA explores potential new BMDS capabilities by leveraging the creativity and innovation of the Nation's small businesses and universities to conduct advanced technology development. MDA also pursues advanced technology development through cooperative international research agreements between U.S. and foreign universities of allied nations. The program manages the selection process and administers the Missile Defense Small Business Innovation Research (SBIR) program element (PE), 0605502C. SBIR topics and projects are selected annually based on needs across the BMDS and executed in partnership with sponsoring intra-agency organizations.

MDA's Advanced Technology Development Project pursues a broad range of emerging technologies targeted for application and insertion into the BMDS. This work facilitates the commercialization and transition of promising technologies into the BMDS by promoting a cooperative environment to reduce cost and increase return on investment between small businesses, prime contractors, and MDA elements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Advanced Research	22.897	41.661	19.793
Description: This activity funds technology and research initiatives. - Conduct systems engineering, integration, research, and material solution analysis to identify initiatives and technology to include missiles, sensors, and command and control components in the defense against current and future threats - Pursue advanced technology investments for defense against non-ballistic hypersonic threats - Utilize NanoSat technology demonstrations to conduct testing and reduce risk for new and advanced technologies for the BMDS - Leverage university to university international research opportunities with allied nations to enhance BMDS advanced technology initiatives and build stronger relationships with allies and partners - Manage the selection process of SBIR and technology applications programs to assist MDA funded technology developers in finding and entering technology transfer opportunities to missile defense applications			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Partner with industry, universities and national laboratories through advanced technology initiatives to develop improvements for example: -- Additive manufacturing technology initiatives for interceptor propulsion and structural components -- Space & sensor technology --- Continue radiation hardened mirror technology --- Continue radiation hardened strained-layer superlattice focal plane arrays --- Radiation insensitive electronics --- 4D carbon-carbon manufacturing process addressing obsolescence issue --- Next generation seeker window development --- Deep learning algorithms for missile discrimination -- Directed energy technology --- High power optical fibers --- Quick recovery high energy diodes --- Ultra low size weight and power diode pump modules --- Large stroke, high spatial bandwidth, deformable mirrors --- Light weight, dampened optical benches --- Optics and coatings for alkali environments -- Interceptor technology --- Domestic source aerospace-grade rayon replacement technology --- High power and energy density batteries --- High temperature and radiation hardened electronics --- Design criteria for stable bipropellant combustion --- Navigation algorithm technology development --- Propellants --- Multifunctional structures --- Thermal management --- Electro-optics -- Future BMDS concept development --- Advanced sensor algorithm initiative --- Aerospace vehicle target, tracking, and discrimination --- Radar interferometric processing for electromagnetic rail gun -- 3D Printing of diamond composite structures			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
- HD component technology: develop technology to raise TRL of new hypersonic components and integrate into the HD architecture, to include: kinetic, non-kinetic, sensors, communications, C2, and M&S - Nanosat Testbed Initiative: providing risk reduction in the development of new and advanced technologies, in support of the BMDS, by testing and demonstrating capabilities under realistic environmental conditions -- CubeSat Networked Communications Experiments demonstrate notional Multi Object Kill Vehicle communications CONOPS -- CubeSat Based Laser Communications Network demonstrate low-latency crosslink in a low-size, weight and power configuration - Accelerate technology in defense of hypersonic threats to include material characterization for hypersonic flight regime for seeker windows, focal plane array, low latency communication and thermal protection system - Mature component technologies and reduce risk using sounding rockets to flight test and demonstrate interceptor and kill vehicle technology - Pursue on-going scientific and engineering university research initiatives and projects, including: -- Auburn University: Survivability of Flexible Hybrid Electronics in Missile Applications -- Johns Hopkins University: Improvements in Thermal Battery Capabilities -- North Carolina State University/Czech Tech University: Space Debris Exploration: Modeling and Fusion Algorithms -- Pennsylvania State University: Development of High Performance W-Based Alloys with Sub-Grained Microstructure by Field Assisted Sintering Technology for Rocket Nozzles -- Purdue University: Investigation of Root Causes of Combustion Instability -- Purdue University: Reliability Risk Management of Gold Contaminated Tin-Lead and Lead-Free Solder Joints in Military Electronics -- Texas A&M University: Hysteresis Engineering of Adaptive Materials for Electronic and Opto-Electric Devices -- University of Michigan: Narrow-Band Infrared Spectral Filtering via Silicon Sub-Wavelength Dielectric Gratings -- U.S. Air Force Academy: Interceptor Flight Control Mechanism Efficiency - Sponsor breakthrough technology and innovative solutions from private industry, qualified accredited domestic educational institutions, and non-profit organizations, using the Advanced Technology Innovation Broad Agency Announcement (BAA), to include research in: -- Radar systems -- Directed energy systems -- Electro-Optical Infrared Sensor Systems			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
-- Computer science, signal, and data processing -- Mechanical and aerospace engineering -- Left through right of launch integration -- Decision theory -- M&S -- Interceptor technology -- Sensor technology ***FY 2020 Plans:*** - Sponsor breakthrough technology and innovative solutions, as funds allow, from private industry, qualified accredited domestic educational institutions, and non-profit organizations, using the Advanced Technology Innovation BAA, for example: -- Additive manufacturing technology initiatives for interceptor propulsion and structural components -- Space & sensor technology -- Directed energy technology -- Radar systems -- Electro-Optical Infrared sensor systems -- Computer science, signal, and data processing -- Mechanical and aerospace engineering -- Left through right of launch integration -- Decision theory -- M&S -- Interceptor technology -- Future BMDS concept development -- 3D printing of diamond composite structures -- HD component technologies --- Technology development to raise TRL of new hypersonic components and integrate into the HD architecture ---- Kinetic ---- Non-kinetic ---- Sensors ---- Communications ---- C2 ---- M&S - Nanosat Testbed Initiative: providing risk reduction in the development of new and advanced technologies, in support of the BMDS, by testing and demonstrating capabilities under realistic environmental conditions			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
- Mature component technology and reduce technology risk using sounding rockets to demonstrate interceptor in a relevant environment ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects a $22.200 million congressional plus-up for the acceleration of Hypersonic Defense technologies. Other Hypersonic Defense efforts are funded in PE 0604181C in FY 2020 and outyears.			
Accomplishments/Planned Programs Subtotals	22.897	41.661	19.793

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	55.562	56.753	13.600	-	13.600	13.475	16.187	18.232	22.949	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy to conduct these technology development agreements consists of partnering with accredited domestic universities, small businesses, and nonprofit organizations. MDA awards competitive procurements via the MDA Science and Technology Advanced Research BAA; the Advanced Technology Innovation BAA; the SBIR and the Small Business Technology Transfer program.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / *Advanced Research*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	1.747	0.868	0.904	0.881	-	0.881	0.994	0.958	1.090	1.094	Continuing	Continuing

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603294C / *Common Kill Vehicle Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	201.109	55.562	56.753	13.600	-	13.600	13.475	16.187	18.232	22.949	Continuing	Continuing
MD85: *Common Kill Vehicle Technology*	201.109	52.599	50.713	10.941	-	10.941	10.941	10.940	10.950	10.950	Continuing	Continuing
MD40: *Program Wide Support*	-	2.963	6.040	2.659	-	2.659	2.534	5.247	7.282	11.999	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Beginning in FY 2020, in accordance with Department priorities, Multi Object Kill Vehicle (MOKV) efforts include limited component technology maturation and concept studies for future MOKV development.

A. Mission Description and Budget Item Justification

The MOKV program will enhance interceptor performance to enable the Warfighter to counter numerous and complex threats to the homeland by establishing the technological foundation for engaging multiple objects from a single interceptor compared to what is currently fielded. The Missile Defense Agency (MDA) is developing the concepts for an MOKV based on a modular open systems architecture designed to common interfaces and standards, making upgrades easier, and enabling a more competitive, broader supplier industrial base.

MOKV will rely on a Ballistic Missile Defense System (BMDS) architecture that balances performance across the sensor, Command, Control, Battle Management and Communications, and kill vehicle elements. Analysis shows that having multiple kill vehicles on each interceptor can dramatically improve the performance of the system, significantly reduce the burden on interceptor inventory, and reduce cost per kill to defend the Homeland.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	252.879	189.753	205.645	-	205.645
Current President's Budget	55.562	56.753	13.600	-	13.600
Total Adjustments	-197.317	-133.000	-192.045	-	-192.045
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-160.000	-55.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	-36.000	-78.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.317	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency					Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*		R-1 Program Element (Number/Name) PE 0603294C *I Common Kill Vehicle Technology*			
• Other Adjustment	0.000	0.000	-192.045	-	-192.045

Change Summary Explanation

Decrease in FY 2018 from PB19 to PB20 reflects the congressional adjustment of -$196.000 million in accordance with the FY 2018 Appropriations Act.

Decrease in FY 2019 from PB19 to PB20 reflects the congressional adjustment of -$133.000 million in accordance with the FY 2019 Appropriations Act.

Decrease in FY 2020 from PB19 to PB20 reflects reduced MOKV efforts to limited component technology maturation and concept studies for future MOKV development in accordance with Department priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603294C / *Common Kill Vehicle Technology*	Project (Number/Name) MD85 / *Common Kill Vehicle Technology*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD85: *Common Kill Vehicle Technology*	201.109	52.599	50.713	10.941	-	10.941	10.941	10.940	10.950	10.950	Continuing	Continuing

Note

Beginning in FY 2020, in accordance with Department priorities, Multi Object Kill Vehicle (MOKV) efforts include limited component technology maturation and concept studies for future MOKV development.

A. Mission Description and Budget Item Justification

MDA will focus on MOKV competitive technology risk reduction with industry.

The MOKV concepts and identified technology component risk reduction will formulate the trade space across cost, risk, and kill vehicle performance to inform requirements that are feasible and affordable for the engineering, manufacturing and development of a future MOKV.

As part of MOKV concept development, industry identified technology component risk reduction efforts that support their concepts. In FY 2019, MDA will continue limited risk reduction for selected kill vehicle and carrier vehicle component technologies that lower technical risk. MOKV limited component technology risk reduction will draw from existing efforts such as engagement management, communications, seekers and advanced sensors, divert attitude and control systems, integrated avionics, and inertial measurement units. In FY 2020, MOKV efforts are limited to component technology maturation and concept studies for future MOKV development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Common Kill Vehicle	52.599	50.713	10.941
Description: Competitive component technology risk reduction of MOKV concepts with industry. Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans: Conduct limited technology risk reduction for selected component technologies that lower technical risk. Potential candidate MOKV limited component technology risk reduction will draw from existing efforts such as engagement management, communications, seekers and advanced sensors, divert attitude and control systems, integrated avionics, and inertial measurement units.			
FY 2020 Plans: Conduct limited component technology maturation and concept studies for future MOKV development.			
FY 2019 to FY 2020 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*	**Project (Number/Name)** MD85 / *Common Kill Vehicle Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
In FY 2020, in accordance with Department priorities, Multi Object Kill Vehicle (MOKV) efforts include limited component technology maturation and concept studies for future MOKV development.			
Accomplishments/Planned Programs Subtotals	52.599	50.713	10.941

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
• 0604894C: *Multi Object Kill Vehicle*	6.347	6.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.847

Remarks

D. Acquisition Strategy

The full acquisition strategy consists of three focus areas. First, through competition with missile integration contractors, develop kill vehicle architectures and interfaces with competitive design of multi- object kill concepts incorporating engagement management concept of operations, kill vehicles and enhanced discrimination capability. Second, conduct risk reduction activities to identify and mature the technology necessary to increase the reliability and performance of our kill vehicles using the Advanced Technology Innovation Broad Agency Announcement and competitive procurements. Make investments that mitigate the component technology gaps for future multi- object kill vehicles that enhance the competitive environment. Third, leverage the technical expertise of Federally Funded Research and Development Centers, University Applied Research Centers, and Universities and government laboratories to independently develop reference concept using proven modeling and analysis techniques.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603294C / *Common Kill Vehicle Technology*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	-	2.963	6.040	2.659	-	2.659	2.534	5.247	7.282	11.999	Continuing	Continuing

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

Program Wide Support (PWS) contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	2.963	6.040	2.659
Description: Program Wide Support (PWS) contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans: - SEE ABOVE.			
FY 2020 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	2.963	6.040	2.659

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,536.412	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
MD07: *THAAD*	1,437.269	292.088	225.932	194.752	-	194.752	187.780	208.121	163.980	180.975	Continuing	Continuing
MC07: *Cyber Operations*	5.454	7.220	6.149	9.580	-	9.580	10.580	7.608	4.770	4.872	Continuing	Continuing
MD06: *Patriot Advanced Capability-3 (PAC-3)*	8.635	144.735	147.459	90.404	-	90.404	26.228	1.252	1.276	1.302	Continuing	Continuing
MD40: *Program-Wide Support*	85.054	10.104	8.733	8.025	-	8.025	10.091	10.940	9.222	10.310	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2019 to FY 2020 reflects completion and delivery of the THAAD Remote Launcher capability (USFK JEON) in FY 2019; completion of Position, Navigation and Timing (PNT) Antenna and regional clock capabilities to replace the GPS antennas; and completion of developmental activities for Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON).

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense (BMD) Terminal Defense Segment provides vital forward-deployable capabilities to support regional defensive BMD operations. The Terminal High Altitude Area Defense (THAAD) system provides Combatant Commanders a globally-transportable, rapidly-deployable capability to intercept and destroy short-range, medium-range, and limited intermediate-range missile threats inside or outside the atmosphere during terminal phase of flight. Continued development and integration will provide enhanced debris mitigation capability, improved interoperability with other BMDS elements, and training devices to support the THAAD Institutional Training Base.

This Program Element also investigates concepts and performs systems engineering to address emerging threats.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603881C *I Ballistic Missile Defense Terminal Defense Segment*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	292.262	214.173	199.399	-	199.399
Current President's Budget	454.147	388.273	302.761	-	302.761
Total Adjustments	161.885	174.100	103.362	-	103.362
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-20.000	-10.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	186.700	184.100			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.815	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	103.362	-	103.362

Change Summary Explanation

Net increase in FY 2018 from PB19 to PB20 reflects the enacted congressional reduction of $20.000 million for THAAD software development, and increases of $186.700 million for USFK JEON, and improved electronic protection / objective debris mitigation (EP/ODM) discrimination.

Net increase in FY 2019 from PB19 to PB20 reflects the enacted congressional reduction of $10.000 million for THAAD software development, and increase of $184.100 million for USFK JEON.

Increase in FY 2020 from PB19 to PB20 provides full funding of the USFK JEON requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MD07 / *THAAD*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD07: *THAAD*	1,437.269	292.088	225.932	194.752	-	194.752	187.780	208.121	163.980	180.975	Continuing	Continuing
Quantity of RDT&E Articles	50	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects completion and delivery of the THAAD Remote Launcher capability (USFK JEON) in 2019; completion of Position, Navigation and Timing (PNT) Antenna and regional clock capabilities to replace the GPS antennas; and completion of developmental activities for Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON).

A. Mission Description and Budget Item Justification

The THAAD Development Program consists of multiple, independent software builds (e.g. Build 2.0, Build 3.0 - Improved Debris Mitigation, Software Build 3.2 - Remote Launcher Part 1 (USFK JEON), Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON), Software Build 5.0 - Expanded Regional Defense, and Software Build 6.0 - Enhanced Correlation and Discrimination) in an incremental evolution to expand the capability of the previously delivered THAAD system. All new software builds include cyber security and information assurance upgrades.

Software Build deliveries have been adjusted to most efficiently and effectively deliver both the USFK JEON content (THAAD Remote Launcher Part 1; Patriot Launch on Remote; THAAD / Missile Segment Enhancement (MSE) Part 1) along with program of record capabilities as follows:

Software Build 3.2 - Remote Launcher Part 1 (USFK JEON) (scheduled to be completed in 4Q FY 2019)
- Initial requirements for increased defended area footprints via remote operation of THAAD Launchers in support of USFK JEON
- PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE's full kinematic capability in support of USFK JEON

Software Build 4.0 - THAAD / MSE Integration Part 1 (USFK JEON) (scheduled to be completed in 2Q FY 2021)
- Initial requirements to integrate MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability in support of USFK JEON
- Expanded requirements for increased defended area footprints via THAAD Remote Launcher Part 2
- Improved capability to engage short-range ballistic missile (SRBM), medium-range ballistic missile (MRBM) and limited intermediate-range ballistic missile (IRBM) threats capable of creating complex scenes

Software Build 5.0 - Expanded Regional Defense (scheduled to be completed in 2Q FY 2023)
- Hypersonic tracking and reporting for the warfighter to utilize the Terminal Mode radar to report hypersonic threats to the BMDS
- Capability to track, discriminate and engage lethal objects reported on surveillance
- Expanded requirements for THAAD / MSE Integration Part 2 to increase defended area footprints via remote operation of MSE Launchers in a THAAD Battery

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Software Build 6.0 - Enhanced Correlation and Discrimination (scheduled to be completed in 1Q FY 2025)
- Enhance engagement coordination with other BMD assets
- Upgrades to process Command, Control, Battle Management and Communications (C2BMC) messages to obtain direction for target engagement

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Terminal High Altitude Area Defense (THAAD) Development	128.400	109.962	110.300
Articles:	-	-	-
Description: Development of the THAAD program as a series of independent, parallel software builds (e.g. Build 2.0, Build 3.0 - Improved Debris Mitigation , Software Build 3.2 - Remote Launcher Part 1 (USFK JEON), Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON), Software Build 5.0 - Expanded Regional Defense, and Software Build 6.0 - Enhanced Correlation and Discrimination) to deliver increments of enhanced weapon system capabilities and expand defense of allies and deployed forces from short-to-intermediate-range threats. Recurring efforts to support software development include: - Support element Models and Simulations (M&S) related activities, to include Verification, Validation and Accreditation(VV&A) and Continuous Digital Assessment (CDA) on the path of accredited models and simulations for BMDS assessment, - Support M&S related activities in element and BMDS test events in the approved Integrated Master Test Plan (IMTP) such as; requirements, design, development, and VV&A, - Design, develop, test, and field the releases of THAAD system software to ensure continued performance and operation of fielded batteries, - Provide software updates in support of the incremental evolution of performance upgrades, - Support laboratory assets and equipment to enable future development, and to isolate, identify, and remedy root causes of equipment and software deficiencies identified by the warfighter, - Perform requirements development, engineering analysis, and performance verification for THAAD development and BMDS integration to ensure THAAD compliance with the Ballistic Missile Defense (BMD) System Specification, BMD System Description Document, and Master Integration Plan, - Participate in MDA and Army studies to determine the architecture and integration of the THAAD Weapon system into the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS). - Provide and coordinate analysis, studies and papers to support the resolution of issues and concerns with the integration of the THAAD weapon system into the future Army IBCS architecture. - Development for THAAD Electronic Protection/Objective Debris Mitigation and implementation of flexible-threat packages and defense planning in order to provide an improved capability to engage SRBM, MRBM and limited IRBM threats capable of creating complex scenes.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Development of expanded defended area footprints via remote operation of THAAD Launchers. This effort adds additional communication pathways between launchers and THAAD Fire Control (TFCC) to allow launchers to be emplaced. - Development of improved tactical network architecture in order to increase availability, robustness, and security of the system to counter cybersecurity threats. - Incremental Development Process to identify THAAD evolution and synchronize requirements that address emerging threat evolution, obsolescence needs, Army training needs, reliability and sustainment issues. Perform redesign mitigation for obsolescence which could impact THAAD's future capability evolution. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Complete mitigation of Track ID Proliferation to correctly associate track objects in track when those objects are tracked by multiple BMDS sensors. - Complete developmental efforts to replace current GPS antennas with Position, Navigation and Timing (PNT) Antennas and regional clock capabilities. This effort is a Department of Defense mandate to ensure the integrity and availability of PNT data for the THAAD weapon system. ***FY 2020 Plans:*** - Complete development for THAAD Electronic Protection/Objective Debris Mitigation and remote operation of THAAD Launchers as described above. - Complete development for improved capability to engage short-range ballistic missile (SRBM), medium-range ballistic missile (MRBM) and limited intermediate-range ballistic missile (IRBM) threats capable of creating complex scenes. - Initiate development of future interoperability architecture and procedures with capability intended to track, discriminate and engage lethal objects reported on surveillance via coordinated, interoperable BMDS elements to conserve limited BMDS interceptors. - Initiate part 2 of THAAD / MSE integration to provide the warfighter the capability to extend the defended area and provide the THAAD weapon system with self-defense capability - Develop or modify THAAD models and supporting M&S components to meet system-level and enterprise M&S infrastructure requirements for both the Ground Test re-architecture and all-Digital BMDS M&S architecture. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Program Operations	48.543	50.930	43.801
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: Program Operations provides strategic planning, program integration, contracting, acquisition, engineering, financial management, internal reviews and audits, and program assessments for the THAAD Program Office. Recurring activities include: -Provide technical and business management support activities to provide the Program Director with critical program status and decision quality data, -Ensure THAAD program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process, -Conduct internal program reviews to measure program progress against the six Missile Defense Agency approved baselines -Continue a Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs, and -Provide Quality Safety and Mission Assurance (QSMA) operations to ensure compliance with Agency requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered to the Warfighter. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects transfer of Program Operations associated with Terminal Defense Segment Test from this Program Element to the Terminal Defense Segment Test 0604876C Program Element.			
Title: USFK JEON	100.557	58.000	33.300
Articles:	-	-	-
Description: This accomplishment fully funds the THAAD portion of USFK JEON to deliver expanded engagement options and increased coverage area. This includes accelerating some content previously included in the THAAD Development accomplishment, while adding new development efforts which include Rapid Deployment of Command and Control and Software upgrades and Performance Optimization Against Additional Threats as well as the following three new priorities:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
1) PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE's full kinematic capability 2) THAAD / MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability 3) THAAD Remote Launcher Part 1 that utilizes flexible communication paths to extend the defended area of a THAAD battery Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Completes accelerated development of the THAAD Remote Launcher Part 1 emplacement in support of the USFK JEON effort. Remote operation of the THAAD Launchers provide a mitigation against advanced threat ballistic missiles, expands defended area footprints, and enables emplacement in restricted terrain locations. - Completes acquisition of testbeds required to support USFK JEON development efforts. - Completes upgrading testbeds and laboratories to reflect current and future hardware configurations of the THAAD Weapon Systems to support the JEON development and testing. - Completes development of an improved and more reliable on-board vehicle power solution in support of the USFK JEON effort. This on-board power solution will increase reliability and availability to all THAAD components. ***FY 2020 Plans:*** - Completes and delivers PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE's full kinematic capability - Continues THAAD / MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion and delivery of the THAAD Remote Launcher capability in 2019.			
Title: Project Redwood- Details at a Higher Classification	6.704	4.356	4.430
Articles:	-	-	-
Description: This project is reported in accordance with Title 10, United States Code, Section 119 (a)(1) in the Special Access Program Annual Report to Congress. ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: THAAD Program Support	7.884	2.684	2.921
Articles:	-	-	-
Description: This activity provides support for efforts such as communications and interoperability upgrades to operate on joint, service, or allied communications networks. This activity provides support for safety and mission assurance requirements, and support of independent government offices as part of the Materiel Release process. Recurring efforts include: - Interoperability development and maintenance to ensure the weapon system is authorized to operate on joint, service, or allied communications networks, - Safety confirmation and verification testing, preparation and approvals of System Safety Risk Assessments, issuance of hazard classifications and safety releases, insensitive munitions approvals and waivers, and independent oversight and support in the areas of reliability, availability, and maintainability (RAM) and quality assurance. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	292.088	225.932	194.752

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD OM*	70.044	87.560	99.819	-	99.819	97.801	101.010	99.504	107.618	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD Procurement*	1,125.732	1,014.068	425.863	-	425.863	430.719	381.628	417.431	432.831	0.000	4,228.272
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0604876C: *Ballistic Missile Defense Terminal Defense Segment Test*	35.738	61.017	25.137	-	25.137	32.124	48.087	61.224	22.584	Continuing	Continuing

Remarks

D. Acquisition Strategy

The THAAD program awards Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders on the Advanced Capability Development (ACD) contract for THAAD development. The ACD contract is comprised of over 40 separate task orders with varying contract types such as firm fixed price, fixed price incentive firm, cost plus incentive fee, and cost plus fixed fee. The discrete task orders allow management and tracking of Development work.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Terminal High Altitude Area Defense (THAAD) Development - Advanced Capability Development	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	714.526	88.341	Nov 2017	71.084	Nov 2018	68.933	Nov 2019	-		68.933	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - IT Program Support	C/CPAF	Northrup Grumman : AL, AK, CA, CO, HI, NM, VA	4.455	2.839	Nov 2017	3.158	Jan 2019	2.870	Jan 2020	-		2.870	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - MDA Program Support	MIPR	Missile Defense Agency (MDA) : Ft. Belvoir, VA/ Huntsville, AL	7.890	3.358	Nov 2017	0.000		2.500	Dec 2019	-		2.500	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Models & Simulations	MIPR	US Army Research, Development, Engineering Command (RDECOM) : Huntsville, AL	197.010	25.037	Dec 2017	23.305	Dec 2018	31.191	Dec 2019	-		31.191	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Requirements and Design	C/CPAF	Boeing : AL	11.572	3.409	Dec 2017	3.858	Dec 2018	2.801	Jan 2020	-		2.801	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Software Support (GOVT)	MIPR	US Army Research, Development, Engineering Command (RDECOM) : Huntsville, AL	4.456	4.408	Nov 2017	5.633	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - THAAD Radar Improvements	SS/CPAF	Raytheon : MA	10.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD)	C/CPFF	TEAMS SE&I : AL / CO	11.232	1.008	Dec 2017	2.924	Dec 2018	2.005	Dec 2019	-		2.005	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development - Verification and Assessment															
USFK JEON - JEON Advanced Capability Development	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	0.000	90.785	Mar 2018	54.304	Dec 2018	30.100	Dec 2019	-		30.100	Continuing	Continuing	Continuing
USFK JEON - MDA Program Support	Various	MDA : Huntsville, AL	0.000	0.509	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
USFK JEON - OGA JEON Support (GOVT)	MIPR	US Army Tank Automotive Research, Development, and Engineering Center (TARDEC), Army Test and Evaluation Command (ATEC) : Warren, MI / Huntsville, AL	0.000	9.263	Jun 2018	3.696	Dec 2018	3.200	Dec 2019	-		3.200	Continuing	Continuing	Continuing
		Subtotal	961.141	228.957		167.962		143.600		-		143.600	Continuing	Continuing	N/A

Remarks

- The ACD contract is comprised of over 40 separate task orders with varying contract types such as firm fixed price, fixed price incentive firm, cost plus incentive fee, and cost plus fixed fee.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Program Operations	Various	Missile Defense Agency (MDA) : Ft. Belvoir, VA/ Huntsville, AL	236.973	48.543	Oct 2017	50.930	Oct 2018	43.801	Nov 2019	-		43.801	Continuing	Continuing	Continuing
Project Redwood- Details at a Higher Classification - Special Programs	SS/FP	N/A : N/A	77.161	6.704	Oct 2017	4.356	Oct 2018	4.430	Nov 2019	-		4.430	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MD07 / *THAAD*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
THAAD Program Support - Mission Support	MIPR	ATEC / SMDC / AMRDEC / MDA : WSMR, NM / Huntsville, AL	24.815	7.884	Nov 2017	2.684	Nov 2018	2.921	Dec 2019	-		2.921	Continuing	Continuing	Continuing
THAAD Program Support - Prime Contractor Support	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	0.600	0.000		0.000		0.000		-		0.000	0.000	0.600	0.000
THAAD Program Support - Prior year no longer funded in the FYDP	Various	Various : Various	136.579	0.000		0.000		0.000		-		0.000	0.000	136.579	0.000
		Subtotal	476.128	63.131		57.970		51.152		-		51.152	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MD07 / *THAAD*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,437.269	292.088		225.932		194.752		-		194.752	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
THAAD Software Build 3.0 - Improved Debris Mitigation Delivery			▲																									
THAAD Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON) Preliminary Design Review (PDR)			▲																									
THAAD Software Build 3.2 (USFK JEON Phase 3)								△																				
THAAD Software Build 5.0 - Expanded Regional Defense Engineering Requirements Review (ERR)									△																			
THAAD Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON) Critical Design Review									△																			
THAAD Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON) Delivery													△															
THAAD Software Build 5.0 - Expanded Regional Defense Delivery																					△							

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
THAAD Software Build 3.0 - Improved Debris Mitigation Delivery	3	2018	3	2018
THAAD Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON) Preliminary Design Review (PDR)	3	2018	3	2018
THAAD Software Build 3.2 (USFK JEON Phase 3)	4	2019	4	2019
THAAD Software Build 5.0 - Expanded Regional Defense Engineering Requirements Review (ERR)	1	2020	1	2020
THAAD Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON) Critical Design Review	1	2020	1	2020
THAAD Software Build 4.0 - THAAD / Missile Segment Enhancement (MSE) Integration (USFK JEON) Delivery	2	2021	2	2021
THAAD Software Build 5.0 - Expanded Regional Defense Delivery	2	2023	2	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MC07 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC07: *Cyber Operations*	5.454	7.220	6.149	9.580	-	9.580	10.580	7.608	4.770	4.872	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides the improved cyber security requirements for software development efforts to align with Agency and USD(R&E) priority. Development efforts involve more robust cyber security for both offense and defense to address the advanced threat.

A. Mission Description and Budget Item Justification

Cyber Operations sustain MDA Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities; analysis of validation results, risk assessments; reviews of proposed Program Manager/Information Assurance Manager Plans of Action and Milestones for MDA THAAD mission systems; and supports THAAD certification to operate in the BMDS.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network / System Certification and Accreditation (C&A)	7.220	6.149	9.580
Articles:	-	-	-
Description: Funding in this project sustains MDA RMF and CVT activities, analysis of validation results, risk assessments, monitoring and tracking of Cybersecurity mitigations, and all other activities necessary to comply with the Federal Information Security Management Act (FISMA). Recurring efforts include: - Conducting cyber security / information assurance engineering and architecture planning for THAAD information technology systems - Developing and testing cyber security/information assurance control measures for BMDS THAAD systems - Developing THAAD RMF for DoD IT certification and accreditation packages - Supporting CVT of THAAD mission, test, and training systems - Developing Plan of Action and Milestones (POA&Ms) to resource and remediate information assurance deficiencies - Conducting annual information assurance reviews on the THAAD enclaves to assess compliance in implementing and maintaining IA controls - Perform IAVA to mitigate potential system vulnerabilities - Update THAAD software and hardware to ensure compliance with DoD Weapon System Information Assurance Programs - Continue THAAD Weapon System software development efforts consistent with DoD cyber security requirements which were previously covered under THAAD Development, in order to correlate cyber software activities with realigned funding.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** - Improve software development efforts for more robust cyber security for both offense and defense to address the advanced threat in order to align with Agency and USD(R&E) cyber security priority. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides the improved cyber security requirements for software development efforts to align with Agency and USD(R&E) priority. Development efforts involve more robust cyber security for both offense and defense to address the advanced threat.			
Accomplishments/Planned Programs Subtotals	7.220	6.149	9.580

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD OM*	70.044	87.560	99.819	-	99.819	97.801	101.010	99.504	107.618	Continuing	Continuing
• 0208866C: MD07: *THAAD Procurement*	1,125.732	1,014.068	425.863	-	425.863	430.719	381.628	417.431	432.831	0.000	4,228.272
• 0604876C: *Ballistic Missile Defense Terminal Defense Segment Test*	35.738	61.017	25.137	-	25.137	32.124	48.087	61.224	22.584	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MC07 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services	C/CPFF	Torch Technologies : Various MDA Locations	2.294	0.860	Nov 2017	0.888	Nov 2018	0.903	Dec 2019	-		0.903	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Security Engineering	SS/CPFF	LMSSC : Sunnyvale, CA/Huntsville, AL	3.160	6.360	Jan 2018	5.261	Jan 2019	8.677	Feb 2020	-		8.677	Continuing	Continuing	Continuing
		Subtotal	5.454	7.220		6.149		9.580		-		9.580	Continuing	Continuing	N/A

Remarks

The increase from FY 2019 to FY 2020 provides the improved cyber security requirements for software development efforts to align with Agency and USD(R&E) priority. Development efforts involve more robust cyber security for both offense and defense to address the advanced threat. Details are available at a higher classification level.

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.454	7.220		6.149		9.580		-		9.580	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC07 Completed Cyber Operations	✦	✦	✦	✦	✦																							
MC07 Planned Cyber Operations						✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC07 Completed Cyber Operations	1	2018	1	2019
MC07 Planned Cyber Operations	2	2019	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MD06 / *Patriot Advanced Capability-3 (PAC-3)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD06: *Patriot Advanced Capability-3 (PAC-3)*	8.635	144.735	147.459	90.404	-	90.404	26.228	1.252	1.276	1.302	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects completion of the USFK JEON PATRIOT Launch on Remote

A. Mission Description and Budget Item Justification

PAC-3 is an operational, land-based weapon built upon the proven U.S. Army Phased Array Tracking Radar Intercept on Target (PATRIOT) air and missile defense infrastructure. The Army is responsible for production and further development of the PAC-3 System and Missile Segment Enhancements (MSE); MDA remains responsible for any BMDS interoperability and integration efforts. Lower Tier Project Office (LTPO) will utilize MDA funds to further the integration of PATRIOT with the BMDS.

Beginning in FY 2018, this project also includes LTPO's portion of the USFK JEON including:
1) PATRIOT launch on remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize MSE's full kinematic capability
2) THAAD / MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: General Support	1.135	1.159	1.204
Articles:	-	-	-
Description: MDA funds PATRIOT participation in BMDS interoperability integration efforts. Activities support the day-to-day tasking that is leveraged upon LTPO by MDA based on the Transfer and Transition Plan Annex L.			
Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans: - SEE ABOVE.			
FY 2020 Plans: - SEE ABOVE			
FY 2019 to FY 2020 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A			
Title: USFK JEON - LTPO	143.600	146.300	89.200
Articles:	-	-	-
Description: This accomplishment fully funds LTPO's portion of the USFK JEON including PATRIOT Launch on Remote and THAAD / MSE integration Part 1. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Continues PATRIOT Launch on Remote effort to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE full kinematic capability - Continues THAAD / MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability ***FY 2020 Plans:*** - Completes and delivers PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE full kinematic capability - Continues THAAD / MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of the USFK JEON PATRIOT Launch on Remote			
Accomplishments/Planned Programs Subtotals	144.735	147.459	90.404

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD OM*	70.044	87.560	99.819	-	99.819	97.801	101.010	99.504	107.618	Continuing	Continuing
• 0208866C: MD07: *THAAD Procurement*	1,125.732	1,014.068	425.863	-	425.863	430.719	381.628	417.431	432.831	0.000	4,228.272
• 0604876C: *Ballistic Missile Defense Terminal Defense Segment Test*	35.738	61.017	25.137	-	25.137	32.124	48.087	61.224	22.584	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The planned acquisition strategy for Phased Array Tracking Radar Intercept on Target (PATRIOT) support is to provide Military Interdepartmental Purchase Requests (MIPR) to the U.S. Army Lower-Tier Program Office (LTPO) to further the integration of PATRIOT with the BMDS.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MD06 / *Patriot Advanced Capability-3 (PAC-3)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USFK JEON - LTPO - USFK JEON - LTPO	MIPR	Lower Tier Project Office : Huntsville, AL	0.000	143.600	Mar 2018	146.300	Dec 2018	89.200	Dec 2019	-		89.200	Continuing	Continuing	Continuing
		Subtotal	0.000	143.600		146.300		89.200		-		89.200	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
General Support - General Support	MIPR	Lower Tier Project Office : Huntsville, AL	8.635	1.135	Nov 2017	1.159	Nov 2018	1.204	Nov 2019	-		1.204	Continuing	Continuing	Continuing
		Subtotal	8.635	1.135		1.159		1.204		-		1.204	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MD06 / *Patriot Advanced Capability-3 (PAC-3)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.635	144.735		147.459		90.404		-		90.404	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD06 Completed Patriot Advanced Capability-3 (PAC-3		✦	✦	✦	✦																							
MD06 Planned Patriot Advanced Capability-3 (PAC-3)						✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD06 Completed Patriot Advanced Capability-3 (PAC-3	2	2018	1	2019
MD06 Planned Patriot Advanced Capability-3 (PAC-3)	2	2019	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	85.054	10.104	8.733	8.025	-	8.025	10.091	10.940	9.222	10.310	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	10.104	8.733	8.025
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	10.104	8.733	8.025

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various : VA	3.500	0.000		0.000		1.473	Oct 2019	-		1.473	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	6.657	0.200	Jul 2018	0.132	Jul 2019	0.120	Jul 2020	-		0.120	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various : Multi: AL, CA, CO, VA	3.515	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA, VA,	14.049	0.000		0.550	Oct 2018	3.401	Oct 2019	-		3.401	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support International and Materiel and Readiness	MIPR	Various : Multi: AL, VA, Aust, Japan	2.534	0.921	Jul 2018	0.037	Apr 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	53.376	8.983	Jan 2018	7.650	Aug 2019	3.031	Oct 2019	-		3.031	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	1.423	0.000		0.364	Jan 2019	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	85.054	10.104		8.733		8.025		-		8.025	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	85.054	10.104		8.733		8.025		-		8.025	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603882C *I Ballistic Missile Defense Midcourse Defense Segment*

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	4,225.003	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
MD08: *Ground Based Midcourse*	4,092.237	1,103.288	739.895	1,065.322	-	1,065.322	741.269	686.536	748.655	686.405	Continuing	Continuing
MC08: *Cyber Operations*	33.863	18.399	33.754	37.870	-	37.870	40.161	34.857	36.450	37.265	Continuing	Continuing
MD40: *Program-Wide Support*	98.903	31.576	29.710	53.314	-	53.314	48.021	44.844	49.428	53.001	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Increase from FY 2019 to FY 2020 provides an increase for ground systems software development and hardware upgrades, initiation of the development of the Hawaii In-Flight Interceptor Communications System (IFICS) Data Terminal (IDT), upgrade and reactivation of the IDT on the Sea Based X-Band Radar (SBX), Ground Based Midcourse Defense (GMD) Lab upgrades and cybersecurity efforts.

A. Mission Description and Budget Item Justification

The GMD element of the Ballistic Missile Defense System (BMDS) provides combatant commanders with a continuously available (24 hours a day, 7 days a week, 365 days a year) capability to defend the Homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The GMD capability consists of Ground Based Interceptor (GBI), GMD Fire Control system (GFC), GMD Communications Network (GCN), Hawaii IFICS IDT and ground Launch Support Systems (LSS). The Missile Defense Agency (MDA) will deliver 64 operationally deployed GBIs located at Fort Greely, Alaska (60 GBIs) and Vandenberg Air Force Base, California (4 GBIs). Each GBI delivers a single kill vehicle to defeat threat warheads in space during the midcourse phase of the ballistic trajectory. The GFC consists of fire control nodes in Fort Greely, Alaska and Missile Defense Integration and Operations Center (MDIOC) Colorado Springs, Colorado. IDTs are currently located in Fort Greely, Alaska: Vandenberg Air Force Base, California; Eareckson Air Station, Alaska; and Fort Drum, New York. The GMD capability leverages integration of BMDS sensors across the globe. Development objectives for GMD include: improve homeland defensive capability against an evolving threat that is increasing both in number of missiles and complexity of threat payloads, execute flight testing, modernize the GMD ground system, provide fire control and communications, develop GBI software enhancements that improve reliability, capability, and discrimination, improve GMD models and simulations (M&S), and participate with other BMDS assets in system ground tests.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603882C *I Ballistic Missile Defense Midcourse Defense Segment*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	957.097	926.359	1,046.235	-	1,046.235
Current President's Budget	1,153.263	803.359	1,156.506	-	1,156.506
Total Adjustments	196.166	-123.000	110.271	-	110.271
• Congressional General Reductions	-4.000	0.000			
• Congressional Directed Reductions	0.000	-136.400			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	229.996	35.000			
• Congressional Directed Transfers	0.000	-21.600			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-24.298	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-5.532	0.000	110.271	-	110.271

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustment of $229.996 million in accordance with the FY 2018 Appropriations Act.

Decrease in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustment for forward financing in the FY 2018 Appropriations Act.

Increase in FY 2020 from PB19 to PB20 provides the development of the Hawaii In-Flight Interceptor Communications System (IFICS) Data Terminal (IDT), upgrade and reactivation of the IDT on the Sea Based X-Band Radar (SBX), Ground Based Midcourse Defense (GMD) Lab upgrades and cybersecurity efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	Project (Number/Name) MD08 / *Ground Based Midcourse*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD08: *Ground Based Midcourse*	4,092.237	1,103.288	739.895	1,065.322	-	1,065.322	741.269	686.536	748.655	686.405	Continuing	Continuing
Quantity of RDT&E Articles	11	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides increased ground systems software development and hardware upgrades, initiation of the development of the Hawaii IFICS IDT, upgrade and reactivation of the IDT on the SBX, GMD Lab upgrades and cybersecurity efforts.

A. Mission Description and Budget Item Justification

GMD includes development and delivery of GMD Ground Systems, GBIs, Systems Engineering and Program Management. Development objectives for GMD include: improve homeland defensive capability against an evolving threat that is increasing both in number of missiles and complexity of threat payloads, execute Flight Tests, modernize the GMD ground system provides improved fire control and communications, develop GBI software enhancements that improve reliability and discrimination, improve GMD M&S, and participate with other BMDS assets in system ground tests. GMD will continue the effort to develop and field improved standalone and integrated BMDS discrimination capabilities, both of which will improve the BMD System's ability to identify lethal reentry vehicles and non-lethal threat objects for enhanced interceptor performance.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Ground Based Interceptor	390.118	104.276	167.186
Articles:	-	-	-
Description: Due to the move of GBI manufacturing to procurement, the FY19 Ground Based Interceptor Development, Manufacturing and Reliability accomplishments were consolidated in this accomplishment beginning in FY 2020. The GBI accomplishment will continue to develop improvements to enhance reliability, counter emerging threats, eliminate obsolescence and incorporate available technologies. The GBI Program will continue acquisition of boosters. The GBI reliability program conducts the analysis and testing necessary to characterize the reliability and service life of the GBI Fleet. The data generated from the reliability program allows the Program Office to manage the GBI fleet, develop design improvements, develop fleet maintenance strategies, and extend interceptor service life. The data is also used by MDA engineering to develop battle simulations for the ground test program; and by the Warfighter in developing tactics, techniques, and procedures. Recurring work: Conduct of key Kill Vehicle (KV) engineering assessments including integrated sneak circuit analyses, Worst Case Circuit Analysis, and electrical/thermal derating analyses to document current performance/capability and identify potential risk areas to assess and improve overall KV reliability for the Warfighter; collection of Reliability, Availability, Maintainability and Testability (RAM-T) data and analysis of performance metrics on the Operational System in order to continuously improve the system for the Warfighter; continue the Probabilistic Risk Assessment (reliability model) development to assess the GBI			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
design enabling improvements to overall GBI reliability for Warfighter defense of the homeland; continue Stockpile Reliability Program (SRP) functional testing of naturally aged GBI subsystems and components removed from previously fielded GBIs during upgrade/modification to understand performance and aging characteristics in order to establish life limits, achieve GBI maintenance cost savings, and build Warfighter confidence in aging GBIs; and continue rocket motor propellant studies to extend the service life of limited life items in order to achieve cost savings on GBI lifecycle maintenance and further build Warfighter confidence in aging GBIs. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Deliver two flight test configured interceptors to support the first GBI salvo test (FTG-11) -Continue to develop, test and field interceptor software upgrade with improved mid-term discrimination capability and capabilities to improve Exoatmospheric Kill Vehicle (EKV) performance reliability for known issues in order to enhance system capability against robust threat systems -Initiate activities to support the Flight Test Ground-based Midcourse Defense Booster Verification Test (BVT-03) -Initiate All Up Round (AUR) systems engineering for RKV integration, testing and fielding with Configuration 1 Integrated Boost Vehicles Continue booster development to address inertial measurement unit obsolescence and increase the capacity of GBIs available for the warfighter from 44 to 64 to defeat developing threats -Complete development of 2- or 3-Stage selectable boost vehicle software that provides additional engagement battlespace to the warfighter -Continue acquisition of CE-II Block I EKV/C2 integrated boost vehicles with the Consolidated Booster and Avionics Upgrades (CBAU) GBI to improve warfighter capability and capacity -Continue acquisition of five boosters to support flight testing -Conduct of key KV engineering assessments including integrated sneak circuit analyses, Worst Case Circuit Analysis, and electrical/thermal derating analyses to document current performance/capability and identify potential risk areas to assess and improve overall KV reliability for the Warfighter - Continue the Probabilistic Risk Assessment (reliability model) development to assess the GBI design enabling improvements to overall GBI reliability for Warfighter defense of the homeland; continue SRP functional testing of naturally aged GBI subsystems and components removed from previously fielded GBIs during upgrade/modification to understand performance and aging characteristics in order to establish life limits, achieve GBI maintenance cost savings, and build Warfighter confidence in aging GBIs			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue rocket motor propellant studies to extend the service life of limited life items in order to achieve cost savings on GBI lifecycle maintenance and further build Warfighter confidence in aging GBIs ***FY 2020 Plans:*** -Initiate GBI developmental laboratory Special Test Equipment (STE) refresh engineering, hardware procurement, and installation planning -Initiate systems engineering effort with Ground Based Strategic Deterrent (GBSD) Program to support future GBI boost vehicle development -Continue to develop, test and field interceptor software upgrades with improved mid-term discrimination capability and capabilities to improve EKV performance reliability for known issues in order to enhance system capability against robust threat systems -Continue to use the EKV Hardware-in-the-Loop 10V Chamber for operational analysis of emerging threats, discrimination improvements performance, pre-mission testing and post flight analysis and reconstruction in accordance with the Integrated Master Test Plan (IMTP) to reduce execution risks and gain confidence that capabilities performed as expected -Continue booster development to address inertial measurement unit obsolescence and increase the capacity of GBIs available for the warfighter from 44 to 64 to defeat developing/emerging threats -Continue All Up Round (AUR) systems engineering for RKV integration, testing and fielding with Integrated Boost Vehicles -Continue flight test rotation program of fielded GBIs by upgrading kill vehicles and boosters, adding the necessary Non-Tactical Equipment to support the IMTP requirements -Continue acquisition of five boosters to support flight testing and to ensure the number of fielded GBIs does not decrease through the FYDP -Deliver a flight test boost vehicle and complete GBI integration to support Flight Test Ground-based Midcourse Defense BVT-03 -Deliver CE-II Block 1 payload level spares as GBI Line Replaceable Units to support maintaining the fielded GBI fleet -Complete acquisition of CE-II Block I EKV/ C2 integrated boost vehicles with the CBAU GBI to improve warfighter capability and capacity -Complete acquisition of CE-II Block I EKV/ C2 integrated boost vehicles with the CBAU GBI to improve warfighter capability and capacity ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for GBI lab upgrades, software maintenance and upgrades, initiation of the engineering effort with GBSD Program to support future GBI boost vehicle development, and GBI AUR engineering/product support for all GBI development and production activities.			
Title: Ground Systems & Fire Control	354.420	264.034	570.445

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Articles:	-	-	-

Description: The GMD Ground Systems enable control and operation of the GMD Element as part of the BMDS. Ground Systems consists of the GMD Fire Control system, GMD Communications Network, In-Flight Interceptor Communications System (IFICS) Data Terminal (IDT), Launch Site Components (LSC) (silos, silo interface vaults [SIVs]), and the LSS (Command and Launch Equipment (CLE), which includes Launch Support Equipment (LSE).

Specific and/or unique accomplishments to each FY are as follows:

FY 2019 Plans:
-Complete deployment of CLE/GFC re-architecture hardware suites to mitigate obsolescence and increase reliability, sustainability, and availability of GMD fire control systems
-Continue development and production of the IDT technology upgrades to support the RKV On-Demand Communications capability for systems discrimination data, directed engagement and hit assessments
-Continue IFICS End-to-End Test to demonstrate communication between the RKV and the GMD Ground System
-Complete design and development of 7B upgrades for Mid-Term discrimination improvements; upgrade interfaces to IDT to support On-Demand Communications and Warfighter enhancements
-Continue GS 7B GCN Modernization efforts to support GMD system expansion and emerging requirement, enhance/maintain Cybersecurity posture, and mitigate hardware and software obsolescence
-Continue design and development of the version 8 software build that allows implementation of Mid-Term Discrimination upgrades
-Continue system upgrades to the Readiness and Control (R&C) building in Fort Greely, Alaska. The upgrades will maximize shielded protection to vital systems and provide more operational space for the Warfighters
-Continue design and development of software upgrades for Shoot-Assess-Shoot version 9 software supported by GMD Post-Intercept Assessment utilizing GMD sensors
-Continue ground systems development to increase the capacity of GBIs for the warfighter to defeat developing threats in terms of number of threat missiles and complexity of threat payloads.
-Continue work for 20 new silos and associated support equipment for a new missile field (Missile Field #4) to accommodate the GBIs at Fort Greely, AK.
-Continue obsolescence upgrades for in-silo hardware and software to support 20 new silos and enhance cybersecurity.
-Continue work to add two additional silos in Missile Field 1 at Fort Greely, AK

FY 2020 Plans:
- Continue development and production of the IDT technology upgrades to support the RKV On-Demand Communications capability for systems discrimination data, directed engagement and hit assessments

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue IFICS End-to-End Test to demonstrate communication between the RKV and the GMD Ground System - Continue GCN Modernization efforts to support GMD system expansion and emerging requirement, enhance/maintain Cybersecurity posture, and mitigate hardware and software obsolescence - Continue design and development of the version 9 software build that allows implementation of BMDS system track within GMD Ground Systems as well as Mid-Term Discrimination upgrades - Initiate development of the Hawaii IFICS IDT and upgrade and reactivation of the IDT on the SBX to increase the defense of Hawaii as well as the number of communication events with the kill vehicle for increased threat raid sizes & flight testing - Continue system upgrades to the R&C building in Fort Greely, Alaska. The upgrades will maximize shielded protection to vital systems and provide more operational space for the Warfighters - Continue design and development of software upgrades for Shoot-Assess-Shoot version 9 software supported by GMD Post-Intercept Assessment utilizing GMD sensors - Continue ground systems development to increase the capacity of GBIs for the warfighter to defeat developing threats in terms of number of threat missiles and complexity of threat payloads ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for ground systems software development and hardware upgrades, initiation of the development of the Hawaii IFICS IDT, upgrade and reactivation of the IDT on the SBX.			
Title: Systems Engineering and Program Management	303.171	311.146	267.423
Articles:	-	-	-
Description: GMD Systems Engineering and Program Management provide essential services for the development and fielding of the GMD hardware and software and Industry Program Management operations. Systems Engineering includes concept definition, requirements and interface development, system design, integration, software IV&V, M&S development, test planning and verification efforts. Key products are development, integration and maintenance of the technical baseline and critical engineering processes for implementation and delivery of an integrated GMD element capability. Recurring System Engineering work includes: Continue requirements development, engineering analysis, capability integration, and performance verification for increment 6 of the GMD system and BMDS integration; continue to assess current capabilities against the evolving threat; continue sustainment of core information technology data and unified communications services to accomplish research and development activities; develop and deliver updated interfaces incorporating RKV capabilities in the GMD system; continue Technical Direction Agent activities to provide the technical and program execution expertise required to offer independent assessment/analysis, unbiased and objective system level-oriented advice; continue modeling and simulation development and integration to assess component and system performance in support of annual technical assessments; continue			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
modeling and simulation verification, validation, and accreditation (VV&A) to establish high confidence in Warfighter assessments; continue design, planning, provide configuration management and control of network diagrams, technical specifications, and interfaces for the Vandenberg Launch Control Center, Vandenberg Air Force Base, California; introduce the use of the RKV Development Laboratory (RDL) space chamber for RKV specific end game performance testing similar to testing conducted for EKV in the 10V chamber; continue government led software assurance and , independent software IV&V of all GMD delivered software and firmware to improve software reliability; continue requirements audit to include: functional decomposition / traceability, bottoms-up verification, sufficiency audit, and establishment of detailed performance requirement error budgets and allocations to ensure complete understanding of system capability and potential gaps; and continue rigorous independent verification and validation and system engineering analysis of GMD software to increase system performance and reliability. Program Management provides for prime contractor management of the GMD program. This effort includes program and business management, program administration, subcontract management, technical and testing oversight, verification of hardware and software development, quality/safety/mission assurance, integrated logistics support, and infrastructure to develop, test and sustain the GMD system and components while ensuring the program meets all cost, schedule, and performance requirements. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Initiate integration phase of ground testing and test analysis for mid-term discrimination capabilities via Ground Test -Complete the Enhanced Homeland Defense Systems Engineering activities executing Increment 6 Systems Engineering under the current Prime Contract -Continue the development of modeling and simulation M&S wrapped tactical code to reduce the life cycle cost and increase the fidelity of the results and integrate GMD Sim into the new OSF -Complete design and development of Mid-term discrimination improvements techniques -Continue test planning for discrimination improvements capabilities -Continue development of discrimination improvements through Far Term -Continue to develop fire control/weapon handover improvements and create preliminary design that includes: - 2/3 Stage Selectable GBI Weapon - Fire Control Cyber security improvements - Initial Integration of RKV ***FY 2020 Plans:*** -Execute Increment 6B Preliminary Design Review -Execute Increment 6B Critical Design Review			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Deliver Increment 6B architectural models -Deliver updated interfaces that support Increment 6B new capabilities to include LRDR, 2/3 stage selectable booster and RKV -Deliver performance assessments to support element and component technical reviews associated with Increment 6B development -Develop and deliver accredited GMD M&S products to support performance assessments, ground tests and flight tests -Update GMD Performance Specifications as required to maintain alignment to BMDS Specifications -Deliver Increment 8 GMD Performance Specification -Continue development of discrimination improvements to enhance GMD performance against existing and emerging threats -Continue to conduct government-led, software IV&V on all industry software and firmware deliveries -Develop or modify GMD models and supporting M&S components to meet system-level and enterprise M&S infrastructure requirements for both the Ground Test re-architecture and all-Digital BMDS M&S architecture ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the realignment of GMD test related funding from this PE to the Ballistic Missile Defense Midcourse Defense Segment Test (0604887C) PE.			
Title: Program Operations	55.579	60.439	60.268
Articles:	-	-	-
Description: Program Operations provides for government management of the GMD program. This effort provides: Technical, business, acquisition, configuration management and integration activities to ensure the GMD program meets cost, schedule, and performance goals and ensure program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process; internal Agency program reviews to measure program progress against the six MDA approved baselines; Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety (QSMA) in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs; and sustainment of core infrastructure and unified communications services to accomplish the GMD mission. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A			
Accomplishments/Planned Programs Subtotals	1,103.288	739.895	1,065.322

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0203882C: MD08: *GMD O&M*	138.751	139.204	153.218	-	153.218	146.614	159.376	165.746	165.790	Continuing	Continuing
• 0603882C: MD08:: *GMD Procurement*	268.000	532.600	9.471	-	9.471	323.466	532.975	467.001	244.663	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604874C: *Improved Homeland Defense (HLD) Interceptors*	742.842	421.820	412.363	-	412.363	326.922	197.386	137.553	86.423	Continuing	Continuing
• 0604887C: *Ballistic Missile Defense Midcourse Defense Segment Test*	85.030	72.634	98.139	-	98.139	91.955	116.709	110.937	101.103	Continuing	Continuing
• 0604894C: *Multi Object Kill Vehicle*	6.347	6.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.847

Remarks

D. Acquisition Strategy

The GMD program will continue to follow testing, development, and evolutionary acquisition through incremental development. The Agency acquisition strategy ensures GMD components are upgraded to improve both All-Up System (AUS) performance and AUR performance in order to retain the proven GMD contribution to the Integrated BMDS. This acquisition approach reduces obsolescence risk, provides opportunities for incremental capability improvements, and allows decision makers to make informed trades between cost, schedule, and performance while exploring improved operational and technological capabilities.

GMD awarded a competitive Development and Sustainment Contract (DSC) on December 30, 2011. This contract included development, fielding, test, systems engineering, integration, and configuration management; equipment manufacturing and upgrade; training, operations and sustainment of the GMD system and associated support facilities.

In January of 2018 the MDA Director approved the extension of the DSC to execute the Missile Defeat and Defense Enhancement scope (20 silos and 20 GBIs). On January 31, 2018, the DSC Extension was awarded to the Boeing Company with a period of performance through Q1 FY2024. In addition to the MDDE requirements,

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

the DSC Extension also includes supporting test, engineering, software, and performance based logistics scope. The DSC structure breaks out major efforts into separate Contract Line Item Numbers with individual incentives for management insight, accounting and property accountability.

GM is also implementing a more robust Program Board structure allowing more Government insight and decisions into the technical baseline and has changed business processes for greater Government involvement in Program decisions. In addition, GM utilizes Government laboratory modeling & simulation, and analysis capabilities to augment Boeing's efforts.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Based Interceptor - All Up Round Development	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	0.000		16.965	Nov 2018	18.672	Nov 2019	-		18.672	Continuing	Continuing	Continuing
Ground Based Interceptor - Booster Development	C/CPIF	Boeing : AL/AK/AZ CA/CO/TX/VA	72.000	53.000	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor - Configuration 2 CBAU Booster Development	C/CPIF	Boeing : AL/AK/AZ CA/CO/TX/VA	53.546	1.004	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor - EKV Spares	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	6.811	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor - Five Boosters	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	40.084	82.602	Nov 2017	39.357	Nov 2018	22.826	Nov 2019	-		22.826	Continuing	Continuing	Continuing
Ground Based Interceptor - Flight Rotations for BMDS Testing	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	61.568	12.382	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor - GBI Prime Product Support	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	235.938	126.302	Nov 2017	19.492	Nov 2018	46.458	Nov 2019	-		46.458	Continuing	Continuing	Continuing
Ground Based Interceptor - Government Reliability Program	MIPR	AMRDEC / Redstone Arsenal, AL : NSWC Crane, IN	17.969	4.763	Nov 2017	6.628	Nov 2018	4.999	Nov 2019	-		4.999	Continuing	Continuing	Continuing
Ground Based Interceptor - Ground Based Interceptors #48-58 (CE-II)	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	705.204	11.376	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor - Ground Based Strategic Deterrent (GBSD) Cooperative Development	TBD	TBD : TBD	0.000	0.000		0.000		15.406	Nov 2019	-		15.406	Continuing	Continuing	Continuing
Ground Based Interceptor - Interceptor Manufacturing Support	MIPR	NASA MSFC& AMRDEC, HSV, AL Draper Laboratory, MA; : Vanguard, HSV, AL	16.124	1.885	Nov 2017	1.812		8.148	Nov 2019	-		8.148	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Based Interceptor - Operational Spares	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	22.430	6.086	Nov 2017	0.446	Nov 2018	2.966	Nov 2019	-		2.966	Continuing	Continuing	Continuing
Ground Based Interceptor - Prime Interceptor Manufacturing & Lab Support	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	34.044	34.044	Nov 2017	1.139	Nov 2018	23.245	Nov 2019	-		23.245	Continuing	Continuing	Continuing
Ground Based Interceptor - Prime Reliability Program	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	31.548	8.984	Nov 2017	8.674	Nov 2018	8.145	Nov 2019	-		8.145	Continuing	Continuing	Continuing
Ground Based Interceptor - Software Maintenance & Updates	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	47.232	40.879	Nov 2017	9.763	Nov 2018	16.321	Nov 2019	-		16.321	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Government Fort Drum IDT	MIPR	MDA/AL : /VA/NY	0.576	0.000		0.000		0.000		-		0.000	0.000	0.576	0.000
Ground Systems & Fire Control - Government Missile Field 4 (20 Silos)	MIPR	MDA : AL/VA	1.200	4.375	Nov 2017	6.207	Nov 2018	8.629	Nov 2019	-		8.629	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Government Software Development	MIPR	AMRDEC : Redstone Arsenal, AL	9.980	0.982	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Hawaii IDT	TBD	TBD : TBD	0.000	0.000		0.000		30.430	Nov 2019	-		30.430	Continuing	Continuing	Continuing
Ground Systems & Fire Control - MF-1: two silos to ensure the number of fielded GBIs does not decrease through the FYDP	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/VA	0.000	0.000		14.958	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime CLE Re-Architecture	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	46.609	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	5.908	2.016	Nov 2017	2.044	Nov 2018	1.264	Nov 2019	-		1.264	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Communications Infrastructure															
Ground Systems & Fire Control - Prime Fort Drum IDT	C/CPIF	Boeing AL : CO/NY/ VA	10.063	0.000		0.000		0.000		-		0.000	0.000	10.063	0.000
Ground Systems & Fire Control - Prime Ground Systems Software Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	310.534	115.483	Nov 2017	142.023	Nov 2018	162.584	Nov 2019	-		162.584	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime MF-1 Repair and Refurbishment	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	38.925	0.000		0.000		0.000		-		0.000	0.000	38.925	0.000
Ground Systems & Fire Control - Prime Missile Field 4 (20 Silos)	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/VA	8.048	63.540	Nov 2017	28.507	Nov 2018	102.777	Nov 2019	-		102.777	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime On Demand Communications	C/CPFF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	0.000		5.820	Nov 2018	66.037	Nov 2019	-		66.037	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime Technology Refresh	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	189.031	168.024	Nov 2017	64.475	Nov 2018	178.745	Nov 2019	-		178.745	Continuing	Continuing	Continuing
Ground Systems & Fire Control - SBX IDT Reactivation	TBD	TBD : TBD	0.000	0.000		0.000		19.979	Nov 2019	-		19.979	Continuing	Continuing	Continuing
		Subtotal	1,958.561	744.538		368.310		737.631		-		737.631	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Management - Cyber Security	MIPR	MDA : AL/VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Systems Engineering and Program Management - Government Discrimination Improvements	MIPR	FFRDC/UARC : AL	8.551	8.374	Nov 2017	2.483	Nov 2018	1.891	Nov 2019	-		1.891	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government EKV HWIL Tests in Space Chamber	MIPR	AEDC : Tullahoma, TN	27.401	6.292	Nov 2017	6.303	Nov 2018	5.707	Nov 2019	-		5.707	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government Modeling and Simulation	MIPR	SED and Morrow Labs : Redstone Arsenal/AL	86.647	18.628	Nov 2017	26.581	Nov 2018	26.048	Nov 2019	-		26.048	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government Systems Engineering & Integration	MIPR	AMRDEC : HSV/AL	61.442	55.894	Nov 2017	60.092	Nov 2018	50.042	Nov 2019	-		50.042	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Information Management & Technology Ops	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	25.670	12.705	Nov 2017	12.415	Nov 2018	12.477	Nov 2019	-		12.477	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Model & Simulations Industry Support	C/CPAF	Northrop Grumman : AI, VA	2.539	0.000		0.000		0.000		-		0.000	0.000	2.539	0.000
Systems Engineering and Program Management - Modeling & Simulation Element Improvements	C/CPIF	Boeing : AL/CA/CO/ VA	0.000	0.000		0.000		2.798	Nov 2019	-		2.798	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime Design, Readiness, Analysis and Reporting	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	14.521	0.000		9.151	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Management - Prime Discrimination Improvements	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	57.350	26.384	Nov 2017	40.338	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime EKV HWIL Tests in Space Chamber	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	68.978	1.678	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime Modeling and Simulation	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	185.083	16.276	Nov 2017	14.298	Nov 2018	15.932	Nov 2019	-		15.932	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime Program Management	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	257.365	64.875	Nov 2017	53.812	Nov 2018	53.546	Nov 2019	-		53.546	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime System Engineering and Integration	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	367.316	28.040	Nov 2017	32.287	Nov 2018	39.979	Nov 2019	-		39.979	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis	MIPR	Various : AL/VA	25.867	2.472	Nov 2017	1.921	Nov 2018	1.851	Nov 2019	-		1.851	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis - CSS Support	C/CPFF	TEAMS : AL	11.715	8.501	Nov 2017	6.607	Nov 2018	6.739	Nov 2019	-		6.739	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis – FFRDC / UARC	MIPR	Various : AL/VA	6.400	4.444	Nov 2017	3.454	Nov 2018	4.742	Nov 2019	-		4.742	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering	C/CPIF	Boeing : AL	17.269	7.734	Nov 2017	6.011	Nov 2018	6.410	Nov 2019	-		6.410	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
& Analysis – Industry Support															
Systems Engineering and Program Management - Systems Engineering and Program Management - Discrimination Engineering & Analysis	C/CPIF	Boeing : AL/CA/CO/VA	9.043	16.388	Nov 2017	12.737	Nov 2018	15.497	Nov 2019	-		15.497	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering and Program Management Model & Simulations Support	Allot	MDA : AL/VA	40.096	8.086	Nov 2017	6.285	Oct 2018	7.760	Nov 2019	-		7.760	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Technical Direction Agent	MIPR	AL/CA/GA/MA : MD/NM/UT/VA	39.506	16.400	Nov 2017	16.371	Nov 2018	16.004	Nov 2019	-		16.004	Continuing	Continuing	Continuing
Program Operations - Contract Support Services	C/CPFF	Various : AL/AK/CA/CO/VA	444.448	14.676	Oct 2017	19.589	Oct 2018	19.430	Oct 2019	-		19.430	Continuing	Continuing	Continuing
Program Operations - FFRDC Support	MIPR	MIT/LL : AL/VA/CO	49.156	2.215	Oct 2017	1.977	Oct 2018	1.933	Oct 2019	-		1.933	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA : AL/VA	266.014	28.844	Oct 2017	30.741	Oct 2018	29.675	Oct 2019	-		29.675	Continuing	Continuing	Continuing
Program Operations - Information Technology Services	MIPR	MDA : AL/CA/VA/CO/AK	3.584	2.619	Nov 2017	2.403	Nov 2018	2.184	Nov 2019	-		2.184	Continuing	Continuing	Continuing
Program Operations - Other Govt Agencies	MIPR	Various : AL/VA/FL/CO	47.865	5.561	Oct 2017	4.168	Oct 2018	5.515	Oct 2019	-		5.515	Continuing	Continuing	Continuing
Program Operations - Safety and Quality	MIPR	MDA : AL/AK/CA/VA	0.583	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - Travel	MIPR	MDA : AL/VA	9.267	1.664	Oct 2017	1.561	Oct 2018	1.531	Oct 2019	-		1.531	Continuing	Continuing	Continuing
		Subtotal	2,133.676	358.750		371.585		327.691		-		327.691	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	Project (Number/Name) MD08 / *Ground Based Midcourse*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4,092.237	1,103.288		739.895		1,065.322		-		1,065.322	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
CLE Re-architecture	✧	✧	✧	✧	✧	✧	✧	✧																				
Communications Infrastructure	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧												
Ground Based Interceptors Rotation and Upgrades	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Technology Refresh	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
On Demand Communications	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧																
Deliver GBIs (54-58)	✧	✧	✧	✧																								
Post-Intercept Assessment	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
Hawaii IFICS Data Terminal (IDT)									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
Ground Systems Software 8 Development (FQT)												✧																
Ground Systems Software 9 Development (FQT)																	✧											

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CLE Re-architecture	1	2018	4	2019
Communications Infrastructure	1	2018	4	2021
Ground Based Interceptors Rotation and Upgrades	1	2018	4	2024
Technology Refresh	1	2018	4	2022
On Demand Communications	1	2018	4	2020
Deliver GBIs (54-58)	1	2018	4	2018
Post-Intercept Assessment	1	2018	4	2022
Hawaii IFICS Data Terminal (IDT)	1	2020	4	2023
Ground Systems Software 8 Development (FQT)	4	2020	4	2020
Ground Systems Software 9 Development (FQT)	2	2022	2	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	Project (Number/Name) MC08 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC08: *Cyber Operations*	33.863	18.399	33.754	37.870	-	37.870	40.161	34.857	36.450	37.265	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 reflects increased efforts to mitigate cybersecurity threats with the implementation of cyber resiliency on the GMD systems through the development of system level requirements which will enhance the operation capability.

A. Mission Description and Budget Item Justification

Sustains MDA Risk Management Framework and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA GMD mission systems. It maintains the Assessment and Authorization (A&A) data repository, capturing the RMF documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorization decisions) and POA&Ms on all MDA information systems.

Monitor and track Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of A&A documentation and authorization recommendations to the MDA Senior Information Systems Security Officer (SISSO)/ Security Control Assessor (SCA), and Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA) 2014.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network / System Certification and Accreditation (C&A)	4.116	6.168	6.393
Articles:	-	-	-
Description: Sustains the MDA RMF and CVT activities, analysis of validation results, risk assessments and reviews of proposed PM POA&Ms for MDA GMD mission system. It maintains the AA data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Authorization Official (AO) accreditation decisions) and POA&M on all MDA information systems. Provides GMD Cybersecurity civilian salaries. Conducts cybersecurity/ Information Assurance (IA) engineering and architecture planning for GMD information technology systems. Plans and tests cybersecurity controls for BMDS GMD systems. Conducts CVT of GMD mission systems and provide PO&Ms to mitigate cybersecurity deficiencies. Conducts annual cybersecurity reviews on the GMD enclaves to assess compliance in implementing and maintaining cybersecurity controls. Develops GMD DoD RMF Assessment and Authorization packages.			
Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** -Implement the GMD Cybersecurity Risk Process across all systems to allow Program Management to execute risk-based decisions on cybersecurity controls -Continue assessing, implementing, documenting, and validating up to 512 cybersecurity control families (1935 security protections and control enhancements) for 25 representative systems which are comprised of 250,000 computing and logic bearing components supporting the GMD Development, Test, Training, and Operational systems -Continue ensuring compliance with security mandates to maintain continued authorization to operate -Continue protecting the GMD systems through the incorporation of a qualified cybersecurity workforce ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides the implementation of the GMD Cybersecurity Risk Process across all systems to allow Program Management to execute risk-based decisions on cybersecurity controls			
Title: Cybersecurity	14.283	27.586	31.477
Articles:	-	-	-
Description: Implements the GMD Cybersecurity Program and Defense in Depth Cybersecurity Strategy for GMD Systems throughout their lifecycle. This includes Research, Development, Test, and Operational Mission Environment Systems, Networks, and Enclaves to ensure system availability to the Warfighter. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Continue implementing necessary upgrades to enhance the cybersecurity posture of the GMD systems while remaining responsive to active or emerging cyber threats against GMD -Execute internal penetration test planning and execution on component level systems to identify candidates for resiliency requirements -Develop mitigation plans for vulnerabilities discovered during cyber testing -Conduct GM Program Cybersecurity Risk Assessments on all vulnerabilities and deficiencies -Develop Tactics, Techniques, and Procedures (TTPs) to address cybersecurity incidents and responses -Develop a cybersecurity training laboratory to test cyber resiliency capabilities and develop training scenarios -Develop training curriculum for Fire Control Operators and Cyber Incident Responders to test TTPs and new cyber defense capabilities			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Increase the number of network defenders to ensure redundancy of network defense capabilities ***FY 2020 Plans:*** -Continue implementing necessary upgrades to enhance the cybersecurity posture of the GMD operational environments and it's supporting information systems and networks while remaining responsive to active or emerging cyber threats against GMD -Implement robust cyber resiliency in GMD systems by developing system level requirements that flow to Ground Systems and Interceptor components to modify designs so GMD systems can operate under cyber-attacks. This level of cybersecurity design will require recurring testing and training for Warfighter and computer network defense operators to address the resilient capability against changing cyber threats -Develop cybersecurity processes and procedures that will provide operators, maintainers, and Warfighter specific steps to recognize and react to cyber-attacks -Develop and execute quarterly cybersecurity training scenarios which will allow fire control operators and network defenders to train through a cyber-contested environment while in an engagement scenario -Execute GM specific penetration testing on multiple components in an effort to identify capability flaws -Develop training curriculum for Fire Control Operators and Cyber Incident Responders to test TTPs and new cyber defense capabilities -Conduct GM Program Cybersecurity Risk Assessments on all vulnerabilities and deficiencies -Continue development Tactics, Techniques, and Procedures (TTPs) to address cybersecurity incidents and responses -Support modification of Installation Support Agreements (ISA's) for assigned real property to ensure Facility-Related Control Systems that support MDA facilities are cyber secure per DoDI 8510.01 -Conduct Cybersecurity training of personnel to include incorporating basic cybersecurity guidance into facility acquisition projects and advanced cybersecurity training for facility cybersecurity personnel ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides increased efforts to mitigate cybersecurity threats with the implementation of cyber resiliency on the GMD systems through the development of system level requirements which will enhance the operation capability.			
Accomplishments/Planned Programs Subtotals	18.399	33.754	37.870

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0203882C: MD08: *GMD O&M*	137.896	143.027	139.319	-	139.319	142.269	145.188	0.000	0.000	Continuing	Continuing
• 0604874C: *Improved Homeland Defense (HLD) Interceptors*	742.842	421.820	412.363	-	412.363	326.922	197.386	137.553	86.423	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604887C: *Ballistic Missile Defense Midcourse Defense Segment Test*	85.030	72.634	98.139	-	98.139	91.955	116.709	110.937	101.103	Continuing	Continuing

Remarks

D. Acquisition Strategy

GMD uses the cybersecurity funding to apply security engineering principles to acquire, design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient protections exist from a threat and risk based approach. To achieve this, cybersecurity protection requirements must be validated and properly flowed into system requirements and design specifications early enough to provide the most cost benefit. Many BMDS systems are now or within the very near future undergoing tech-refresh and so the opportunity to receive the most benefit of implementing the more stringent protections is at hand and aligns with the proposed budget as submitted.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Civilian Salaries	MIPR	MDA : AL/CA/CO	2.788	0.732	Oct 2017	1.218	Oct 2018	1.176	Oct 2019	-		1.176	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Contract Support Services	C/CPFF	Booz Allen Hamilton, AL : Torch Technologies, AL Parsons, AL	14.078	3.384	Nov 2017	4.950	Oct 2018	5.217	Nov 2019	-		5.217	Continuing	Continuing	Continuing
Cybersecurity - Cybersecurity	C/CPAF	Jacobs, CO : BAE, AL	10.603	4.298	Nov 2017	4.076	Nov 2018	3.846	Nov 2019	-		3.846	Continuing	Continuing	Continuing
Cybersecurity - Facility-Related Control Systems Contract Method	MIPR	TBD : TBD	0.000	0.000		0.000		0.914	Nov 2019	-		0.914	Continuing	Continuing	Continuing
Cybersecurity - GMD Cybersecurity Program	C/CPIF	Boeing : AL/AK/CA/CO	0.951	5.861	Nov 2017	18.305	Nov 2018	19.679	Nov 2019	-		19.679	Continuing	Continuing	Continuing
Cybersecurity - Ground Systems Software Cybersecurity	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	5.443	4.124	Nov 2017	5.205	Nov 2018	7.038	Nov 2019	-		7.038	Continuing	Continuing	Continuing
		Subtotal	33.863	18.399		33.754		37.870		-		37.870	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	33.863	18.399		33.754		37.870		-		37.870	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
GMD Cybersecurity Mitigation Monitoring and Tracking	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
GMD Cybersecurity Program Policy / Risk Management	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
GMD Information Assurance Certification and Accreditation (C&A) Package Preparation/Submission	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
GMD Transition to Cybersecurity Risk Management Framework (CRMF)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
BMDS Cybersecurity Policy Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GMD Cybersecurity Mitigation Monitoring and Tracking	1	2018	4	2024
GMD Cybersecurity Program Policy / Risk Management	1	2018	4	2024
GMD Information Assurance Certification and Accreditation (C&A) Package Preparation/ Submission	1	2018	4	2024
GMD Transition to Cybersecurity Risk Management Framework (CRMF)	1	2018	4	2022
BMDS Cybersecurity Policy Development	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	98.903	31.576	29.710	53.314	-	53.314	48.021	44.844	49.428	53.001	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	31.576	29.710	53.314
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	31.576	29.710	53.314

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	14.937	1.860	Jul 2018	0.427	Jul 2019	0.698	Jul 2020	-		0.698	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	MDA : Multi: AK, AL, CA, CO, VA	25.886	25.886	Oct 2017	26.223	Oct 2018	28.885	Oct 2019	-		28.885	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	PHACIL, INC : Multi: AK, AL, CA, CO, VA	22.720	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPR)	MIPR	Various : Multi: AK, AL, CO, CA, HI, VA	26.298	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL,CA, CO, HI, VA	3.830	3.830		0.000		23.731	Nov 2019	-		23.731	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Sustainment Transportation	Reqn	Various : AK, AL, CA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPFF	Utah St Univ; JHU/ APL LLC : Multi: MD, UT	1.372	0.000		0.000		0.000		-		0.000	3.500	4.872	0.000
Program Wide Support - Facilities and Maintenance	MIPR	Various : Multi: AK, AL, CA, VA	3.860	0.000		3.060	May 2019	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	98.903	31.576		29.710		53.314		-		53.314	Continuing	Continuing	N/A

Remarks

Support is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	Project (Number/Name) MD40 / *Program-Wide Support*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	98.903	31.576		29.710		53.314		-		53.314	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603884C / *Ballistic Missile Defense Sensors*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,418.571	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
MD11: *BMDS Radars*	1,328.092	275.144	366.335	263.491	-	263.491	281.044	249.504	260.982	309.225	Continuing	Continuing
MC11: *Cyber Operations*	5.101	3.894	6.079	8.212	-	8.212	1.555	1.586	1.617	24.618	Continuing	Continuing
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	2.078	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.078
MD40: *Program-Wide Support*	85.378	9.173	12.961	11.784	-	11.784	13.499	12.591	13.493	17.764	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follow:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41

The decrease from FY 2019 to FY 2020 reflects completion of AN/TPY-2 development in FY 2019 to provide improved raid handling and enhanced Aegis Engage on Remote Capability.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) network of layered Sensors provides essential situational awareness and fire control data for the command and control of BMDS weapon systems, such as Ground-Based Midcourse Defense (GMD), Aegis Ballistic Missile Defense (BMD), and Terminal High Altitude Area Defense (THAAD). The suite of remote ground-based sensors provides; early warning, midcourse and terminal missile defense threat data enabling layered detection and tracking of missile targets, providing fire-control quality position, velocity, and discrimination data through Ground-Based Midcourse Defense Fire Control (GFC), or Command and Control, Battle Management and Communications (C2BMC).

Overlapping coverage of geographically diverse sensors provides improved threat track data, reduces the impact of the loss of any one sensor, and reduces the potential impact of countermeasures. The extended coverage and accuracy provided by a network of layered sensors increases the defensive footprint and reduces the number of target engagements required, thereby conserving interceptor inventory and maintaining a high probability of successful engagement. Networked forward-based sensors enable C2BMC to pair the best sensor coverage with the best available weapon system to provide the most effective defense against missile threats.

This program element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603884C *I Ballistic Missile Defense Sensors*

more efficiently using interceptor inventory. BMDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) PEs.

The BMD Sensors Program contributes to regional missile defense through the development, delivery and deployment/redeployment of Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) radars for operations or tests. AN/TPY-2 radars can be configured to operate either as a THAAD Fire Unit Radar (terminal mode) or Forward-Based Radar. These radars are transportable, they add flexibility to respond to geographical changes in threats. Radars provide early warning tracking and discrimination data through all phases of missile flight. Through the BMDS C2BMC and coalition data links, the AN/TPY-2 provides fire control data to enable remote Standard Missile (SM)-3 engagements by Aegis BMD, and to cue deployed THAAD and U.S. and partner Patriot batteries.

The BMDS sensor network includes; the COBRA DANE Radar at Eareckson Air Station, Alaska, the Upgraded Early Warning Radars (UEWRs) at Beale Air Force Base, CA; Fylingdales Royal Air Force, United Kingdom, and Thule Air Base in Greenland for defense of the homeland. The Clear Ultra High Frequency Early Warning Radar (EWR), at Clear Air Force Station, AK, and the Cape Cod EWR, at Cape Cod Air Force Station, MA, are also being upgraded to include missile defense functionality against long-range threats in addition to their existing Missile Warning and Space Surveillance missions. Upgrade activities began in CY 2012 and are now projected to be completed in CY 2020 due to current UEWR operational configuration emergency maintenance required by AF Space Command that blocked access to the radar sites for operational testing. The addition of the Clear UEWR and Cape Cod UEWRs to the BMDS sensor architecture improves BMDS sensor coverage and provides new engagement options against long-range missile threats from Northeast Asia and Southwest Asia respectively.

In accordance to Section 1684 (e) (2) of the National Defense Authorization Act for fiscal year 2016, the Missile Defense Agency is required to submit with the President's Budget request for fiscal year 2020 a plan to carry out Section 1684(d) and an update on progress in meeting Section 1684 (b) and (c). A decision to deploy an additional radar in the Atlantic has not yet been made. Current planned radar deployments include the Long-Range Discrimination Radar in Alaska, the Homeland Defense Radar - Hawaii, and the Pacific Radar that begin operating in 2021, 2023, and 2026 respectively.

The SBX is currently deployed in the Pacific Ocean. Current operational plans do not require homeporting of the SBX to the Atlantic.

The MDA previously completed the studies required by Section 1684 (b) and (c) of the National Defense Authorization Act for fiscal year 2016 and submitted them to the Congressional Defense Committees.

Cyber Operations sustain the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments, reviews of Plans of Action and Milestones (POA&Ms), and alignment and integration to the Tier 2 Cybersecurity Service Provider (CSSP) for the Sensors mission system.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603884C *I Ballistic Missile Defense Sensors*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	278.145	220.876	250.238	-	250.238
Current President's Budget	290.289	385.375	283.487	-	283.487
Total Adjustments	12.144	164.499	33.249	-	33.249
• Congressional General Reductions	-2.000	0.000			
• Congressional Directed Reductions	-5.000	-8.801			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	46.000	178.300			
• Congressional Directed Transfers	-21.000	-5.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-5.856	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	33.249	-	33.249

Change Summary Explanation

Net increase in FY 2018 from PB19 to PB20 reflects improvements in discrimination capabilities and USFK JEONS.

Net increase in FY 2019 from PB19 to PB20 reflects enacted congressional increases (USFK JEON, cyber threats, improved discrimination capabilities, systems engineering enhancements, AN/TPY-2 radar improvements) and decreases (program operations unjustified request; and transfer of Pacific Radar from this Program Element to Pacific Radar PE 0604673C).

Increase in FY 2020 from PB19 to PB20 provides additional VV&A, M&S Enterprise improvements, and USFK JEONS integration requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / *Ballistic Missile Defense Sensors*	Project (Number/Name) MD11 / *BMDS Radars*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD11: *BMDS Radars*	1,328.092	275.144	366.335	263.491	-	263.491	281.044	249.504	260.982	309.225	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease in FY 2020 reflects the completion of AN/TPY-2 development in FY 2019 providing new BMDS capabilities, to include additional raid handling and enhanced Aegis BMD Engage on Remote.

A. Mission Description and Budget Item Justification

The BMDS Radars project includes development of future AN/TPY-2, COBRA DANE, LRDR, Sea Based X-Band (SBX), and UEWR capabilities through system engineering; software development; and testing support.

Modeling and Simulation (M&S) efforts include enhanced sensor models, development of Radio Frequency scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDS) M&S architecture, and Verification, Validation, and Accreditation of radar models. United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS) provides rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. This project also funds participation and support for Ballistic Missile Defense System (BMDS) element ground and flight test campaigns and Warfighter games and exercises.

This project will continue development of discrimination advanced algorithms for the AN/TPY-2, COBRA DANE, Sea Based X-Band (SBX), and the UEWR radars to counter evolving threats. The discrimination improvement effort will develop and field integrated Element capabilities to improve BMDS ability to identify lethal and non-lethal objects. Sensors will continue development of discrimination improvement mid-term design and test support for SBX and far-term trade analysis and planning.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Basic Development Program	25.004	25.502	28.742
Articles:	-	-	-
Description: The Basic Development Program includes development and testing of software maintenance updates to address software trouble reports identified on fielded SW versions and flight/ground test events. Software maintenance updates also includes annual cybersecurity certifications and accreditations, testing for vulnerabilities, and third party assessments of all sensors systems. Software improvement efforts also include optimization of increased processing capabilities. The Basic Development Program also provides analysis of software performance during flight and ground testing of Phased Adaptive Approach (PAA) Phases II and III to conduct Materiel Release Analysis for software delivery. The Materiel Release Closure Plan for the AN/TPY-2 ensures the Reliability, Availability, and Maintainability (RAM) Program promotes reliability growth in the suite of AN/TPY-2 radars via product improvements.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides additional software development.			
Title: BMDS Radars Modeling & Simulation (M&S)	20.212	23.815	60.812
Articles:	-	-	-
Description: BMDS Radars M&S efforts include enhanced sensor models, development and maintenance of Radio Frequency (RF) scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDS), M&S architecture, and Verification, Validation, and Certification (VV&C) of radar models. This effort includes support for technical and performance assessments using Open Systems Architecture Sensor Models (OSM), Open Systems Architecture Signal Injectors (OSI) and other models/tools, as well as development and sustainment of Digital and Hardware in the Loop (HWIL) representations of the tactical versions of AN/TPY-2, LRDR, SBX, UEWR, and COBRA DANE Upgrade (CDU). This effort includes support for tactical Requirements verification, including development and VV&C of models for testing electronic protection and objective debris mitigation algorithms. This project also supports war games, Warfighter exercises and training, and execution of element-level ground test campaigns to anchor M&S. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** - Initiate development of additional capabilities in high fidelity digital models for AN/TPY-2 and SBX. - Initiate Validation of high fidelity digital models for AN/TPY-2 and SBX. - Initiate Validation of Multi-band Electronic Attack Digital Injection Capability (MEDIC). - Initiate development of integrated simulation capabilities in high fidelity radar models for Full Digital Product as part of Enterprise Digital Integrated System Simulation (EDISS)			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Initiate development of integrated simulation capabilities in HWIL radar models for Ground Test Integrated System Simulation (GTISS) ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides additional VV&A and M&S Enterprise improvements to provide high fidelity simulation (Digital) and stimulation (HWIL) of advanced radar capabilities in support of future technical capability declarations (TCD).			
Title: Capability Development Program	136.611	223.777	103.973
Articles:	-	-	-
Description: The Capability Development Program provides engineering support to enable compliance with BMD System Specification threat capabilities and addresses advanced threats prevalent in 2017 and beyond. This task includes the redesign of select components to address obsolescence and improve reliability of the system. This task initiates electronic protection and objective debris mitigation development efforts to reduce or eliminate the effect of corporate clutter and electronic attack on sensors. This effort develops the Post Intercept Assessment (PIA) capability for the SBX and UEWRs. It develops, designs and tests sensor mid-term discrimination improvements for X-Band radars, to include SBX threat discrimination improvements. It also performs object classification performance updates to UEWR radars. This effort funds participation in far-term discrimination improvement threat model specifications and develops discrimination and countermeasure mitigation capability development. Additional software development activities include support to THAAD Launch on Remote (LoR) capability and X86 performance optimization to enhance processing speed. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** - Initiate additional raid handling, - Initiate enhanced Aegis BMD Engage on Capability, - Initiate expanded active sensor bias and full sensor bias reporting. - Initiate threat updates and verification, core standards system engineering, required updates to models and simulation, and performance assessments. ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Decrease from FY 2019 to FY 2020 reflects completion of AN/TPY-2 development in FY 2019 to provide improved raid handling and enhanced Aegis BMD Engage on Remote Capability.			
Title: Sensors Directorate Operations	65.483	57.428	50.892
Articles:	-	-	-
Description: Program Operations provides strategic planning, program integration, contracting, acquisition, engineering, financial management, internal reviews and audits, and program assessments for the Sensors Program Office. Recurring activities include: - Provide technical and business management support activities to provide the Program Director with critical program status and decision quality data - Ensure Sensors program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process - Conduct internal program reviews to measure program progress against the six Missile Defense Agency approved baselines - Continue a Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs - Provide Quality Safety and Mission Assurance (QSMA) operations to ensure compliance with Agency requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered to the Warfighter Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** -SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the transition of Sensors Test and SBX personnel to the Sensors Test PE, 0604879C, and SBX PE, 0603907C.			
Title: Upgrade Clear Early Warning Radar	2.034	6.613	3.172
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: Upgrade of Clear Early Warning Radar and Cape Cod Early Warning Radar includes adaptation of hardware and software to UEWR infrastructure, support to BMDS communications and architecture work and installation at site. This project also includes preparation and removal of legacy equipment at each UEWR site. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Initiate operations and sustainment activities post operational acceptance to include SATCOM operators and System Administrators ***FY 2020 Plans:*** - Complete operations and sustainment activities post operational acceptance to include interim contractor logistics support at Clear Air Force Station (AFS) ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the completion of operations and sustainment activities post operational acceptance to include interim contractor logistics support at Clear Air Force Station (AFS).			
Title: United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS)	25.800	29.200	15.900
Articles:	-	-	-
Description: Rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. Phase 1 provides enhanced discrimination, increases search plan optimization, and updates Position, Navigation, and Timing and Regional Mission Data. Phase 2 will improve debris mitigation to increase raid performance against threats, improve debris tracks on radar resources, and provide search plan upgrades that increase search acquisition and support remote launcher capabilities. Phase 3 provides additional increased search plan capabilities, implementation of the DoD Regional Clock, remote launcher upgrades to integrate AN/TPY-2 with PATRIOT and THAAD systems, and improves proficiencies against advanced threats in complex environments. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Complete Phase 3 to utilize the DoD Regional Clock, expand defended areas and increase capabilities against threats, including improved remote launch capabilities			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Initiate studies for an alternative radar mission profile and search plans to support regional engagement with THAAD, Aegis and Patriot ***FY 2020 Plans:*** - Initiate expanded THAAD/MSE integration (Part II) in support of the U.S. Forces Korea (USFK) Joint Emergent Operational Need Statement (JEONS), ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects USFK JEON requirements.			
Accomplishments/Planned Programs Subtotals	275.144	366.335	263.491

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0208866C: *O&M*	491.179	472.473	522.529	-	522.529	502.337	552.596	573.723	657.706	0.000	3,772.543
• 0208866C: *PROCUREMENT*	3,052.841	2,572.400	1,493.793	-	1,493.793	1,670.987	1,834.709	1,971.280	1,822.396	0.000	14,418.406
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604181C: *Hypersonic Defense*	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
• 0604673C: *Pacific Discriminating Radar*	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	88.840	77.405	105.530	-	105.530	114.698	99.088	112.943	96.526	Continuing	Continuing
• 13999903: *Planning and Design, Defense Wide*	8.397	8.525	8.822	-	8.822	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Radar Development Contract (RDC) awarded on Nov 1, 2017 supports the Sensors Directorate's X-Band Radars (XBR). Ballistic Missile Defense System (BMDS) capability and performance requirements, which underpin continuing XBR development requirements include, but are not limited to, the Army/Navy Transportable Radar Surveillance and Control (AN/TPY-2) radar and the Sea-Based X-Band (SBX) radar. These requirements stem directly from formal Warfighter requirements as developed in the United States Strategic Command (USSTRATCOM)-led Warfighter Involvement Process (see USSTRATCOM Special Instruction (SI) 538-3, Missile Defense Warfighter Involvement Process, June 25, 2008). Achievable requirements documented in the Prioritized Capabilities List (PCL) and Modification and Fielding Requirements List (MFRL) are documented in MDA's Achievable Capabilities List (ACL) and translated via the BMDS architecture and system specifications into flow-down requirements, characteristics, and capability needs for individual BMDS program specifications, and ultimately are approved through the systems engineering and baseline change management process for BMDS programs to execute. The RDC supports the XBRs for product improvement, including developmental upgrades of software and development of hardware and software to meet enhanced capabilities and risk reduction measures; warfighter support, including wargames and exercise support; engineering services, including engineering support for delivered and accepted radars to facilitate maintenance efforts which may include, but are not limited to, hardware obsolescence studies, hardware redesign, technology insertion and refurbishment; BMDS test subject matter expert (SME) support; modeling and simulation SME support; and cybersecurity. These support activities are for all AN/TPY-2 radars, in the Forward Based Mode (FBM) and Terminal Mode (TM), and the SBX Radar to include the Weather Air Search Radar (WxASR) located on the SBX platform.

The BMDS Communications System Complex-Transportable (BCSC-T) Program Plan addresses the design, development, acquisition, testing, integration, activation, and fielding of the BCSC-T. The overall executing agent is the Program Manager Defense Communications and Transmission Systems (PMDCATS). Lockheed Martin Mission Systems (C2BMC prime contractor) via an Other Transaction Agreement provides on-site support.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Basic Development Program - Information Assurance AN/TPY-2	SS/CPAF	Raytheon : MA	18.953	3.722	Nov 2017	3.802	Nov 2018	17.699	Nov 2019	-		17.699	Continuing	Continuing	Continuing
Basic Development Program - Information Assurance SBX	SS/CPAF	Raytheon : MA	0.855	0.223	Oct 2017	0.225	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Basic Development Program - Material Release Get Well Plan	SS/CPAF	Raytheon : MA	14.520	2.045	Dec 2017	2.082	Dec 2018	0.609	Dec 2019	-		0.609	Continuing	Continuing	Continuing
Basic Development Program - Prior year Capability Development no longer funded in the FYDP	Various	Various : Various	8.778	0.000		0.000		0.000		-		0.000	0.000	8.778	0.000
Basic Development Program - Sys Integration & Tech Assessments	SS/CPAF	Raytheon : MA/AL	20.186	3.273	Mar 2018	2.824	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Basic Development Program - X-Band Software Enhancements/ Development	SS/CPAF	Raytheon : AL	93.972	15.741	Jan 2018	16.569	Jan 2019	10.434	Feb 2020	-		10.434	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - M&S Development	SS/CPFF	Raytheon : MA, CO	131.027	13.178	Nov 2017	16.656	Nov 2018	43.399	Jan 2020	-		43.399	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - VV&A of Models	MIPR	AMRDEC : AL	48.281	5.037	Dec 2017	5.124	Dec 2018	14.946	Dec 2019	-		14.946	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - Warfighter Exercises	SS/CPFF	Raytheon : MA	10.340	1.997	Feb 2018	2.035	Feb 2019	2.467	Mar 2020	-		2.467	Continuing	Continuing	Continuing
Capability Development Program - AN/TPY-2 Capability Development	SS/CPAF	Raytheon : MA	124.939	66.632	Oct 2017	37.813	Nov 2018	20.416	Nov 2019	-		20.416	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Capability Development Program - AN/TPY-2 GaN TTP	SS/CPAF	Raytheon : MA	14.720	10.200	Jan 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - COBRA DANE Upgrades	TBD	TBD : TBD	16.000	5.000	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Electronic Protection	SS/CPAF	Raytheon, GTRI : MA, GA	14.897	7.659	Oct 2017	8.911	Oct 2018	5.209	Oct 2019	-		5.209	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Discrimination	C/CPAF	USAF, Raytheon : Hanscom AFB MA	99.818	24.900	Nov 2017	160.353	Jan 2019	60.360	Jan 2020	-		60.360	Continuing	Continuing	Continuing
Capability Development Program - Homeland Defense Radar - Hawaii (HDR-H) Studies and Analysis	MIPR	JHU/APL, NSWC, MDA : MD, AL, VA	2.451	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Homeland Defense Radar - Pacific (HDR-P) Study	MIPR	JHU/APL, NSWC, MDA : MD, VA, AL	0.000	5.000	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Integrated Electronic Security System (IESS) Site K	MIPR	US Corps of Engineers : Germany	0.000	6.820	Jan 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Post Intercept Assessment (PIA)	C/CPAF	Raytheon : MA	0.000	10.400	Jan 2018	6.700	Dec 2018	5.200	Dec 2019	-		5.200	Continuing	Continuing	Continuing
Capability Development Program - Prior year Capability Development no longer funded in the FYDP	Various	Various : Various	22.753	0.000		0.000		0.000		-		0.000	0.000	22.753	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Capability Development Program - SBX Capability Development	SS/CPAF	Raytheon : MA	0.000	0.000		7.000	Jan 2019	11.788	Mar 2020	-		11.788	Continuing	Continuing	Continuing
Capability Development Program - UEWR Capability Development	SS/CPAF	Raytheon : MA	0.000	0.000		3.000	Jun 2019	1.000	Jun 2020	-		1.000	Continuing	Continuing	Continuing
Sensors Directorate Operations - - Contractor Service Support	Various	Various : Various	205.153	19.027	Nov 2017	18.709	Nov 2018	18.267	Oct 2019	-		18.267	Continuing	Continuing	Continuing
Sensors Directorate Operations - - FFRDC/ UARC	SS/CPAF	CSS, APL, LL, OGA, GTRI, MITRE : AL,MA, VA, MD, GA	86.054	13.404	Nov 2017	7.613	Nov 2018	7.815	Nov 2019	-		7.815	Continuing	Continuing	Continuing
Sensors Directorate Operations - -- Civilians/ Travel	Various	MDA : AL, VA, MA	156.857	22.026	Oct 2017	21.970	Oct 2018	19.512	Oct 2019	-		19.512	Continuing	Continuing	Continuing
Sensors Directorate Operations - Army Hybrid Program Office	MIPR	SMDC : AL	5.968	1.865	Dec 2017	1.236	Dec 2018	1.258	Dec 2019	-		1.258	Continuing	Continuing	Continuing
Sensors Directorate Operations - Network and Infrastructure Services	C/CPAF	Northrop Grumman/ IJacobs Eng : AL, AK, CA, CO, HI, NM, VA	35.583	6.205	Feb 2018	5.700	Feb 2019	2.000	Jan 2020	-		2.000	Continuing	Continuing	Continuing
Sensors Directorate Operations - Other Govt Agencies	MIPR	SMDC/AL, Hanscom AFB : MA	32.393	2.956	Feb 2018	2.200	Feb 2019	2.040	Feb 2020	-		2.040	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - BCN Upgrades	MIPR	MDA C2BMC / DISA : MA, AK	18.633	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Facilities Site Activation/Admin Comms	MIPR	MDA C2BMC : MA, AK	7.449	0.000		5.282	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Upgrade Clear Early Warning Radar - GMD Fire Control Integration	SS/CPAF	Boeing/AK/AL, Raytheon : MA	5.910	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Prior year Upgrade Clear Early Warning Radar no longer funded in the FYDP	Various	Various : Various	9.218	0.000		0.000		0.000		-		0.000	0.000	9.218	0.000
Upgrade Clear Early Warning Radar - Radar Upgrade -- Prime Contractor	C/CPAF	Raytheon : MA	122.384	2.034	Jan 2018	1.331	Jan 2019	3.172	Jan 2020	-		3.172	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS) - Software Enhancements/ Development	C/CPAF	Raytheon : MA	0.000	25.800	Jan 2018	29.200	Jan 2019	15.900	Jan 2020	-		15.900	Continuing	Continuing	Continuing
		Subtotal	1,328.092	275.144		366.335		263.491		-		263.491	Continuing	Continuing	N/A

Remarks

Note: Clear Early Warning Upgrade Program includes upgrade of the Cape Cod EWR.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

Operations and sustainment of Upgraded Early Warning Radar (UEWR), COBRA DANE (CD), and Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) Radars Contract Logistics Support (CLS) are Operations and Maintenance (O&M) Defense-Wide appropriations and are described in the Missile Defense Agency (MDA) O-Documents.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,328.092	275.144		366.335		263.491		-		263.491	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
SNG-C-D-2	◇																											
SNG-A-H-2	◇																											
SNG-U-D-2	◇																											
SNG-S-H-2	◇																											
SNG-C-H-3		◇																										
SNG-S-D-3			◇																									
FTI-03 (OTA, OT Intercept Flight Test)					△																							
FTG-11 (OT) (GM, OT Intercept Flight Test)						△																						
FTT-23 (TH, DT Intercept Flight Test)								△																				
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)								△																				
(EX) EAGLE RESOLVE 20									△																			
(EX) AIR AND MISSILE DEFENSE EXERCISE 21											△																	
(EX) AIR AND MISSILE DEFENSE EXERCISE 22															△													
(EX) EAGLE RESOLVE 22																	△											
(EX) AIR AND MISSILE DEFENSE EXERCISE 23																			△									
SNG-U-H-4																					◇							
SNG-A-D-4																						◇						
SNG-C-D-3																						◇						
SNG-A-H-4																							◇					
(EX) AIR AND MISSILE DEFENSE EXERCISE 24																							△					
SNG-S-D-6																								✧	✧			
(EX) EAGLE RESOLVE 24																									△			
SNG-A-D-5																										✧	✧	
SNG-S-H-5																										✧	✧	

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SNG-C-D-2	1	2018	1	2018
SNG-A-H-2	1	2018	1	2018
SNG-U-D-2	1	2018	1	2018
SNG-S-H-2	1	2018	1	2018
SNG-C-H-3	2	2018	2	2018
SNG-S-D-3	3	2018	3	2018
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	4	2019	4	2019
(EX) EAGLE RESOLVE 20	2	2020	2	2020
(EX) AIR AND MISSILE DEFENSE EXERCISE 21	4	2020	4	2020
(EX) AIR AND MISSILE DEFENSE EXERCISE 22	4	2021	4	2021
(EX) EAGLE RESOLVE 22	2	2022	2	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 23	4	2022	4	2022
SNG-U-H-4	2	2023	2	2023
SNG-A-D-4	3	2023	3	2023
SNG-C-D-3	3	2023	3	2023
SNG-A-H-4	4	2023	4	2023
(EX) AIR AND MISSILE DEFENSE EXERCISE 24	4	2023	4	2023
SNG-S-D-6	1	2024	2	2024
(EX) EAGLE RESOLVE 24	2	2024	2	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SNG-A-D-5	3	2024	4	2024
SNG-S-H-5	3	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / *Ballistic Missile Defense Sensors*	Project (Number/Name) MC11 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC11: *Cyber Operations*	5.101	3.894	6.079	8.212	-	8.212	1.555	1.586	1.617	24.618	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides developmental efforts for DoD directed cybersecurity improvements including DoD required cybersecurity tools, policies and procedures for improved network defense against cyber threats to enhance BMDS cybersecurity posture as well as to begin full Sensors system integration with an automated BMDS Cybersecurity Service Provider (CSSP).

A. Mission Description and Budget Item Justification

Sustain the Department of Defense Instruction (DoDI) 8510.01 Risk Management Framework (RMF) for DoD Information Technology (IT) requirement for the MDA Sensors Directorate and conduct Security Control Assessments (SCA) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones for MDA Sensors mission systems. It also includes support for external cybersecurity assessments and penetration testing of the Sensors mission systems, both in laboratory Element Cybersecurity Experiments and in ground test activities, in accordance with the Director, Operational Test and Evaluation (DOT&E) directive and the Integrated Master Test Plan (IMTP). It maintains the Assessment and Authorization (A&A) data repository, capturing the RMF documentation (artifacts, validation results, Cybersecurity Risk Assessment results, cybersecurity scorecard, and Authorizing Official (AO) authorization decisions) and POA&M for all MDA information systems. This project supports the alignment, development, and implementation of an integrated Tier 2 Cyber Security Service Provider (CSSP) capability on the Sensors mission systems IAW the DoD Cybersecurity Discipline Implementation Plan and DoDI 8530.01 Cybersecurity Activities Support to DoD Information Network Operations.

Provides the monitoring, prioritization, and tracking of Cybersecurity mitigation detailed in Information Technology security POA&Ms. The activities include preparation of A&A documentation and accreditation recommendations to the MDA Senior Information Security Officer (SISO)/Security Control Assessor (SCA) and Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission; test; and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network / System Assessment and Authorization (A&A)	3.894	6.079	8.212
Articles:	-	-	-
Description: Cyber Operations funds Sensors Directorate Information System Security Manager (ISSM) civilian salaries and cybersecurity engineering and architecture planning for program information technology systems. This project plans and tests the cybersecurity controls for the BMDS and maintains Sensors Risk Management Framework (RMF) authorizations for Sensors-managed information systems, conducts Controls Validation Testing (CVT)/ Security Controls Assessment (SCA) of sensors mission and support systems and provides and maintains Plans of Action and Milestones to mitigate cybersecurity deficiencies.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Cyber Operations conducts annual cybersecurity program reviews on the Sensors enclaves to assess compliance in implementing and maintaining controls. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** -SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides developmental efforts for DoD directed cybersecurity improvements including DoD required cybersecurity tools, policies and procedures for improved network defense against cyber threats to enhance BMDS cybersecurity posture as well as to begin full Sensors system integration with an automated BMDS Cybersecurity Service Provider (CSSP).			
Accomplishments/Planned Programs Subtotals	3.894	6.079	8.212

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604879C: *Ballistic Missile Defense Sensor Test*	88.840	77.405	105.530	-	105.530	114.698	99.088	112.943	96.526	Continuing	Continuing
• 0901598C: *Management HQ - MDA*	29.947	28.626	27.065	-	27.065	27.446	28.164	28.698	29.271	Continuing	Continuing
• 13999903: *Planning and Design, Defense Wide*	8.397	8.525	8.822	-	8.822	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Assessment and Authorization (A&A) - CND/IA Advisory and Assistance Services (Booz Allen)	C/CPFF	Booz Allen Hamilton : AL, CO, VA	2.692	0.538	Nov 2017	0.509	Nov 2018	0.509	Nov 2019	-		0.509	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - CND/IA Advisory and Assistance Services (Torch Technologies)	C/CPFF	Torch Technologies : AL, CO, VA	1.654	0.353	Jan 2018	0.385	Jan 2019	0.719	Nov 2019	-		0.719	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - Civilian Salaries	Various	MDA : AL, CO, VA	0.755	0.176	Oct 2017	0.185	Oct 2018	0.297	Oct 2019	-		0.297	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - Cybersecurity Supply Chain Compliance	SS/CPAF	Raytheon : MA	0.000	2.827	Mar 2018	5.000	Jan 2019	6.687	Mar 2020	-		6.687	Continuing	Continuing	Continuing
		Subtotal	5.101	3.894		6.079		8.212		-		8.212	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.101	3.894		6.079		8.212		-		8.212	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
BMDS Cyber Security Policy Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
Transition to Cyber Security Risk Management Framework (CRMF)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Information Assurance Certification and Accreditation (C&A) Package Preparation / Submission	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cyber Security Program Policy / Risk Management	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cyber Security Mitigation Monitoring and Tracking	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Integrated Cyber Security Service Provider									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧			

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BMDS Cyber Security Policy Development	1	2018	4	2023
Transition to Cyber Security Risk Management Framework (CRMF)	1	2018	4	2024
Information Assurance Certification and Accreditation (C&A) Package Preparation / Submission	1	2018	4	2024
Cyber Security Program Policy / Risk Management	1	2018	4	2024
Cyber Security Mitigation Monitoring and Tracking	1	2018	4	2024
Integrated Cyber Security Service Provider	1	2020	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / *Ballistic Missile Defense Sensors*	Project (Number/Name) MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	2.078	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.078
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

HDRH funding was appropriated/budgeted as follow:
FY 2017: PE 0603884C BMDS Sensors, Project MD41 FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41 FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41

A. Mission Description and Budget Item Justification

The Homeland Defense Radar-Hawaii (HDR-H) is a persistent discrimination radar that will provide additional capability to the Ballistic Missile Defense System (BMDS) to support the defense of Hawaii. HDR-H's primary mission is to provide autonomous acquisition and persistent precision tracking and discrimination to optimize the defensive capability of the BMDS and counter evolving threats. The HDR-H radar will be integrated into the BMDS through the C2BMC system and will feature a scalable and open system architecture to mitigate evolving threats. HDR-H's inherent capability will support additional mission areas, including but not limited to, Space Situational Awareness (SSA). The HDR-H radar is comprised of an equipment shelter housing a singled-faced array, a Mission Control Facility (MCF) which supports radar operations, a Radar Antenna Base, a Thermal Control System, and supporting facilities and infrastructure. The radar prime contractor will be responsible for building and fielding the radar equipment with associated Radar Antenna Base and Thermal Control, and the HDR-H Equipment Shelter (HES). Siting surveys will be conducted and EIS will be completed to determine the final recommended site. The HDR-H radar will be made operational in Hawaii by not later than September 30, 2023.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: MD41 Homeland Defense Radar - Hawaii (HDR-H)"	2.078	0.000	0.000
Articles:	-	-	-
Description: The HDR-H program includes requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and Models and Simulation (M&S) efforts for radar development. Efforts include site activation and preparation of site infrastructure for construction activities. The program will develop and integrate C2BMC systems for HDR-H functionality.			
FY 2019 Plans: N/A			
FY 2020 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** HDRH funding was appropriated/budgeted as follow: FY 2017: PE 0603884C BMDS Sensors, Project MD41 FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41 FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41			
Accomplishments/Planned Programs Subtotals	2.078	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MD41 Homeland Defense Radar - Hawaii (HDR-H)" - Homeland Defense Radar - Hawaii (HDR-H) - Site Activation & Studies	C/CPFF	Lockheed Martin : AL	0.000	2.078	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	2.078		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	2.078		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Development	✧																											

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Development	1	2018	1	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / *Ballistic Missile Defense Sensors*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	85.378	9.173	12.961	11.784	-	11.784	13.499	12.591	13.493	17.764	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	9.173	12.961	11.784
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	9.173	12.961	11.784

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	8.214	0.134	Jul 2018	0.075	Jul 2019	0.177	Jul 2020	-		0.177	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	MIPR	Various : Multi: AL, CO, NM, VA, Various	8.251	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi:AL,VA	11.077	0.000		0.000		2.234	Jul 2020	-		2.234	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (Reqn)	Reqn	Department of Labor : Washington, DC	0.170	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, CA, VA	51.160	8.665	Aug 2018	12.886	Mar 2019	9.373	Aug 2020	-		9.373	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support civilian Salaries, Travel, Training	Allot	MDA : Multi:AK, AL,CA, CO, VA	4.189	0.374	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	C/CPAF	JRDC : JRDC	0.587	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, CA, VA	1.730	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	85.378	9.173		12.961		11.784		-		11.784	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / *Ballistic Missile Defense Sensors*	Project (Number/Name) MD40 / *Program-Wide Support*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	85.378	9.173		12.961		11.784		-		11.784	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	2,137.840	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
MD24: *System Engineering & Integration*	791.319	208.588	204.853	164.291	-	164.291	160.729	147.305	154.875	159.575	Continuing	Continuing
MT23: *Enabling - Test*	51.455	22.758	39.288	59.029	-	59.029	36.658	52.208	58.268	36.538	Continuing	Continuing
MD28: *Intelligence & Security*	191.735	41.448	44.078	43.851	-	43.851	45.048	45.315	46.062	46.969	Continuing	Continuing
MD30: *BMD Information Management Systems*	409.688	82.507	79.979	84.525	-	84.525	87.524	90.302	92.513	94.357	Continuing	Continuing
MC30: *Cyber Operations*	102.286	62.622	98.912	66.212	-	66.212	65.381	68.046	68.891	69.889	Continuing	Continuing
MD31: *Modeling & Simulation*	211.917	55.185	83.186	88.487	-	88.487	115.556	71.841	80.727	73.117	Continuing	Continuing
MC31: *Engineering Cyber Operations*	3.797	6.466	20.666	11.564	-	11.564	34.665	10.697	13.383	13.651	Continuing	Continuing
MD32: *Quality, Safety, and Mission Assurance*	236.059	30.291	29.319	29.986	-	29.986	30.528	30.976	31.738	32.373	Continuing	Continuing
MD40: *Program-Wide Support*	139.584	24.128	20.550	23.562	-	23.562	27.583	24.977	28.096	27.500	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2019 to FY 2020 reflects the return to core funding levels following completion of content added in response to FY 2019 congressional funding increase.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) Enabling Programs provide critical products and processes needed to combine element missile defense systems into a single, integrated and layered BMDS to provide new defensive capabilities and evaluate existing capabilities against the emerging threats. Specifically, the Enabling Programs:

- Define BMDS architectures and functional requirements, conduct Analyses of Alternatives (AoA) for the DoD, and provide engineering requirements, execution support, and pre- and post-mission analysis for BMD System tests
- Provide validated models and simulations for BMD System assessment
- Assess BMDS performance (through data collection and analysis) and deliver capabilities to the Warfighter
- Provide multi-disciplinary security and intelligence support for BMDS acquisition, development, test, and deployment
- Identify potential threats and vulnerabilities to MDA and the BMDS and develop and implement strategies to mitigate those risks

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603890C *I BMD Enabling Programs*

- Assess architecture alternatives to address advanced threats and provide recommendations for future BMDS configurations to keep pace with evolving threats
- Provide Information Management tools and products supporting the development of BMDS capabilities while safeguarding networks and critical program information
- Provide MDA secure communication networks, IT systems, special purpose processing nodes, operations and monitoring centers, and disaster recovery and continuity of operations requirements
- Evaluate quality, technical safeguards, and mission assurance effectiveness
- Assess System ability to maintain integrity and superiority with advances in technology development

This Program Element also funds BMDS threat discrimination development to enhance BMDS effectiveness against the evolving adversary threat. The end result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. BMDS threat discrimination development is funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), BMD Command, Control, Battle Management and Communications (C2BMC) (0603896C), and Aegis BMD (0603892C) PEs.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	465.642	540.926	542.326	-	542.326
Current President's Budget	533.993	620.831	571.507	-	571.507
Total Adjustments	68.351	79.905	29.181	-	29.181
• Congressional General Reductions	0.000	-3.595			
• Congressional Directed Reductions	-10.000	-10.800			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	56.342	94.300			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	27.236	0.000			
• SBIR/STTR Transfer	-10.566	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	5.339	0.000	29.181	-	29.181

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the Omnibus Above Threshold Reprogramming for advanced threat systems engineering and cybersecurity, and the following congressional adjustments:
- decrease of $10.000 million for development activities in support of an organic Aegis Ashore Defense capability.
- increase of $6.000 million for additional modeling and simulation capabilities for the all-digital M&S representation of the BMDS.
- increase of $23.342 million for improved discrimination capabilities.
- increase of $1.900 million to repeat flight test FTM-29 (FTM-45).
- increase of $25.000 million for additional cyber training requirements and cyber defense enhancements to counter emerging threats.

Increase in FY 2019 from PB19 to PB20 reflects the following congressional adjustments:

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603890C *I BMD Enabling Programs*

- decrease of $6.600 million for modeling and simulations.
- decrease of $4.200 million for cyber operations.
- increase of $34.100 million for systems engineering improvements.
- increase of $4.000 million for discrimination improvements.
- increase of $16.200 million for cyber assessments of Defense Industrial Base.
- increase of $40.000 million for cyber security enhancements.

Increase in FY 2020 from PB19 to PB20 provides emerging Department of Defense priorities, including execution of a continuous integration and agile ground testing capability; modeling and simulation enhancements for Hardware-in-the-Loop (HWIL) and end-to-end digital simulation to provide significantly more data for BMD System Assessment and give Warfighters confidence in BMDS performance; and additional enhancements to cybersecurity.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD24: *System Engineering & Integration*	791.319	208.588	204.853	164.291	-	164.291	160.729	147.305	154.875	159.575	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The budget project reflects the FY 2019 Appropriations Act add of $38.1 million for Systems Engineering Improvements and Discrimination Improvements. The FY 2020 decrease reflects a return to Core Engineering funding levels following completion of congressional add content.

A. Mission Description and Budget Item Justification

The System Engineering & Integration (SE&I) workforce, including Industry and Contractor Support Services (CSS), defines, designs, tests and integrates the BMDS, and provides analysis, decision support and planning activities for real-world operations to the National Command Authority, Joint Staff, Military Services, Combatant Commanders, Operational Test Agencies, Director of Operational Test and Evaluation, Allies, and others.

The SE&I Major Program Goals are:
- Plan, design, develop, integrate, and test a layered BMDS that provides the required BMD performance
- Provide system-level engineering support to the BMDS Elements, and lead collaborative cross-Element, cross-Component engineering
- Lead the engineering required to achieve Enhanced Homeland Defense capability
- Develop architectures and requirements to respond to the proliferation of short and medium range ballistic missiles
- Provide a more effective missile defense capability for U.S. deployed forces, allies, and partners, and enhance homeland defense
- Develop discrimination improvements for the Homeland and Regional Defense missions
- As technical authority for Integrated Air and Missile Defense (IAMD), provide a consistent, disciplined systems engineering process using a multi-Service team to integrate Joint IAMD systems
- Provide technical direction to Element and Component developers and provide System-level forums to track, assess, and improve hardware and software reliability
- Identify BMDS capabilities and limitations
- Develop performance assessment requirements, verify BMDS performance through testing, and conduct assessments to form the basis for technical capability declarations in support of fielding decisions
- Identify Critical Engagement Conditions and data required to develop the test campaigns to demonstrate BMDS performance
- Define the test objectives necessary to anchor BMDS-level models and simulations, enable independent verification and validation
- Identify System issues occurring in ground and flight tests and lead the effort to resolve them
- Analyze architecture alternatives and new technologies to establish technical roadmaps for future capabilities
- Ensure the BMDS is complementary to and interoperable with NATO and other theater systems
- Develop anti-tamper approaches to enable international fielding of the BMDS

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

The BMDS discrimination and countermeasures mitigation effort will develop and field integrated Element capabilities to increase the BMDS ability to identify lethal and non-lethal objects. SE&I will conduct BMDS performance analysis and engineering to specify the BMDS requirements and interfaces to achieve the capability increase.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Requirements and Design	53.158	53.827	30.736
Articles:	-	-	-

Description: The Requirements and Design effort develops the BMD System level requirements and specifications and drives the integration of the BMDS. Requirements and Design allocates requirements to BMDS Elements and adjudicates Element level specifications to provide required capabilities for the Warfighter.
- Define BMDS technical content expectations and develop system requirements.
- Develop and allocate functional performance, interface, and design suitability requirements to Programs, in collaboration with BMDS element engineers.
- Deliver system technical baseline updates to document integrated system build content as identified in the R4 summary.
- Identify and resolve technical disconnects through the requirements trace process and element certifications; conduct engineering analyses and perform trade studies.
- Participate in Element Requirements Reviews.
- Develop Specification Change Notices (SCN) for future requirements changes, to include mitigation strategies to address BMDS Discrepancy Reports.
- Ensure accurate reporting of Element functionality and software / hardware integration in the BMDS Accountability Report (BAR) and Director's Program Reviews.
- Assess and add emerging threats to MDA`s lethality prediction models.
- Incorporate updates to lethality assessments, collateral effects, and consequences of intercept into the BMDS Lethality Program Plan.

Specific and/or unique accomplishments to each FY are as follows:

FY 2019 Plans:
- Complete system requirements and interface definition for the Homeland Defense Radar in Hawaii.
- Per FY 2019 Appropriations Act Add for Systems Engineering Enhancements:
-- Provide updated threat products for BMDS development and testing
-- Replace obsolete M&S interface for hardware in support of BMDS testing

FY 2020 Plans:
- Complete system requirements and interface definition for the Pacific Radar.

FY 2019 to FY 2020 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Decrease from FY 2019 to FY 2020 reflects a return to Core Engineering funding levels following completion of content added in response to FY 2019 congressional funding increase.			
Title: Integrated Air and Missile Defense (IAMD)	16.911	16.246	15.981
Articles:	-	-	-
Description: The IAMD effort provides a consistent, disciplined systems engineering process using a joint service systems engineering team to develop the technical requirements necessary to support integration of joint service IAMD systems, implementing capabilities required by the Geographic Combatant Commands. This effort includes systems engineering analysis, development of technical and interface control requirements and documents, definition of candidate Joint IAMD increments, and configuration control across the joint systems. IAMD provides improved performance such as an improved air picture to enable engagement coordination decision making, increase battlespace, and improve track continuity. Additional efforts will address critical joint Command and Control and interoperability needs such as integrated fire control. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Continue IAMD Increment 2 engineering efforts: -- Develop Combat Identification models and conduct analyses -- Develop Joint Force Planner options -- Work with the Combatant Commands, Joint Staff, and Services to understand and prioritize existing and emerging capability gaps -- Conduct studies and analysis to assess and advocate for the development of technologies to address these technical gaps -- Monitor and assess the implementation of technical requirement compliance within Service and MDA Programs of Record - Conduct long-range planning for future capabilities ***FY 2020 Plans:*** - Complete IAMD Increment 2 Joint Planning and Combat ID engineering efforts - Conduct engineering required to address critical Joint Command and Control and interoperability needs, including Joint Integrated Fire Control (IFC) ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: System-Level Verification and Assessment	23.008	32.017	25.369
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: This activity funds BMD System Assessment and Verification, Validation, and Accreditation (VV&A) activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling & simulation. - Develop and manage assessment plans and requirements for BMDS capability increments: -- Map assessment requirements to data collection venues (i.e., ground tests, flight tests, and exercises). -- Evaluate current Modeling & Simulation (M&S) capability to address assessment requirements, and provide recommendations for new or improved M&S. - Maintain assessment documentation per the R4 summary. - Conduct extensive analysis of data collected in BMDS ground and flight test events to characterize BMDS interoperability and performance, and anchor models and simulations. - Identify mitigation approaches for system performance issues uncovered during the course of analysis and assessment. - Monitor development and recommend improvements to the simulation enterprise based on an evaluation of the validity of Component, Element and System-level models (and frameworks) and participation in assessment activities and Modeling and Simulation events. - Continue VV&A activities to meet and maintain Hardware-in-the-Loop (HWIL) model accreditation in accordance with the HWIL Accreditation plan - Conduct assessments of BMD System capabilities and limitations prior to capability delivery decisions. - Produce independent assessments of each incremental BMDS Capability Delivery to support fielding readiness determinations. - Verify BMDS performance against specified requirements, and produce BMDS verification reports. - Maintain M&S VV&A database and toolkit. - Maintain verification data for BMD System Specification Change Notices. - Recommend solutions to improve assessment confidence, including M&S and testing issue resolutions. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Complete system assessment in support of BMDS EPAA Phase 3 TCD. - Increase verification documentation and analyze additional performance parameters for each BMDS model. - Improve VV&A process for M&S used in ground tests, per MDA-BMDS OTA joint prioritized M&S limitations list -- Develop new analysis tools to verify that the Objective Simulation Framework correctly presents threat data to all Element M&S -- Develop threat implementation verification reports for all Element M&S -- Conduct verification and validation for additional environmental models -- Identify root cause for and resolve sensor model track accuracy issues - Continue analysis of tactical system outputs to increase confidence in ground test data			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Per FY 2019 Appropriations Act Add for Systems Engineering Enhancements: -- Address systems engineering and M&S shortfalls to mitigate DOT&E concerns regarding BMDS model accreditation -- Provide comprehensive, high-fidelity performance assessments for capability deliveries to the Warfighter ***FY 2020 Plans:*** - Conduct VV&A for the initial BMDS end-to-end Digital simulation ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects progress made to accredit BMDS Hardware-in-the-Loop models in accordance with Operational Test Agency (OTA) Assessment Plan.			
Title: Knowledge Centers	15.219	15.224	14.138
Articles:	-	-	-
Description: Knowledge Centers serve as independent technical advisors to BMDS program offices in the C2BMC, Interceptor, Space, and Sensor areas to support development of technical approaches and improve reliability. - Provide Federally Funded Research and Development Centers (FFRDC) and University Affiliated Research Centers (UARC) subject matter expertise, to include reach-back capability as needed, for Element program managers: -- Provide Subject Matter Expertise and analytical support for Independent Review Teams, mission assurance assessments, Failure Review Boards and Failure Investigation Teams -- Identify and provide recommendations to mitigate technical risks, including innovative and unconventional approaches -- Promote knowledge sharing between external technical sources and MDA. - Perform independent technical assessments of critical BMDS and Element program issues: -- Define element knowledge points (KPs), establish closure criteria, and provide closure recommendations -- Continue to provide BMD System and Element performance assessments. - Conduct assessments of emerging technologies as required. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Future Concepts and Planning	20.027	14.898	13.288

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Articles:	-	-	-

Description: This activity funds BMDS architecture and future concept development, and efforts and studies to address the BMDS emergent threat, including DoD Analyses of Alternatives (AoA).
- Participate in designated OSD activities or analyses, as directed by Congress
- Perform BMDS capability gap analysis, and analyze and document architecture alternatives and/or new technologies to address gaps
- Develop Initial Requirements Documents (IRDs) to establish functional, performance and integration planning requirements for next generation BMD weapons and sensors
- Identify architecture alternatives that improve BMDS performance and are complementary to and interoperable with North Atlantic Treaty Organization (NATO) systems and theaters around the world
- Conduct technology development reviews for future/follow-on BMDS Element development efforts.
- Update concept capability documentation based on architectural options, trade studies, and technology development experiments.
- Maintain and update Phased Implementation Plan to document integrated requirements for improvements to, or augmentations of, current system capabilities.
- Develop Preliminary Specification Change Notices for selected future BMDS capabilities and technologies.
- Maintain a dialog with the warfighter community for all BMDS engineering and technical issues
-- Inform Warfighter development of the Prioritized Capabilities List (PCL) by providing relevant BMD System data
-- Develop updates to the Achievable Capabilities List (ACL) as required
- Lead collaborative effort to improve foreign partners' understanding of existing system capabilities, architectural performance and operational concepts of the BMDS
Specific and/or unique accomplishments to each FY are as follows:

FY 2019 Plans:
- Conduct analyses of architecture alternatives, including:
-- Directed energy technologies
-- Improvements recommended by the Missile Defense Review (MDR)
- Per the FY 2019 Appropriations Act Add for Systems Engineering Enhancements:
-- Provide architecture analyses and requirements to ensure the operational effectiveness of potential space architecture solutions

FY 2020 Plans:
- Deliver the 2020 Achievable Capabilities List

FY 2019 to FY 2020 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Decrease from FY 2019 to FY 2020 reflects a return to Core Engineering funding levels following completion of content added in response to FY 2019 congressional funding increase.			
Title: Systems Engineering, Engineering Analysis and Quick Response Team	10.620	10.690	10.497
Articles:	-	-	-
Description: This task provides rapid response, high quality systems engineering analysis products and supporting technical data to address external and internal Agency inquiries and decisions: - Conduct system level analyses to support ongoing BMDS Architecture and Systems Engineering efforts. - Analyze expected performance of BMDS Architecture options: -- Analyze and predict the performance of future BMDS capabilities -- Provide technical assessments, and collaborate with BMDS Elements to define and track technical performance measures. - Respond to Warfighter, Combatant Command (CCMD) and congressional requests for information and analysis (RFIs/RFAs) - Provide analytical support for real-world events. - Maintain analysis parameters database and standards per the R4 summary to ensure consistency. - Develop analytical data to respond to information requests from MDA and DoD leadership. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Discrimination	35.116	26.322	23.334
Articles:	-	-	-
Description: For Mid-term and Far-term discrimination, SE&I will establish performance goals for the technology development phase; develop functional, performance, and interface requirements to address the Mid-term and Far-term threat sets. SE&I will establish ground and flight test requirements for the Mid-term and Far-term phases, and develop updated high fidelity threat models to support analysis and testing activities. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Develop and refine requirements to integrate new and improved discrimination capabilities. - Complete integration phase of ground testing for Mid-term discrimination capabilities via GTI-08. - Monitor Mid-term ground testing and analyze test results. - Support planning of distributed phase of ground testing for Mid-term discrimination capabilities via GTD-08. - Per the FY 2019 Appropriations Act Add for Discrimination Improvements: -- Provide systems engineering expertise to develop and field improved discrimination capabilities, including accelerated delivery of threat definitions and threat models and Ballistic Missile Defense System Specification changes to implement critical discrimination and countermeasures mitigation techniques. ***FY 2020 Plans:*** - Provide technical support for fielding Discrimination capability in BMDS Increment 6B/6C. - Conduct deep dive analysis on impact of new discrimination techniques on BMDS engagement performance. - Develop prototype modeling techniques of Electronic Attack for definition and validation of initial requirements for BMDS. - Develop Electronic Attack/Electronic Protection models and interfaces to current analysis environment for performance analysis and technique assessment. - Define operational concepts for improved Counter-countermeasure techniques and technologies and develop required models and tools to estimate BMDS impact and performance. - Assess discrimination planning and reporting of BMDS Midterm Increment 6C Technical Capability Declaration. - Develop models and simulations for reactive/responsive Electronic Attack, objective debris aggregation, Electro-optical/infrared improvements, and high fidelity scene generation. - Develop BMD System Specification inputs and supporting analysis for multi- sensor/phenomenology Discrimination techniques. -- Develop Preliminary Change Notice, Functional Specification Change Notice, Performance Specification Change Notice, and Document Change Notice for Discrimination and Decision Logic improvements. -- Develop Preliminary Change Notice, Specification Change Notice, and Document Change Notice for Objective Debris Mitigation. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects a return to Core Engineering funding levels following completion of content added in response to FY 2019 congressional funding increase.			
Title: Risk Management	7.868	7.768	7.497
Articles:	-	-	-
Description: The Risk Management task identifies BMDS element and component technical risks, and tracks status and risk mitigation progress. - Convene and chair Risk Management Working Group. - Execute the risk management and mission readiness working group process.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Maintain a risk database using the Failure Reporting and Corrective Action System. - Review and approve program element risks, on quarterly basis. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Anti-Tamper & Engineering Manufacturing Readiness Level Development	5.517	5.637	5.065
Articles:	-	-	-
Description: This task develops anti-tamper approaches to inhibit reverse engineering of critical technologies, and oversees the use of Engineering and Manufacturing Readiness Levels (EMRLs) to assess BMDS element, component, or system maturity. - Develop anti-tamper approaches to enable international fielding, support coalition warfare, and extend the effective operational life of the BMDS. - Engage and support the Services in understanding and transitioning BMDS Element Anti-Tamper activities. - Participate in Element reviews to assess proposed Anti-Tamper solutions and assist programs in developing and implementing Anti-Tamper detection and response technologies to mitigate risk. - Monitor application of EMRLs to evaluate engineering and manufacturing maturity of BMDS elements, systems, and components. - Assess and report readiness of MDA development efforts for transition to production. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A			
Title: Manufacturing and Producibility	4.944	7.724	4.686
Articles:	-	-	-

Description: This activity supports a system-level manufacturing and producibility team to address materials, key component, and subsystem design and development to reduce cycle time, part count, and risk. This activity also supports a system-level reliability team to reduce risk of test failures and performance shortcomings and drive reliability into system and component designs.
- Assess BMDS industrial base and determine critical manufacturing technologies
-- Conduct assessments of critical component supply base and update critical technologies database
-- Collaborate with national security space components on investment strategies for critical technologies
-- Develop engineering management tool to characterize industrial base risks.
- Utilize supply chain risk identification and mitigation tracking system to mitigate manufacturing supply issues for critical components
- Assess the effectiveness of reliability programs for each MDA Product (Radar, Launcher, Missile/Interceptor, etc.) to achieve/ sustain required reliability.
- Perform reliability, composite risk, and probability of mission success assessments for flight tests.
- Identify failure trends/modes and evaluate impact on the Probability of Mission Success; evaluate potential corrective actions
-- Provide element/program scorecard data to support reliability evaluations/assessments.
- With Logistics Support, develop MDA Reliability and Logistic Policies/Plans to promote an integrated Sustainability efforts
- Ensure that BMDS products have achieved the required maturity in Reliability, Availability, and Maintainability (RAM) to support the transition from MDA to the appropriate service organization; provide RAM expertise as needed to Element Program Offices.
- Provide updates to MDA RAM policy and guidance.

Specific and/or unique accomplishments to each FY are as follows:

FY 2019 Plans:
- SEE ABOVE.
- Per FY 2019 Appropriations Act Add for Systems Engineering Improvements:
-- Address systems engineering challenges in the manufacturing and producibility arena to address concerns regarding BMDS reliability and sustainability

FY 2020 Plans:
- SEE ABOVE.

FY 2019 to FY 2020 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Decrease from FY 2019 to FY 2020 reflects a return to Core Engineering funding levels following completion of content added in response to FY 2019 congressional funding increase.			
Title: Aegis Ashore Defense	0.000	0.000	0.000
Articles:	-	-	-
Description: Consistent with direction in Public Law 114-92, National Defense Authorization Act for FY 2016, the Department is required to provide defense of Aegis Ashore sites in Romania and Poland by mid-year 2019. Congress eliminated all funding for this initiative in the FY 2018 Appropriations Act. ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: USFK JEON Capability	16.200	14.500	13.700
Articles:	-	-	-
Description: In conjunction with the Lower Tier Project Office (LTPO), for a U.S. Forces-Korea (USFK) Joint Emergent Operational Need (JEON), provide system-level engineering activities to develop, test and deploy an integrated solution for upper tier/lower tier integration by achieving enhanced interoperability between the Terminal High Altitude Area Defense (THAAD) and PATRIOT capabilities, including: -- Develop threat updates to inform requirements -- Develop functional, performance, and interface requirements -- Develop test requirements -- Update Modeling and Simulation (M&S) frameworks and core truth models -- Provide M&S integration for testing, and provide Wargame and training support -- Develop requirements for capability assessments -- Provide test and performance analysis -- Perform Element integration Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Improve THAAD performance against defended area and emerging threats. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	208.588	204.853	164.291

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing

Remarks

D. Acquisition Strategy

In order to optimize the performance of the BMDS, MDA leverages the nation's engineering Centers of Excellence at government agencies and Military Services, FFRDCs, UARCs, and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. Products and Services will be acquired by competitive means to the extent that is possible and practical.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements and Design - Reqts & Design - Lethality Spt - FFRDC/ UARC	MIPR	Various : CA	1.405	1.046	Nov 2017	0.947	Nov 2018	0.963	Nov 2019	-		0.963	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - Lethality Spt - CSS	C/CPAF	TEAMS : NC	2.217	0.000		0.592	Nov 2018	0.604	Nov 2019	-		0.604	Continuing	Continuing	Continuing
Requirements and Design - BMDS ground test infrastructure improvements	Various	Various (GWAC) : AL, CO	0.000	0.000		11.382	Jan 2019	0.000		-		0.000	0.000	11.382	0.000
Requirements and Design - Integrated Cybersecurity Environment	Various	Various : AL	0.000	2.312	Sep 2018	0.000		0.000		-		0.000	0.000	2.312	0.000
Requirements and Design - Pre & Post-Launch Analysis Classification Toolset	Various	Various : AL	0.000	5.700	Sep 2018	0.000		0.000		-		0.000	0.000	5.700	0.000
Requirements and Design - Previous Year Reqts & Design Content No Longer in FYDP	Various	Various : AL, VA	4.595	0.000		0.000		0.000		-		0.000	0.000	4.595	0.000
Requirements and Design - Reqts & Design	C/CPFF	TEAMS : AL, VA	36.033	4.156	Nov 2017	5.557	Nov 2018	4.646	Nov 2019	-		4.646	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - CSS 3	C/CPFF	MEI : AL	1.167	0.509	Nov 2017	0.000		0.000		-		0.000	0.000	1.676	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements and Design - Reqts & Design - FFRDC/UARC 1	MIPR	ORNL : TN	0.984	0.391	Nov 2017	0.399	Nov 2018	0.406	Nov 2019	-		0.406	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - FFRDC/UARC 2	MIPR	MITRE : VA	1.317	2.074	Nov 2017	1.196	Nov 2018	1.219	Nov 2019	-		1.219	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - HAENS Spt	MIPR	NSWC Crane : IN	1.443	0.479	Nov 2017	0.488	Nov 2018	0.498	Nov 2019	-		0.498	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - Industry	C/CPFF	Boeing : AL	106.832	8.534	Nov 2017	7.095	Nov 2018	7.136	Nov 2019	-		7.136	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - MDA	Allot	MDA : AL, VA	46.687	8.800	Oct 2017	8.018	Oct 2018	8.289	Oct 2019	-		8.289	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - OGA	MIPR	AMRDEC : AL	7.459	2.062	Nov 2017	3.231	Nov 2018	2.275	Nov 2019	-		2.275	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - Post Intercept Assessment	Various	Various : Various	0.000	6.900	Dec 2017	5.700	Nov 2018	4.700	Nov 2019	-		4.700	Continuing	Continuing	Continuing
Requirements and Design - Systems Engineering Improvements	Various	Various : VA, AL, CO	0.000	3.467	Sep 2018	4.870	Nov 2018	0.000		-		0.000	0.000	8.337	0.000
Requirements and Design - Threat engineering	MIPR	Various : AL, VA, MD	0.000	3.508	Sep 2018	4.352	Jan 2019	0.000		-		0.000	0.000	7.860	0.000
Requirements and Design - WebCOP	Various	Various : AL	0.000	3.220	Sep 2018	0.000		0.000		-		0.000	0.000	3.220	0.000
Integrated Air and Missile Defense (IAMD) - IAMD - OGA	MIPR	AMRDEC : AL	4.319	4.448	Nov 2017	4.627	Nov 2018	4.720	Nov 2019	-		4.720	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - IAMD - Support	C/CPFF	TEAMS : AL, VA, CO	3.890	1.498	Nov 2017	1.802	Nov 2018	0.898	Nov 2019	-		0.898	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - IAMD - Various	MIPR	DoD Activities : Various	32.659	10.965	Nov 2017	9.817	Nov 2018	10.363	Nov 2019	-		10.363	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Air and Missile Defense (IAMD) - Previous Year IAMD Content No Longer in FYDP	Various	Various : AL, VA, MD	6.520	0.000		0.000		0.000		-		0.000	0.000	6.520	0.000
System-Level Verification and Assessment - Cyber Engineering	Various	Various : AL, VA	0.000	2.285	Sep 2018	0.000		0.000		-		0.000	0.000	2.285	0.000
System-Level Verification and Assessment - Cyber Engineering - CSS	C/CPFF	TEAMS : AL, CO	0.000	1.013	Sep 2018	0.000		0.000		-		0.000	0.000	1.013	0.000
System-Level Verification and Assessment - Cyber Engineering - OGA	MIPR	AMRDEC : AL	0.000	1.008	Sep 2018	0.000		0.000		-		0.000	0.000	1.008	0.000
System-Level Verification and Assessment - Sys V&A - CSS	C/CPFF	TEAMS : AL	6.409	3.368	Nov 2017	5.723	Nov 2018	4.221	Nov 2019	-		4.221	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - CSS 2	C/CPFF	MiDAESS / TEAMS : AL, CO	2.046	0.000		0.000		0.000		-		0.000	0.000	2.046	0.000
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 1	MIPR	Aerospace : CA	18.224	1.700	Nov 2017	1.750	Nov 2018	1.800	Nov 2019	-		1.800	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 2	MIPR	JHU/APL : MD, VA	10.958	1.100	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 3	MIPR	GTRI : AL	0.000	0.000		1.125	Nov 2018	1.150	Nov 2019	-		1.150	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 6	MIPR	MIT/LL : MA	19.898	1.400	Nov 2017	1.425	Nov 2018	1.450	Nov 2019	-		1.450	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 7	MIPR	MITRE : VA	18.166	1.618	Nov 2017	1.369	Nov 2018	1.623	Nov 2019	-		1.623	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System-Level Verification and Assessment - Sys V&A - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	2.193	0.000		0.000		0.000		-		0.000	0.000	2.193	0.000
System-Level Verification and Assessment - Sys V&A - M&S Accreditation	Various	AMRDEC / Various : AL	0.000	2.000	Nov 2017	10.581	Nov 2018	6.873	Dec 2019	-		6.873	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - MDA	Allot	MDA : VA, AL	7.268	2.389	Oct 2017	2.306	Nov 2018	4.806	Oct 2019	-		4.806	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - OGA	MIPR	AMRDEC : AL	9.871	1.609	Oct 2017	4.841	Nov 2018	2.490	Nov 2019	-		2.490	Continuing	Continuing	Continuing
System-Level Verification and Assessment - V&A Industry Support	C/CPFF	Boeing : AL	13.982	3.518	Nov 2017	2.897	Nov 2018	0.956	Nov 2019	-		0.956	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 5	MIPR	Draper : VA	0.000	0.000		0.639	Nov 2018	0.652	Nov 2019	-		0.652	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 1	MIPR	Aerospace : CA	13.180	1.793	Nov 2017	1.828	Nov 2018	1.865	Nov 2019	-		1.865	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 2	MIPR	MIT/LL : MA	8.000	1.027	Nov 2017	1.048	Nov 2018	1.069	Nov 2019	-		1.069	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 3	FFRDC	MITRE : VA	8.066	1.042	Nov 2017	1.063	Nov 2018	1.084	Nov 2019	-		1.084	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 4	FFRDC	JHU/APL : VA	7.135	0.820	Nov 2017	0.700	Nov 2018	0.714	Nov 2019	-		0.714	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 7	MIPR	GTRI : GA	4.286	0.363	Nov 2017	0.370	Nov 2018	0.377	Nov 2019	-		0.377	Continuing	Continuing	Continuing
Knowledge Centers - KC - MDA	Various	MDA : AL, VA	30.176	5.099	Oct 2017	4.460	Oct 2018	4.264	Oct 2019	-		4.264	Continuing	Continuing	Continuing
Knowledge Centers - KC - TEAMS	C/CPFF	TEAMS : AL	0.000	3.276	Nov 2017	2.725	Nov 2018	2.708	Nov 2019	-		2.708	Continuing	Continuing	Continuing
Knowledge Centers - KC - Various	MIPR	Various : Various	5.639	1.799	Nov 2017	2.391	Dec 2018	1.405	Dec 2019	-		1.405	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Knowledge Centers - Previous Year KC Content No Longer In FYDP	Various	Various : AL, AK, CA, CO, HI, NM, VA	3.032	0.000		0.000		0.000		-		0.000	0.000	3.032	0.000
Future Concepts and Planning - Future Concepts - Architecture CSS	C/CPFF	TEAMS : AL, VA	9.986	3.740	Nov 2017	2.957	Nov 2018	5.212	Nov 2019	-		5.212	Continuing	Continuing	Continuing
Future Concepts and Planning - Advanced Photonics	Various	Various : AL	0.000	4.200	Sep 2018	0.000		0.000		-		0.000	0.000	4.200	0.000
Future Concepts and Planning - Future Concepts - Architecture Support	Various	Various : VA, AL	7.516	4.537	Oct 2017	1.471	Nov 2018	1.000	Nov 2019	-		1.000	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 1	MIPR	SNL : CA	3.067	0.391	Nov 2017	0.817	Nov 2018	0.406	Nov 2019	-		0.406	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 3	MIPR	MIT/LL : MA	3.916	0.783	Nov 2017	0.797	Nov 2018	0.406	Nov 2019	-		0.406	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 4	MIPR	JHU/APL : MD, VA	5.243	0.000		0.000		0.000		-		0.000	0.000	5.243	0.000
Future Concepts and Planning - Future Concepts - FFRDC / UARC 5	MIPR	MITRE : VA	2.444	0.478	Nov 2017	0.080	Nov 2018	0.488	Nov 2019	-		0.488	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 6	MIPR	Aerospace : CA	4.065	0.391	Nov 2017	0.854	Nov 2018	0.406	Nov 2019	-		0.406	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Future Concepts and Planning - Future Concepts - Industry	C/CPFF	Boeing : AL	30.976	2.000	Nov 2017	2.000	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - Support	Allot	MDA : VA / AL	10.045	3.507	Oct 2017	5.922	Oct 2018	5.370	Oct 2019	-		5.370	Continuing	Continuing	Continuing
Future Concepts and Planning - Previous Year Future Concepts - No Longer in FYDP	Various	Various : Various	23.482	0.000		0.000		0.000		-		0.000	0.000	23.482	0.000
Future Concepts and Planning - Previous Year Hypersonic Defense Content	Various	Various : Various	7.200	0.000		0.000		0.000		-		0.000	0.000	7.200	0.000
Systems Engineering, Engineering Analysis and Quick Response Team - Previous Year Sys Engrg, QRT - No Longer In FYDP	Various	Various : Various	1.295	0.000		0.000		0.000		-		0.000	0.000	1.295	0.000
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - CSS	C/CPFF	TEAMS : AL	36.042	2.421	Nov 2017	2.063	Nov 2018	2.105	Nov 2019	-		2.105	Continuing	Continuing	Continuing
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - CSS 2	C/CPFF	SAIC : VA, AL	18.343	7.650	Nov 2017	7.636	Nov 2018	7.800	Nov 2019	-		7.800	Continuing	Continuing	Continuing
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - Industry Spt	C/CPFF	Boeing : VA, AL	0.000	0.000		0.520	Nov 2018	0.592	Nov 2019	-		0.592	Continuing	Continuing	Continuing
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - MDA	Various	MDA : VA, AL	3.269	0.549	Oct 2017	0.471	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Discrimination - Discrimination - CSS	C/CPFF	TEAMS : AL	14.736	2.489	Nov 2017	2.450	Nov 2018	6.600	Nov 2019	-		6.600	Continuing	Continuing	Continuing
Discrimination - Discrimination - Industry	C/CPAF	Boeing : AL, VA	22.672	14.843	Nov 2017	12.769	Nov 2018	14.898	Nov 2019	-		14.898	Continuing	Continuing	Continuing
Discrimination - Discrimination - Support	Allot	MDA : AL, VA	25.415	3.337	Oct 2017	3.260	Oct 2018	1.836	Oct 2019	-		1.836	Continuing	Continuing	Continuing
Discrimination - Discrimination - Various	Various	Various : AL, VA	14.201	14.447	Nov 2017	7.843	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Discrimination - Prior Year Discrimination Improvements no longer funded in FYDP	Various	Various : Various	27.219	0.000		0.000		0.000		-		0.000	0.000	27.219	0.000
Risk Management - Risk Mgt - Analysis	Various	MDA : VA, AL	18.623	6.547	Oct 2017	6.403	Oct 2018	6.585	Oct 2019	-		6.585	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - Analysis Spt	C/CPAF	TEAMS : AL	2.963	0.733	Nov 2017	0.767	Nov 2018	0.302	Nov 2019	-		0.302	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - FFRDC/UARC	MIPR	MITRE : VA	4.824	0.588	Nov 2017	0.598	Nov 2018	0.610	Nov 2019	-		0.610	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	2.125	0.000		0.000		0.000		-		0.000	0.000	2.125	2.125
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - Anti-Tamper	Various	Various : AL, VA, CO	0.000	0.000		0.000		1.097	Dec 2019	-		1.097	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - Anti-Tamper OGA Support	MIPR	AMRDEC : AL	0.000	0.000		0.000		0.261	Dec 2019	-		0.261	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - Anti-Tamper Support	MIPR	NSWC Crane : IN	6.481	0.498	Nov 2017	0.508	Nov 2018	0.256	Dec 2019	-		0.256	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - MDA	Allot	MDA : AL, VA	20.925	5.019	Oct 2017	5.129	Oct 2018	3.451	Nov 2019	-		3.451	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - Prior Year AT & EMRL no longer funded in FYDP	Various	Various : Various	2.983	0.000		0.000		0.000		-		0.000	0.000	2.983	0.000
Manufacturing and Producibility - Core Standards	C/CPFF	Boeing : AL	3.313	1.500	Nov 2017	1.282	Nov 2018	1.653	Nov 2019	-		1.653	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility	Allot	MDA : AL	2.423	1.475	Oct 2017	2.154	Oct 2018	0.819	Nov 2019	-		0.819	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility - CSS	C/CPFF	TEAMS : AL, VA	0.000	0.000		0.764	Nov 2018	0.498	Nov 2019	-		0.498	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility - OGA Support	MIPR	AMRDEC : AL	8.021	1.969	Nov 2017	1.719	Nov 2018	1.716	Nov 2019	-		1.716	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility - Various	Various	Various : AL	0.000	0.000		1.805	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Manufacturing and Producibility - Previous Year Mfg and Producibility - No Longer In FYDP	Various	Various : Various	1.450	0.000		0.000		0.000		-		0.000	0.000	1.450	0.000
Aegis Ashore Defense - Concept Dev	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
USFK JEON Capability - CSS	C/CPFF	TEAMS : VA, AL	0.000	0.652	Dec 2017	0.562	Nov 2018	0.920	Dec 2019	-		0.920	Continuing	Continuing	Continuing
USFK JEON Capability - FFRDC/UARC	MIPR	MITRE : VA	0.000	0.528	Jan 2018	0.499	Nov 2018	0.407	Dec 2019	-		0.407	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USFK JEON Capability - Framework, Truth Models	Various	Various : CO, AL	0.000	1.064	Jan 2018	1.628	Nov 2018	1.942	Dec 2019	-		1.942	Continuing	Continuing	Continuing
USFK JEON Capability - Industry Support	C/CPFF	Boeing : AL, VA	0.000	2.106	Jan 2018	0.000		0.000		-		0.000	0.000	2.106	0.000
USFK JEON Capability - Industry Support - IRES	C/CPAF	Northrop Grumman : AL, VA	0.000	2.445	Dec 2017	2.494	Nov 2018	2.335	Dec 2019	-		2.335	Continuing	Continuing	Continuing
USFK JEON Capability - OGA	MIPR	AMRDEC : AL	0.000	0.984	Dec 2017	1.016	Nov 2018	1.232	Dec 2019	-		1.232	Continuing	Continuing	Continuing
USFK JEON Capability - Systems Engineering	Various	MDA Various : VA, AL, CO	0.000	1.179	Dec 2017	2.996	Nov 2018	1.979	Dec 2019	-		1.979	Continuing	Continuing	Continuing
USFK JEON Capability - Test & Performance Analysis	Various	Various : VA, AL	0.000	3.268	Jan 2018	3.967	Nov 2018	4.210	Dec 2019	-		4.210	Continuing	Continuing	Continuing
USFK JEON Capability - UARC	MIPR	JHU / APL : MD, VA	0.000	3.974	Dec 2017	1.338	Nov 2018	0.675	Dec 2019	-		0.675	Continuing	Continuing	Continuing
		Subtotal	791.319	208.588		204.853		164.291		-		164.291	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD24 / *System Engineering & Integration*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	791.319	208.588		204.853		164.291		-		164.291	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
BMD SS - 1Q FY 2018	▲																											
Element Design Reviews - FY 2018		▲																										
Update to IMAP - 2Q FY 2018		▲																										
Update MIP - FY 2018		▲																										
BMD SEP - FY 2018			▲																									
Element/Component Characterization for Analysis (E/CCA) - 3Q - FY 2018			▲																									
Update Achievable Capabilities List - FY 2018				▲																								
BMD SS - 4Q FY 2018				▲																								
Update to IMAP - 1Q FY 2019					△																							
Update to BMD SDD - FY 2019					▲																							
BMD SS - FY 2019					▲																							
Deliver Assessment for EPAA Phase 3 – FY 2019					△																							
E/CCA 1Q - FY 2019					▲																							
Element Design Reviews - FY 2019						△																						
SEP Update - FY 2019						△																						
Update to IMAP - 3Q FY 2019							△																					
BMDS Engineering Review - FY 2019							△																					
Technical Objectives & Goals / Effectiveness Metrics Standard Updates - FY 2019								△																				
Update MIP - FY 2019								△																				
E/CCA 4Q - FY 2019								△																				
Update to BMD SDD - FY 2020									△																			
Update Achievable Capabilities List - FY 2020									△																			
SEP Update - FY 2020										△																		
BMD SS - FY 2020										△																		

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
BMDS Engineering Review - FY 2020											△																	
Update to IMAP - 3Q FY 2020											△																	
Update MIP - FY 2020												△																
E/CCA - 4Q - FY 2020												△																
Update to BMD SDD - FY 2021													△															
SEP Update FY 2021														△														
BMD SS - FY 2021														△														
BMDS Engineering Review - FY 2021															△													
Update to IMAP - 3Q FY 2021															△													
Update Achievable Capabilities List - FY 2022															△													
Update MIP - FY 2021																△												
E/CCA - 4Q FY 2021																△												
Update to BMD SDD - FY 2022																	△											
SEP Update FY 2022																		△										
BMD SS - FY 2022																		△										
Updates to IMAP -3Q FY 2022																			△									
BMDS Engineering Review - FY 2022																			△									
Update MIP - FY2022																				△								
E/CCA - 4Q FY 2022																				△								
Update to BMD SDD - FY 2023																					△							
BMD SS - FY 2023																						△						
SEP Update - FY 2023																						△						
Update to IMAP - 3Q FY 2023																							△					
E/CCA - 4Q - FY 2023																								△				

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Update MIP - FY 2023																								△				
Update to BMD SDD - FY 2024																									△			
BMD SS - 2024																									△			
Update Achievable Capabilities List - FY 2024																									△			
SEP Update - FY 2024																										△		
Update to IMAP - 3Q FY 2024																											△	
E/CCA - 4Q - FY 2024																												△
Update MIP - FY 2024																												△

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BMD SS - 1Q FY 2018	1	2018	1	2018
Element Design Reviews - FY 2018	2	2018	2	2018
Update to IMAP - 2Q FY 2018	2	2018	2	2018
Update MIP - FY 2018	2	2018	2	2018
BMD SEP - FY 2018	3	2018	3	2018
Element/Component Characterization for Analysis (E/CCA) - 3Q - FY 2018	3	2018	3	2018
Update Achievable Capabilities List - FY 2018	4	2018	4	2018
BMD SS - 4Q FY 2018	4	2018	4	2018
Update to IMAP - 1Q FY 2019	1	2019	1	2019
Update to BMD SDD - FY 2019	1	2019	1	2019
BMD SS - FY 2019	1	2019	1	2019
Deliver Assessment for EPAA Phase 3 FY 2019	1	2019	1	2019
E/CCA 1Q - FY 2019	1	2019	1	2019
Element Design Reviews - FY 2019	2	2019	2	2019
SEP Update - FY 2019	2	2019	2	2019
Update to IMAP - 3Q FY 2019	3	2019	3	2019
BMDS Engineering Review - FY 2019	3	2019	3	2019
Technical Objectives & Goals / Effectiveness Metrics Standard Updates - FY 2019	4	2019	4	2019
Update MIP - FY 2019	4	2019	4	2019
E/CCA 4Q - FY 2019	4	2019	4	2019
Update to BMD SDD - FY 2020	1	2020	1	2020
Update Achievable Capabilities List - FY 2020	1	2020	1	2020
SEP Update - FY 2020	2	2020	2	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BMD SS - FY 2020	2	2020	2	2020
BMDS Engineering Review - FY 2020	3	2020	3	2020
Update to IMAP - 3Q FY 2020	3	2020	3	2020
Update MIP - FY 2020	4	2020	4	2020
E/CCA - 4Q - FY 2020	4	2020	4	2020
Update to BMD SDD - FY 2021	1	2021	1	2021
SEP Update FY 2021	2	2021	2	2021
BMD SS - FY 2021	2	2021	2	2021
BMDS Engineering Review - FY 2021	3	2021	3	2021
Update to IMAP - 3Q FY 2021	3	2021	3	2021
Update Achievable Capabilities List - FY 2022	3	2021	3	2021
Update MIP - FY 2021	4	2021	4	2021
E/CCA - 4Q FY 2021	4	2021	4	2021
Update to BMD SDD - FY 2022	1	2022	1	2022
SEP Update FY 2022	2	2022	2	2022
BMD SS - FY 2022	2	2022	2	2022
Updates to IMAP -3Q FY 2022	3	2022	3	2022
BMDS Engineering Review - FY 2022	3	2022	3	2022
Update MIP - FY2022	4	2022	4	2022
E/CCA - 4Q FY 2022	4	2022	4	2022
Update to BMD SDD - FY 2023	1	2023	1	2023
BMD SS - FY 2023	2	2023	2	2023
SEP Update - FY 2023	2	2023	2	2023
Update to IMAP - 3Q FY 2023	3	2023	3	2023
E/CCA - 4Q - FY 2023	4	2023	4	2023
Update MIP - FY 2023	4	2023	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Update to BMD SDD - FY 2024	1	2024	1	2024
BMD SS - 2024	1	2024	1	2024
Update Achievable Capabilities List - FY 2024	1	2024	1	2024
SEP Update - FY 2024	2	2024	2	2024
Update to IMAP - 3Q FY 2024	3	2024	3	2024
E/CCA - 4Q - FY 2024	4	2024	4	2024
Update MIP - FY 2024	4	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MT23 / *Enabling - Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT23: *Enabling - Test*	51.455	22.758	39.288	59.029	-	59.029	36.658	52.208	58.268	36.538	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides ramp-up to conduct pre-mission activities for Continuous Integration and Agile Test (CI/CAT) sprints in FY 2021 while maintaining support for current flight- and ground test missions, and implementation of a Continuous Development and Integration (CDI) Environment to reduce test risk by resolving technical issues early, enabling better flexibility and ability to meet CI/CAT testing tempo.

A. Mission Description and Budget Item Justification

The Enabling Test project includes the SE&I that drives BMDS test planning, execution, and post-test analysis and assessment, and the M&S tools and framework required to prepare for and execute ground and flight tests.

SE&I allocates test requirements to individual test events, designs test architectures, defines target requirements, and generates ground and flight test scenarios to collect data essential for model validation and system verification. SE&I works with the Service Operational Test Agencies (OTA) to incorporate operational test requirements into BMDS events to ensure the incremental capability being transferred to the Warfighter will be operationally effective, suitable, and survivable. The resulting data ensures BMDS requirements are being met by the system under test and confirms proper BMD System operation. It also helps to anchor system and element M&S for use in simulations to characterize BMDS performance across the battle space, including areas where no live-fire-testing is performed.

Engineering ground test (GT) responsibilities include BMDS performance sensitivity analysis; scenario design and optimization; analysis to mitigate test data collection risks; test architecture certification analysis; and test result analysis. Flight test (FT) responsibilities include pre-mission scenario analysis to identify and mitigate test execution risk in advance; range safety analysis; mission analysis during test execution; extensive post-mission analysis; and event analysis reporting products. These efforts inform senior leaders' decisions on BMDS development and evolution and underpin the BMDS capability declarations that deliver new capabilities to the Warfighter.

Pre-mission predictions use the test framework and Hardware in the Loop (HWIL) and digital models of the test configuration to exercise system interfaces, calculate expected BMDS performance, and gauge readiness for test execution. Post-mission, MDA uses test results to anchor System and element M&S and provide confidence in their ability to correctly predict BMDS behavior and performance.

Reliability, Availability and Maintainability data collected through BMDS test events increases confidence in BMDS performance over the entire lifecycle. SE&I documents any abnormal system behavior observed during tests and alerts MDA to issues with test article reliability. SE&I leads test failure review boards, identifies data collection shortfalls, and reallocates objectives to future test events as needed until all required model validation data is collected. The Failure Reporting, Analysis, and Corrective Action System provides a framework to investigate test failures and anomalies and identify solutions that will ultimately improve BMDS performance and reliability.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

MDA's M&S systems and products provide the BMDS, the Warfighter, and the OTA with the capability to evaluate individual BMDS components and the overall M&S system-of-systems. MDA validates and accredits system-level models and simulations to support accurate and comprehensive assessments of the BMDS. M&S System and product testing follows the test program outlined in MDA's IMTP and serves as a necessary precursor to conducting BMD System-level testing. Resources for the planning, design, execution and management of this testing are provided in accordance with the BMDS Test Policy, as listed in the most current version of the IMTP.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Engineering and Analysis	22.758	34.131	35.773
Articles:	-	-	-

Description: The Engineering and Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event:
- Design test architecture, define test objectives and evaluation criteria, define target requirements, and generate ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor Models and Simulations.
- Produce the threat data for BMDS ground and flight tests.
- Coordinate with BMDS Operational Test Agency (OTA) to address test issues, disposition them, coordinate them, and recommend action plans to achieve closure.
- Deliver HWIL M&S integration test cases.
- Conduct M&S HWIL Integration Benchmarking and integrate the BMDS HWIL M&S framework with MDA and non-MDA Elements into the test event BMDS architecture.
- Integrate, test, and deliver end-to-end BMDS simulations supporting ground test missions.
- Deploy and maintain M&S System Interface Units (SIUs) for BMDS testing.
- Analyze System-level interoperability.
- Conduct modeling and technical analysis for Combatant Command wargames and exercises.
- Utilize M&S for pre-test assessment, post-test review, and M&S updates.
- Provide test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure.
- Analyze test results to identify verification and validation data collection shortfalls and reassign objectives to future test events as required.
- Document BMDS test observations for system-level test anomalies and coordinate the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS)
- Upgrade test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency.

Specific and/or unique accomplishments to each FY are as follows:

FY 2019 Plans:
- Provide more robust BMDS architecture analysis for Ground Test to support expanded assessment requirements.
- Increase Cybersecurity requirements across Ground Test venues and cybersecurity events.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Purchase additional System Interface Units (SIUs) for new BMDS hardware under test (i.e., LRDR, Clear UEWR) - Augment test and performance analysis capability in response to: -- Increased number of flight and ground test events requiring system analysis -- Extended analysis timeline due to early analysis requirements - Develop/refine requirements for Continuous Integration and Agile Test (CI/CAT) capability - Begin implementation of M&S infrastructure upgrades to support CI/CAT ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Continuous Integration and Agile Test (CI/CAT)	0.000	5.157	13.293
Articles:	-	-	-
Description: Provide test planning, analysis, M&S integration, M&S execution, and post-event analysis for the BMDS-wide Continuous Integration / Continuous Agile Testing approach for integrated ground testing. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Develop/refine requirements for Continuous Integration and Agile Test (CI/CAT) capability - Begin implementation of M&S infrastructure upgrades to support CI/CAT ***FY 2020 Plans:*** - Execute pre-CI/CAT Sprint activities: -- Develop and document ground test sprint requirements -- Develop scenario designs for sprints -- Provide M&S integration -- Provide pre-mission analysis for ground test sprints - Execute agency ground test plan in accordance with new CONOPS and maintain integration across concurrent ground test and flight test activities ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Increase from FY 2019 to FY 2020 provides pre-mission activities for CI/CAT ground test sprints in FY 2021 while maintaining support for current flight and ground test missions. CI/CAT will increase ground test capacity to provide additional requested data for system assessments/fielding decisions and provide flexibility to adjust for emerging assessment requirements.			
Title: Continuous Development and Integration (CDI) Environment	0.000	0.000	9.963
Articles:	-	-	-
Description: Provide a Continuous Development and Integration (CDI) environment, allowing BMDS Elements to integrate new tactical and M&S software to be tested ahead of a ground test event. CDI will provide a venue for early test of BMDS Element and System upgrades, reducing risk of anomalies during HWIL integration and execution, and impacts of testing delays due to test configuration rework. This is a critical enabler to achieve the planned Continuous Integration/Continuous Agile Testing (CI/CAT) schedule and tempo.			
FY 2019 Plans: N/A			
FY 2020 Plans: - Procure additional hardware to enable pre-event integration - Initiate expansion of BMDS Integration and Development (BID) Lab to replicate the BMDS in order to meet evolving IMTP cadence - Conduct early integration activities such as scenario refinement, framework capability, and early checkout of Element software for GT-21 Sprints			
FY 2019 to FY 2020 Increase/Decrease Statement: Beginning in FY 2020, this funding will provide more efficient BMDS ground testing through the consistent application of Early Integration to resolve technical issues ahead of ground test events, enabling better flexibility and ability to meet the CI/CAT testing tempo.			
Accomplishments/Planned Programs Subtotals	22.758	39.288	59.029

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	128.757	92.160	169.822	-	169.822	76.270	149.764	137.058	147.923	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

D. Acquisition Strategy

In order to optimize the performance of the BMDS, MDA leverages the nation's engineering Centers of Excellence at government agencies and Military Services, FFRDCs, UARCs, and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. MDA will acquire products and services by competitive means to the extent practical.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MT23 / *Enabling - Test*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Analysis - Engineering & Analysis - CSS Support	C/CPFF	TEAMS : AL	3.008	1.526	Nov 2017	2.147	Nov 2018	5.131	Nov 2019	-		5.131	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - FFRDC	MIPR	Aerospace : AL	0.731	0.391	Nov 2017	0.399	Nov 2018	0.406	Nov 2019	-		0.406	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Industry	C/CPAF	Boeing : VA, AL	10.087	4.486	Nov 2017	5.405	Nov 2018	7.201	Nov 2019	-		7.201	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Integration Support CSS	C/CPAF	COLSA : AL, CO	13.194	7.076	Nov 2017	8.774	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Non-MDA Element Support for IMTP Events	Various	Various : AL, CO	0.000	0.000		0.000		7.641	Nov 2019	-		7.641	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - OGA Support	MIPR	AMRDEC : AL	20.040	6.602	Nov 2017	10.441	Nov 2018	14.856	Nov 2019	-		14.856	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - OGA Support - NME	MIPR	LTPO : AL	0.000	1.202	Nov 2017	4.375	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Technical Support	C/CPAF	Northrop Grumman : VA, AL	2.559	0.000		2.340	Nov 2018	0.000		-		0.000	0.000	4.899	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MT23 / *Enabling - Test*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Analysis - Engineering & Analysis - Test Engineering Support	Various	Various : AL, CO, VA	1.836	1.475	Nov 2017	0.250	Nov 2018	0.538	Nov 2019	-		0.538	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CI/CAT M&S Integration	Various	Various : AL, CO	0.000	0.000		0.000		7.673	Dec 2019	-		7.673	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CI/CAT Test & Performance Analysis	Various	Various : AL, CO	0.000	0.000		0.000		4.567	Dec 2019	-		4.567	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CI/CAT Test Requirements Development	C/CPFF	TEAMS : AL, CO	0.000	0.000		0.000		1.053	Nov 2019	-		1.053	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CSS	Various	Various : Various	0.000	0.000		2.734	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - Hardware	C/CPFF	TBE : AL	0.000	0.000		2.423	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Continuous Development and Integration (CDI) Environment - Continuous Development and Integration Environment	MIPR	AMRDEC : AL, CO	0.000	0.000		0.000		9.963	Dec 2019	-		9.963	Continuing	Continuing	Continuing
		Subtotal	51.455	22.758		39.288		59.029		-		59.029	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MT23 / *Enabling - Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	51.455	22.758		39.288		59.029		-		59.029	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Integrated Master Test Plan (IMTP) Engineering Inputs - 1Q - FY 2018	▲																											
IMTP Engineering Inputs - 3Q - FY 2018			▲																									
IMTP Engineering Inputs - 1Q - FY 2019					△																							
IMTP Engineering Inputs - 3Q - FY 2019							△																					
IMTP Engineering Inputs - 1Q - FY 2020									△																			
IMTP Engineering Inputs - 3Q - FY 2020											△																	
FTO-03 (OTA, OT Intercept Flight Test)												△																
GTI-08 (N/P) (BMDS Ground Test)												✧	✧															
IMTP Engineering Inputs - 1Q - FY 2021													△															
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)													✧	✧														
IMTP Engineering Inputs - 2Q - FY 2021															△													
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)															✧													
IMTP Engineering Inputs - 1Q - FY2022																	△											
IMTP Engineering Inputs - 3Q - FY 2022																			△									
IMTP Engineering Inputs - 1Q - FY 2023																					△							
IMTP Engineering Inputs - 3Q - FY 2023																							△					
IMTP Engineering Inputs - 1Q - FY 2024																									△			
IMTP Engineering Inputs - 3Q - FY 2024																											△	

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Integrated Master Test Plan (IMTP) Engineering Inputs - 1Q - FY 2018	1	2018	1	2018
IMTP Engineering Inputs - 3Q - FY 2018	3	2018	3	2018
IMTP Engineering Inputs - 1Q - FY 2019	1	2019	1	2019
IMTP Engineering Inputs - 3Q - FY 2019	3	2019	3	2019
IMTP Engineering Inputs - 1Q - FY 2020	1	2020	1	2020
IMTP Engineering Inputs - 3Q - FY 2020	3	2020	3	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
IMTP Engineering Inputs - 1Q - FY 2021	1	2021	1	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	1	2021	2	2021
IMTP Engineering Inputs - 2Q - FY 2021	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
IMTP Engineering Inputs - 1Q - FY2022	1	2022	1	2022
IMTP Engineering Inputs - 3Q - FY 2022	3	2022	3	2022
IMTP Engineering Inputs - 1Q - FY 2023	1	2023	1	2023
IMTP Engineering Inputs - 3Q - FY 2023	3	2023	3	2023
IMTP Engineering Inputs - 1Q - FY 2024	1	2024	1	2024
IMTP Engineering Inputs - 3Q - FY 2024	3	2024	3	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD28 / *Intelligence & Security*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD28: *Intelligence & Security*	191.735	41.448	44.078	43.851	-	43.851	45.048	45.315	46.062	46.969	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Intelligence and Security program provides multi-disciplinary intelligence and security for the BMDS acquisition, development, test and deployment. The Intelligence and Security Major Program Goals are:
-- Ensure the Intelligence Community (IC) understands and fulfills MDA's current and future prioritized intelligence requirements; advocate BMDS test intelligence requirements; and work closely with the IC.
-- Leverage available National and DoD Counterintelligence resources. Ensure counterintelligence products and services are fully integrated into all RDT&E programs and activities to protect classified information and critical technologies and to protect MDA and BMDS personnel, facilities, information and activities.
-- Define cybersecurity systems engineering requirements for BMDS assets. Identify cybersecurity systems engineering and infrastructure intelligence requirements to focus IC collection, analysis and production to target MDA/BMDS cyber vulnerabilities. Incorporate cybersecurity engineering requirements into the BMDS systems engineering process.
-- Provide cross-Agency acquisition security oversight and support for the identification and protection of Critical Program Information (CPI), and evaluation and implementation of developing Supply Chain Risk Management (SCRM) requirements. Provide physical security for BMDS weapons/sensor system deployments, including Foreign Military Sales (FMS). Implement MDA's information security and declassification programs. Strengthen Test and Operations Security (OPSEC) across the Agency.

The Security and Intelligence Project captures five specific areas: 1) Intelligence; 2) Counterintelligence; 3) Cybersecurity Engineering; 4) Program Protection; and 5) Threat Systems Engineering. Collectively, these efforts provide critical information regarding threat ballistic missile system capabilities; protection of personnel, activities, and technology from espionage and terrorism; and identification and mitigation of BMDS system vulnerabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Intelligence	8.842	10.186	9.696
Articles:	-	-	-
Description: The Intelligence program provides expertise to develop intelligence products on threat ballistic missile system capabilities, and leverages unique intelligence-community developed, owned, and operated capabilities for the benefit and advocacy of the missile defense community. Program goals include: - Serve as designated intelligence broker between MDA and the Intelligence Community -- Maintain and communicate prioritized, specific BMDS intelligence requirements to the Intelligence Community.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-- Maintain a focused dialog with members of the Intelligence Community to ensure understanding, urgency and context of MDA intelligence requirements. - Provide Current, Technical, Acquisition, Collection and Cyber intelligence to the BMDS throughout the acquisition life cycle. - Maintain and update MDA's knowledge base of foreign ballistic missile threats, including development, enhancement, and population of the Missile Threat Portals with Intelligence Community produced documents at the appropriate security classification levels. - Characterize all ballistic missile threat systems from adversaries for use by the MDA Systems Engineer, Program Managers, and Director for Test to perform modeling, simulation, and testing of the BMDS. - Maintain Missile Intelligence Secure Link (MISL) classified portal (full operational capability). Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Counterintelligence	6.919	6.776	7.051
Articles:	-	-	-
Description: The Counterintelligence Program detects, mitigates or neutralizes espionage, foreign intelligence collection activities and terrorist activities conducted for or on behalf of foreign powers, organizations, persons, or their agents directed against U.S. national security interests, or DoD/MDA and its personnel, information, material, facilities, and activities. Program goals include: - Serve as MDA Liaison with Federal, State and Local Law Enforcement and Counterintelligence (CI) Organizations to report and resolve incidents involving MDA personnel, information and technologies. -- Engage National, Combatant Command and DoD CI resources to share and obtain threat information impacting MDA personnel, facilities, information, technologies, programs and activities, worldwide. -- Provide CI, technical and cyber threat support to MDA flight tests, conferences, and BMDS deployment activities worldwide, including FMS Programs, to detect, deter, or neutralize criminal, terrorist and foreign intelligence collection threats targeting MDA and BMDS technologies, personnel, facilities and activities. - Execute life cycle replacement of outdated technical surveillance countermeasures and cyber forensics gear to employ the latest technologies during conferences, flight tests and other classified activities to detect, deter and prevent the loss or compromise of classified or sensitive information to foreign adversary collection activities.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Conduct CI in Cyberspace activities to detect malicious and insider threat activities targeting MDA administrative and fire control networks. - Conduct MDA Insider Threat Program to identify, deter and mitigate potential insider threats. - Provide required CI Awareness and Reporting training to MDA workforce. - Provide CI research and assistance for cyber forensics and analysis to identify insider and foreign entity cyber threats to MDA computer networks and BMDS fire control systems. - Conduct CI research and analysis to produce CI threat products that address foreign intelligence, cyber and international terrorist threats to MDA personnel, facilities, information, systems and activities worldwide. - Maintain technical surveillance countermeasures and cyber forensic gear to detect, identify and neutralize adversary collection platforms and capabilities used to gain unauthorized access to MDA classified and controlled unclassified information. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Cybersecurity Engineering Program	4.537	4.572	4.413
Articles:	-	-	-
Description: The Cybersecurity Engineering Program is focused on developing designs and solutions to protect the BMDS from existing and emerging cyber threats through coherent cybersecurity systems engineering. Program goals include: - Ensure Cybersecurity is integrated into the Acquisition Process. - Assess the Cybersecurity Architecture to address gaps/disconnects, enhance interoperability, and realize efficiencies across all mission systems. Define the "As Built" and "To Be" Cybersecurity Systems Engineering concepts to strengthen technical assessments and cybersecurity design solutions and implementation recommendations impacted by the change in requirements. -- Develop and coordinate near-term and long-term engineering changes to the BMDS -- Develop requirements for building cybersecurity into incremental BMDS Hardware and Software builds -- Monitor allocation of these requirements to the Elements. -- Recommend updates to the BMDS Core Standards, including Cyber-related requirements specified by the Agency, the Combatant Commanders (CCMDs), the DoD, and the Federal Government.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-- Perform cybersecurity systems engineering assessments for proposed BMD System Specification and interface changes and additions. - Provide and recommend updates to cybersecurity systems engineering policy and guidance for BMDS system design and acquisition to enhance BMDS resiliency against cyber threats - Implement cybersecurity engineering resiliency techniques. - Provide objectives and requirements for Cybersecurity testing. - Provide independent cybersecurity reviews at critical engineering milestones. - Provide information system security engineering by assessing cybersecurity requirements, design, and implementations and provide recommendations to address architecture gaps or shortfalls. - Implement cyber threat mitigation strategies within BMDS architecture, design, system requirements, and specifications documentation to ensure traceability to necessary components and interfaces that make up the BMDS mission. - Coordinate evaluation of cybersecurity capability during BMDS tests. - Develop verification and assessment strategies for system cybersecurity requirements. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Program Protection	10.217	11.889	11.443
Articles:	-	-	-
Description: Program Protection protects BMDS information, Critical Program Information, technologies, and deploying systems; develops and coordinates Security Classification Guides; and performs declassification reviews to identify equities that warrant continued protection in order to preserve the technological advantage of the BMDS. Program Protection also coordinates MDA intelligence, counterintelligence and security to help BMDS test activities. Program goals include: - Perform reviews required for all Agency public release, security classification, and FOIA and Mandatory Declassification Reviews to ensure sensitive BMDS information is not inadvertently released into the public domain. - Perform Information Security program management and oversee implementation by MDA programs -- Perform internal program reviews, policy oversight and implementation, and training to identify and fix deficiencies and protect critical BMDS information			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-- Collect information required for annual reports and communicate security posture to leadership - Provide security oversight for the Agency's classified contracts by drafting and coordinating DD254 "Contract Security Classification Specification" documents. - Execute an effective SCRM program to prevent unmitigated risks from degrading the performance of components and systems across the BMDS supply chain. - Provide dedicated on-site security and protection of BMDS resources and personnel at operational sites in Alaska, California and Colorado to ensure security protection coverage of the BMDS mission operations and test assets based in those regions. - Perform systematic Declassification reviews on historical Agency information to prevent unauthorized disclosures due to automatic declassification requirements. - Identify and integrate Physical Security requirements for overseas sites with existing or planned missile defense weapons or sensor systems to ensure protection of deployed sites. - Provide effective physical protection to low density/high demand emerging warfighter capability. - Expand security activities to include FMS. - Conduct program protection planning for the continuing assessment of candidate critical program information for Advanced Technology programs and reassessment of other BMDS programs affected by technical baseline changes; ensure critical technologies embedded in missile defense systems are not vulnerable to compromise. - Keep pace with mission growth in program protection, system security engineering, acquisition security, and SCRM. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Threat Systems Engineering	10.933	10.655	11.248
Articles:	-	-	-
Description: Threat Engineering provides representations of adversary missile capabilities based on available intelligence information, and develops, coordinates, and baselines BMDS-level targets and countermeasures requirements to define target capabilities required to meet BMDS flight test objectives. Program goals include: - Develop threat definitions for system specifications -- Produce threat / scenario data for BMDS development events			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-- Perform Threat Verification and Validation analysis to verify missile models meet specifications and are consistent with intelligence assessments. - Produce Adversary Data Package (ADP) updates. - Develop target requirements to ensure flight test targets meet operationally realistic conditions. - Produce Target Assessment and Certification Reports. - Assess threat representation of flight test targets. - Develop target system specifications and guide targets requirements development, planning, and certification for BMDS flight tests. - Analyze flight test target performance relative to threat intelligence assessments to support target system verification and certification. - Provide Technical Data for major reviews (System Requirements Reviews, Critical Design Reviews, etc.) - Complete Target Specification builds. - Update MDA INS 5000.06, Target Class Capabilities and Requirements documents as necessary. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	41.448	44.078	43.851

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0305103C: *Cyber Security Initiative*	0.964	0.985	1.138	-	1.138	1.160	1.184	1.206	1.230	Continuing	Continuing

Remarks

D. Acquisition Strategy

This project leverages expertise in the intelligence community, counterintelligence community, and information assurance community, including the Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry. The executing agents utilize various

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

contracting strategies in a flexible manner to maximize their contribution to the BMDS. Products and Services will be acquired by competitive means to the extent that is beneficial and practical.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD28 / *Intelligence & Security*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intelligence - Intelligence Analysis & Support	Allot	MDA : VA, AL, CO	20.699	4.566	Oct 2017	4.046	Oct 2018	3.668	Oct 2019	-		3.668	Continuing	Continuing	Continuing
Intelligence - Intelligence Support	C/CPFF	TEAMS : AL, VA, CO	21.596	3.719	Nov 2017	5.832	Nov 2018	5.714	Nov 2019	-		5.714	Continuing	Continuing	Continuing
Intelligence - Intelligence Support - IT Maintenance	C/CPFF	Northrop Grumman : AL, CO	2.056	0.557	Nov 2017	0.308	Nov 2018	0.314	Nov 2019	-		0.314	Continuing	Continuing	Continuing
Intelligence - Prior year Intelligence Support no longer funded in FYDP	Various	Various : Various	7.770	0.000		0.000		0.000		-		0.000	0.000	7.770	0.000
Counterintelligence - CI Analysis & Support	Allot	MDA : AL, CO, VA	8.406	2.102	Oct 2017	3.075	Oct 2018	2.788	Oct 2019	-		2.788	Continuing	Continuing	Continuing
Counterintelligence - CI Analysis and Support	C/CPFF	TEAMS : AL, CO, VA	15.439	4.020	Nov 2017	2.667	Nov 2018	3.839	Nov 2019	-		3.839	Continuing	Continuing	Continuing
Counterintelligence - CI Surveillance Gear	Various	Various : Various	0.000	0.797	Dec 2017	1.034	Dec 2018	0.424	Dec 2019	-		0.424	Continuing	Continuing	Continuing
Counterintelligence - Prior Year Counterintelligence Support no longer funded in FYDP	C/CPFF	MIDAESS : VA	1.069	0.000		0.000		0.000		-		0.000	0.000	1.069	0.000
Cybersecurity Engineering Program - Cybersecurity - FFRDC	FFRDC	Aerospace : CA, VA	3.279	0.384	Nov 2017	0.398	Nov 2018	0.000		-		0.000	0.000	4.061	0.000
Cybersecurity Engineering Program - Cybersecurity - FFRDC (2)	FFRDC	MITRE : VA, AL	2.713	1.145	Nov 2017	1.196	Nov 2018	0.000		-		0.000	0.000	5.054	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD28 / *Intelligence & Security*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cybersecurity Engineering Program - Cybersecurity Engineering	Allot	MDA : VA, AL	11.686	2.467	Oct 2017	2.241	Oct 2018	2.058	Oct 2019	-		2.058	Continuing	Continuing	Continuing
Cybersecurity Engineering Program - Cybersecurity Engineering - Hardware	Various	Various : AL, CO, VA	0.000	0.000		0.000		1.107	Nov 2019	-		1.107	Continuing	Continuing	Continuing
Cybersecurity Engineering Program - Cybersecurity Engineering CSS	C/CPFF	TEAMS : VA, AL	2.828	0.541	Nov 2017	0.737	Nov 2018	1.248	Nov 2019	-		1.248	Continuing	Continuing	Continuing
Program Protection - Declassification Analysis	C/CPFF	TEAMS : VA, AL	7.496	1.061	Nov 2017	2.055	Nov 2018	2.096	Nov 2019	-		2.096	Continuing	Continuing	Continuing
Program Protection - Program Protection Analysis	Allot	MDA : VA, AL	20.892	4.555	Oct 2017	4.654	Oct 2018	3.733	Oct 2019	-		3.733	Continuing	Continuing	Continuing
Program Protection - Program Protection Analysis & Support	C/CPFF	TEAMS : AL, AK, CA, CO, VA	19.534	4.006	Nov 2017	4.648	Nov 2018	4.821	Nov 2019	-		4.821	Continuing	Continuing	Continuing
Program Protection - Program Protection Support	Various	Various : AL, VA, CO	2.717	0.595	Nov 2017	0.532	Nov 2018	0.793	Nov 2019	-		0.793	Continuing	Continuing	Continuing
Threat Systems Engineering - Prior Year Threat Systems Engineering Support no longer funded in FYDP	Various	Various : AL, MD, VA	19.225	0.000		0.000		0.000		-		0.000	19.225	38.450	0.000
Threat Systems Engineering - Threat Systems Engineering	Allot	MDA : VA, AL, CO	13.991	5.037	Oct 2017	4.522	Oct 2018	3.731	Oct 2019	-		3.731	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat Systems Engineering - CSS	C/CPFF	TEAMS : VA, AL	6.237	3.290	Nov 2017	3.343	Nov 2018	4.672	Nov 2019	-		4.672	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat	FFRDC	MIT/LL : MA	1.869	1.174	Nov 2017	1.196	Nov 2018	1.219	Nov 2019	-		1.219	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD28 / *Intelligence & Security*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - FFRDC															
Threat Systems Engineering - Threat Systems Engineering - UARC	FFRDC	JHU/APL : MD	2.233	1.432	Nov 2017	1.594	Nov 2018	1.626	Nov 2019	-		1.626	Continuing	Continuing	Continuing
		Subtotal	191.735	41.448		44.078		43.851		-		43.851	Continuing	Continuing	N/A

Remarks

NASIC - National Air and Space Intelligence Center

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	191.735	41.448		44.078		43.851		-		43.851	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD28 / *Intelligence & Security*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD28 Intelligence & Security	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Adversary Data Package (ADP) - 2018				▲																								
Annual MDA OPSEC Report to USD(I) - 2018				▲																								
Annual Declassification Review - 2018				▲																								
ADP - 2019								△																				
Annual MDA OPSEC Report to USD(I) - 2019								△																				
Annual Declassification Review - 2019								△																				
Adversary Data Package (ADP) - 2020												△																
Annual MDA OPSEC Report to USD(I) - 2020												△																
Annual Declassification Review - 2020												△																
Annual Report to Congress for SAPs (FY 2020)												△																
Annual Report to Congress for SAPs (FY 2021)															△													
ADP - 2021															△													
Annual MDA OPSEC Report to USD(I) - 2021															△													
Annual Declassification Review - 2021															△													
Annual Report to Congress for SAPs (FY 2022)																			△									
ADP - 2022																			△									
Annual MDA OPSEC Report to USD(I) - 2022																			△									
Annual Declassification Review - 2022																			△									
Annual Report to Congress for SAPs (FY 2023)																							△					
ADP - 2023																							△					
Annual MDA OPSEC Report to USD(I) - 2023																							△					
Annual Declassification Review - 2023																							△					
ADP - 2024																								△				

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Annual MDA OPSEC Report to USD(I) - 2024																									△			
Annual Declassification Review - 2024																									△			
Annual Report to Congress for SAPs (FY 2024)																												△

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD28 Intelligence & Security	1	2018	4	2024
Adversary Data Package (ADP) - 2018	4	2018	4	2018
Annual MDA OPSEC Report to USD(I) - 2018	4	2018	4	2018
Annual Declassification Review - 2018	4	2018	4	2018
ADP - 2019	4	2019	4	2019
Annual MDA OPSEC Report to USD(I) - 2019	4	2019	4	2019
Annual Declassification Review - 2019	4	2019	4	2019
Adversary Data Package (ADP) - 2020	4	2020	4	2020
Annual MDA OPSEC Report to USD(I) - 2020	4	2020	4	2020
Annual Declassification Review - 2020	4	2020	4	2020
Annual Report to Congress for SAPs (FY 2020)	4	2020	4	2020
Annual Report to Congress for SAPs (FY 2021)	4	2021	4	2021
ADP - 2021	4	2021	4	2021
Annual MDA OPSEC Report to USD(I) - 2021	4	2021	4	2021
Annual Declassification Review - 2021	4	2021	4	2021
Annual Report to Congress for SAPs (FY 2022)	4	2022	4	2022
ADP - 2022	4	2022	4	2022
Annual MDA OPSEC Report to USD(I) - 2022	4	2022	4	2022
Annual Declassification Review - 2022	4	2022	4	2022
Annual Report to Congress for SAPs (FY 2023)	4	2023	4	2023
ADP - 2023	4	2023	4	2023
Annual MDA OPSEC Report to USD(I) - 2023	4	2023	4	2023
Annual Declassification Review - 2023	4	2023	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
ADP - 2024	1	2024	1	2024
Annual MDA OPSEC Report to USD(I) - 2024	1	2024	1	2024
Annual Declassification Review - 2024	1	2024	1	2024
Annual Report to Congress for SAPs (FY 2024)	4	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD30 / *BMD Information Management Systems*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD30: *BMD Information Management Systems*	409.688	82.507	79.979	84.525	-	84.525	87.524	90.302	92.513	94.357	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The BMD Information Management Systems budget project funds information technology mission critical functions necessary for the efficient operations and safeguarding of BMD information in compliance with DoD policies and in keeping with the President's declaration on 29 May 2009, "cyber threat is one of the most serious economic and national security challenges we face as a nation". IT is critical to the day-to-day functions of MDA personnel to communicate (classified and unclassified) with each other, Congress, senior DoD and other U.S. government agency personnel, Combatant Commander's, NATO partners, and other industry partners. Communication among these organizations facilitates the MDA mission of developing and fielding an integrated BMDS to defend the United States, our deployed forces, allies, and friends against all ranges of enemy ballistic missiles in all phases of flight.

MDA information management systems capabilities support rigorous missile defense Research, Development, Test and Engineering (RDT&E) and facilitate the development of technologies to guard against evolving missile threat. Communications are vital for missile defense to continue a viable homeland defense against rogue threats and to provide the integration required to defend deployed forces, allies, and friends against theater threats. The BMD information management consists of MDA Special Purpose Processing Nodes (SPPNs), IT systems, data centers, operations and monitoring centers which are vital to support the strategic mission of the Agency and necessary to meet disaster recovery and continuity of operations requirements. This infrastructure is required to sustain access to the Secret Internet Protocol Router Network (SIPRNET), Non secure Internet Protocol Router Network (NIPRNET), MDA classified and unclassified networks, classified and unclassified video teleconferencing services, test and business knowledge data centers, the Defense Research Engineering Network (DREN). These mission critical functions provide for the efficient operation and safeguarding of all agency information in locations supporting MDA around the world.

Project MD30 is aligned into the following inter-agency mission critical IT services and the associated plans in accordance with the Federal Information Technology Shared Services Strategy.

1. End User Support
2. Special Purpose Processing Nodes (SPPNs)
3. IT Planning and Solutions
4. Unified Communications
5. Portal and Data Services
6. Business Automation Services

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: End User Support	19.694	20.791	21.076
Articles:	-	-	-
Description: Provides IT operations, support and maintenance (18 hours a day, six days a week) to over 10,500 MDA worldwide users (classified and unclassified) executing the Research, Development, Test and Engineering (RDT&E) mission. Services include Integrated Service Desk support (Help Desk and Client Support Services); management of hardware and software maintenance and licensing; and monitoring network activity to ensure users comply with DoD policies for the proper use of information systems. Services also include printing and copying; email and file; directory and authentication services. Includes investments in equipment at end-of-life to comply with Federal and DoD mandated cybersecurity policies. Provides life-cycle management of over 190,000 IT assets including IT procurement, receiving, shipping/transportation, warehousing, transfers and disposal using the Defense Property Accountability System (DPAS). Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure Services)	17.309	10.964	11.632
Articles:	-	-	-
Description: Provides for the developmental engineering and operational strategies and concepts; and planning, design, implementation and maintenance for MDA Research, Development, Test and Evaluation (RDT&E) Special Purpose Processing Nodes (SPPNs) in Huntsville, AL and Colorado Springs, CO. The SPPN infrastructure consists of routers, switches, firewalls, compute, storage and intrusion detection systems that provide IT support to over 10,500 MDA classified/unclassified users worldwide. The SPPNs support dynamic and rapid modifications and reconfigurations of network infrastructure in support of RDT&E mission and event unique configurations. Funds provide for network operations and performance monitoring; development of detailed solutions, designs, and plans; Disaster Recovery and Continuity of Operations (DR/COOP) rehearsals; Internet access management; and web filtering. Sustains core communications distribution services across the MDA Enterprise. Includes investments in equipment at end-of-life to comply with Federal and DoD mandated cybersecurity policies. Plan, engineer and implement sustainment projects for general IT services and business systems consistent with the IT architecture roadmap.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Information Technology (IT) Planning and Solutions ***Articles:*** ***Description:*** Provides IT engineering support for new requirements analysis, design, planning and implementation of IT solutions for real-world issues. Addresses the increasing demand for more complex IT products and highly specialized IT services. Manages the prioritization and integration of investments in the MDA IT Portfolio to ensure compliance with Federal and DoD polices. Supports the MDA Chief Information Officer Enterprise Architecture Board, Project Steering Committee and the Change Control Board. Ensures compliance with Federal Laws, DoD policies, directives and regulations including: Clinger-Cohen Act, the Federal Information Security Management Act (FISMA), and Office of Management and the Office of Management and Budget (OMB) IT budget reporting policies. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A	14.998 -	14.431 -	12.893 -
Title: Unified Communications ***Articles:*** ***Description:*** Provides for the management, operations and sustainment of classified and unclassified globally deployed video teleconferencing capabilities and equipment. Also includes unclassified desktop instant messaging, wireless services, and collaboration capabilities. Provides and implements engineering solutions for all unified communications services. Supports	14.998 -	16.973 -	18.667 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
MDA global RDT&E mission for classified and unclassified voice and data circuits (wide area, local area and metropolitan area networks) and interfaces with the Defense Information System Network (DISN) Video Services Global (DVSG), the Defense Research and Engineering Network (DREN), Joint Service Provider (JSP) and commercial vendors. Maintenance agreements and licenses for MDA Enterprise network and telecommunications equipment (classified and unclassified mobile and desktop telephony devices). Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase from FY 2019 to FY 2020 provides additional support and sustainment requirements for asset management, test operations tempo and bandwidth expansion due to the increased global mission.			
Title: Business Automation Services	8.087	9.255	10.515
Articles:	-	-	-
Description: Provides for the management, operation and maintenance of enterprise business applications for the MDA community to access and share various sources of available data, information and knowledge and enable improved organization, retrieval, manipulation, and storage. Operate and maintain nine Defense Business Systems that meet the reporting requirements of Title 10 United States Code section 2222; these include portal-based Electronic Learning Management System (E-LMS), Program Resource Internet Database Environment (PRIDE), Information Management Program Activity control Tool (IMPACT), Standard Procurement System (SPS), Human Resource Tracking System/Personnel Tracking System (HRTS/PTS), TEAMMATE, E-TASKER, Comprehensive Cost and Requirements (CCaR), Electronic Content and Records Tool (ECART). Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Portal and Data Services	7.421	7.565	9.742
Articles:	-	-	-
Description: Provides for the management, operation and maintenance support for the classified and unclassified MDA Portal application and the IT portal infrastructure. The support includes web-based developmental engineering and operations, planning, design, application implementation, content management and training. Also provides MDA Privacy Office and Civil Liberties compliance and reporting, and manages data storage capacity to accommodate MDA users. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY2020 reflects a realignment of $1.034M from Information Technology (IT) Planning & Solutions for Civilian Labor and an increase of $1.143M for the Research and Development Enterprise Collaboration Services (RECS) contract for additional license cost and portal content.			
Accomplishments/Planned Programs Subtotals	82.507	79.979	84.525

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	55.562	56.753	13.600	-	13.600	13.475	16.187	18.232	22.949	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603913C: *Israeli Cooperative Programs*	373.800	300.000	300.000	-	300.000	300.000	300.000	300.000	300.000	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	29.652	27.692	38.352	-	38.352	36.348	28.029	22.733	30.463	Continuing	Continuing
• 0604881C: *AEGIS SM-3 Block IIA Co-Development*	9.531	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.531
• 0901598C: *Management HQ - MDA*	29.947	28.626	27.065	-	27.065	27.446	28.164	28.698	29.271	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

This acquisition strategy to provide IT services for MDA consists of three MDA issued contracts. The Integrated Research and Development for Enterprise Solutions (IRES) provides IT design, engineering, implementation and sustainment services. The Research and Development Enterprise Collaboration Services (RECS) provides Video Teleconferencing, Portal, Data and Business Automation Services.

MDA issues multiple Military Interdepartmental Purchase Requisitions (MIPRs) for leased communications including DISA, DREN and the US Army.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
End User Support - Consolidated Support Logistics/Asset Mgmt	C/CPFF	Venturi : AL, CO	0.000	0.000		0.514	Nov 2018	0.383	Nov 2019	-		0.383	Continuing	Continuing	Continuing
End User Support - End User Civilian Pay/Travel/ PCS	Allot	MDA Civilian Pay/ TDY/PCS : AL, CO, NM, VA	14.833	3.213	Oct 2017	3.117	Oct 2018	1.881	Oct 2019	-		1.881	Continuing	Continuing	Continuing
End User Support - End User Civilian Travel	Allot	MDA Civilian Travel : AL, AK, CA, CO, HI, NM, VA	1.093	0.232	Oct 2017	0.000		0.000		-		0.000	0.000	1.325	0.000
End User Support - End User IT Hardware/ Software Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	30.242	7.071	Feb 2018	6.130	Nov 2018	6.630	Nov 2019	-		6.630	Continuing	Continuing	Continuing
End User Support - End User IT Licenses	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	11.837	1.744	Feb 2018	5.262	Nov 2018	5.710	Nov 2019	-		5.710	Continuing	Continuing	Continuing
End User Support - End User Operational Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	43.495	7.434	Feb 2018	5.768	Oct 2018	6.472	Oct 2019	-		6.472	Continuing	Continuing	Continuing
Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure	Allot	MDA Civilian Pay : AL, CO, VA	5.975	1.280	Oct 2017	1.326	Oct 2018	0.506	Oct 2019	-		0.506	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Services) - SPPN Civilian Pay/Travel/PCS															
Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure Services) - SPPN Licenses	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	64.800	9.037	Feb 2018	6.525	Nov 2018	9.000	Nov 2019	-		9.000	Continuing	Continuing	Continuing
Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure Services) - SPPN Operational Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	63.418	6.992	Feb 2018	3.113	Nov 2018	2.126	Nov 2019	-		2.126	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - Consolidated Support, IT Planning and Solutions	C/CPFF	Five Stones, Yorktown, Peopletec : AL, CO, VA	15.056	5.755	Mar 2018	5.423	Nov 2018	7.707	Aug 2020	-		7.707	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions Civilian Pay/Travel/PCS	Allot	MDA Civilian Pay : AL, CO, VA	5.417	0.960	Oct 2017	1.823	Oct 2018	1.783	Oct 2019	-		1.783	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions OMB,OSD, and DOD Compliance Monitoring and Reporting/Contract Deliverable	C/CPFF	Colsa : AL, CO, VA	0.834	0.128	Mar 2018	0.000		0.000		-		0.000	0.000	0.962	0.000
Information Technology (IT) Planning and Solutions - IT Planning and Solutions Operational Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	30.628	8.155	Feb 2018	7.185	Oct 2018	0.503	Oct 2019	-		0.503	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions	Allot	MDA Business Operations : AL, CO, VA	1.904	0.000		0.000		0.000		-		0.000	0.000	1.904	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
- MDA Agency Business Operations															
Information Technology (IT) Planning and Solutions - SWDC PNT	C/CPFF	Northrup Grumman : AL, CO, VA	0.000	0.000		0.000		2.900	Oct 2019	-		2.900	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Civilian Pay/Travel/PCS	Allot	MDA Civilian Pay : Al, CO, VA	5.301	1.120	Oct 2017	0.994	Oct 2018	2.023	Oct 2019	-		2.023	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Leased Communications/ Licenses	MIPR	DISA/DREN/IT2S : AL, AK, CA, CO, HI, NM, VA	18.668	2.813	Oct 2017	3.102	Oct 2018	3.334	Oct 2019	-		3.334	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Operational Support	C/CPAF	IRES : AL, CO, VA	8.882	2.088	Feb 2018	4.062	Oct 2018	2.037	Oct 2019	-		2.037	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Wireless Services	C/FFP	AT&T : AL, CO, VA	3.592	2.011	Nov 2017	1.998	Nov 2018	1.983	Nov 2019	-		1.983	Continuing	Continuing	Continuing
Unified Communications - VTC HW Licenses	C/CPIF	IRES : AL, CO, VA	1.800	0.000		1.736	Nov 2018	1.850	Nov 2019	-		1.850	Continuing	Continuing	Continuing
Unified Communications - VTC HW/Break-Fix	C/CPIF	RECS : AL, CO, VA	1.209	0.000		1.267	Nov 2018	1.976	Nov 2019	-		1.976	Continuing	Continuing	Continuing
Unified Communications - VTC Operations Support	C/CPIF	RECS : AL, AK, CO, NM, VA	27.447	6.966	Nov 2017	3.814	Nov 2018	5.464	Nov 2019	-		5.464	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Civilian Pay/ Travel/PCS	Allot	MDA Civilian Pay : AL, CO, VA	3.033	0.480	Oct 2017	0.331	Oct 2018	0.506	Oct 2019	-		0.506	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Licenses	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	4.496	0.953	Feb 2018	0.972	Nov 2018	0.991	Nov 2019	-		0.991	Continuing	Continuing	Continuing
Business Automation Services - Business	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	15.025	6.632	Feb 2018	7.930	Nov 2018	9.018	Nov 2019	-		9.018	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD30 / *BMD Information Management Systems*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Automation Operational Support															
Business Automation Services - Business Automation Services Support	MIPR	CACI : AL, CO, VA	0.080	0.022	Oct 2017	0.022	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Civilian Pay/Travel/PCS	Allot	MDS Civilian Pay : AL, CO, VA	4.428	0.800	Oct 2017	0.829	Oct 2018	1.686	Oct 2019	-		1.686	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Licenses and Maintenance	C/CPAF	Northrop Grumman / Jaobs Engineering : AL, CO, VA	8.589	1.627	Feb 2018	1.661	Nov 2018	1.800	Nov 2019	-		1.800	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Operational	C/CPAF	Online Subscriptions Services : AL, CO, VA	1.849	0.408	Oct 2017	0.417	Oct 2018	0.455	Oct 2019	-		0.455	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Operational Support	C/FFP	NMR / TBD : AL, CO, VA	15.757	4.586	Nov 2017	4.658	Nov 2018	5.801	Nov 2019	-		5.801	Continuing	Continuing	Continuing
		Subtotal	409.688	82.507		79.979		84.525		-		84.525	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD30 / *BMD Information Management Systems*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	409.688	82.507		79.979		84.525		-		84.525	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Operate, Monitor and Sustain Recurring Operations for Video Teleconferencing for Unified Communications Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Manage DoD Mandated Business Applications and Sustain MDA Financial and Contractual Support Systems - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Operate and Maintain General Information Technology Services 18 hours per day, 6 days per week - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Revise and Test Contingency Plans for Information Technology Systems - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Operate and Maintain Classified and Unclassified MDA Knowledge Online Services - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Procure, Implement, and Asset Control for Information Technology Operational Systems -Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Provide 18 hours per day, 6 days per week Network and Helpdesk Services for General Information Technology Services for MDA Workforce - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Fund Recurring Leased Circuits, Maintenance Agreements and Licenses for MDA Enterprise - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Operate, Monitor and Sustain Recurring Classified and Unclassified Telecommunication Requirements for Unified Communications - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Sustain the BMDS Integrated Master Schedule and the Ballistic Missile Defense Asset Management Tool - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Perform Analysis, Track, and Report Metrics on Equipment Lifecycle - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Sustain the Information Technology Infrastructure Across the MDA Enterprise - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Operate, Monitor and Sustain Recurring Operations for Video Teleconferencing for Unified Communications Follow-On	1	2018	4	2024
Manage DoD Mandated Business Applications and Sustain MDA Financial and Contractual Support Systems - Follow-On	1	2018	4	2024
Operate and Maintain General Information Technology Services 18 hours per day, 6 days per week - Follow-On	1	2018	4	2024
Revise and Test Contingency Plans for Information Technology Systems - Follow-On	1	2018	4	2024
Operate and Maintain Classified and Unclassified MDA Knowledge Online Services - Follow-On	1	2018	4	2024
Procure, Implement, and Asset Control for Information Technology Operational Systems -Follow-On	1	2018	4	2024
Provide 18 hours per day, 6 days per week Network and Helpdesk Services for General Information Technology Services for MDA Workforce - Follow-On	1	2018	4	2024
Fund Recurring Leased Circuits, Maintenance Agreements and Licenses for MDA Enterprise - Follow-On	1	2018	4	2024
Operate, Monitor and Sustain Recurring Classified and Unclassified Telecommunication Requirements for Unified Communications - Follow-On	1	2018	4	2024
Sustain the BMDS Integrated Master Schedule and the Ballistic Missile Defense Asset Management Tool - Follow-On	1	2018	4	2024
Perform Analysis, Track, and Report Metrics on Equipment Lifecycle - Follow-On	1	2018	4	2024
Sustain the Information Technology Infrastructure Across the MDA Enterprise - Follow-On	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC30 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC30: *Cyber Operations*	102.286	62.622	98.912	66.212	-	66.212	65.381	68.046	68.891	69.889	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Accomplishments map to the Office of Management and Budget (OMB) and Office of the Secretary of Defense (OSD) approved Cybersecurity Taxonomy including 1) Preventing Malicious Activity; 2) Detect, Analyze and Mitigate Intrusions, 3) Planning, Policy Development and Workforce Management, 4)Continuous Monitoring and 5)Outside Federal Outreach, Defense Industrial Base.

Decrease from FY 2019 to FY 2020 reflects the FY 2019 congressional plus up for Cybersecurity Enhancements.

A. Mission Description and Budget Item Justification

A number of key IT strategies were identified in the DoD Information Technology Enterprise Strategy and Roadmap issued by the Deputy Secretary of Defense in 2011. The IT Roadmap specifically addresses the need to improve Cybersecurity. It states that DoD networks are under constant attack from cybersecurity threats launched from various sources. MDA must meet the National Command Authority Directives for rapid deployment of the BMDS while complying with the key principles of the Cybersecurity standards to ensure MDA remains a secure member of the DoD Information Network (DODIN).

DoD Instruction 8500.01 Cybersecurity issued in March 2014, requires continuous monitoring, data analysis, reporting and incident mitigation of DoD classified and unclassified, mission, test and administrative networks. To comply with the Instruction, MDA must implement a multi-tiered cybersecurity risk management capability to protect critical BMD data and systems from rapidly evolving internal and external threats.

The issuance of DoD Instruction 8510.01, Risk Management Framework (RMF) Information Technology in March 2014 requires additional resources to implement, manage, monitor and report as a result of a thirty-five percent increase in controls (237 controls with 817 enhancements). DoD 8510.01 also states that resources for implementing the RMF must be identified and allocated as part of the Defense planning, programming, budgeting, and execution process. The Controls must be tested on all IT supporting research, development, test and evaluation and DoD-controlled IT operated by a contractor or other entity on behalf of DoD and reported.

This project provides funds to sustain the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Officer (PM/ISSO) Plan of Action and Milestones (POA&M) for the MDA mission, test and administrative systems. Maintains the Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&M on all MDA information systems. Supports the monitoring and tracking of Cybersecurity mitigations detailed in IT security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA PM/ISSO and AO. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with Federal Information Security Management Act(FISMA).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

This project funds the MDA Security Operations Center (SOC), responsible for monitoring, managing, patching, and maintaining MDA network and core IT services; issuing and tracking Technical Compliance Orders; and coordinating overarching Enterprise NetOps. The SOC provides the network security operations centers and supporting processes to protect and defend BMDS and the MDA Enterprise information and information systems.

The MDA Computer Emergency Response Team (CERT) monitors the classified and unclassified information technology MDA administrative IT networks and reports vulnerabilities. The MDA CERT coordinates with U.S. Cyber Command to identify and implement network vulnerability updates and patches to comply with U.S. Cyber Command vulnerabilities identified for DoD networks.

The project funds Cybersecurity governance management and administrative management support, annual Agency-wide computer-based IA training and metrics reporting, implementation of Public Key Infrastructure and Enabling and COMSEC related activities.

New Accomplishment beginning in FY 2019:
Outside Federal Service Outreach - Defense Industrial Base
- Participate and liaison with the Defense Security Service (DSS), MDA organizations and industry partners to conduct site visits and inspections to improve network monitoring capabilities at classified contractor sites to ensure protection of MDA BMDS data.
-Assist with the analysis of network scans of industry partner networks and mitigation of risks to BMDS data.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Information Assurance/Computer Network Defense (IA/CND)	0.000	0.000	0.000
Articles:	-	-	-
Description: Provides for the certification of Information Technology networks and systems, monitoring and computer emergency response services. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Detect, Analyze and Mitigate Intrusions	41.692	71.857	35.227
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: Provide cybersecurity activities including: Federal Incident Response Centers; National Institute of Standards for Technology (NIST) SP 800.53 Implementation; Cyber Threat Analysis; Cyber Continuity of Operations (COOP); Incident Response and Remediation; Forensics and Damage Assessment; and Computer Emergency Response Teams. Specific and/or unique accomplishments to each FY are as follows: Recurring Activities for the Detect, Analyze and Mitigate Intrusions Accomplishment: -Test RMF controls on all IT supporting research, development, test and evaluation and DoD-controlled IT operated by a contractor or other entity on behalf of DoD and reported. -Conduct RMF analysis and reporting for the BMDS such as evaluation of residual risk by incorporating current and proposed BMDS monitoring and mitigations. -Maintain MDA Computer Emergency Response Team (MDA CERT) as a fully accredited Tier II Computer Network Defense Service provider (CNDSP) in accordance with CJCSI 6510.01F and DoD O-8530.1. -Perform CNDSP services (protect, detect, respond and sustain) for all MDA Admin/General Services, MDA Mission and test networks and enclaves 24 hours per day, seven days a week, 365 days a year. -Conduct application testing that looks for vulnerabilities and issues using a number of tactics, technical and procedures. -Conduct vulnerability scanning of MDA network to assess risks to MDA data from inside and outside sources. -Conduct monthly information assurance vulnerability audits. -Issue and track implementation of Information Assurance Vulnerability Alerts (IAVA), Bulletins and Technical Advisories. -Implement Information Assurance Vulnerability Alerts (IAVA) and Communication Tasking Orders remediation and patches. -Perform network security monitoring of all MDA subscriber networks and enclaves. -Conduct system forensic analysis, review content of compromised system, document files and data, and identify tactics, techniques and procedures used by an attacker to gain access. -Develop and maintain the RMF package for the BMDS Mission System to support a full Authorization to Operation (ATO). -Compile and validate BMDS Mission Element-level certification and accreditation documents to include BMDS Element-level SIPs, DIPs, C&A Scorecards, POA&M artifacts (CVT -Ensure MDA mission, test, and administrative systems are operated securely in accordance with DoD Information Assurance Certification and Accreditation policies. -Prepare and maintain current certification and accreditation documentation for general service networks reported to DoD and Office of Management and Budget. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - FY19 congressional plus up provides for cybersecurity enhancements in support of all the above recurring activities. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the FY 2019 congressional plus up for Cybersecurity Enhancements.			
Title: Preventing Malicious Cybersecurity Activity	9.685	18.738	20.080
Articles:	-	-	-
Description: Provide: Federal Information Security Management Activity Act (FISMA)-related activities; Intrusion Prevention Systems; Trusted Internet Connections; Identity Management and Authentication; Supply Chain Management; Network & Data Protection and Insider Threat Mitigation Activities. This effort includes integration and test capabilities for element interface verification and provide operations and sustainment of the deployed PNT Last Mile integration capabilities at BMDS locations. Recurring Activities to Preventing Malicious Cyber Attacks: -Maintain a current Information Assurance risk and residual risk assessment of the BMDS. -Coordinate all IT projects and remote sites to ensure Cybersecurity compliance. -Implement methodologies and goals to identify insecure and unauthorized vectors of access to networks or applications, analyze the threat, attempt to exploit the vectors and confirm existence and analyze the risk for exploiting an application, network or service. -Track ports, protocols, and services. -Coordinate with private partnerships to ensure the Defense Industrial Base protects MDA data. ***FY 2019 Plans:*** -SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Continuous Monitoring	7.032	5.134	7.495
Articles:	-	-	-
Description: Provide IT Security Tools and Other Continuous Monitoring. Recurring Activities for the Continuous Monitoring Accomplishment: -Manage data-at-rest encryption to ensure compliance with Global Information Grid mandated policies. -Procure/renew cybersecurity software maintenance agreements for IT Security Tools. -Procure/renew cybersecurity hardware maintenance for hardware.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides ArcSight licenses (bi-annual license cost).			
Title: Planning, Policy Development, Workforce Training & Force Management	4.213	3.017	3.243
Articles:	-	-	-
Description: Provide National Initiative for Cybersecurity Education (NICE); Workforce Development; Security Training for Employees with Significant Security Responsibilities; and Cybersecurity Strategic Planning, Policy, Oversight and Management. Specific and/or unique accomplishments to each FY are as follows: Recurring Activities for the Planning, Policy Development, Workforce Training and Force Management Accomplishment: -Document and maintain Standard Operating Instructions/Procedures for consistent interface with the MDA BMDS Network Operations Support Center (BNOSC) and the BMDS elements. -Publish MDA policies to incorporate new requirements stated in DoDI 8510.01 Risk Management Framework (RMF) to comply with 237 new controls and 817 control enhancements into controls validation testing of BMDS elements and networks. -Manage the Information Assurance Workforce Improvement Program to certify Cybersecurity professionals and report compliance in accordance with Federal Information Security Management Act (FISMA) and Information Assurance Workforce Improvement Program (DoD Manual 8570.1), achieving the DoD certification goal; reports IA Risk Assessments, Primary RMF artifacts. -Interface with Central Command (CENTCOM) to provide BMDS Mission RMF package. -Conduct an annual IA Security review of the BMDS in accordance with DoDI 8510.01 and provide an analysis of changes in IA posture. -Collect, analyze, and report vulnerability and cyber warfare attack metrics to the MDA CIO, MDA leadership, and U.S. Cyber Command. -Provide Information Assurance engineering and planning guidance and vulnerability assessment for all MDA Information Technology acquisition programs. Specific and/or unique accomplishments to each FY are as follows:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Outside Federal Outreach - Defense Industrial Base	0.000	0.166	0.167
Articles:	-	-	-
Description: Review current Cybersecurity Policies and coordinating with MDA BMDS Programs to ensure all applicable Cybersecurity clauses are included into MDA contracts with MDA Industry partners in the Defense Industrial Base (DIB) to ensure protection of Ballistic Missile Defense System (BMDS) Controlled Unclassified Information (CUI). Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	62.622	98.912	66.212

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Integrated Research and Development for Enterprise Solutions (IRES) provides IT design, engineering, implementation and sustainment services.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC30 / *Cyber Operations*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Information Assurance/ Computer Network Defense (IA/CND) - BMDS IA Advisory and Assistance Services	C/CPFF	Booz Allen Hamilton : AL, CO, VA	5.396	0.000		0.000		0.000		-		0.000	0.000	5.396	0.000
Information Assurance/ Computer Network Defense (IA/CND) - CND/IA Advisory and Assistance Services	C/CPFF	Torch Technologies : AL, CO, VA	10.755	0.000		0.000		0.000		-		0.000	0.000	10.755	0.000
Information Assurance/ Computer Network Defense (IA/CND) - CND/ IA Civilian Travel	Allot	MDA Civilian Travel : AL, AK, CA, CO, HI, NM, VA	0.631	0.000		0.000		0.000		-		0.000	0.000	0.631	0.000
Information Assurance/ Computer Network Defense (IA/CND) - CND/ IA Civilian pay/Travel/PCS	Allot	MDA Civilian Pay : AL, CO, VA	9.609	0.000		0.000		0.000		-		0.000	0.000	9.609	0.000
Information Assurance/ Computer Network Defense (IA/CND) - CND/ IA Licenses	C/CPAF	Northrop Grumman : AL, CO, VA	11.879	0.000		0.000		0.000		-		0.000	0.000	11.879	0.000
Information Assurance/ Computer Network Defense (IA/CND) - CND/ IA Operational Support	C/FFP	Northrop Grumman : AL, CO, VA	43.672	0.000		0.000		0.000		-		0.000	0.000	43.672	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC30 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Information Assurance/ Computer Network Defense (IA/CND) - CND/ IA, CCRI, Comsec	MIPR	NSA/DISA : AL, CO, VA	0.741	0.000		0.000		0.000		-		0.000	0.000	0.741	0.000
Information Assurance/ Computer Network Defense (IA/CND) - Cyber Compliance Projects	C/CPAF	Northop Grumman : AL, CO, VA	19.603	0.000		0.000		0.000		-		0.000	0.000	19.603	0.000
Detect, Analyze and Mitigate Intrusions - A&AS Cyber IT Mgmt	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.164	Mar 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - A&AS, BMDS CSM/CND	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	1.140	Mar 2018	1.452	Mar 2019	1.390	Aug 2020	-		1.390	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - A&AS, Cyber Risk Mgmt	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	2.856	Mar 2018	3.916	Mar 2019	3.904	Mar 2020	-		3.904	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Civilian Pay	Allot	Civilian Pay : AL, CO, NM,, VA	0.000	3.255	Oct 2017	2.320	Oct 2018	2.823	Oct 2019	-		2.823	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Cyber CSS	C/CPAF	IRES : AL, CO, VA	0.000	34.277	Feb 2018	64.169	Jan 2019	27.110	Jan 2020	-		27.110	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - PNT, CSS	C/CPAF	JRDC / IRES : AL, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - A&AS IT Mgmt	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - CND/IA, CCRI, Comsec	MIPR	NSA/TBD : AL, CO, VA	0.000	0.000		0.000		0.200	Mar 2020	-		0.200	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - Civpay	Allot	Civilian Pay : AL, CO, VA, NM	0.000	1.704	Oct 2017	1.740	Mar 2019	1.408	Oct 2019	-		1.408	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC30 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Preventing Malicious Cybersecurity Activity - Consolidated Support CSM	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.570	Apr 2018	0.904	Mar 2019	0.701	Mar 2020	-		0.701	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - Cyber CSS	C/CPAF	JRDC / IRES : AL, COL, VA	0.000	7.411	Feb 2018	16.094	Jan 2019	17.771	Jan 2020	-		17.771	Continuing	Continuing	Continuing
Continuous Monitoring - Continuous Monitoring - IT Security Tools	C/CPAF	IRES : AL, CO, VA	0.000	7.032	Jan 2018	5.134	Jan 2019	7.495	Jan 2020	-		7.495	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training & Force Management - A&AS Cyber BMDS CSM/CND	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	2.672	Mar 2018	1.779	Mar 2019	1.815	Aug 2020	-		1.815	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training & Force Management - A&AS Cyber CRM	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.329	Mar 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training & Force Management - Civilian PayTravel/PCS	Allot	Civilian Pay : AL, CO, NM, VA	0.000	1.212	Oct 2017	1.238	Oct 2018	1.428	Oct 2019	-		1.428	Continuing	Continuing	Continuing
Outside Federal Outreach - Defense Industrial Base - Civpay	Allot	MDA Civilian Pay : AL, CO, NM, VA	0.000	0.000		0.166	Oct 2018	0.167	Oct 2019	-		0.167	Continuing	Continuing	Continuing
		Subtotal	102.286	62.622		98.912		66.212		-		66.212	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC30 / *Cyber Operations*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	102.286	62.622		98.912		66.212		-		66.212	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
PNT Operations and Maint					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
PNT Test Capabilities						✧	✧	✧																				
PNT BMDS Last Mile Capability Operations & Sustainment				✧																								
PNT Last Mile Integration 3 Additional BMDS Sites				✧																								
PNT Last Mile Integration 3 BMDS Sites			✧	✧																								
PNT interface testing equipment		✧	✧	✧																								
Report Vulnerability and Cyber Warfare Attack Metrics to the MDA Chief Information Officer, MDA Leadership, and Cyber Command - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Monitor Networks and Systems to Defend Mission, Test, and Administrative Systems on a 24 hours per day, 7 days per week, 365 days per year basis for Information Assurance - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Provide Information Assurance Engineering and Planning Guidance and Vulnerability Assessment for Information Technology Acquisition Programs - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Procure, Implement, and Asset Control of Hardware maintenance and Software Licenses for Monitoring Systems of Information Assurance - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Conduct Information Assurance Certification Evaluation of Mission, Test, and Administrative Systems - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Complete Annual Information Assurance user Training for MDA Workforce - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Implement Information Assurance Vulnerability Alert Control Improvements for General Information Technology Services - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
PNT Operations and Maint	1	2019	4	2023
PNT Test Capabilities	2	2019	4	2019
PNT BMDS Last Mile Capability Operations & Sustainment	4	2018	4	2018
PNT Last Mile Integration 3 Additional BMDS Sites	4	2018	4	2018
PNT Last Mile Integration 3 BMDS Sites	3	2018	4	2018
PNT interface testing equipment	2	2018	4	2018
Report Vulnerability and Cyber Warfare Attack Metrics to the MDA Chief Information Officer, MDA Leadership, and Cyber Command - Follow-On	1	2018	4	2024
Monitor Networks and Systems to Defend Mission, Test, and Administrative Systems on a 24 hours per day, 7 days per week, 365 days per year basis for Information Assurance - Follow-On	1	2018	4	2024
Provide Information Assurance Engineering and Planning Guidance and Vulnerability Assessment for Information Technology Acquisition Programs - Follow-On	1	2018	4	2024
Procure, Implement, and Asset Control of Hardware maintenance and Software Licenses for Monitoring Systems of Information Assurance - Follow-On	1	2018	4	2024
Conduct Information Assurance Certification Evaluation of Mission, Test, and Administrative Systems - Follow-On	1	2018	4	2024
Complete Annual Information Assurance user Training for MDA Workforce - Follow-On	1	2018	4	2024
Implement Information Assurance Vulnerability Alert Control Improvements for General Information Technology Services - Follow-On	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD31 / *Modeling & Simulation*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD31: *Modeling & Simulation*	211.917	55.185	83.186	88.487	-	88.487	115.556	71.841	80.727	73.117	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

MDA's Modeling and Simulation (M&S) program is essential to ensuring missile defense capabilities are affordable and effective. M&S develops system-level models, frameworks, truth, simulations, and operational environments as missile defense technologies continually advance and the threat changes, and evaluates performance of the Elements, Components, and overall BMD System for verification, validation and accreditation purposes. MDA's M&S program provides a cost effective means to assess and examine the performance space of the BMDS beyond what can be physically tested under current test range conditions and within the Agency's fiscal constraints. M&S future concept simulation activities provide the capability to design and develop technologies to hedge against future missile threats. MDA's M&S systems and products provide analysis, decision-making, and planning capabilities for Real-World Operations to inform the National Command Authority, Joint Staff, Military Services, NATO, Combatant Commanders (CCMDs), Operational Test Authority (OTAs), Director of Operational Test & Evaluation (DOT&E), and Allies.

The strategy of MDA's M&S Program is 1) to execute a single, integrated, and synchronized program to manage M&S development and sustainment in support of MDA's BMDS acquisition, 2) to improve BMDS Flight and Ground Test execution, 3) to leverage MDA test activities to collect data to anchor M&S, and 4) to perform warfighter training and tactics validation. The strategy also incorporates key elements to address DOT&E's BMDS Assessment Report: Ensure that future M&S architectures are composable and flexible, and simplify the integration process to conserve resources and improve capabilities; Ensure that future M&S architectures incorporate and require the use of consistent truth representations (phenomenology, lethality, environmental factors, threat simulations, etc.); Improve cross-organizational system engineering processes to optimize requirements generation and ensure the inclusion of all stakeholders; Develop refined M&S accreditation criteria between MDA and the OTA.

MDA's M&S Program consists of system and product planning, development, integration, and operation; threat model development, verification, and analysis; and integration and deployment of MDA's Distributed BMDS real-time Hardware-in-the-Loop (HWIL) and digital M&S simulation capabilities. Models and simulations are tailored to the specific needs of the Agency's test events and to match BMDS components in their various stages of development, ranging from low-to-medium fidelity analyses supporting concept definitions studies, to high-fidelity models used to support engineering level activities. MDA validates and accredits system-level models and simulations by anchoring them to ground and flight test events, per the Integrated Master Test Plan (IMTP), to enable accurate and comprehensive assessments of the BMDS.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: M&S Requirements, Design Support, Scenario Optimization	8.047	12.621	12.340
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: This activity provides the integrated program lifecycle planning and requirements definition of all BMDS M&S models and capabilities to enable assessment of BMDS capability deliveries. M&S capability development executes an integrated, synchronized program to manage M&S development in support of BMDS development, testing, and assessment. The following actions are required on a continuing basis to accomplish the M&S lifecycle planning and requirements definition mission: - Maintain traceability between the M&S Systems Requirements Documents and M&S product development. - Produce capability documents and specifications for M&S product development to enable BMDS flight and HWIL tests, training events, exercises, wargames, concept evaluation and development engineering. - Support MDA response to export requests for M&S software and technical data to nations or international organizations. - Participate in Technical Interchange Meetings and provide support for bilateral agreements with allies and partners. - Support system engineering capability trades for all BMDS capability deliveries (including BMDS capability deliveries for Phased Adaptive Approach and Homeland Defense). - Continue the transition to replace the Single Stimulation Framework (SSF) with the Objective Simulation Framework (OSF) to support M&S Intended Uses. - Provide integrated program lifecycle planning and scheduling of all BMDS M&S models and capabilities to enable assessment of BMDS capability deliveries for Homeland and Regional Defense. - Execute M&S planning, development, framework and test integration and operation; threat model development, verification, and analysis; and integration and deployment of MDA's Distributed BMDS real-time Hardware-in-the-Loop (HWIL) and digital M&S simulation capabilities. - Develop/sustain models and simulations tailored to the specific needs of the Agency's test events; match BMDS components in their various stages of development or sustainment as required for the test venue. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Upgrade the System Interface Unit (SIU) Fleet to current technical standards, interfaces, components and product line support to meet BMDS stakeholder needs for all BMDS Increments and associated test campaigns -Update Threat Modeling Tools to meet future threat data needs and event environments -Ensure Environment and Plume core truth model development, verification, maintenance and sustainment meets requirements -Incorporate emerging BMDS capabilities to include advanced threats into BMD simulations and ground test events ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A			
Title: BMDS Simulations & Tools	11.618	12.326	12.585
Articles:	-	-	-
Description: This activity funds the development and sustainment of digital products and the architecture framework, and delivery/maintenance of infrastructure for BMDS performance assessments, Warfighter events, and BMD International Simulation events. The following actions are required on a continuing basis: Event Integration/Support Operations: - Provide ground test architecture integration to meet IMTP requirements. Use the BMDS test framework to integrate distributed architectures in support of BMDS capability deployments for EPAA Phase 3. - Deliver integrated architecture instantiations of the BMDS to support Performance Assessments and integration of new capabilities into the BMDS Operational Capability Baseline.- Integrate, test, and verify the M&S enterprise supporting BMDS testing, assessment, exercises, and wargaming, including testing infrastructure. - Integrate, test, functionally qualify, and deliver M&S tools and complex test architectures to provide system test capabilities to support MDA IMTP based test events, wargames, and exercises. - Continue the transition of real-time digital simulation capability to OSF to support Intended Uses. - Maintain simulations for Element M&S development laboratories used in the BMDS Integration & Development Lab and Digital M&S Integration Center (DMIC) in Huntsville, AL and in the MDIOC Simulation Center. - Conduct integration, testing and system-level verification per the digital System Requirements Document (SRD). Operate the testbed to mature the OSF-based digital system simulation. - Provide Event Integration Support for non-MDA BMDS component and weapon system models for use in MDA test and validation events. - Provide HWIL/M&S benchmarking/integration, documentation and coordination. Sustain, integrate and execute ground tests, FAST Events and Exercises/Wargames. - Provide communications emulation (MTJ, STJ, and Link-16) and network analysis support via the Tactical Communications Environment Segment (TCES) for use in IMTP events, HWIL System Post Flight Reconstructions (SPFRs) and HWIL System Pre Mission Tests (SPMTs). - Perform operational planning for planned BMDS assessment events. - Conduct M&S system integration and verification to support M&S system architecture development. Conduct developmental integration testing. M&S Operations: - Provide digital representations of BMDS elements/components using MDA's BMD International Simulation (I-SIM) in support of CCMD and International Wargames, conceptual planning, BMD visualizations, BMD training/orientation, M&S demonstrations, and the Warfighter's Modification & Fielding Requirements List (MFRL) for exercises and training.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Implement I-SIM re-architecture requirements and emerging requirements such as IAMD/Fog of War to adapt to growing distributed event requirements. - Maintain the Missile Defense Space Warning Tool (MDST) to keep pace with fielded BMDS Overhead Persistent Infrared (OPIR) Architectures in support of Warfighter training events, BMDS exercise events, and BMDS development engineering. - Provide software operations/maintenance support to the Extended Air Defense Simulation (EADSIM) code base for use in Warfighter exercises, training venues, and CCMD planning tools. - Upgrade legacy models and develop new designs or software as required to support BMDS simulation Re-Architecture. - Provide threat representations (kinematic trajectories, radar cross sections, and infrared signatures data) for use in real-world events, simulations, exercises, wargames, and test and evaluation activities across the DoD. -Develop products that meet digital and test requirements and allow M&S participation in these venues. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: M&S Objective Simulation Framework (OSF)	13.360	14.680	14.661
Articles:	-	-	-
Description: The following actions are required on a continuing basis to accomplish the OSF mission: - Develop and implement OSF upgrades to incorporate advanced tracking, discrimination, engagement and associated upper tier debris mitigation capabilities, as well as other requirements and capabilities to meet MDA's evolving M&S Enterprise needs. - Perform testing and integration of Core Truth Model capabilities into the OSF framework. - Sustain and enhance framework products to maintain capabilities to support stakeholders and to keep pace with the IMTP. - Develop plans, procedures and documentation for scheduled events including Wargames and Combatant Command Exercises and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP. Provide event architecture integration and checkout of Wargames for these same IMTP scheduled events. - Provide the ground test architecture integration expertise to meet the testing requirements of the IMTP. Support delivery of integrated architectures for test across all test venues using the BMDS test framework to integrate distributed architectures in support of BMDS.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Develop, maintain, test, field, and operate model representations for use in IMTP events and other MDA M&S stakeholder application areas. Deploy hardware and software updates to distributed sites. Perform regular maintenance and critical repairs of hardware and software. - Develop a BMDS-level integrated, high-fidelity end-to-end digital simulation, including hardware and software, data storage and transmission, and verification tools. - Maintain the M&S Integration and Development Laboratories for Element M&S. Maintain venue for stakeholders to conduct early integration efforts and identification of issues prior to event architecture integration to support system development. - Deploy Simulation Interface Units (SIUs) for BMDS testing - materials, licenses, SIU fleet purchasing. Deploy SIUs and components to maintain and sustain SIU fleet including cybersecurity; enables Developmental and Operational testing with full BMDS as required in IMTP. - Continue maintenance of SSF in the required venues until the transition to OSF in the venues completes. - Develop M&S products to keep pace with evolving requirements in all digital and test venues Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: M&S Core Truth Modeling	10.840	12.373	12.166
Articles:	-	-	-
Description: The Core Truth Model (CTM) program provides consistent and common Phenomenology, Lethality, Environment, Communications, and Threat models for BMDS M&S venues utilized in all Digital and Ground Test Events and Wargaming Exercises. The CTM efforts are critical in the assessment of all BMDS capability deliveries. The following actions are required on a continuing basis to accomplish the CTM mission: - Implement next generation truth representations for signatures and lethality to address advanced BMDS capability needs for tracking, discrimination and engagement - Maintain legacy truth representations (e.g., Parametric Endoatmospheric-Exoatmospheric Lethality Simulation (PEELS), Kinetic Intercept Debris Distribution (KIDD) and Optical Signatures Code/Optical Signature Inline Generator (OSC/OPTISIG)) until fully transitioned. - Support integration of all applicable CTM functions into the OSF framework.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Provide support for scheduled events including training, exercises, Wargames, and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP. - Deliver CTM Toolkit for integrated truth representations across the M&S enterprise. - Maintain an Environments Program that will provide consistent environment models for system and element level simulations. - Continue development of Truth Interaction which includes infrared (IR) propagation and radio frequency (RF) propagation. This will provide consistent models and truth to system and element level simulations. - Generate CTM Sensitivity analysis to identify the sensitivity within system simulation of Core Truth Models and boundary. - Develop and maintain CTM design to support system and element level simulations across the entire M&S portfolio. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Update Threat Modeling Tools to meet evolving threat data needs and event environments - Ensure Environment and Plume core truth model development, verification, maintenance and sustainment meets requirements ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: M&S Improvements	11.320	31.186	36.735
Articles:	-	-	-
Description: This effort funds BMDS Enterprise-wide M&S improvements that will enhance digital and ground test capabilities. Planned improvements include an experimental, developmental M&S prototype capability necessary to achieve a BMDS-level integrated, high-fidelity end-to-end digital simulation. The prototype effort designs and develops a digital simulation capability that will provide assessment data for the BMDS, supplemental to Ground- and Flight tests, in areas that those venues cannot address. The end-to-end digital simulation will eventually replace the current stand-alone approach to digital predictive pre-mission analysis. MDA is also implementing Ground Test Re-architecture to address accreditation and assessment limitations, increased Hardware-in-the-Loop (HWIL) complexity and reduced available integration times. The Ground Test Integrated System-level Simulation (GTISS) will make truth data consistent, implement standard framework interfaces, and provide common data formats to correct ground test simulation inadequacies in threat uncertainty as well as debris modeling. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Develop M&S infrastructure needed to modify Element-level models to meet System-level requirements - Continue the development of initial digital capability for first use supporting BMDS Increment 6b in FY 2021 Timeframe			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-- Conduct Systems Engineering Design Reviews -- Implement software development for initial Digital M&S components -- Incorporate required M&S IT hardware infrastructure to enable statistically significant runs for Increment 6b FY21 assessment - Design and develop full BMDS-level high-fidelity digital capability: -- Conduct System Requirements Review (SRR) -- Build towards full Digital BMDS M&S architecture - Perform top-down systems engineering and software development to implement BMD System-level ground test improvements: -- Develop a ground test system design to align with the tactical BMDS for new and more complex systems and implement system-wide M&S improvements in truth data consistency, framework interfaces, consistent data formats and reduce integration timelines -- Implement Ground Test enterprise-wide re-architecture, to address Ground Test capability gaps and limitations that have hindered M&S ***FY 2020 Plans:*** - Complete development for the Early Digital Product initial capability (EDISS-EDP) -- Complete integration testing for EDISS-EDP in support of data production runs starting in FY 2021 -- Continue to implement M&S software development and execute M&S integration testing across MDA Elements in support of EDISS-EDP - Acquire M&S IT hardware infrastructure to support data production runs - Complete systems engineering and top-level design for next increment of all-digital capability EDISS-FDP (Full Digital Product) -- Conduct a System Requirements Review and System Functional Review for EDISS-FDP 1 - Ground Test Integrated System-level Simulation (GTISS) -- Execute software development, testing and prototyping in support of Ground Test re-architecture -- Complete consistent modeling of environments and debris -- Execute systems engineering design and early software development in support of advanced threats and advanced BMDS capabilities ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides development of ground test improvements.			
Accomplishments/Planned Programs Subtotals	55.185	83.186	88.487

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing

Remarks

D. Acquisition Strategy

The M&S acquisition strategy utilizes full and open competition to develop, acquire and deliver the integrated architectures/frameworks while the Elements, using the same open competition methods, develop and deliver models of their systems. The Digital and HWIL product centers integrate the suite of M&S into a composite simulation capability, all based on an open architecture. M&S achieves this end-state via close collaboration between its integrating contractor teams (Digital and HWIL) and those of the Element prime contractors, with additional technical standards and engineering oversight provided by FFRDCs and UARCs.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD31 / *Modeling & Simulation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M&S Requirements, Design Support, Scenario Optimization - 3rd generation SIU development	C/CPFF	TBE : AL	0.000	0.000		4.500	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - FFRDC & UARC	MIPR	Various : CO, AL	4.592	1.632	Nov 2017	1.781	Nov 2018	1.458	Nov 2019	-		1.458	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - Prior Yr Requirements & Scenario Design no longer funded in FYDP	Various	Various : AL	8.532	0.000		0.000		0.000		-		0.000	0.000	8.532	0.000
M&S Requirements, Design Support, Scenario Optimization - Requirements & Design - CSS 2	C/CPFF	TEAMS : CO, AL	15.787	6.415	Nov 2017	6.340	Nov 2018	6.838	Nov 2019	-		6.838	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - Science and Technology Council	Various	Various : VA, AL	0.000	0.000		0.000		0.500	Dec 2019	-		0.500	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - Threat Modeling	Various	Various : CO, AL	0.000	0.000		0.000		3.544	Dec 2019	-		3.544	Continuing	Continuing	Continuing
BMDS Simulations & Tools - Digital Framework Development	C/CPAF	Northrop Grumman : CO	20.891	6.909	Nov 2017	7.007	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
BMDS Simulations & Tools - Digital Simulation Development / Support	MIPR	SMDC : AL	3.547	0.000		0.000		1.108	Dec 2019	-		1.108	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD31 / *Modeling & Simulation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BMDS Simulations & Tools - M&S / Digital Framework Development	C/CPAF	SWDC : CO	0.000	0.000		0.000		9.610	Nov 2019	-		9.610	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support	Various	MDA : CO, AL	2.560	0.000		0.000		0.867	Nov 2019	-		0.867	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - CSS	C/CPFF	TEAMS : CO	1.539	1.300	Nov 2017	1.339	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - Industry	C/CPFF	TBE : AL	0.959	0.891	Nov 2017	0.834	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - OGA	MIPR	AMRDEC : AL	13.941	2.518	Nov 2017	3.146	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
BMDS Simulations & Tools - Science & Technology Council	Various	Various : VA, AL	0.000	0.000		0.000		1.000	Dec 2019	-		1.000	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - Continuous Integration Requirements Development	Various	Various : CO, AL	0.000	0.000		0.000		3.294	Dec 2019	-		3.294	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL - CSS	C/CPFF	TEAMS : CO	2.200	0.800	Nov 2017	1.016	Nov 2018	2.708	Nov 2019	-		2.708	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL - Industry	C/CPAF	Northrop Grumman : CO	6.190	0.350	Nov 2017	0.350	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL Framework Development and Support	C/CPFF	MASC : AL, CO	20.238	9.484	Nov 2017	9.849	Nov 2018	1.663	Nov 2019	-		1.663	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S	Various	Various : CO, AL	0.000	0.000		0.000		2.426	Dec 2019	-		2.426	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD31 / *Modeling & Simulation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HWIL Simulations / Models - Various															
M&S Objective Simulation Framework (OSF) - M&S HWIL Simulations / Models Development	MIPR	AMRDEC : AL	23.065	0.550	Nov 2017	0.550	Nov 2018	3.570	Nov 2019	-		3.570	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL Support / GT re-architecture	Various	MDA : AL, CO	6.381	2.176	Nov 2017	2.915	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - Science & Technology Council	Various	Various : VA, AL	0.000	0.000		0.000		1.000	Dec 2019	-		1.000	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - OGA	MIPR	AFRL : CO	1.300	1.400	Nov 2017	1.400	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S Core Truth Modeling - Core Truth Modeling - Engineering	Various	Various : CO	0.000	0.000		0.000		4.282	Dec 2019	-		4.282	Continuing	Continuing	Continuing
M&S Core Truth Modeling - Core Truth Models Validation	Various	MDA : CO, AL	6.144	1.000	Nov 2017	0.800	Nov 2018	2.200	Nov 2019	-		2.200	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - CSS	C/CPFF	Peopletec : AL, CO	0.916	1.591	Nov 2017	1.990	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - CSS 2	C/CPFF	TEAMS : AL, CO	0.000	0.000		1.683	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - Lethality/ Phenomenology Modeling	MIPR	AMRDEC : AL	32.402	1.310	Nov 2017	1.110	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth	C/CPAF	Northrop Grumman : CO	40.733	5.539	Nov 2017	5.390	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD31 / *Modeling & Simulation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Modeling Simulation System															
M&S Core Truth Modeling - M&S Core Truth Modeling Simulation System 2	C/CPAF	SWDC : CO	0.000	0.000		0.000		5.684	Nov 2019	-		5.684	Continuing	Continuing	Continuing
M&S Improvements - Enterprise-wide ground test re-architecture improvements	Various	Various : CO, AL	0.000	0.000		11.400	Dec 2018	10.219	Dec 2019	-		10.219	Continuing	Continuing	Continuing
M&S Improvements - M&S Improvement - Enterprise-wide digital capability development	Various	Various : CO, AL	0.000	11.320	Dec 2017	19.786	Nov 2018	26.516	Nov 2019	-		26.516	Continuing	Continuing	Continuing
		Subtotal	211.917	55.185		83.186		88.487		-		88.487	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD31 / *Modeling & Simulation*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	211.917	55.185		83.186		88.487		-		88.487	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MDST v16.3	▲																											
International Simulation v8.5	▲																											
Release Update to OSF - FY 2018		▲																										
International Simulation v8.6					▲																							
MDST v16.4					▲																							
Release Update to OSF - FY 2019					△																							
Release Update to OSF - 2Q FY 2020									△																			
International Simulation v8.7									△																			
Release Update to OSF - FY 2021													△															
International Simulation v8.8 - 1Q-FY 2021													△															
Initial GTISS Delivery													△															
Early Digital Product														△														
Release Update to OSF - FY 2022																	△											
International Simulation v8.9 - 1Q FY 2022																	△											
GTISS Update (2022)																	△											
International Simulation v8.10 - 1Q FY 2023																					△							
Release Update to OSF - FY 2023																					△							
GTISS Update (2023)																					△							
Release Update to OSF - FY 2024																									△			
International Simulation v8.11 - 1Q FY 2024																									△			

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MDST v16.3	1	2018	1	2018
International Simulation v8.5	1	2018	1	2018
Release Update to OSF - FY 2018	2	2018	2	2018
International Simulation v8.6	1	2019	1	2019
MDST v16.4	1	2019	1	2019
Release Update to OSF - FY 2019	1	2019	1	2019
Release Update to OSF - 2Q FY 2020	1	2020	1	2020
International Simulation v8.7	1	2020	1	2020
Release Update to OSF - FY 2021	1	2021	1	2021
International Simulation v8.8 - 1Q-FY 2021	1	2021	1	2021
Initial GTISS Delivery	1	2021	1	2021
Early Digital Product	2	2021	2	2021
Release Update to OSF - FY 2022	1	2022	1	2022
International Simulation v8.9 - 1Q FY 2022	1	2022	1	2022
GTISS Update (2022)	1	2022	1	2022
International Simulation v8.10 - 1Q FY 2023	1	2023	1	2023
Release Update to OSF - FY 2023	1	2023	1	2023
GTISS Update (2023)	1	2023	1	2023
Release Update to OSF - FY 2024	1	2024	1	2024
International Simulation v8.11 - 1Q FY 2024	1	2024	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC31 / *Engineering Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC31: *Engineering Cyber Operations*	3.797	6.466	20.666	11.564	-	11.564	34.665	10.697	13.383	13.651	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase in FY 2019 includes congressional plus up for Cyber Assistance Teams (CATs) to assess the safeguarding of MDA's information on Defense Industrial Base partners' networks. Beginning in FY 2020, funding for CATs is distributed across all Agency PE's in cyber projects.

A. Mission Description and Budget Item Justification

This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POAMs. Activities include preparation of certification and accreditation documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/Certification Authority (CA) and DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act.

This project implements Risk Management Framework (RMF) system engineering principles as specified within DOD 8510.01 to acquire, design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient protections exist from a threat and risk based approach. MDA's goal is to ensure Cybersecurity engineering principles flow into system requirements and design specifications early to provide the most cost benefit and ensure security controls are aligned with the National Institute of Standards and Technology (NIST) 800-53a security controls as applicable to systems categorized as National Security Systems.

This project includes funding to conduct an MDA Insider threat program to identify, deter, and mitigate potential insider threats. This activity is Presidentially and DoD-mandated.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Information Assurance / Cyber Network Defense	6.466	20.666	11.564
Articles:	-	-	-
Description: This activity funds network defense and Information System Security Manager (ISSM) activities for MDA Engineering. Specific tasks include: - Conduct Cybersecurity/information assurance engineering and architecture planning for Engineering information technology systems. - Plan and test the information assurance controls for Engineering systems. - Implement RMF system engineering principles to ensure sufficient protections exist from a threat and risk based approach - Conduct Controls Validation Testing of systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Conduct annual information assurance reviews to assess compliance in implementing and maintaining information assurance controls. - Perform cybersecurity upgrades as needed to MDA Engineering systems to be in compliance with DoD mandates. - Continue MDA Insider Threat Mitigation Team efforts. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Continue development and implementation of Software Assurance policies, processes, and guidelines. - Per FY 2019 Appropriations Act Add for Cyber Assessments: -- Improve MDA cybersecurity posture and ability to address cybersecurity threats to the MDA Defense Industrial Base (DIB) -- Augment Cyber Assistance Teams to conduct assessments to identify and propose mitigations for cyber threats to the MDA DIB unclassified networks ***FY 2020 Plans:*** - Continue to perform on-site visits of MDA DIB partners to detect and increase understanding of DIB cyber threats - Develop tailored cyber threat mitigation strategies - Promote cyber threat reporting and information sharing within the DIB. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects distribution of funding for CATs across all Agency PE's in cyber projects.			
Accomplishments/Planned Programs Subtotals	6.466	20.666	11.564

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0305103C: *Cyber Security Initiative*	0.964	0.985	1.138	-	1.138	1.160	1.184	1.206	1.230	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC31 / *Engineering Cyber Operations*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Information Assurance / Cyber Network Defense - Cyber Assistance Team Leads	MIPR	Various : VA, AL	0.000	0.000		2.876	Nov 2018	1.000	Nov 2019	-		1.000	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Contractor Support	C/CPFF	TEAMS : VA, AL	0.000	0.806	Jun 2018	7.362	Nov 2018	3.860	Nov 2019	-		3.860	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Hardware	Various	Various : VA, AL	0.000	0.291	May 2018	1.401	Nov 2018	1.184	Nov 2019	-		1.184	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Intelligence Reporting	C/CPAF	Deloitte : AL, VA	0.000	1.018	Aug 2018	2.160	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Software/Licenses	C/CPAF	Splunk : AL, VA	0.000	0.000		2.401	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - IT / Cybersecurity Support	C/CPFF	TEAMS : CO, AL, VA	1.703	1.559	Nov 2017	1.194	Nov 2018	2.220	Nov 2019	-		2.220	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense -	C/CPAF	Northrop Grumman : CO	1.250	1.150	Dec 2017	0.510	Dec 2018	0.520	Dec 2019	-		0.520	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MC31 / *Engineering Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Insider Threat Mitigation Cell - IT															
Information Assurance / Cyber Network Defense - Insider Threat Mitigation Cell IT Network Defense	C/CPFF	TEAMS : CO, AL, VA	0.500	1.129	Dec 2017	0.862	Dec 2018	0.880	Dec 2019	-		0.880	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Software Assurance	Various	MDA : Various	0.344	0.513	Jul 2018	1.900	Nov 2018	1.900	Nov 2019	-		1.900	Continuing	Continuing	Continuing
		Subtotal	3.797	6.466		20.666		11.564		-		11.564	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.797	6.466		20.666		11.564		-		11.564	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Engineering Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Engineering Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD32 / *Quality, Safety, and Mission Assurance*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD32: *Quality, Safety, and Mission Assurance*	236.059	30.291	29.319	29.986	-	29.986	30.528	30.976	31.738	32.373	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Quality, Safety, and Mission Assurance verifies that all systems are functioning and tracking against actual verified targets and that all associated processes and procedures are strictly followed.

Quality: Provides on-site Quality Assurance (QA) inspection for all ground and flight tests to ensure that all processes and procedures are adhered to and no short cuts or deviations occur. Quality management system audits are performed on the sub tier supply chain to determine adequacy of contractor requirement flow down and sub tier supplier compliance to industry standards. Quality Subject Matter Experts (SMEs) attend BMDS configuration control boards to ensure quality is implemented across all Programs. Provides quality on-site formal inspection and resolution when troubled suppliers are identified and also initiates and leads on-site Joint Government and Industry Team field support and expertise to assist when critical sole source suppliers are failing. Conducts initiatives to revamp sole source suppliers by assisting them to get healthy and perform at world class levels, establishes consistent acquisition and award fee contractual requirements to ensure that a strategic approach is applied to all mission critical systems and maintains MDA Assurance Provisions for the Agency.

Safety: Responsible for system safety of the BMDS and for the Safety and Occupational Health of personnel located in the National Capital Region (NCR); Huntsville, Alabama; Fort Greely, Alaska; Vandenberg Air Force Base (VAFB), California; and, Dahlgren, VA. Additionally responsible for ensuring the overall safety of the civilian, contractor and military workforce. BMDS Safety Officers (BSOs) provide on-site support 24 hours a day, 365 days a year to ensure operational safety of systems.

Mission Assurance: Provides in-plant MDA Assurance Representatives (MARs) for the MDA at government and contractor facilities. MARs are Government Mission Assurance and Quality experts who provide quality and technical oversight of contractor manufacturing. Mission Assurance Audits are conducted which focus on design margin, the effectiveness of acceptance testing and the sufficiency of manufacturing processes. Audits are performed for contractual requirements, internal requirements, and industry best practices. These audits are one of MDA's most effective methods of enabling change among the MDA contractors and suppliers. Quality, Safety, and Assurance provides Subject Matter Experts (SMEs) who attend all technical reviews (i.e. Design, Test, Mission Readiness Reviews, and Failure Review Boards) to ensure mission assurance principles are consistently implemented across the Ballistic Missile Defense System (BMDS). Quality, Safety, and Mission Assurance develops overarching design and quality standards such as the MDA Assurance Provisions (MAP) for MDA which enhances BMDS reliability. Hardware acceptance reviews and pedigree documentation reviews are performed to ensure all manufacturing rework and repair is performed within approved processes.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Quality, Safety & Mission Assurance	30.291	29.319	29.986
Articles:	-	-	-
Description: Quality, Safety, and Mission Assurance verifies that all systems are functioning and tracking against actual verified targets and that all associated processes and procedures are strictly followed. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	30.291	29.319	29.986

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Quality, Safety and Mission Assurance program is a collaboration between subject matter expertise in the Government, Federally Funded Research and Development Centers (FFRDC), University Affiliated Research Centers (UARC), Contract Support Services (CSS), and Industry.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Quality, Safety & Mission Assurance - Agency Safety & Occupational Health	C/CPFF	Various Multi : AL, CO, AK, DC	2.554	0.250	Dec 2017	0.273	Nov 2018	0.220	Nov 2019	-		0.220	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Audits & Quality On-site Support	MIPR	NSWC Corona : AL, CA	22.256	2.896	Dec 2017	3.305	Nov 2018	3.500	Nov 2019	-		3.500	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Mission Assurance Agency Operations	C/CPFF	AI Solutions : AL	8.754	0.750	Dec 2017	0.714	Nov 2018	0.750	Nov 2019	-		0.750	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Quality Support	C/CPFF	AI Solutions : AL	9.607	0.800	Dec 2017	0.762	Nov 2018	0.800	Nov 2019	-		0.800	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Safety	C/CPFF	APT, INC : AL	10.836	0.750	Dec 2017	1.191	Nov 2018	0.600	Nov 2019	-		0.600	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Safety Officers	MIPR	AMRDEC : AL	4.297	0.090	Dec 2017	0.101	Nov 2018	0.092	Nov 2019	-		0.092	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - HQ & Core Management	MIPR	AMRDEC : AL	2.750	0.226	Dec 2017	0.221	Nov 2018	0.222	Nov 2019	-		0.222	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - In-Plant Quality Support (MARS)	C/CPFF	Various Multi : AL, AK, AZ, CA, CO, FL,	12.839	1.600	Dec 2017	1.417	Nov 2018	1.600	Nov 2019	-		1.600	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		HI, NJ, MA, MO, MD, UT													
Quality, Safety & Mission Assurance - Independent Readiness Review Team	C/CPFF	AI Solutions : AL	5.359	0.200	Dec 2017	0.191	Nov 2018	0.200	Nov 2019	-		0.200	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Mission Assurance Subject Matter Experts	C/CPFF	APT, INC. : AL	7.643	0.520	Dec 2017	0.476	Nov 2018	0.500	Nov 2019	-		0.500	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Operations Support	MIPR	Various Multi : AL, CA	5.009	0.450	Dec 2017	0.200	Nov 2018	0.200	Nov 2019	-		0.200	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Parts, Materials and Processes (PMP) Program	MIPR	Various Multi : AL, CA, IN	14.035	2.000	Dec 2017	2.727	Nov 2018	2.300	Nov 2019	-		2.300	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Parts, Materials and Processes - PMP - Program	C/CPFF	AI Solutions : AL	4.686	2.876	Dec 2017	0.700	Nov 2018	1.666	Nov 2019	-		1.666	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Pedigree & Design Certification - FFRDC	MIPR	Aerospace : AL, CA	23.969	2.800	Dec 2017	2.752	Nov 2018	3.000	Nov 2019	-		3.000	Continuing	Continuing	Continuing
		Subtotal	134.594	16.208		15.030		15.650		-		15.650	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance HQ & Core Management (MDA CIV)	Allot	MDA QS : AL, VA, MD, CA, AZ, HI, AK, MA, NJ, FL, AR, UT	75.679	12.150	Oct 2017	11.822	Oct 2018	11.836	Oct 2019	-		11.836	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance Operations Support	C/CPFF	MDA QS : AL, DC, VA	10.060	0.962	Nov 2017	1.467	Nov 2018	1.500	Nov 2019	-		1.500	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance Operations Support (Travel/PCS)	Allot	MDA QS : AL, CO, AK, DC, VA	15.726	0.971	Nov 2017	1.000	Nov 2018	1.000	Nov 2019	-		1.000	Continuing	Continuing	Continuing
		Subtotal	101.465	14.083		14.289		14.336		-		14.336	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	236.059	30.291		29.319		29.986		-		29.986	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD32 / *Quality, Safety, and Mission Assurance*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD32 Quality, Safety, and Mission Assurance	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD32 Quality, Safety, and Mission Assurance	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	139.584	24.128	20.550	23.562	-	23.562	27.583	24.977	28.096	27.500	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	24.128	20.550	23.562
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	24.128	20.550	23.562

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various Multi: : AL, CO, CA, VA etc.	19.897	4.299	Jan 2018	3.635	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	5.416	0.429	Jul 2018	0.311	Jul 2019	0.356	Jul 2020	-		0.356	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various : Multi: AL, CO, NM, VA, various	5.602	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	MDA : AK, AL, CA, CO, VA	32.108	0.000		0.000		16.012	Oct 2019	-		16.012	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, CA, VA	75.756	19.400	Nov 2017	16.604	Apr 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	0.805	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services MIPRs	MIPR	Various : Multi: AK, AL, CO, CA, HI, MD, VA, NJ, NY, OCONUS	0.000	0.000		0.000		5.442	Nov 2019	-		5.442	Continuing	Continuing	Continuing
Program Wide Support - FFRDC	C/CPFF	JHU : CA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: AL, CA, AL, AK	0.000	0.000		0.000		1.752	May 2020	-		1.752	Continuing	Continuing	Continuing
		Subtotal	139.584	24.128		20.550		23.562		-		23.562	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*	Project (Number/Name) MD40 / *Program-Wide Support*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	139.584	24.128		20.550		23.562		-		23.562	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603891C / *Special Programs - MDA*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,769.906	356.560	422.348	377.098	-	377.098	357.650	343.919	277.106	277.157	Continuing	Continuing
MD27: *Special Programs*	1,769.906	356.560	422.348	377.098	-	377.098	357.650	343.919	277.106	277.157	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	365.190	422.348	406.779	-	406.779
Current President's Budget	356.560	422.348	377.098	-	377.098
Total Adjustments	-8.630	0.000	-29.681	-	-29.681
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-7.963	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-0.667	0.000	-29.681	-	-29.681

Change Summary Explanation

Further details are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	3,007.310	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
MD09: *Aegis BMD*	2,538.845	285.052	227.223	292.462	-	292.462	341.861	336.405	285.224	287.994	Continuing	Continuing
MG09: *Aegis BMD SM-3 Development Articles*	-	194.018	120.217	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	314.235
MM09: *Aegis BMD SM-3 Development*	-	117.179	161.958	232.714	-	232.714	162.708	143.663	14.672	18.509	0.000	851.403
MC09: *Cyber Operations*	5.226	2.718	10.886	10.827	-	10.827	11.748	10.679	9.165	10.816	Continuing	Continuing
MX09: *Aegis BMD Development Support*	190.248	157.811	185.742	163.628	-	163.628	172.649	182.454	170.658	182.767	Continuing	Continuing
MD40: *Program-Wide Support*	272.991	41.617	35.050	27.848	-	27.848	29.983	30.272	25.810	27.634	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2019 to FY 2020 reflects the following:
- Reflects the completion of the SM-3 Block IIA FY16 manufacturing contract.
- Transition of flight test execution support costs from this PE to PE 0604878C Aegis Test to ensure continued transparency and program efficiency.
- Transition of Common Source Library (CSL), BMD 5.0 CU software maintenance, and transition of Test Site Usage for in-service baselines from RDT&E to O&M.
- Resolution of hardware availability issues and increased commonality within the SM-3 Missile family with utilization of previous material acquisitions of Kinetic Warhead (KW) and Guidance Section (GS).

A. Mission Description and Budget Item Justification

The Aegis BMD mission is to deliver an enduring, operationally effective and supportable BMD capability to defend the nation, deployed forces, friends and allies, and to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. The Aegis BMD element of the BMDS capitalizes upon and evolves from the existing United States Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track Ballistic Missiles of all ranges, and the ability to destroy Short-Range Ballistic Missiles (SRBMs), Medium-Range Ballistic Missiles (MRBMs), and Intermediate-Range Ballistic Missiles (IRBMs) in the midcourse phase of flight, and shorter range missiles in the terminal phase of flight. Aegis BMD also provides a Long Range Surveillance and Track (LRS&T) capability to the BMDS. Upgrades to both the Aegis BMD Weapon System and the Standard Missile-3 (SM-3) configuration enable Aegis BMD to provide effective, supportable defensive capability against longer range, more sophisticated threats and an enduring Aegis Ashore defensive capability.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603892C *I AEGIS BMD*

This Program Element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. BMDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) PEs.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	860.788	767.539	780.085	-	780.085
Current President's Budget	798.395	741.076	727.479	-	727.479
Total Adjustments	-62.393	-26.463	-52.606	-	-52.606
• Congressional General Reductions	-2.500	0.000			
• Congressional Directed Reductions	-31.451	-30.463			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	30.800	4.000			
• Congressional Directed Transfers	-41.247	0.000			
• Reprogrammings	-0.573	0.000			
• SBIR/STTR Transfer	-13.422	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-4.000	0.000	-52.606	-	-52.606

Change Summary Explanation

Decrease in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustments for Aegis BMD 6.x development due to excess growth and SM-3 Block IIA All Up Rounds (AURs) transferred to Procurement

Decrease in FY 2019 from PB19 to PB20 reflects Congressional reduction of Weapon System Capability due to early to need (RDT&E)

Decrease in FY 2020 from PB19 to PB20 reflects the following:
- Transition of flight test execution support costs from this PE to PE 0604878C Aegis Test to ensure continued transparency and program efficiency.
- Transition of Common Source Library (CSL), BMD 5.0 CU software maintenance, and transition of Test Site Usage for in-service baselines from RDT&E to O&M
- Resolution of hardware availability issues and increased commonality within the SM-3 Missile family with utilization of previous material acquisitions of KW and GS

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD09 / *Aegis BMD*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD09: *Aegis BMD*	2,538.845	285.052	227.223	292.462	-	292.462	341.861	336.405	285.224	287.994	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides the following:
- Aegis BMD 5.x capability upgrade which adds new BMD threats inherent in the SM-3 Block IIA Build 8 missile software and improve Raid performance through Force Level Engagement and Sensor Coordination Raid (FENSR)
- Aegis Baseline 5.4 (BMD 4.1) certification in FY2020 and begins development of Aegis Baseline 5.4 (BMD 4.2) which adds radar refurbishment and Low Noise Amplifiers (LNA) upgrades
- Requirements to modify Aegis BMD models in support of BMDS Ground Test re-architecture, all-Digital BMDS M&S architecture, additional model development, analysis and M&S simulation support

A. Mission Description and Budget Item Justification

Aegis BMD continues development of a Sea-Based BMD capability in support of the MDA's mission to protect the homeland, deployed forces, friends and allies from ballistic missile threats of all ranges and in all stages of flight.

Systems Engineering & Integration performs requirements development, engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration.

Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion enables cross-baseline specification management and capability assessments to ensure consistent application of technical standards, processes, and procedures across the Aegis BMD program. Aegis BMD specific efforts include: systems engineering and architecture (process and execution); modeling and simulation (M&S); Verification and Validation (V&V) test and evaluation support; ship integration; quality; safety and mission assurance M&S. V&V efforts in this accomplishment are performed at the Aegis BMD element level, which feed into the overall BMDS system level.

Aegis BMD 4.1 capability builds upon legacy Aegis BMD 4.0 and captures all the threats built into Aegis BMD 5.0 CU. It includes an increased BMD threat set, and provides increased maximum engagements and maximum missiles-in-flight over BMD 4.0.

Aegis BL 5.4 (BMD 4.1) merges the BMD 4.1 capability with the U. S. Navy (USN) Aegis Baseline 5.3 into a single integrated computer program with planned U.S. Navy Certification in FY 2019. 21 legacy Aegis Flight I/II Destroyers, not planned for Aegis Modernization (AMOD), possess two separate certified computer programs: Aegis BMD 4.0 for BMD missions and Aegis Baseline 5.3 for Anti-Air Warfare (AAW), Surface Warfare (SUW), and Undersea Warfare (USW). The Aegis BL 5.4 (BMD 4.1) computer program integrates Aegis Baseline 5.3 and Aegis BMD 4.0 to remedy the need for the warfighter to use both simultaneously. An additional benefit of the single integrated computer program is enabling future SPY-1 Low Noise Amplifier (LNA) Refurbishment efforts to be added during the ship's Service Life.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Aegis BL 5.4.X (BMD 4.2) AN/SPY-1 upgrade with the U.S. Navy provides refurbishment of existing ship AN/SPY-1 radar arrays with the installation of antenna LNAs (MDA funding beginning in FY 2019). MDA and PEO IWS will establish a rotatable pool of antenna arrays to be installed and the removed arrays will be refurbished for the follow-on installation. These refurbished and upgraded antennas, when integrated with Aegis BL 5.4.X (BMD 4.2), will increase BMD capabilities with improved sensitivity, discrimination, and more efficient radar resource utilization.

Aegis BMD 5.1 builds upon Aegis BMD 5.0 CU (COTS based open architecture) and further expands the threat set required for EPAA Phase III. This includes the integration of the SM-3 Block IIA, introduction of an Engage on Remote (EoR) capability, and improved BMDS interoperability and engagement coordination. The Aegis BMD 5.1 computer program will also incorporate new BMD threats inherent in the SM-3 Block IIA Build 8 missile software and improve Raid performance through FENSR.

Aegis BMD 6.0 provides an increased BMD capability by incorporating the Air and Missile Defense Radar (AMDR), now designated SPY-6, for introduction on the first DDG Flight III. Aegis BMD 6.0 will enable BMDS element utilization of AMDR data for remote engagement and supplement deployed assets with simultaneous multi-mission capabilities (e.g. Integrated Air and Missile Defense (IAMD)). It will include IAMD planning; search, track, and discrimination. SPY-6 will support force level (multi-asset) approach to raid defense and enable U.S. Navy ships greater stand-off range from threat environments.

Aegis Underlay funds Aegis Weapon System and SM-3 Block IIA software modifications to existing systems to support a phased delivery of operational capability against expanded threat/mission space.

Modeling & Simulation (M&S) Objective Simulation Framework (OSF) effort develops, maintains and deploys the framework hardware and software for use at element laboratories and Combatant Command (CCMD) locations to support IMTP events, BMDS capability delivery assessments, Warfighter training, exercises, and wargames.

M&S BMDS Simulations & Tools effort provides development and sustainment of digital products and the architecture framework, and delivery/maintenance of infrastructure for BMDS performance assessments.

BMD System Assessment and Verification, Validation & Assessment (VV&A) funds activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling and simulation.

Land Based SM-3 Site Activation provides site design, site activation, temporary facilities, base operations support, and utilities as site activation progresses and until sites are transferred to the Navy.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Systems Engineering & Integration	18.530	19.310	20.780
Articles:	-	-	-
Description: Perform requirements development, engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration, including Aegis BMD compliance with the BMDS Specification, BMDS Description Document, and Master Integration Plan (MIP).			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Recurring Accomplishments: - Conduct system level performance analyses to support ongoing BMDS Architecture and Systems Engineering efforts - Perform top-down system level engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration, including Aegis BMD compliance with the BMD System Specification, BMD System Description Document, and Master Integration Plan (MIP) - Identify architecture alternatives that improve the BMD System's performance and are complementary to and interoperable with NATO systems and theaters around the world - Define BMDS technical content expectations and develop system requirements, to include integration of new capabilities, such as the U.S. Navy's Air and Missile Defense Radar (AMDR) - Develop functional performance, interface, and design suitability requirements in collaboration with Aegis BMD engineers to ensure correct flow-down and allocation of BMD System-level requirements to Aegis BMD - Respond to Warfighter, Combatant Command and other requests for analyses and requests for information; provide analytical support for real-world events - Conduct non-advocate assessments of BMDS capabilities and limitations prior to capability delivery decisions to determine fielding readiness (including Theater/Regional BMD) - Conduct extensive analysis of data collected in BMD test events to evaluate BMD System operations and performance. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion	43.432	45.542	53.041
Articles:	-	-	-
Description: Aegis BMD Core System Engineering enables cross-baseline specification management and capability assessments to ensure consistent application of technical standards, processes, and procedures across the Aegis BMD program. Aegis BMD specific efforts include: systems engineering and architecture (process and execution), modeling and simulation (M&S), Verification and Validation (V&V) test and evaluation support, ship integration, quality, safety and mission assurance M&S, V&V efforts in this accomplishment are performed at the Aegis BMD element level, which feed into the overall BMDS system level. Recurring Accomplishments: - Conduct U.S. Navy and Joint Link certifications required for BMD Baseline certifications for operational deployment			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Support Ground Test Campaign for BMDS to achieve Operational Capability Baseline (OCB) declaration - Execute V&V activities and provide results to MDA System Verification Team and the OTA in support of BMD system level accreditation for BMDS events - Provide M&S Requirements Management and Development - Conduct further development of Aegis BMD System Architecture and overarching system concepts - Conduct BMDS system level requirements allocation and Aegis BMD system requirements development, trace, validation and verification, and configuration management for coordination with all participating external agencies and organizations - Perform Command, Control, Computer, Communications and Intelligence (C4I) systems engineering to further develop Aegis BMD requirements, and to identify and resolve BMDS interoperability issues - Define and coordinate development and implementation of C4I capabilities in U.S. Navy C4I programs of record to meet Aegis BMD requirements - Conduct Threat Engineering analysis and Requirements Assessment - Conduct Systems Engineering for Aegis BMD system-level M&S development and interfaces to the BMDS architecture - Provide verified, validated, accredited models in support of U.S. Navy certification, MDA characterization of system-level performance, Operational Test Agency (OTA) assessment of operational capabilities, and representation of Aegis BMD capabilities in BMD test and exercise venues - Provide target engineering, test planning activities, and IMTP process/inputs for Aegis BMD - Conduct Performance Assessment and Verification (PAV) processes which assess the sufficiency of Objective Quality Evidence (OQE) to provide a traceable evidence to verify ES requirements traced to BMDS requirements - Provide oversight of all Aegis BMD analysis in support of systems assessment and verification supporting test and analysis requirements and test planning inputs to align with MDA and U.S. Navy test programs - Provide consolidated analysis and reporting for firing events Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Conduct Science & Technology evaluations, identify solutions for identified system needs, conduct concept exploration and related trade studies - Complete development of initial RF Mid-Term discrimination algorithms within the B/L 9 architecture - Execute Electronic Protection analysis and develop initial Electronic Attack mitigation concepts - Design, develop, test, and certify overhead satellite data sources to meet Aegis BMD fire control capabilities in support of dual path requirement in Aegis BMD 5.1 - Continue model development and V&V in support of COMOPTEVFORBL 9.C2 M&S accreditation - Continue support and oversight of development, integration and sustainment of M&S in support of BMD 6			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue to develop and mature Regional Sensor Advanced Discrimination solutions and modeling and simulation updates for multiple Aegis BMD architectures ***FY 2020 Plans:*** - Continue model development and V&V in support of COMOPTEVFOR BL 9.C2 M&S accreditation - Continue support and oversight of development, integration and sustainment of M&S in support of BMD 6 - Continue Electronic Protection analysis and development of Electronic Attack mitigation concepts - Develop or modify Aegis BMD models and supporting M&S components to meet system-level and enterprise M&S infrastructure requirements for both the Ground Test re-architecture and all-Digital BMDS M&S architecture. - Continue to develop and mature Regional Sensor Advanced Discrimination solutions and modeling and simulation updates for multiple Aegis BMD architectures ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides modifications to Aegis BMD models in support of BMDS Ground Test re-architecture and all-Digital BMDS M&S architecture and additional model development, analysis and M&S simulation support			
Title: Aegis BMD 4.x Development	22.954	25.128	45.047
Articles:	-	-	-
Description: Aegis Baseline 5.4 (BMD 4.1) incorporates the BMD 5.0 CU capability of EPAA Phase II ENDO/EXO requirements including EPAA Phase II Exo-atmospheric threats, integration of the SM-3 Block IB Threat Upgrade (TU), and reintroduction of other Aegis capabilities integrated with the SM-6 Dual I (Endo only). It provides Aegis Modernization capabilities comparable to the BMD 4.0 ships with legacy computer processing architecture. Aegis Baseline 5.4 (BMD 4.2) will provide refurbishment of existing ship AN/SPY-1 radar arrays with the installation of Low Noise Amplifiers (LNAs). These refurbished and upgraded antennas will increase BMD capabilities with improved sensitivity, discrimination, and more efficient radar resource utilization. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** For Aegis Baseline 5.4 (BMD 4.1): - Complete computer program integration efforts, capability development and coding - Complete unit test and element computer program integration and test - Complete Engineering Test and Evaluation (ET&E), Multi-Element Integration and Test (MEIT) with regression testing - Conduct Engineering Assessment (EA) ***FY 2020 Plans:*** Support of computer program delivery and to provide Objective Quality Evidence (OQE) for Certification: - Conduct Aegis Baseline 5.4 (BMD 4.1) Ship Installation and Test on first ship to support U.S. Navy At-Sea Testing - Certify Aegis Baseline 5.4 (BMD 4.1) in FY 2020			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Provide Aegis Baseline 5.4 (BMD 4.1) support to BMDS ground test events, collect Objective Qualitative Evidence (OQE) to support MDA Operational Capacity Baseline (OCB) reviews For Aegis Baseline 5.4 (BMD 4.2): - Update Critical Item Development (CIDS), Interface Description Specifications (IDS) and all supporting engineering document and plans - Conduct Aegis BMD low-level performance analysis supporting In-Process Reviews (IPR) - Conduct computer program integration efforts, capability development and coding; unit test and element computer program integration and test; Engineering Test and Evaluation (ET&E), Multi-Element Integration and Test (MEIT) with regression testing. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides Aegis Baseline 5.4 (BMD 4.1) certification in FY 2020. Aegis Baseline 5.4 (BMD 4.2) development efforts start in FY 2020.			
Title: Aegis BMD 5.x Development	76.772	12.678	32.656
Articles:	-	-	-
Description: Aegis BMD 5.1 builds upon BMD 5.0 CU and will further expand the threat set to include those threats required for EPAA Phase III through the integration of the SM-3 Block IIA, introduction of EoR capability, and improved BMDS interoperability and engagement coordination. In addition to expanding the BMD battlespace, EoR with SM-3 Block IIA frees up radar resources and increases the number and type of threats that can be engaged simultaneously over previous baselines. Aegis BMD Phase 1 capabilities include SM-3 Block IIA missile integration, SM-3 weapons selection algorithm, enhanced tracking, discrimination and mission planner updates to support organic engagements, Launch-on-Remote (LoR) engagements, and Long Range Surveillance & Tracking (LRS&T) missions. Aegis BMD 5.1 Phase 1 integration, testing, and evaluation (IT&E) events include various lab-based and shipboard weapon-system-to-missile integration testing utilizing the Virtual Operational Missile (VOM) and the Inert Operational Missile (IOM), as well as participation in BMDS-wide ground test campaigns. Aegis BMD 5.1 Phase 1 development supports early integration and testing with the SM-3 Block IIA missile testing. The development of partial capability is contiguous across both Phase 1 and Phase 2 and supports delivery for EPAA Phase III. Aegis BMD 5.1 Combat System certification occurs in FY 2018. Post-certification upgrades include incorporating new BMD threats inherent in SM-3 Block IIA Build 8 missile software and improved raid performance through FENSR, which preserves missile inventory and radar resources Recurring Accomplishments: - Continue supporting BMDS ground test events, collect Objective Qualitative Evidence (OQE) to support MDA OCB reviews, and EPAA Phase III TCD Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue supporting BMDS ground test events, collect Objective Qualitative Evidence (OQE) to support MDA OCB reviews, and EPAA Phase III TCD ***FY 2020 Plans:*** - Conduct ET&E and MEIT with regression testing for FENSR and Build 8 missile upgrades for the SM-3 Block IIA ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides SM-3 Block IIA Build 8 required weapon system changes to incorporate new BMD threats inherent in missile software and improved raid performance through FENSR.			
Title: Aegis BMD 6.x Development	43.155	63.479	66.798
Articles:	-	-	-
Description: U.S. Navy is developing the Advance Capability Build (ACB) 20 Combat System (CS) and the Air and Missile Defense Radar (AMDR), now designated SPY-6, for introduction on the first DDG Flight III. Aegis BMD 6.0 will integrate Aegis BMD 5.1 capability with the ACB 20 Combat System, to include new SPY-6 requirements. Aegis BMD 6.0 exploits SPY-6 radar improvement to enhance Engagement and Search &Track capabilities to include discrimination, raid defense and expanded threat space. This will enable BMDS element utilization of SPY-6 data for remote engagements and will supplement deployed assets with simultaneous multi-mission capabilities (e.g. IAMD). SPY-6 will support a force-level (multi-asset) approach to raid defense and will enable U.S. Navy ships to have a greater stand-off range from threat environments. Recurring Accomplishments: - Develop (CIDS), IDS and all supporting engineering documents and plans - Conduct design studies and concepts supporting development and integration - Conduct Aegis BMD performance analysis supporting In-Process Reviews(IPR) - Participation in program leadership and technical forums including Program Management Team, System Engineering Team, and Cross Product Teams for Integration and Test, Modeling & Simulation, Test, Evaluation & Certification, and Fleet Integration and Design - Computer program development for Aegis BMD 6.0 supporting Software Increment Reviews (SWIR) -MDA/Navy co-funded effort to provide BMD capability on Flight III DDGs Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Execute coordinated development with U.S. Navy on the combined computer program - Prepare for and conduct Aegis BMD performance analysis supporting CDR/Interim Program Review (IPR) - Compile Element Review Team (ERT) and CDR/IPR data packages and begin Element Technical Reviews (ETR) to validate system requirements			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue BMD 6.0 requirement updates, trade studies, design efforts, computer program coding and performance testing ***FY 2020 Plans:*** Aegis BMD 6.0 computer program development activities to support the Flight III DDG schedule: - Conduct Aegis BMD 6.0 concurrent engineering across BMD Surveillance and Track, Exo-organic, Endo-organic, and Mission Planner areas - Conduct SPY-6 integration efforts, capability development, and performance analysis - Conduct Aegis BMD 6.0 design and code across the BMD Mission area - Conduct Aegis BMD 6.0 unit test and element computer integration and test ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Aegis Underlay ***Articles:*** ***Description:*** Aegis Weapon System and SM-3 Block IIA software modifications to existing systems to support a phased delivery of operational capability against expanded threat/mission space. This upgrade adds capability for Aegis BMD to provide an under layer capability to GMD in support of Homeland Defense and will operationalize FTM-44 capability with SM-3 Block IIA Build 8 & AWS 9.2 ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** -Conduct requirement definition for Aegis Homeland Defense Underlay -Conduct BMDS system level requirements allocation and Aegis BMD system requirements development, trace, validation and verification, and configuration management for coordination with all participating external agencies and organizations ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides Aegis Weapon System and SM-3 Block IIA software modifications to existing systems to support a phased delivery of operational capability against expanded threat/mission space	0.000 -	0.000 -	12.000 -
Title: Modeling & Simulation Objective Simulation Framework ***Articles:*** ***Description:*** This effort develops, maintains and deploys the framework hardware and software for use at element laboratories and Combatant Command (CCMD) locations to support IMTP events, BMDS capability delivery assessments, Warfighter training, exercises, and wargames. Recurring Accomplishments:	35.448 -	35.882 -	36.337 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Develop and implement Objective Simulation Framework (OSF) upgrades to incorporate advanced tracking, discrimination, engagement and associated upper tier debris mitigation capabilities, as well as other requirements and capabilities to meet MDA's evolving M&S Enterprise needs. - Sustain and enhance framework products to maintain capabilities to support stakeholders. - Develop plans, procedures and documentation for scheduled events including Wargames and Combatant Command Exercises and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP. Provide event architecture integration and checkout of Wargames for these same IMTP scheduled events. - Provide the ground test architecture integration expertise to meet the testing requirements of the IMTP. Support delivery of integrated architectures for test across all test venues using the BMDS test framework to integrate distributed architectures in support of BMDS. - Develop, maintain, test, field, and operate model representations for use in events and other MDA M&S stakeholder application areas. Deploy hardware and software updates to distributed sites. Perform regular maintenance and critical repairs of hardware and software. - Support MDA's Experimental End-to-end Digital Integrated System-level Simulation (X-EDISS) requirements, referred to Tier 2 Digital in previous reports, requirements, including hardware and software, data storage and transmission, and verification tools. - Control and maintain the M&S Integration and Development Laboratories for Element M&S. Maintain venue for stakeholders to conduct early integration efforts and identification of issues prior to event architecture integration to support system development. - Deploy System Interface Units (SIUs) for BMDS testing - materials, licenses, SIU fleet purchasing. Deploy SIUs and components to maintain and sustain SIU fleet including cybersecurity; enables Developmental and Operational testing with full BMDS as required in IMTP. - Continue maintenance of the Single Stimulation Framework in the required venues until the transition of the Objective Simulation Framework into the venues completes. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: M&S BMDS Simulations & Tools	5.227	4.767	4.647
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: This effort includes: development and sustainment of digital products and the architecture framework, and delivery/ maintenance of infrastructure for BMDS performance assessments. Recurring Accomplishments: - Integrate, test, and verify the M&S enterprise supporting BMDS testing, assessment, exercises, and wargaming, including testing infrastructure. Guide and facilitate integration testing of MDA's M&S frameworks and core truth models, and all M&S components into virtual representations of the BMDS that are credible, affordable, and provide decision makers with the data needed - Integrate, test, functionally qualify, and deliver M&S tools and complex test architectures to provide system test capabilities to support MDA IMTP based test events, wargames, and exercises - Continue the transition of real-time digital simulation capability to the OSF to support Intended Uses - Provide HWIL/M&S Benchmarking/Integration documentation and coordination - Conduct M&S system integration and verification to support M&S system architecture development. Provide developmental integration testing to support M&S system architecture integration Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: BMDS Verification, Validation & Assessment (VV&A) ***Articles:***	20.219 -	20.437 -	21.156 -
Description: This activity funds BMD System Assessment and VV&A activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling and simulation. Recurring Accomplishments: - Verify BMDS performance, and produce BMDS verification status reports - Conduct extensive analysis of data collected in BMDS ground and flight test events, instrumental to understanding BMD System operations and performance and anchoring models and simulations - Identify mitigation approaches for BMDS performance issues uncovered during system level analysis and assessment - Maintain M&S VV&A database, and verification data for BMD System Specification Change Notices - Develop, maintain, and update the M&S VV&A tool kit - Provide recommendations for improving assessment confidence, including M&S and testing issue resolutions			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Conduct verification and validation (V&V) in support of MDA BMD System level accreditation process in support of BMDS Ground Test and performance assessment events - Conduct specified BMD System post-flight reconstructions, element post-flight reconstructions, and pre-mission testing events so as to optimize the body of evidence and analysis supporting system-level BMDS accreditation. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Land Based SM-3 Site Activation	19.315	0.000	0.000
Articles:	-	-	-
Description: Provide site design, unexploded ordnance clearing; spectrum analysis studies; temporary facilities; utilities; administrative communications equipment and services; infrastructure modifications; generator and commercial power; leased vehicles; material handling equipment; generator fuel; supplies, barriers temporary lighting; transportation of materials and equipment; translators; and emerging requirements as site activation progresses and until sites are transferred to the Navy. Recurring Accomplishments include: -Provide site activation for Aegis Ashore site in Poland to include temporary site activation facilities, base operation support, utilities, administrative communications, on-site material handling equipment services, and equipment installation -Fuel for facility commissioning activities, backup generators, and on-site vehicle support -Technical support to facilitate processing facility change proposals and construction modifications -Post-award technical services (structural, mechanical, and electrical) to ensure quality standards and construction schedule is met ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2018 congressional plus up received for Aegis Ashore Poland. Additional FY 2018 and FY 2019 out year efforts are funded in PE 0604880C: Land Based SM-3			
Accomplishments/Planned Programs Subtotals	285.052	227.223	292.462

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604878C: *Aegis BMD Test*	128.757	92.160	169.822	-	169.822	76.270	149.764	137.058	147.923	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	29.652	27.692	38.352	-	38.352	36.348	28.029	22.733	30.463	Continuing	Continuing
• 0604881C: *AEGIS SM-3 Block IIA Co-Development*	9.531	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.531

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

The M&S acquisition strategy utilizes full and open competition to develop, acquire and deliver the integrated architectures/frameworks, as well as develop and deliver models of Aegis systems. The Digital and HWIL product centers integrate the suite of M&S into a composite simulation capability, all based on an open architecture. M&S achieves this end-state via close collaboration between its integrating contractor teams (Digital and HWIL) and those of the Aegis BMD prime contractors, with additional technical standards and engineering oversight provided by Federally Funded Research and Development Centers (FFRDCs) and University Affiliated Research Centers (UARCs).

E. Performance Metrics

Aegis BMD utilizes Award Fee and Incentive-based contracts to ensure project completes on time

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering & Integration - Systems Engineering	Various	MDA Various : VA, AL	62.359	3.620	Oct 2017	2.111	Nov 2018	1.813	Nov 2019	-		1.813	Continuing	Continuing	Continuing
Systems Engineering & Integration - Systems Engineering - CSS	C/CPFF	TEAMS : VA	16.463	0.945	Nov 2017	3.113	Nov 2018	5.312	Nov 2019	-		5.312	Continuing	Continuing	Continuing
Systems Engineering & Integration - Systems Engineering - Industry	C/CPAF	Boeing : VA	49.025	13.965	Nov 2017	14.086	Nov 2018	13.655	Nov 2019	-		13.655	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD APL	MIPR	JHU/APL : Columbia, MD	17.340	9.643	Nov 2017	7.904	Nov 2018	9.639	Nov 2019	-		9.639	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD LM	C/CPFF	Lockheed Martin : Moorestown, NJ	17.604	5.742	Nov 2017	3.716	Nov 2018	3.277	Nov 2019	-		3.277	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD MIT	MIPR	Hanscom AFB - MIT/ LL : Lexington, MA	10.503	4.778	Nov 2017	3.169	Nov 2018	3.775	Nov 2019	-		3.775	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD MITRE	MIPR	CECOM - MITRE : Dahlgren, VA	1.017	1.495	Nov 2017	1.228	Nov 2018	1.608	Nov 2019	-		1.608	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD NSWCDD	MIPR	NSWC DD : Dahlgren, VA	17.413	9.986	Nov 2017	7.285	Nov 2018	10.620	Nov 2019	-		10.620	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 Raytheon	SS/CPAF	Raytheon : AZ	1.587	0.000		0.825	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09-Technology Design and Insertion-TD No longer funding in the FYDP	Various	Various, : Various	7.834	0.000		0.000		0.000		-		0.000	0.000	7.834	0.000
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - SPAWAR	MIPR	SPAWAR : San Diego, CA	1.072	4.444	Dec 2017	5.255	Nov 2018	4.482	Nov 2019	-		4.482	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Technology Design and Insertion - Discrimination	MIPR	Various - MDA : AL,VA	9.972	5.923	Nov 2017	7.957	Nov 2018	3.745	Nov 2019	-		3.745	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Technology Design and Insertion - M&S improvements	MIPR	Various - MDA : AL, VA	0.000	0.000		0.000		8.812	Nov 2019	-		8.812	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Various - MDA	MIPR	Various - MDA : AL,VA,CA	2.471	1.421	Nov 2017	8.203	Nov 2018	7.083	Nov 2019	-		7.083	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev -MD09- Aegis Techrep	MIPR	AEGIS Techrep : Moorestown, NJ	2.653	0.552	Nov 2017	0.377	Nov 2018	2.844	Nov 2019	-		2.844	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - D	MIPR	MDA : VA	30.396	1.438	Nov 2017	0.000		5.216	Nov 2019	-		5.216	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - Dahlgren	MIPR	NSWC/DD : DAHLGREN, VA	147.077	2.442	Nov 2017	6.156	Nov 2018	3.912	Nov 2019	-		3.912	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - Lockheed Martin	SS/CPIF	LOCKHEED MARTIN : MOORESTOWN, NJ	795.890	18.522	Nov 2017	17.087	Nov 2018	30.059	Nov 2019	-		30.059	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. -MD09- BMD 4.0 Dev-	Various	Various : Various	43.102	0.000		1.508	Nov 2018	3.016	Nov 2019	-		3.016	0.000	47.626	0.000
Aegis BMD 5.x Development - 6.x - D	MIPR	MDA : Ft. Belvoir, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323680	MIPR	NSWC/DD : DAHLGREN, VA	60.134	15.677	Nov 2017	1.400	Nov 2018	5.896	Nov 2019	-		5.896	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323684	MIPR	NSWC/PHD : PT HUENEME, CA	9.588	1.875	Nov 2017	0.000		0.591	Nov 2019	-		0.591	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323686	SS/CPFF	JHU/APL/MD : COLUMBIA, MD	51.536	2.667	Nov 2017	0.460		1.787	Nov 2019	-		1.787	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323689	SS/CPAF	LOCKHEED MARTIN : MOORESTOWN, NJ	661.093	53.751	Nov 2017	9.170	Nov 2018	22.189	Nov 2019	-		22.189	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - AW	MIPR	Aegis Tech Rep : Moorestown, NJ	2.401	2.108	Nov 2017	0.000		0.750	Nov 2019	-		0.750	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - Various	MIPR	Various : MA, MD, VA, NJ	77.223	0.694	Nov 2017	1.648	Nov 2018	1.443	Nov 2019	-		1.443	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09- No longer funded in the FYDP	Various	Various : various	129.494	0.000		0.000		0.000		-		0.000	0.000	129.494	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis BMD 6.x Development - Hanscom AFB - MIT/LL - TD	MIPR	Hanscom AFB - MIT/LL : MA	1.970	0.840	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - JHU/APL	SS/CPFF	JHU/APL : MD	3.861	6.064	Nov 2017	3.902	Nov 2018	3.932	Nov 2019	-		3.932	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Lockheed Martin	C/CPFF	Lockheed Martin : NJ	10.105	21.098	Nov 2017	51.773	Nov 2018	55.062	Nov 2019	-		55.062	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - MD09 - DD	MIPR	NSWC/DD : Dahlgren, VA	4.976	2.781	Nov 2017	3.902	Nov 2018	3.902	Nov 2019	-		3.902	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - NAVSEA	MIPR	NAVSEA : Sudbury, MA	0.000	1.500	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - NSWC DD-TD	MIPR	NSWC/DD : VA	3.321	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Raytheon	MIPR	Raytheon : Tucson, AZ	1.375	7.373	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Tech Rep	MIPR	Aegis TechRep : Moorestown, NJ	0.339	0.928	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Various	MIPR	Various : MA, MD, VA, NJ, CA	2.985	2.571		3.902	Nov 2018	3.902	Nov 2019	-		3.902	Continuing	Continuing	Continuing
Aegis Underlay - Aegis Weapon System - MD09 - APL	SS/CPFF	JHU/APL : MD	0.000	0.000		0.000		0.756	Nov 2019	-		0.756	Continuing	Continuing	Continuing
Aegis Underlay - Aegis Weapon System - MD09 - Aegis Techrep	MIPR	Aegis Techrep : Moorestown NJ	0.000	0.000		0.000		0.324	Nov 2019	-		0.324	Continuing	Continuing	Continuing
Aegis Underlay - Aegis Weapon System - MD09 - DD	MIPR	NSWC DD : Dahlgren VA	0.000	0.000		0.000		0.540	Nov 2019	-		0.540	Continuing	Continuing	Continuing
Aegis Underlay - Aegis Weapon System - MD09 - LM	SS/CPFF	Lockheed Martin : Moorestown NJ	0.000	0.000		0.000		9.180	Nov 2019	-		9.180	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD09 / *Aegis BMD*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis Underlay - Standard Missile - 3 (SM-3) BLock IIA Development - MD09 - Raytheon	SS/CPIF	Raytheon : AZ	0.000	0.000		0.000		1.200	Nov 2019	-		1.200	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering	Various	MDA : AL, VA	12.588	0.763	Nov 2017	3.211	Nov 2018	3.256	Nov 2019	-		3.256	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - CSS Support	C/CPFF	TEAMS : AL, CO	17.549	1.095	Nov 2017	4.480	Nov 2018	7.344	Nov 2019	-		7.344	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Engineering Support	C/CPAF	Northrop Grumman : CO	23.866	8.613	Nov 2017	5.845	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Integration	MIPR	AMRDEC : AL	20.498	3.625	Nov 2017	2.887	Nov 2018	3.090	Nov 2019	-		3.090	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Prime	C/CPFF	Teledyne Brown Engineering / TBD : AL, CO	116.960	21.352	Nov 2017	19.459	Nov 2018	22.647	Nov 2019	-		22.647	Continuing	Continuing	Continuing
M&S BMDS Simulations & Tools - Sims & Tools	C/CPFF	Teledyne Brown Engineering : AL, CO	1.130	1.243	Nov 2017	1.298	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S BMDS Simulations & Tools - Sims & Tools - Industry	C/CPAF	Northrop Grumman : CO	33.070	3.984	Nov 2017	3.469	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
M&S BMDS Simulations & Tools - Sims & Tools - Industry (2)	C/CPAF	SWDC : CO	0.000	0.000		0.000		3.887	Nov 2019	-		3.887	Continuing	Continuing	Continuing
M&S BMDS Simulations & Tools - Sims & Tools - Various	Various	Various : AL, CO	0.000	0.000		0.000		0.760	Nov 2019	-		0.760	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BMDS Verification, Validation & Assessment (VV&A) - Prior Year Verification & Assessment - No Longer in the FYDP	C/CPFF	Sparta : AL	1.585	0.000		0.000		0.000		-		0.000	0.000	1.585	0.000
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment	Various	MDA Various : AL, VA	0.773	0.709	Nov 2017	1.759	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - CSS Support	C/CPFF	TEAMS : AL	12.532	2.210	Nov 2017	1.323	Nov 2018	0.806	Nov 2019	-		0.806	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - Industry	C/CPAF	Boeing : AL	14.916	6.165	Nov 2017	6.429	Nov 2018	8.421	Nov 2019	-		8.421	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - Labs	MIPR	MITRE : VA	6.647	1.174	Nov 2017	1.196	Nov 2018	2.236	Nov 2019	-		2.236	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - OGA	MIPR	AMRDEC : AL	20.390	7.432	Nov 2017	7.662	Nov 2018	7.836	Nov 2019	-		7.836	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - UARC	MIPR	GTRI : GA, AL	2.162	1.100	Nov 2017	0.000		0.000		-		0.000	0.000	3.262	0.000
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - UARC2	MIPR	JHU/APL : AL, VA	0.000	1.429	Nov 2017	2.068	Nov 2018	1.857	Nov 2019	-		1.857	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation	MIPR	DTRA : Ft Belvoir VA	0.000	0.500	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
- DTRA - support to construction in Poland															
Land Based SM-3 Site Activation - Site Activation - Poland Admin Communication	MIPR	Northrop Grumman : Poland	0.000	0.285	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation - Poland Base Operating Support	MIPR	NAVFAC : Poland	0.000	3.900	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation - Poland Commercial and Temporary Utilities	MIPR	NAVFAC : Poland	0.000	2.900	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation - Poland Fuel	MIPR	DLA : Fort Belvoir VA	0.000	0.500	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation - Poland Material Handling Services	MIPR	NAVFAC : Naples Italy	0.000	0.130	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation - Transportation of Aegis Weapon System	MIPR	SDDC : Scotts AFB IL	0.000	0.100	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation - USACE in-house support in Poland	MIPR	CEHNC : Huntsville AL	0.000	0.700	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activation - USACE support in Poland	MIPR	CENAU : Poland	0.000	2.300	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Land Based SM-3 Site Activation - Site Activiation	C/FFP	Chenega Infinity : Chantilly VA	0.000	8.000	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD09 / *Aegis BMD*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
- Poland Security Guards/ Escorts															
		Subtotal	2,538.845	285.052		227.223		292.462		-		292.462	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD09 / *Aegis BMD*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,538.845	285.052		227.223		292.462		-		292.462	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, MIPRs, and civilian salaries on the R-3.
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
BL 5.4 IPR #2	✧																											
BMD 6.0 IPR #1	✧																											
BMD 5.1 Certification				△																								
BMD 6.0 IPR #2				✧																								
BL 5.4/BMD 4.x EA					✧																							
BL 5.4 SRR					△																							
BMD 6.0 IPR #3					✧																							
BL 5.3.x/BMD 4.x Certification							☆																					
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)							△																					
BMD 6.0 IPR #4								✧																				
BL 5.4 (BMD 4.2) SRR								✧																				
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)									△																			
BL 5.4 IPR #1										☆																		
BL 5.4 (BMD 4.1) Certification										△																		
BMD 6.0 IPR #5											✧																	
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)											△																	
FTO-03 (OTA, OT Intercept Flight Test)											△																	
BL 5.4 (BMD 4.2) IPR #2											☆																	
BL 5.1.2 Certification												△																
BL 5.4 (BMD 4.2) IPR #3												✧																
BMD 6.0 EA												✧																
BL 5.4 (BMD 4.2) EA													✧															
BL 5.4 (BMD 4.2) IPR #4													✧															
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																			△									

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)																					△							
BL 5.4 (BMD 4.2) Certification																								✧				
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)																									△			
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)																										△		
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)																											△	

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BL 5.4 IPR #2	1	2018	1	2018
BMD 6.0 IPR #1	1	2018	1	2018
BMD 5.1 Certification	4	2018	4	2018
BMD 6.0 IPR #2	4	2018	4	2018
BL 5.4/BMD 4.x EA	2	2019	2	2019
BL 5.4 SRR	2	2019	2	2019
BMD 6.0 IPR #3	2	2019	2	2019
BL 5.3.x/BMD 4.x Certification	4	2019	4	2019
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	4	2019	4	2019
BMD 6.0 IPR #4	1	2020	1	2020
BL 5.4 (BMD 4.2) SRR	1	2020	1	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
BL 5.4 IPR #1	3	2020	3	2020
BL 5.4 (BMD 4.1) Certification	3	2020	3	2020
BMD 6.0 IPR #5	4	2020	4	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
BL 5.4 (BMD 4.2) IPR #2	4	2020	4	2020
BL 5.1.2 Certification	1	2021	1	2021
BL 5.4 (BMD 4.2) IPR #3	1	2021	1	2021
BMD 6.0 EA	1	2021	1	2021
BL 5.4 (BMD 4.2) EA	3	2021	3	2021
BL 5.4 (BMD 4.2) IPR #4	3	2021	3	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	4	2022	4	2022
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)	1	2023	1	2023
BL 5.4 (BMD 4.2) Certification	4	2023	4	2023
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)	1	2024	1	2024
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)	2	2024	2	2024
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)	3	2024	3	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MG09 / *Aegis BMD SM-3 Development Articles*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MG09: *Aegis BMD SM-3 Development Articles*	-	194.018	120.217	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	314.235
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects the completion of the SM-3 Block IIA FY16 manufacturing contract.

A. Mission Description and Budget Item Justification

This project supported Aegis BMD purchase of Development Articles to use as test articles, and initial deployment in support of EPAA Phase III. Project included manufacturing of SM-3 Block IIA All Up Round (AUR) for the purposes of flight testing and delivery to the fleet as operational assets, and to ensure the maturation of SM-3 Block IIA manufacturing process.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: FY16 SM-3 Block IIA RDT&E All Up Rounds	194.018	120.217	0.000
Articles:	-	-	-
Description: Manufacture seventeen (17) SM-3 Block IIA All Up Rounds (AURs) (delivered FY 2018 through FY 2020) for the purposes of flight testing as reflected in the IMTP and, if not consumed in testing, delivery to the fleet as operational assets prior to an initial production decision in support of EPAA Phase III. SM-3 Block IIA AURs validate the Engineering Manufacturing Readiness Level 3 criteria for an Initial Production Decision scheduled 4Q FY 2018. Recurring Accomplishment: Deliver SM-3 Block IIA AURs Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans: Continue manufacturing and deliver of FY16 SM-3 Block IIA RDT&E All Up Rounds deliveries			
FY 2020 Plans: Complete manufacturing and deliver of FY16 SM-3 Block IIA RDT&E All Up Rounds deliveries			
FY 2019 to FY 2020 Increase/Decrease Statement: Decrease from FY 2019 to FY 2020 reflects the completion of the SM-3 Block IIA FY16 manufacturing contract.			
Title: FY18 SM-3 Block IIA RDT&E All Up Rounds	0.000	0.000	0.000
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: N/A ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	194.018	120.217	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MG09 / *Aegis BMD SM-3 Development Articles*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds - NSWC/DD	MIPR	NSWC/DD : Dahlgren, VA	0.000	0.145	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds - SM-3 MANUFACTURING - MG09	SS/CPAF	Raytheon : Tucson, AZ	0.000	193.873	Nov 2017	118.217	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds- Various	MIPR	Various : Various, CA, VA, MD	0.000	0.000		2.000	Apr 2019	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	194.018		120.217		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	194.018		120.217		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FY16 SM-3 Block IIA AUR-first round delivery								✧																				
FY16 SM-3 Block IIA AUR EPAA Phase III Declaration											✧																	

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY16 SM-3 Block IIA AUR-first round delivery	4	2019	4	2019
FY16 SM-3 Block IIA AUR EPAA Phase III Declaration	3	2020	3	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MM09 / *Aegis BMD SM-3 Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MM09: *Aegis BMD SM-3 Development*	-	117.179	161.958	232.714	-	232.714	162.708	143.663	14.672	18.509	0.000	851.403
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase from FY 2019 to FY 2020 provides for increased GEU Activities (manufacturing readiness review for custom electronic parts and verify unit is production ready; GEU re-qualification; Computer in the Loop (CIL) and Hardware in the Loop (HIL); and transition GEU upgrades into current production lines), and completion of manufacturing maturity (EMRL 4).

A. Mission Description and Budget Item Justification

Provides development of SM-3 Missiles, Upgrade Modifications, and Integration into the Aegis Weapon System.

The SM-3 Block IB improves Aegis BMD's ability to expand the BMD battlespace, engage longer range, more sophisticated ballistic missiles that may deploy countermeasures and launch in larger raid sizes. The SM-3 Block IB Kinetic Warhead's (KW) two color infra-red (IR) seeker and advanced signal processor provides a real-time discrimination and characterization capability while improving sensitivity for longer range targets and performance against more sophisticated threats. Additionally, the new Throttleable Divert and Attitude Control System (TDACS) KW divert engine has been upgraded over the SM-3 Block IA to provide a more flexible divert in order to maneuver the KW to intercept.

The SM-3 Block IIA consists of an upgrade to a 21-inch diameter SM-3 missile and expands beyond the SM-3 Block IB battlespace to counter Intermediate Range Ballistic Missile (IRBM). SM-3 Block IIA provides an increased kinematic envelope through improved infa-red (IR) discrimination and divert capability that provide performance against the EPAA phase III expanded threat set. When combined with Aegis BMD 5.1 weapon system modifications, the SM-3 Block IIA will provide Engage on Remote (EoR) capability, which allows the use of remote off board sensor information to launch and guide the SM-3 Block IIA to final intercept. Aegis BMD 5.1 EoR capability with SM-3 Block IIA also frees up Radar resources and increases the number and type of threats to be engaged simultaneously over previous baselines.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Standard Missile-3 (SM-3) Block IB Development	17.554	49.259	34.611
Articles:	-	-	-
Description: This effort develops and modernizes the SM-3 Block IB missile, which improves on the SM-3 Block IA performance and enables engagement of more sophisticated ballistic missiles and larger raid sizes. SM-3 Block IB Modernization will provide the following upgrades: - Upgraded SM-3 KW Common Avionics Package will provide improved producibility and reduced cost resulting from utilization of common components between SM-3 Block IIA and the Redesigned Kill Vehicle (RKV). SM-3 Block IB Common Components			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
will be extendable to support different form/fit in circuit card assemblies across SM-3 Block IB, SM-3 Block IIA, and RKV and will mitigate SM-3 Block IB hardware availability issues. - Upgraded SM-3 Block IB Guidance Section (GS) will resolve Computer Processing Unit 3 and Plate 3A hardware availability issues, enable use of 5.1/IIA Target Object Map (TOM) and similar software to SM-3 Block IIA Mission Computer; and enable additional capability against complex threats. - Continue development of the upgraded SM-3 Block IB Guidance Section (GS) Recurring Accomplishments: - Assess performance with weapons systems upgrades/modifications and against emerging threats Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Complete detailed design of the KW Common Avionics Package - Initiate development of common KW Circuit Card Assembly ***FY 2020 Plans:*** - Continue development of common KW Circuit Card Assembly - Initiate Guidance Section changes to support Dual - Band Data Link (DDL) integration and M-Code GPS compatibility ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects resolved hardware availability issues and increased commonality within the SM-3 Missile family with utilization of previous material acquisitions of KW and GS.			
Title: Standard Missile-3 (SM-3) Block IIA Development	99.625	112.699	198.103
Articles:	-	-	-
Description: The SM-3 Block IIA is required to meet EPAA Phase III. It will increase the area that can be defended by Aegis BMD, increase the probability of kill against a larger threat set, and leverage enhanced capability provided by BMDS sensor upgrades. Recurring Accomplishments: - Conduct SM-3 Block IIA software update to support engagements against additional complex threats identified during Aegis BMD 5.1 design process conducted after missile Critical Design Review (CDR) - Conduct End to End Distributed Development System (ETEDDS) integration testing; and flight test support - Continue implementation of SM-3 Block IIA cost reduction initiatives to support meeting cost goals to reduce the current estimated Average Unit Production Price (AUPP) - Continue transition of KW hardware commonality effort (from design to material purchases) to system integration testing in order to demonstrate technology readiness level 7 - Continue Engineering Manufacture Readiness Level (EMRL) 3 compliance to support life cycle progression			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Conduct Non-Recurring Engineering (NRE) services and materials to increase factory build and test capacity to sustain a rate capability of up to two SM-3 Block IIAs per month. ***FY 2020 Plans:*** - Complete NRE services for manufacturing maturity (EMRL 4) inclusive of rate capability and production test equipment - Guidance Electronics Unit (GEU) Engineering Change Proposal (ECP) planned activities: - Conduct manufacturing readiness review for custom electronic part and verify unit is production ready - Complete upgraded GEU re-qualification activities and ensure readiness for production - Complete Computer in the Loop (CIL) and Hardware in the Loop (HIL) upgrades; upgrade Technical Design Agent's GEU equipment for flight test simulations - Complete the Engineering Change Proposal, including the technical data package and supporting documentation, for cut-in to missile production - Execute activities to transition GEU upgrades into current production line ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for increased GEU ECP activities (as reflected in FY 2020 base plans) to incorporate into current production line.			
Accomplishments/Planned Programs Subtotals	117.179	161.958	232.714

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MM09 / *Aegis BMD SM-3 Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09	SS/CPAF	Raytheon : Tuscon, AZ	0.000	13.832	Jan 2018	42.360	Dec 2018	28.959	Dec 2019	-		28.959	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 - 20117142332259	MIPR	NSWC/PHD : Port Hueneme, CA	0.000	0.085	Nov 2017	0.246	Nov 2018	0.660	Nov 2019	-		0.660	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 - Various	MIPR	NSWC Corona : Corona, CA	0.000	2.747	Nov 2017	0.343	Nov 2018	0.790	Nov 2019	-		0.790	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development- MM09 DD	MIPR	NSWC Dahlgren : Dahlgren, VA	0.000	0.341	Nov 2017	1.415	Nov 2018	1.612	Nov 2019	-		1.612	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development- MM09 JHU/APL	SS/CPAF	JHUAPL : Laurel, MD	0.000	0.549	Nov 2017	2.746	Nov 2018	0.420	Nov 2019	-		0.420	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development- MM09-NAVSEA	MIPR	NAVSEA BAE Systems : Baltimore, MD	0.000	0.000		2.149	Nov 2018	2.170	Nov 2019	-		2.170	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - CA,VA, MD	MIPR	Various : CA, VA, MD	0.000	3.338	Nov 2017	3.202	Nov 2018	6.281	Nov 2019	-		6.281	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development -	SS/CPIF	Raytheon : Tucson, AZ	0.000	76.521	Nov 2017	96.570	Apr 2019	159.827	Apr 2020	-		159.827	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MM09 / *Aegis BMD SM-3 Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION															
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION - APL	MIPR	JHU/APL : Laurel, MD	0.000	5.378	Nov 2017	6.514	Dec 2018	15.890	Dec 2019	-		15.890	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION - DD	MIPR	NSWC DD : Dahlgren, VA	0.000	6.466	Nov 2017	4.258	Nov 2018	9.485	Nov 2019	-		9.485	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - NSWC Corona	MIPR	NSWC Corona : Corona, CA	0.000	2.794	Nov 2017	1.057	Nov 2018	4.698	Nov 2019	-		4.698	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - NSWC/Crane	MIPR	NWSC/Crane : IN	0.000	0.907	Nov 2017	1.098	Nov 2018	1.922	Nov 2019	-		1.922	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - NJ	C/CPFF	Lockheed Martin : Moorestown NJ	0.000	4.221		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	117.179		161.958		232.714		-		232.714	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MM09 / *Aegis BMD SM-3 Development*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	117.179		161.958		232.714		-		232.714	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Kinetic Warhead hardware commonality (also known as Guidance Electronic Unit Engineering Change Proposal (GEU ECP)) CDR	✧																											
GEU ECP Host GEU delta-CDR					✧																							
GEU ECP Qualification									✧																			
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)										△																		
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)												△																
FTO-03 (OTA, OT Intercept Flight Test)												△																
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																			△									
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)																				△								
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)																									△			
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)																										△		
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)																											△	

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Kinetic Warhead hardware commonality (also known as Guidance Electronic Unit Engineering Change Proposal (GEU ECP)) CDR	1	2018	1	2018
GEU ECP Host GEU delta-CDR	1	2019	1	2019
GEU ECP Qualification	1	2020	1	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	4	2022	4	2022
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)	1	2023	1	2023
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)	1	2024	1	2024
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)	2	2024	2	2024
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)	3	2024	3	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MC09 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC09: *Cyber Operations*	5.226	2.718	10.886	10.827	-	10.827	11.748	10.679	9.165	10.816	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Sustain the DoD RMF Certification and Accreditation process and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM).

This project supports the monitoring and tracking of Cybersecurity mitigation detailed in Information Technology Security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the AB mission and non-mission systems, which includes test and remote site administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network / System Certification and Accreditation (C&A)	2.718	10.886	10.827
Articles:	-	-	-
Description: This accomplishment has reoccurring efforts. Conduct cybersecurity engineering and architecture requirements planning or Aegis BMD systems. Plan and test the Risk Management Framework (RMF) controls for the BMDS in regards to Aegis BMD systems to comply with new directive, RMF for DoD Information Technology (DoDi 8510.01) to replace the DoD Information Assurance Certification and Accreditation process (DIACAP). In addition, conduct Controls Validation Testing (CVT). Recurring Accomplishments: - Continue coordination and development of new and existing accreditation packages that comply with new directive, RMF for DoD Information Technology (DoDi 8510.01) process - Conduct regular Controls Validation Testing (CVT) and cooperative risk assessments to mitigate cybersecurity deficiencies - Develop and deploy Hardware and Software HW/SW implementation strategies for Continuous Monitoring activities at remote sites and Aegis BMD assets Monthly reviews of systems through the eMass - Daily management of eMass System Plan of Action and Milestones (POAMs) Specific and/or unique accomplishments to each FY are as follows: - Daily management of eMass System Plan of Action and Milestones (POAMs)			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** -SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	2.718	10.886	10.827

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	128.757	92.160	169.822	-	169.822	76.270	149.764	137.058	147.923	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	29.652	27.692	38.352	-	38.352	36.348	28.029	22.733	30.463	Continuing	Continuing
• 0604881C: *AEGIS SM-3 Block IIA Co-Development*	9.531	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.531
• 0901598C: *Management HQ - MDA*	29.947	28.626	27.065	-	27.065	27.446	28.164	28.698	29.271	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

D. Acquisition Strategy

Full and Open contract support through Missile Defense Agency Program Management Office.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MC09 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - BOOZ ALLEN HAMILTON INC	C/CPIF	MDA : MCLEAN, VA	3.476	1.459	Nov 2017	2.680	Nov 2018	4.000	Nov 2019	-		4.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services	C/CPIF	Torch Technologies : Huntsville, AL	1.750	0.416		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network System Certification and Accreditation	SS/CPAF	Lockheed Martin : Moorestown NJ	0.000	0.843		6.405	Nov 2018	6.827	Nov 2019	-		6.827	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network System Certification and Accreditation - PHD	MIPR	NSWC/PHD : Port Hueneme CA	0.000	0.000		0.501	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network/System Certification and Accreditation - DD	MIPR	NSWC - DD : Dahlgren VA	0.000	0.000		1.300	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	5.226	2.718		10.886		10.827		-		10.827	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.226	2.718		10.886		10.827		-		10.827	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MC09 / *Cyber Operations*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC09 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC09 Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MX09 / *Aegis BMD Development Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MX09: *Aegis BMD Development Support*	190.248	157.811	185.742	163.628	-	163.628	172.649	182.454	170.658	182.767	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects the following:
- Transition of Common Source Library (CSL), BMD 5.0 CU software maintenance, and transition of Test Site Usage for in-service baselines from RDT&E to O&M
- Transition of test related program management costs from this PE to PE 0604878C Aegis Test to ensure continued transparency and program efficiency

A. Mission Description and Budget Item Justification

Aegis Ballistic Missile Defense (BMD), in accordance with negotiated agreements between the U.S. Navy and the Missile Defense Agency (MDA) has identified and segregated funding for Developmental Support of Aegis BMD specific elements resident aboard Aegis capable U.S. Navy ships. Computer Program Support consists of, but is not limited to, reviews of Technical Observation Reports (TORs) that are generated by ship crews during exercises or deployments, determination of root causes and preparation of Computer Program Change Request (CPCR) to correct TORs, updates to the in-service computer program to apply, test and certify multiple CPCRs, and tests installation of Aegis Weapon System (AN/SPY-radar/Fire Control System (FCS)) alignment updates as required. Aegis BMD provides support to Annual Integration Events (AIEs) to ensure any updated Aegis Combat System (ACS) computer programs do not degrade BMD equipped ships and provides distance and technical support for BMD equipped ships.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Fleet Integration	9.257	15.395	16.871
Articles:	-	-	-
Description: Provide Fleet operations and mission support to enable the conduct of sustained BMD operations; advocate war fighter requirements and fleet feedback in baseline development and capability upgrades to Aegis BMD weapon system; provide analysis and Mission Planning support for Geographic Combatant Commanders for operational application of Maritime BMD capabilities; and provide BMD Capabilities Analysis and Exercise Support for Aegis BMD baselines under development or currently deployed in the Operational Fleet. Deliver Aegis BMD Mission Planner Prototype (Cerberus). Recurring Accomplishments: - Define, develop and review Joint and Fleet Doctrine for incorporation of Aegis BMD capability transition to warfighter and baseline acceptance into MDA Operational Capacity Baseline (OCB) - Research and define certification and warfighter acceptance requirements for Aegis BMD baselines to ensure successful capability delivery - Develop Aegis BMD training simulations and scenarios to support shipboard training including BMD Qualification (BMDQ) and higher level exercises			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Execute warfighter feedback process to enhance Aegis BMD functional capability development and influence future Aegis BMD requirements and support MDA Test Community and Combatant Commanders in BMD Exercises and Wargames - Provide analysis for Anti-Ship Ballistic Missile Defense - Provide analysis on parametric organic sensor sensitivity - Provide analysis on up-range ship/sensor support for LoR, EoR, and Cued engagements - Provide analysis on impacts of countermeasures - Provide analysis on developing threats Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Optimization of multi-baseline/ship defense designs - Limited anti-air warfare depth of fire calculations - Real-time mission planning for COCOMs and fleet components to facilitate regional defense design laydowns ***FY 2020 Plans:*** - Deliver Aegis BMD Mission Planner Prototype ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Infrastructure Upgrades	22.336	25.297	24.332
Articles:	-	-	-
Description: Provides management of C4I aspects of the BMDS Test Site (BTS) San Diego upgrade plan to maintain Fleet representative C4I configurations to support testing, troubleshooting, and Fleet operations. Special Access Program (SAP) facility upgrades inclusive of labor for Contractor Program Security Officers, Information Assurance Officers, and System Administrators that will oversee the associated development activities and data transfer efforts. Funds IT services in support of the Aegis RDT&E mission to include: IT help-desk services; portal and data services; records management; business automation services; and desktop and Special Purpose Processing Nodes (SPPNs) maintenance and licenses. In addition, funds will be used to replace critical IT infrastructure at end-of-life and to implement DoD mandated projects in support of the Joint Information Environment (JIE) initiative. Recurring Accomplishments: - Transfer necessary data between collateral and SAP environments to comply with Federal and DoD mandates (Cybersecurity and Joint Information Environment) - Configuration and data management to ensure Modeling and Simulation (M&S) and software builds are identical in collateral and SAP environment			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Fund Aegis IT services such as IT help-desk services; portal and data services; records management; business automation services; and desktop and SPPN maintenance and licenses. - Fund critical end-of-life IT equipment replacements - Fund IT infrastructure upgrade planning and implementation efforts to accomplish DoD mandated IT projects (JIE and DoD CIO Information Resources Management (IRM) initiatives) - Implement and maintain Fleet representative C4I configurations to support testing, troubleshooting, and Fleet operations Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Aegis Ballistic Weapon System Support	21.698	37.613	22.747
Articles:	-	-	-
Description: Provides system engineering for fielded Aegis BMD Weapon Systems from warfighter feedback, investigation of BMDS Discrepancy Reports, and BMDS ground test observation analysis. It includes computer program defect corrections and supports assessment of flight test readiness. Recurring Accomplishments: - Update threat adaptation data to keep pace with emergent threats - Provide operation and maintenance of land based test sites used for the development of Aegis BMD baselines. Operation and maintenance includes Quality Assurance, Configuration Management and other support activities to both baseline development and the sites. Engineering, logistic, quality assurance, configuration management and administrative support for the operation and maintenance of the Aegis shore sites and centers in support of the delivery of BMD baselines - Provide support for contingency operations of National interest - Support the fielded Aegis BMD computer programs baselines approved as an Operational Capability Baseline - Provide engineering support to Operationally Capable Baseline ships that participate in BMD test events - Provide test site usage for maintenance and support of baselines under development - Sustain the classified computing infrastructure Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the transition of Common Source Library (CSL), BMD 5.0CU software maintenance, and Test Site Usage for in-service baselines from RDT&E to O&M			
Title: Program Operations	102.420	104.737	99.678
Articles:	-	-	-
Description: This activity funds the Government, contractor, and Federally Funded Research and Development Center (FFRDC) workforce that manage the overall Aegis Ballistic Missile Defense (BMD) program and enables the program to develop, build, and test standard missiles and the associated Aegis Weapon Systems. This project includes all operations support for the Aegis program office in Engineering, Testing, Logistics, Acquisition, Safety, Quality Assurance, Finance, Budget Formulation and Execution, Cost Estimation, and Earned Value Management in support of development activities. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects transition of test related program management costs from this PE to PE 0604878C Aegis Test to ensure continued transparency and program efficiency			
Title: United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS)	2.100	2.700	0.000
Articles:	-	-	-
Description: Integrated upper tier Ballistic Missile Defense System that expands engagement options and increases coverage area. Provides updated Threat Adaptation Data necessary for successful mission planning and threat detection on Aegis BMD ships. JEON funding also supports initial development efforts for regional peer-to-peer engagement coordination with Terminal High-Altitude Area Defense (THAAD). ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Deliver an integrated upper tier Ballistic Missile Defense System that expands engagement options and increases coverage area. ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects no FY 2020 requirements			
Accomplishments/Planned Programs Subtotals	157.811	185.742	163.628

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604878C: *Aegis BMD Test*	128.757	92.160	169.822	-	169.822	76.270	149.764	137.058	147.923	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	29.652	27.692	38.352	-	38.352	36.348	28.029	22.733	30.463	Continuing	Continuing
• 0604881C: *AEGIS SM-3 Block IIA Co-Development*	9.531	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.531

Remarks

D. Acquisition Strategy

The Aegis Ballistic Missile Defense (BMD) element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the Standard Missile-3 (SM-3) and the Aegis BMD Weapon System, respectively.

Competition will be maximized for purchase of any products or services as appropriate.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fleet Integration - MX09 - Fleet APL	C/CPAF	JHU/APL/MD : Columbia, MD	12.750	4.746	Nov 2017	8.085	Nov 2018	11.130	Nov 2019	-		11.130	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet DD	MIPR	NSWC DD : Dahlgren, VA	4.786	2.979	Nov 2017	2.938	Nov 2018	5.081	Nov 2019	-		5.081	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet PHD	MIPR	NSWC PHD : Port Huenmene	0.432	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet SMDC	MIPR	SMDC/ARSTRST : Huntsville, AL	0.837	0.468	Nov 2017	0.639	Nov 2018	0.660	Nov 2019	-		0.660	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet CSCS	MIPR	CSCS : Dahlgren, VA	2.096	1.064	Nov 2017	1.053	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Fleet Integration - MX09- Fleet System Engineering Group	C/CPFF	System Engineering Group : Laurel, MD	0.000	0.000		2.680	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - ICT Funding	C/CPAF	Jacobs Engineering : AL,CA,CO,NM,VA,HI	21.603	13.282	Nov 2017	12.911	Nov 2018	11.569	Nov 2019	-		11.569	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S	MIPR	SPAWAR : CA	0.000	0.191	Nov 2017	0.255	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S APL	SS/CPAF	JHU/APL : Laurel, MD	1.050	0.447	Nov 2017	0.250	Nov 2018	5.160	Nov 2019	-		5.160	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S Corona	MIPR	NSWC Corona : Corona, CA	1.630	1.158	Nov 2017	1.203	Nov 2018	0.847	Nov 2019	-		0.847	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S LM	C/CPAF	Lockheed Martin : Moorestown, NJ	11.238	3.670	Nov 2017	3.375	Nov 2018	0.894	Nov 2019	-		0.894	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MX09 / *Aegis BMD Development Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Infrastructure Upgrades - MX09 - S MIT	C/CPAF	MIT : Lexington, MA	0.320	0.338	Nov 2017	0.300	Nov 2018	0.348	Nov 2019	-		0.348	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S RMS	C/CPAF	Raytheon : Tucson, AZ	5.820	0.000		0.830	Nov 2018	1.100	Nov 2019	-		1.100	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09- D/TD	MIPR	SPAWAR : CA	3.598	1.497	Nov 2017	4.853	Nov 2018	3.294	Nov 2019	-		3.294	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09- S DD	MIPR	NSWC DD : Dahlgren, VA	2.319	0.994	Nov 2017	0.525	Nov 2018	0.300	Nov 2019	-		0.300	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09-Various	MIPR	Various : Various	0.000	0.759		0.795	Nov 2018	0.820	Nov 2019	-		0.820	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW APL	SS/CPFF	JHU/APL : Columbia, MD	4.682	0.445	Nov 2017	1.182	Nov 2018	0.853	Nov 2019	-		0.853	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW DD	MIPR	NSWC DD : Dahlgren, VA	18.051	0.077	Nov 2017	3.946	Nov 2018	3.618	Nov 2019	-		3.618	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW LM	C/CPFF	Lockheed Martin : Moorestown, NJ	30.879	10.526	Nov 2017	8.373	Nov 2018	2.098	Nov 2019	-		2.098	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW NAVSEA	MIPR	NAVSEA : Washington, DC	32.145	9.316	Nov 2017	22.450	Nov 2018	15.372	Nov 2019	-		15.372	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW SSCPAC	MIPR	SPAWAR : San Diego, CA	2.390	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW TECH REP	MIPR	Aegis Tech Rep : Moorestown, NJ	0.849	0.091	Nov 2017	0.432	Nov 2018	0.432	Nov 2019	-		0.432	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW Wallops	MIPR	SCSC : Wallops Island, VA	2.000	1.243	Nov 2017	0.374	Nov 2018	0.374	Nov 2019	-		0.374	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - D	MIPR	MDA : Arlington, VA	1.037	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MX09 / *Aegis BMD Development Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis Ballistic Weapon System Support - MX09 - IH	MIPR	NSWC Indian Head : MD	0.249	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - Raytheon	SS/CPAF	Raytheon : AZ	5.644	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD JHU/APL	SS/CPFF	JHU/APL : Columbia, MD	2.554	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD MITRE	MIPR	CECOM - MITRE : Dahlgren, VA	2.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD NSWC DD	MIPR	NSWC DD : Dahlgren, VA	1.833	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD PHD	MIPR	NSWC PHD : Port Hueneme, CA	0.557	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD SSCPAC	MIPR	SPAWAR : San Diego, CA	11.826	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD Various	MIPR	Various : San Diego, CA	4.573	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW PHD	MIPR	NSWC PHD : Port Hueneme, CA	0.500	0.000		0.856	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09-AW MIT/LL	MIPR	Hanscom, AFB : Lexington, MA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09-AW Various	MIPR	Various : MD, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Program Operations - MD09 - Civ Sal	MIPR	MDA : Arlington, VA	0.000	33.575	Nov 2017	35.750	Nov 2018	36.417	Nov 2019	-		36.417	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - DD PM	MIPR	NSWC DD : Dahlgren, VA	0.000	4.932	Nov 2017	3.186	Nov 2018	3.186	Nov 2019	-		3.186	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - IT	MIPR	MDA : Arlington, VA	0.000	1.402	Nov 2017	1.752	Nov 2018	1.752	Nov 2019	-		1.752	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - MDA Travel	MIPR	MDA : Arlington, VA	0.000	2.165	Nov 2017	3.958	Nov 2018	3.483	Nov 2019	-		3.483	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - MIDAESS	MIPR	MDA : Arlington, VA	0.000	40.197	Nov 2017	38.448	Nov 2018	33.878	Nov 2019	-		33.878	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA Civ Sal	MIPR	NAVSEA : Washington, DC	0.000	13.691	Nov 2017	15.466	Nov 2018	14.785	Nov 2019	-		14.785	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA RB Sal	MIPR	NAVSEA : Washington, DC	0.000	2.225	Nov 2017	2.499	Nov 2018	2.499	Nov 2019	-		2.499	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA Training, Various	MIPR	NAVSEA : Washington, DC	0.000	1.526	Nov 2017	0.297	Nov 2018	0.297	Nov 2019	-		0.297	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA Travel	MIPR	NAVSEA : Washington, DC	0.000	1.056	Nov 2017	0.659	Nov 2018	0.659	Nov 2019	-		0.659	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - Security	MIPR	Various VA : VA	0.000	1.651	Nov 2017	2.722	Nov 2018	2.722	Nov 2019	-		2.722	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS)	SS/CPFF	JHU/APL : Columbia, MD	0.000	0.480	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MX09 / *Aegis BMD Development Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
- United States Forces Korea (USFK) - MX09 AW JHU/APL															
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW Lockheed Martin	C/CPFF	Lockheed Martin : Moorestown, NJ	0.000	0.935	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW MIT/LL	MIPR	MIT/LL : Lexington, MA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW NSWC	MIPR	NSWC DD : Dahlgren, VA	0.000	0.685	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW Various	MIPR	Various : Various	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK)-AW	SS/CPAF	LM : LM	0.000	0.000		2.700	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MX09 / *Aegis BMD Development Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	190.248	157.811		185.742		163.628		-		163.628	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	190.248	157.811		185.742		163.628		-		163.628	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MX09 Aegis BMD Development Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MX09 Aegis BMD Development Support	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	272.991	41.617	35.050	27.848	-	27.848	29.983	30.272	25.810	27.634	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	41.617	35.050	27.848
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	41.617	35.050	27.848

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

NA

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance SRM (MIPR)	MIPR	Various : Multi: AL, CO, CA, VA, AK	1.394	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	1.886	0.816	Jul 2018	0.537	Jul 2019	0.423	Jul 2020	-		0.423	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various/Multi: AL, CA, CO, : NM, VA, various	0.623	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries	Allot	MDA : Multi: AK, AL, CO, CA, VA	199.075	37.906	Nov 2017	34.513	Oct 2018	25.547	Oct 2019	-		25.547	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AK/ AL/CA/CO/HI/MD/ VA/NJ/NY/OCONUS	30.979	0.000		0.000		0.152	Jan 2020	-		0.152	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	36.361	2.895	Aug 2018	0.000		1.726	Jul 2020	-		1.726	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and materiel and Readiness	MIPR	Naval Surface Warfare Center : AL, VA	1.616	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	MIPR	Various : Multi: AL, CA, CO, VA	1.057	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	272.991	41.617		35.050		27.848		-		27.848	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	272.991	41.617		35.050		27.848		-		27.848	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD40 / *Program-Wide Support*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603896C *I Ballistic Missile Defense Command and Control, Battle Management & Communication*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	2,662.039	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
MD01: *Command & Control, Battle Management, Communications (C2BMC)*	1,799.991	259.457	302.038	346.862	-	346.862	306.370	280.549	300.559	298.605	Continuing	Continuing
MC01: *Cyber Operations*	7.317	5.421	17.651	14.162	-	14.162	16.173	15.916	12.398	14.377	Continuing	Continuing
MT01: *C2BMC Test*	240.110	60.607	54.100	64.624	-	64.624	63.956	60.569	61.907	62.943	Continuing	Continuing
MX01: *Command & Control, Battle Management, Communications (C2BMC) Development Support*	508.427	106.449	112.910	114.876	-	114.876	123.815	123.051	125.377	133.555	Continuing	Continuing
MD40: *Program-Wide Support*	106.194	18.051	21.118	23.682	-	23.682	24.674	22.496	25.501	26.156	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Increase from FY 2019 to FY 2020 provides an expansion of C2BMC space tasking capability development; additional System Level Discrimination Data Integration and Integrated Threat Characterization development activities; expanded depth and breadth of ground test scope to include Models and Simulation (M&S) development and Verification and Validation for new BMDS M&S environment; integration and testing of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); and addition of Space-based Kill Assessment Sensor operationalization and prototyping for the Robust BMDS Post Intercept Assessment capability. Additionally, the increase reflects the transfer of the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab from PE 0603914C to PE 0603896C to consolidate lab efforts to synergize efforts and gain efficiencies.

A. Mission Description and Budget Item Justification

The Command and Control, Battle Management, and Communications (C2BMC) program is the integrating element of the Ballistic Missile Defense System (BMDS). It is a vital operational system that enables the U.S. President, Secretary of Defense and Combatant Commanders at strategic, regional and operational levels to systematically plan missile defense operations, to collectively see the battle develop, and to dynamically manage designated networked sensors and weapons systems to achieve global and regional mission objectives. Systems linked through C2BMC include Patriot, Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense (BMD), Aegis Ashore, Ground-based Midcourse Defense (GMD), and Army Integrated Air and Missile Defense Battle Command System (IBCS), and sensors such as the Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) Radar, Sea-Based X-Band Radar (SBX), Homeland Defense Radar - Hawaii (HDR-H), Pacific Radar, Long Range Discrimination Radar (LRDR), Space-Based Infrared System (SBIRS), and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA). The C2BMC program also works to increase coalition partners' capabilities and investigates concepts and explores system engineering issues associated with innovative space applications for a missile defense intercept and defeat system.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603896C *I Ballistic Missile Defense Command and Control, Battle Management & Communication*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	454.862	475.168	515.239	-	515.239
Current President's Budget	449.985	507.817	564.206	-	564.206
Total Adjustments	-4.877	32.649	48.967	-	48.967
• Congressional General Reductions	-2.000	0.000			
• Congressional Directed Reductions	-3.575	-10.851			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	5.100	43.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	2.230	0.000			
• SBIR/STTR Transfer	-6.632	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	48.967	-	48.967

Change Summary Explanation

Net decrease in FY 2018 from PB19 to PB20 reflects the combined effect of enacted congressional adjustments for improved discrimination and Mobile Sensor Integration (MSI) Phase I, reduction for concurrent development efforts, and the C2BMC portion of the congressional general RDT&E reduction.

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustments for MSI Phase II and Cybersecurity and reductions for S8.2-3 scope adjustment and C2BMC future incremental capabilities.

Increase in FY 2020 from PB19 to PB20 provides enhanced regional and homeland defense capabilities related to hypersonic tracking, advanced discrimination techniques, and integration of discriminating radars in accordance with the BMDS Phased Implementation Plan (PIP). This increase also reflects the transfer of Space-Based Infrared Sensors/BMDS Overhead Persistent Infra-Red (OPIR) Architecture test lab support from PE0603914C to PE0603896C to consolidate and gain efficiencies in lab efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	Project (Number/Name) MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD01: *Command & Control, Battle Management, Communications (C2BMC)*	1,799.991	259.457	302.038	346.862	-	346.862	306.370	280.549	300.559	298.605	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides an expansion of C2BMC space tasking capability development; additional System Level Discrimination Data Integration and Integrated Threat Characterization development activities; expanded depth and breadth of ground test scope to include Models and Simulation (M&S) development and Verification and Validation for new BMDS M&S environment; integration and testing of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); and addition of Space-based Kill Assessment Sensor operationalization and prototyping for the Robust BMDS Post Intercept Assessment capability.

A. Mission Description and Budget Item Justification

Provides incremental development, deployment and operational support of C2BMC capabilities required for BMDS planning, situational awareness, sensor management, and engagement coordination. The FY 2019 National Defense Authorization Act (NDAA) section 869 recognized C2BMC for its implementation of this iterative practice and directed C2BMC's inclusion in a Community of Practice to advise on agile or iterative development.

C2BMC delivers capabilities incrementally with each software build (named as a Spiral), adding to or enhancing the capability of the previous build. C2BMC incremental delivery of Spiral 8.2 provides critical Homeland Defense for increased GMD battlespace, improved threat tracking using multiple sensors communicating via Link 16, enhanced sensor tasking to meet track quality and discrimination timeliness requirements, space situational awareness tasking support, and improved cyber capabilities. Enhanced Homeland Defense also integrates the BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) with the BMDS to enhance system level missile-tracking capabilities through earlier cueing of radars and weapon systems.

European Phased Adaptive Approach (EPAA) Phase 3/Engage on Remote (EOR) (Spiral 8.2-3) provides critical sensor management capability, greater engagement flexibility, improved OPIR-based cueing, and enhanced Aegis BMD defended area by enabling Aegis to use Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) data for EOR engagements, providing a five-fold increase in defended area coverage in the CENTCOM/EUCOM area of responsibility compared to individual weapon system organic capability. Spiral 8.2-3 also includes Space Situational Awareness and integrates Mobile Sensor Integration (MSI) Phase 1 and BMDS Overhead Persistent Infra-Red Architecture (BOA) data into the BMDS.

Long Range Discrimination Radar (LRDR) Control for Homeland Defense (Spiral 8.2-5) enables increased homeland and regional defense by providing LRDR sensor management, creation and dissemination of a BMD System track inclusive of LRDR sensor data; hypersonic threat tracking; significant expansion of Space Situational Awareness (SSA) capabilities for the Air Force; implements Link-16 reporting; integration of system level discrimination data; transmission of LRDR-based information

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

to GMD Fire Control (GFC) and other BMDS elements; operationalization of Space-based Kill Assessment (SKA) as part of Post Intercept Assessment (PIA); and integration of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) with the BMDS.

Future incremental C2BMC capability enhancements will include expanded Regional and Homeland Defense to continue risk reduction, planning, and development efforts including C2BMC tasking of OPIR Enterprise assets, enhanced system-level integrated discrimination functionality with Advanced Discrimination regional weapon system use of Link 16 based system track, AN/TPY-2 tasking improvements to support Aegis Engage on Remote, transmission of advanced discrimination features for regional BMD use, and monitoring of modified Aegis BMD, THAAD, PATRIOT, IBCS peer-to-peer engagement coordination.

C2BMC continues to develop incremental improvements to the BMDS to keep pace with emerging threats worldwide by investing in the development, integration and testing of advanced algorithms to improve track and discrimination capabilities, prototyping Robust Post Intercept Assessment (PIA) and enhancing use of space based sensor data from sources such as the Space Based Infra-Red System (SBIRS), using the BMDS OPIR architecture. Related disciplines provide development and deployment support to C2BMC system capabilities. In support of Hypersonic Defense, C2BMC will provide contingency capability to demonstrate, develop and deploy a detection and warning for advanced threats.

C2BMC International Partner system engineering ensures friends and allies are integrated to the fullest extent possible with U.S. BMDS capabilities. Collaborative system engineering, testing, and fielding facilitate interoperability with North Atlantic Treaty Organization (NATO) and partner nations such as Israel and Japan. C2BMC works with these nations to define and document international interfaces that are compatible with international standards and traceable to U.S. BMDS requirements. C2BMC participates in test events and live fire exercises hosted by international partners to ensure U.S. missile defense weapons, sensors, and Command and Control (C2) systems are interoperable with international systems. C2BMC maintains and upgrades the U.S./NATO secure data sharing gateways located at Ramstein Air Base, Germany, for missile defense operations and training. C2BMC also supports development of Japan's BMD requirements to ensure interoperability of Japanese and U.S. BMD systems (sensors, shooters, command and control) resulting in an integrated regional, operational, and strategic defense of Japan.

C2BMC Modeling and Simulation (M&S) maintains BMDS simulation/stimulation tools and federated models to support development and verification of deployed C2BMC and BOA Spirals. The BMDS C2BMC Model (BCM) is used for Flight Test pre-mission analysis and exercises to represent a second C2 Suite for Cross-Area of Responsibility (XAOR) functionality, Early Digital Product (EDP) for C2BMC performance assessment, and supports development and integration of GMD, AN/TPY-2, and Aegis software and models. The OPIR sensor M&S is used in the Ground Test Integrated System-level Simulation (GTISS) as the stimulus for BOA. The BCM program provides a cost effective means to assess and explore the performance space of the BMDS beyond what can be physically tested via Flight Tests and Target of Opportunity collections.

C2BMC develops, integrates, and tests advanced algorithms to improve discrimination capabilities and enhance the use of space-based sensor data. In support of MDA's discrimination improvements effort, C2BMC demonstrates, develops, and deploys multiple techniques to improve BMD System ability to identify lethal and non-lethal objects.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: C2BMC Development and Deployment	232.778	276.121	317.731
Articles:	-	-	-

Description: Provides funding for incremental development and deployment of C2BMC capabilities that link sensors and shooters to enable integrated BMDS capabilities, integrate BOA with the BMDS architecture to enhance missile tracking capabilities and enable much earlier cueing of radars and shooters, and fulfill Cybersecurity requirements. The Enterprise Sensors Laboratory (ESL) and Experimentation Laboratory (X-Lab) produce key prototypes for further maturation in the C2BMC capability Spiral development process and enables integrated experimentation for C2BMC, ESL, OPIR products, and other BMDS elements through robust connectivity to simulation frameworks, weapon systems, sensors, and operational assets. Recurring accomplishments include iterative development and procurement cycles for hardware, software, network capability system engineering tasks, and artifacts for technical engineering reviews; participation in test readiness reviews, pre-test engineering and analysis of ground and flight test results, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP); site planning, scheduling and hardware acquisition to support planned deployment of C2BMC Spirals and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) capabilities; updates and maintenance for C2BMC Model (BCM) BMDS simulation/stimulation (federated model) and verification scenarios for all C2BMC Spirals deployed and under development; prototyping and characterizing BOA, Discrimination, operationalization of SKA as part of Post Intercept Assessment (PIA): prototyping Robust PIA and C2BMC capabilities; design, installation and sustainment of operational sharing gateways; and collaboration with international partners to ensure future interoperability.

Specific and/or unique accomplishments for each FY are as follows:

FY 2019 Plans:
Enhanced Homeland Defense (Spiral 8.2-1):
- Maintain ability to develop/deploy capability in response to emergent operational requirements

EPAA Phase 3 / EOR (Spiral 8.2-3):
- Complete fielding of hardware and capability to EUCOM, CENTCOM, NORTHCOM, and INDOPACOM and support operation
- Complete fielding of BMDS Overhead Persistent Infra-Red Architecture (BOA) 6.1
- Provide analysis support for Technical Capability Declaration

LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus:
- Replan Critical Design Review caused by requirements expansion for Discrimination Data Integration and Integrated Threat Characterization

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Complete development tasks and conduct Critical Design Review - Complete model and simulation development to support requirement verification, ground test events and provide Wideband OPIR modeling and simulation for ground tests - Continue physics-based algorithm improvements for missile typing which are necessary to address emerging threats C2BMC, regional defense focus: - Continue planning and development tasks for Initial Robust BMDS Post Intercept Assessment including Spacebased Kill Assessment (SKA) ***FY 2020 Plans:*** EPAA Phase 3 / EOR (Spiral 8.2-3): - Maintain ability to develop/deploy capability in response to emergent operational requirements LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus: - Continue iterative software coding, unit testing, and interoperability testing of Spiral 8.2-5 capabilities, including LRDR and hypersonic threat detection and tracking - Initiate iterative software coding, unit testing, and interoperability testing for BMDS integration with the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) - Support developmental testing and preparation of transfer of the LRDR to the Air Force - Continue deployment of hardware and software to provide LRDR BMDS network connectivity and sensor control nodes - Increase Verification and Validation in support of BMDS capability ground testing and participation in BMDS ground tests C2BMC Additional and Expanded Regional and Homeland Defense focus: - Design and prototype the next incremental capability addressing Additional Homeland Defense and Mid-Term Discrimination requirements, inclusive of C2BMC Generation of BMD System Track (with System Level Discrimination Data Integration) for GMD Homeland Defense Engagements and Expanded Regional and Homeland Defense, inclusive of the integration of the Homeland Defense Radar-Hawaii (HDR-H) and an expanded interface with the OPIR enterprise, which yields additional raid handling capacity, enhanced Aegis BMD engage on capability, and expanded hypersonic defense tracking and reporting - Continue operationalization of Space-based Kill Assessment (SKA) as part of PIA - Continue planning and prototyping tasks for Robust BMDS Post Intercept Assessment (PIA) - Initiate design and development of accredited models and simulations (M&S) for C2BMC and BOA spirals for participation in End-to-end Digital Integrated System Simulation (EDISS)			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue design and development of Ground Test Integrated System-level Simulation (GTISS) ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides an expansion of C2BMC space tasking capability development; additional System Level Discrimination Data Integration and Integrated Threat Characterization development activities; expanded depth and breadth of ground test scope to include Models and Simulation (M&S) development and Verification and Validation for new BMDS M&S environment; integration and testing of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); and addition of Space-based Kill Assessment Sensor operationalization; and prototyping for the Robust BMDS Post Intercept Assessment capability.			
Title: C2BMC Communications	23.679	25.917	29.131
Articles:	-	-	-
Description: The BMD Communications Network (BCN) ties together an expanding set of sensors and weapons systems to enable the National Command Authority and the commanders at the strategic, theater and tactical levels to optimally engage missile threats. Recurring accomplishments include the following: - Provide GMD Communications Network (GCN) Long Haul Communications Transport (LHCT) services and a robust, end-to-end, high availability, operational communications network (COMNET) infrastructure with diverse paths that quickly and unambiguously share information across the global BMDS - Participate in and analyze results from events scheduled in the BMDS IMTP - Provide engineering and deployment support of C2BMC Deployable Interface Nodes - Provide BMDS communications via leased DISA circuits, and resolve real-time operational issues through DISA's Network Operations and Security Center - Provide effective network management to coordinate and integrate information across diverse equipment platforms, interface with other DoD communications systems, evolve information standards and capabilities, and adhere to the DoD Risk Management Framework (RMF) - Upgrade BCN capability by supporting all DoD teleports to enhance satellite communications Specific and/or unique accomplishments for each FY are as follows: ***FY 2019 Plans:*** - Acquire network circuits to support the Ground-Based Midcourse Defense Communication Network Modernization - Conduct Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration and installations ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Complete installation of hardware circuits for the Ground-Based Midcourse Defense Communication Network Modernization - Continue Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration and installations - Conduct technical refresh for End-of-Life SATCOM terminals on SBX by transitioning to Military Satellite Communications (MILSATCOM) terminals - Acquire network circuits to support the threat based communication network modernization ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase in FY 2019 to FY 2020 provides GMD Communication Network (GCN) modernization efforts to meet emerging threats and SBX SATCOM terminal end-of-life replacements and MILSAT upgrade.			
Title: United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEON) ***Articles:*** ***Description:*** Provides funding for development and deployment of C2BMC portion of the USINDOPACOM Joint Emergent Operational Needs Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement-MSE) ballistic missile defense system that expands engagement options and increases coverage area. Specific and/or unique accomplishment for each FY are as follows: ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease in FY 2019 reflects the completion of C2BMC efforts supporting the USINDOPACOM communication node.	3.000 -	0.000 -	0.000 -
Accomplishments/Planned Programs Subtotals	259.457	302.038	346.862

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
• 0604672C: *Homeland Defense Radar-Hawaii*	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: *Pacific Discriminating Radar*	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - Independent Performance Assessment and Analysis -Various	MIPR	Various : Huntsville, AL, Colorado Springs, CO; NCR	0.000	1.864	Oct 2017	2.952	Oct 2018	2.938	Oct 2019	-		2.938	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Aggregated Discrim	Various	Various : Various	10.490	9.301	Oct 2017	15.064	Oct 2018	14.902	Oct 2019	-		14.902	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BMDS C2BMC Model (BCM) - EDISS Integration	SS/CPIF	Lockheed Martin : Huntsville, AL, Colorado Springs, CO; NCR	0.000	0.000		0.000		3.107	Oct 2019	-		3.107	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS	C/CPAF	SciTec : Newark, NJ	0.000	0.250	Sep 2018	0.000		0.711	Oct 2019	-		0.711	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS -GOV	MIPR	Sandia National Labs : Albuquerque, NM	0.000	0.000		0.600	Nov 2018	2.523	Nov 2019	-		2.523	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS -NGC	SS/CPAF	Northrop Grumman Space and Mission Systems : Azusa, CA	0.000	0.000		0.697	Nov 2018	3.722	Nov 2019	-		3.722	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA Simulation Development and Integration- EDISS	SS/CPAF	Northrup Grumman Space and Mission Systems : Boulder, CO	0.000	0.000		0.000		6.355	Oct 2019	-		6.355	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Hardware/Software Development, Integration & Test (I&T)	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	672.298	108.162	Dec 2017	85.153	Dec 2018	158.287	Dec 2019	-		158.287	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - C2BMC Integration	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	160.198	3.688	Nov 2017	13.412	Nov 2018	6.819	Nov 2019	-		6.819	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT	SS/CPFF	Northrop Grumman Space and Mission Systems : Huntsville, AL	34.028	7.231	Oct 2017	6.905	Oct 2018	7.978	Oct 2019	-		7.978	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT OGA	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	2.400	0.717	Nov 2017	0.970	Nov 2018	0.713	Nov 2019	-		0.713	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Contract Support Services (CSS)	C/CPFF	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	252.893	23.810	Nov 2017	25.766	Nov 2018	26.022	Nov 2019	-		26.022	Continuing	Continuing	Continuing
C2BMC Development and Deployment - ESL/BOA Development	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	23.109	14.620	Oct 2017	8.884	Oct 2018	9.507	Oct 2019	-		9.507	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Federally Funded Research & Development Centers / University Affiliated Research Center	MIPR	MITRE, IDA, ORNL, Aerospace, JHU/APL, GTRI : Arlington, VA/ Huntsville, AL/ Colorado Springs, CO	161.615	19.251	Oct 2017	20.514	Oct 2018	19.741	Oct 2019	-		19.741	Continuing	Continuing	Continuing
C2BMC Development and Deployment - IT User Services - IRES	C/CPAF	Jacobs Technical, Inc : AL, AK, CA, CO, HI, NM, VA	0.000	1.823	Mar 2018	5.989	Mar 2019	6.166	Mar 2020	-		6.166	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - IT User Services - NGC	SS/CPFF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	4.898	4.368	Oct 2017	0.000		0.000		-		0.000	0.000	9.266	0.000
C2BMC Development and Deployment - Independent Performance Assessment and Analysis	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	0.000	4.359	Nov 2017	5.907	Nov 2018	2.411	Nov 2019	-		2.411	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Joint Early Warning Lab (JEWL)	C/CPAF	Jacobs Technical, Inc : Colorado Springs, CO	0.000	0.000		1.502	Mar 2019	1.548	Mar 2020	-		1.548	Continuing	Continuing	Continuing
C2BMC Development and Deployment - MDA Civilian, Travel & PCS	Various	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	149.679	19.196	Oct 2017	23.925	Oct 2018	21.953	Oct 2019	-		21.953	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Mobile Sensor Integration Phase II	Various	Various : AL; CO; FL; OH; MA; VA	0.000	0.000		33.500	Apr 2019	0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Models & Simulation	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO; NCR	0.000	2.358	Oct 2017	4.933	Oct 2018	8.926	Oct 2019	-		8.926	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment	C/CPFF	SciTec : Newark, NJ	0.000	1.105	Nov 2017	6.290	Nov 2018	1.578	Nov 2019	-		1.578	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment Hardware	C/CPAF	Northrop Grumman Space and Missile Systems : Colorado Springs, CO	0.000	0.713	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post	SS/CPIF	Lockheed Martin Team : Huntsville,	0.000	0.000		0.550	Nov 2018	1.200	Nov 2019	-		1.200	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intercept Assessment Integration		AL/Colorado Springs, CO													
C2BMC Development and Deployment - Post Intercept Assessment Prototyping	C/CPFF	Corvid : Huntsville, AL	0.000	2.089	Jun 2018	3.947	Nov 2018	2.035	Nov 2019	-		2.035	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Prior year C2BMC Development and Deployment no longer funded in the FYDP	Various	Various : Various	1.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Specialized Warfighter Development Program Management	SS/CPAF	Northrup Grumman Space and Mission Systems : Huntsville, AL	0.000	2.031	Mar 2018	0.000		3.500	Mar 2020	-		3.500	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Spiral Development	MIPR	Sandia, MDA Various : AL; CA; CO; NCR, NM	6.000	1.466	Oct 2017	5.394	Oct 2018	4.106	Oct 2019	-		4.106	Continuing	Continuing	Continuing
C2BMC Development and Deployment - X Lab	SS/CPIF	Lockheed Martin : Huntsville, AL	0.000	4.376	Oct 2017	3.267	Oct 2018	0.983	Oct 2019	-		0.983	Continuing	Continuing	Continuing
C2BMC Communications - Communication Equipment and Fielding	MIPR	DISA, PMDCATS, SPAWAR : Springfield, VA	133.302	13.634	Jan 2018	13.529	Jan 2019	14.721	Jan 2020	-		14.721	Continuing	Continuing	Continuing
C2BMC Communications - Communication Leases	MIPR	DISA : Arlington, VA	44.185	8.424	Oct 2017	10.142	Oct 2018	11.550	Oct 2019	-		11.550	Continuing	Continuing	Continuing
C2BMC Communications - Networks Development and Deployment	SS/CPFF	Lockheed Martin Team : Colorado Springs, CO	26.877	1.621	Nov 2017	2.246	Nov 2018	2.860	Nov 2019	-		2.860	Continuing	Continuing	Continuing
C2BMC Communications - Prior year C2BMC Communications no longer funded in the FYDP	Various	Various : Various	117.019	0.000		0.000		0.000		-		0.000	7.115	124.134	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEON) - C2BMC Hardware/ Software Development, Integration & Test (I&T)	SS/CPFF	Lockheed Martin : Huntsville, AL	0.000	3.000	Apr 2018	0.000		0.000		-		0.000	0.000	3.000	0.000
		Subtotal	1,799.991	259.457		302.038		346.862		-		346.862	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	Project (Number/Name) MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,799.991	259.457		302.038		346.862		-		346.862	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD01 Command & Control, Battle Management, Communications (C2BMC)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Spiral 8.2-1 NORTHCOM/INDOPACOM Capability Declaration		△																										
USFK JEON User Node Delivery				△																								
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration					△																							
Spiral 8.2-3 NORTHCOM/INDOPACOM Capability Declaration							△																					
Spiral 8.2-5 Homeland Defense Capability Declaration NORTHCOM/INDOPACOM														△														
Spiral 8.2-5 Homeland Defense Capability Declaration EUCOM/CENTCOM																△												
Expanded Regional and Homeland Defense Capability Declaration																									△			

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD01 Command & Control, Battle Management, Communications (C2BMC)	1	2018	4	2024
Spiral 8.2-1 NORTHCOM/INDOPACOM Capability Declaration	2	2018	2	2018
USFK JEON User Node Delivery	4	2018	4	2018
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration	1	2019	1	2019
Spiral 8.2-3 NORTHCOM/INDOPACOM Capability Declaration	3	2019	3	2019
Spiral 8.2-5 Homeland Defense Capability Declaration NORTHCOM/INDOPACOM	3	2021	3	2021
Spiral 8.2-5 Homeland Defense Capability Declaration EUCOM/CENTCOM	1	2022	1	2022
Expanded Regional and Homeland Defense Capability Declaration	1	2024	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC01: *Cyber Operations*	7.317	5.421	17.651	14.162	-	14.162	16.173	15.916	12.398	14.377	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects the FY 2019 congressional plus up for continued upgrade of hardware and software and includes DoD required cyber tools, policies and procedures to improve C2BMC network defense against cyber threats and enhance cybersecurity posture.

A. Mission Description and Budget Item Justification

Command and Control, Battle Management, and Communications (C2BMC) Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plan of Action and Milestones (POA&Ms) for MDA C2BMC mission systems. Activities in this Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network/System Certification and Accreditation (C&A)	5.421	17.651	14.162
Articles:	-	-	-
Description: This activity maintains the Assessment and Authorization (A&A) and Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and Plan of Action and Milestones (POA&Ms) on all Missile Defense Agency (MDA) information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) / Security Controls Assessor and the AO. Leverages Cross Domain Solution (CDS) as single authority implementing standard security policies for C2BMC across the BMDS. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems. - Conduct cybersecurity design, engineering, and architecture planning for C2BMC information technology systems - Plan and test the cybersecurity controls for C2BMC systems - Conduct Security Controls Assessment testing continuous monitoring of C2BMC mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities. Specific and/or unique accomplishments for each FY are as follows: ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue purchase of hardware/software upgrades and implementation of Windows Server 2016 ***FY 2020 Plans:*** - Implement DoD required Endpoint Security Solution to replace current Host Based Security Solution - Continue upgrade and implementation of DoD required Secure Host Baselines for required operating systems - Plan and test virtualization and artificial intelligence capability solutions in relation to cyber resiliency ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the FY 2019 congressional plus up for continued upgrade of hardware and software and includes DoD required cyber tools, policies and procedures to improve C2BMC network defense against cyber threats and enhance cybersecurity posture.			
Accomplishments/Planned Programs Subtotals	5.421	17.651	14.162

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network/System Certification and Accreditation (C&A) - Civ Cyber Labor	Various	MDA Other : Various	0.559	0.369	Oct 2017	0.192	Oct 2018	0.387	Oct 2019	-		0.387	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Consolidated Contractor Support	Various	MDA : Huntsville, AL; Colorado Springs, CO, NCR	0.000	1.025	Oct 2017	0.838	Oct 2018	1.287	Oct 2019	-		1.287	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Core C2BMC	SS/CPAF	Lockheed Martin : Colorado Springs, CO / Huntsville, AL	0.000	2.438	Jan 2018	10.708	Jan 2019	9.343	Jan 2020	-		9.343	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - IA/ CND Network/System C&A	MIPR	Army, Air Force : Various	6.076	0.255	Oct 2017	0.000		0.000		-		0.000	0.000	6.331	0.000
Network/System Certification and Accreditation (C&A) - Information Assurance	C/CPAF	Jacobs Technology : Colorado Springs, CO	0.000	1.252	Mar 2018	5.163	Mar 2019	3.008	Mar 2020	-		3.008	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Lab Infrastructure	SS/CPAF	Northrop Grumman : Colorado Springs, CO	0.682	0.082	Mar 2018	0.750	Mar 2019	0.137	Mar 2020	-		0.137	Continuing	Continuing	Continuing
		Subtotal	7.317	5.421		17.651		14.162		-		14.162	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	7.317	5.421		17.651		14.162		-		14.162	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	Project (Number/Name) MC01 / *Cyber Operations*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC01 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC01 Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT01: *C2BMC Test*	240.110	60.607	54.100	64.624	-	64.624	63.956	60.569	61.907	62.943	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 reflects the transfer of the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab from PE 0603914C to PE 0603896C to consolidate lab efforts to synergize efforts and gain efficiencies.

A. Mission Description and Budget Item Justification

TESTING:
Command and Control, Battle Management and Communications (C2BMC) Test supports system flight and ground testing, wargames, and exercises as detailed in the Missile Defense Agency (MDA) Integrated Master Test Plan (IMTP) to ensure C2BMC capabilities delivered are consistent with the Prioritized Capabilities List and are interoperable with other Ballistic Missile Defense System (BMDS) components.

LAB INFRASTRUCTURE:
MDA gains efficiencies and minimizes laboratory resource requirements (footprint, personnel, and hardware) by utilizing the C2BMC test bed infrastructure as the laboratory environment supporting System Test, Development, and Sustainment. For System Ground and Flight Test, the labs are used for pre-test analysis, test execution and post-test analysis. For Development, the labs are utilized for software verification and validation testing and system integration testing. For Sustainment, the labs are used to assist with root cause determination for issues discovered on the fielded system and validation of any required software patches.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Integrated Master Test Plan	60.607	54.100	64.624
Articles:	-	-	-
Description: This activity funds C2BMC participation in BMDS flight and ground testing, wargames and exercises, and resources in accordance with the BMDS IMTP. Recurring accomplishments include: Test Execution: - Assess BMDS interoperability, integration, and functionality in lab and distributed environments, leveraging a complex set of scenarios to test the limits of the C2BMC system. Participate in and analyze results of ground tests and flight tests in accordance with the BMDS IMTP. Support all phases of the MDA Ground Test Concept of Operations (CONOPS) and the MDA Flight Test CONOPS. Provide Flight Test Predictive Analysis support. Generate, test, and distribute federated model compatible scenarios for Ground Test and Flight Test Experimentation test support. Use BMDS C2BMC Model (BCM) to support exercise integration testing activities including test case and scenario checkout.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Utilize the Enterprise Sensors Laboratory (ESL) to plan, coordinate, and provide test operations to demonstrate prototype algorithms through flight tests, ground tests and real-world targets of opportunity. The development plans for algorithm improvements focus on track and measurement level sensor data fusion and feature extraction to improve 3-d track formation utilizing a variety of space, airborne, and terrestrial-based sensors. Results from the tests and experiments are provided back to the algorithms development activity to enable algorithm refinement. - Utilize the C2BMC Experimentation Laboratory (X-Lab) to plan, coordinate, and provide test operations to demonstrate maturing C2BMC technologies and software builds within an integrated C2BMC environment through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds. The development plans for C2BMC improvements focus on the BMDS Post Intercept Assessment (PIA) capability, architecture improvements, and C2BMC algorithm improvements to mitigate development risk. Results from the tests and experiments are provided back to the C2BMC and X-Lab development activity. - Utilize the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab to plan, coordinate, and provide test operations to demonstrate maturing SBIRS and BOA software builds within an integrated system test environment through flight tests and ground tests. Wargame and Exercises: - Participate in wargames and exercises using current and future C2BMC architectures to support all requesting combatant commands, NATO partners, and Host Nations allowing warfighters to validate Ballistic Missile Defense (BMD) Techniques, Tactics, and Procedures (TTP) specific to all designated Areas of Operations (AOs) to include current and future C2BMC architectures. Resources: - Continue the development and upgrades in the C2BMC Testbed (CTB) to support flight and ground tests. Continue Cyber Testing in the CTB to support continuous C2BMC spiral development. Continue C2BMC and NATO planning demonstrations and support to NATO live fire events. Provide Situational Awareness (SA) Node sustainment for the BMDS increment development to support ongoing planning and cooperation in the development and enhancement of interoperability between U.S. BMD systems and the NATO BMD systems. Provide infrastructure, network, and troubleshooting support to C2BMC Command Center (CCC), to include the BMDS Network Operations and Security Center (BNOSC), System Test and Operations Center (STOC), C2BMC System Support Center (CSSC), BMDS Communications Network (BCN), the Distributed Training system (DTS) and Space Based Infrared Sensors/BMDS Overhead Persistent Infra-Red (OPIR) Architecture Lab.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020

Specific and/or unique accomplishments for each FY are as follows:

FY 2019 Plans:

Test Execution:

- Integrate and test the BMDS OPIR Architecture to enable wideband processing
- Integrate and test INDOPACOM JEON advanced threat capability for regional and homeland defense
- Integrate and test additional OPIR coverage with the new Highly Elliptical Orbits (HEOs) and Geosynchronous Earth Orbits (GEOs) to increase raid size and improve threat typing
- Participate in flight and ground test events to support the Spiral 8.2-5 and Homeland Defense including LRDR, mid-term discrimination and Redesigned Kill Vehicle (RKV) integration by testing the following capabilities: C2BMC generation of BMD System Track (discrimination results by C2BMC selection); GMD RKV into the BMDS; SBX Forward-Based Discrimination; Aegis BMD boost phase cues of SBX; Long Range Discrimination Radar (LRDR) Integration into BMDS; Active Sensor Bias Monitoring & Reporting; Existing Sensor Data Interfaces & LRDR Data for Risk Reduction; and Cyber Security Enhancements
- Complete LRDR for Homeland Defense (Spiral 8.2-5) upgrades at the Missile Defense Integration and Operation Center (MDIOC), CO. providing support for test and training
- Complete analysis associated with NATO Ensemble Test 7 and deliver results to NATO participants per NATO Communications and Information Agency agreement

FY 2020 Plans:

- Participate in flight and ground test events to support the BMDS Spiral 8.2-5 and Homeland Defense including LRDR, mid-term discrimination and RKV integration by testing the following capabilities: C2BMC generation of initial BMD System Track (discrimination results by enhanced C2BMC selection); GMD RKV integrated into BMDS; Long Range Discrimination Radar (LRDR) Integration into BMDS; Initial GMD use of LRDR data; Initial Active Sensor Bias Monitoring & Reporting; Retain Existing Sensor Data Interfaces and provide LRDR Data for Risk Reduction for GMD; Initial Hypersonic Tracking and Reporting; Initial Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) Integration into BMDS; and Cyber Security Enhancements Risk Management Functions
- In flight test events: Assess ability to satisfy Aegis remote engagement logic using space sensors and other C2BMC assets. Collect data for Post Intercept Assessment (PIA)/ Space-based Kill Assessment (SKA) algorithm development. Demonstrate Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) Forward Base Mode (FBM) ability to execute a cued acquisition tasked by C2BMC based on BMDS Overhead Persistent Infra-Red Architecture (BOA) tracks, and demonstrate C2BMC ability to construct system tracks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- In ground test events: Assess C2BMC incremental capability to perform PIA; assess Advanced Threat Processing (ATP) alternatives for C2BMC system track typing, correlation, and launch event association processes in the presence of advances threats. Demonstrate interoperability with Aegis and collect data to assess Aegis Engage-on-Remote (EoR) capability. Provide Aegis BL 9.C2 EoR and improved sensor processing with BOA 6.1; ensure message traffic is being sent and received between C2BMC and Aegis Ashore Poland and assess message accountability. Assess interoperability of C2BMC S8.2-5, hypersonic threats, AN/TPY-2 FBM CX 4.0, LRDR 1.0, GS 8, XBR 4.1, RKV 2.0, and Terminal High Altitude Area Defense (THAAD) 4.0; assess C2BMC planning, monitoring, and tasking capabilities effect on Homeland Defense performance; assess SKA and PIA algorithms - Continue LRDR node integration, testing, and training with new C2BMC Spiral 8.2-5 Homeland Defense baseline changes at the Missile Defense Integration and Operation Center (MDIOC) - Consolidate and synergize Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab efforts to plan, coordinate, and provide test operations for BMDS system flight tests and ground tests ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the transfer of the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab from PE 0603914C to PE 0603896C to consolidate lab efforts to synergize efforts and gain efficiencies.			
Accomplishments/Planned Programs Subtotals	60.607	54.100	64.624

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
• 0604672C: *Homeland Defense Radar-Hawaii*	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: *Pacific Discriminating Radar*	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC),

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Master Test Plan - BMDS Level Testing GOV	MIPR	Army/Air Force : Various	2.517	4.683	Oct 2017	3.651	Oct 2018	6.485	Oct 2019	-		6.485	Continuing	Continuing	Continuing
Integrated Master Test Plan - Consolidated Contractor Support	Various	MDA : Huntsville, AL; Colorado Springs, CO; NCR	0.000	0.000		0.000		0.336	Oct 2019	-		0.336	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure Support	MIPR	Various : VA; OH; AL; NM; CA	11.780	1.532	Oct 2017	2.178	Oct 2018	2.210	Oct 2019	-		2.210	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure/BOA Infrastructure-BMDS Level Testing	SS/CPAF	Northrop Grumman Corporation : Colorado Springs, CO	38.376	4.408	Oct 2017	2.480	Oct 2018	1.487	Mar 2020	-		1.487	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Master Test Plan - FFRDC	MIPR	Institute for Defense Analyses (IDA) : Alexandria, VA	0.000	0.000		0.000		0.700	Oct 2019	-		0.700	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS Level Testing	SS/IDIQ	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	96.736	25.888	Jul 2018	18.213	Jul 2019	21.692	Jul 2020	-		21.692	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing - Element/System Test Lab Facilities	C/CPAF	Northop Grumman Corporation : Colorado Springs, CO	0.000	6.186	Mar 2018	5.005	Mar 2019	12.945	Mar 2020	-		12.945	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing (Element/System Test Lab Facilities)	C/CPAF	Jacobs Technology, Inc : Huntsville, AL; Colorado Springs, CO	0.000	17.910	Mar 2018	22.573	Mar 2019	18.769	Mar 2020	-		18.769	0.000	59.252	0.000
Integrated Master Test Plan - Prior year IMTP no longer funded in the FYDP	Various	Various : Various	90.701	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	240.110	60.607		54.100		64.624		-		64.624	Continuing	Continuing	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	240.110	60.607		54.100		64.624		-		64.624	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(EX) AIR AND MISSILE DEFENSE EXERCISE 18	▲																											
(EX) EPOCH PLANEX 19	▲																											
(EX) GLOBAL LIGHTNING 18	✦	✦																										
Enterprise Sensor Lab Infrastructure Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Warfighter TP 07a (BMDS Ground Test)		✦																										
(EX) EUROPEAN TEST BED 18		▲																										
(EX) STEADFAST ALLIANCE 18		✦	✦																									
(EX) PACIFIC SENTRY 18		✦	✦	✦																								
JFTM-05 E1 (JAPAN, DT Intercept Flight Test)				▲																								
JFTM-05 E2 (JAPAN, DT Intercept Flight Test)				▲																								
PACIFIC DRAGON-18 (AEGIS 5.0, DT Tracking Exercise Flight Test)				▲																								
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 18				▲																								
(EX) AIR AND MISSILE DEFENSE EXERCISE 19				▲																								
(EX) ULCHI FREEDOM GUARDIAN 18				▲																								
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)					▲																							
FTI-03 (OTA, OT Intercept Flight Test)					△																							
Israeli Cooperative Intercept Flight Test - FY 2019					✧	✧	✧	✧																				
FTG-11 (OT) (GM, OT Intercept Flight Test)						△																						
GT-18 Sprint 3 (N/P) (BMDS Ground Test)						✧																						
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)							△																					
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)							△																					
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)							△																					
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)							△																					
GT-19 Sprint 1 (N/P) (BMDS Ground Test)							✧																					

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
GT-19 Sprint 2 (JEON) (BMDS Ground Test)							✧																					
GTD-07b (N/P) (BMDS Ground Test)							✧																					
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)								△																				
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)								△																				
FTT-23 (TH, DT Intercept Flight Test)								△																				
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)								△																				
Warfighter TP 07b (BMDS Ground Test)								✧																				
GTI-07c (N/P) (BMDS Ground Test)									✧																			
FTX-39 (LTPO, DT Target Only Flight Test)									△																			
(EX) EPOCH PLANEX 21									△																			
(EX) JUNIPER COBRA 20									✧	✧																		
(EX) GLOBAL LIGHTNING 20									✧	✧																		
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)										△																		
FTM-33 (AEGIS SBT, DT/OT Intercept Flight Test)										△																		
FTP-21 (LTPO, DT Intercept Flight Test)										△																		
FTP-27 E1 (LTPO, DT/OT Flight Test)										△																		
GT-20 Sprint (JEON) (BMDS Ground Test)										✧																		
GT-20 Sprint (BL 5.4) (BMDS Ground Test)										✧																		
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)										△																		
FTP-27 E2 (LTPO, DT/OT Flight Test)										△																		
(EX) EAGLE RESOLVE 20										△																		
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19										△																		
(EX) KEY RESOLVE 20										△																		
(EX) EUROPEAN TEST BED 20										△																		

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(EX) RESILIENT SHIELD 20									△																			
(EX) STEADFAST ALLIANCE 20									✧	✧																		
(EX) PACIFIC SENTRY 20									✧	✧	✧																	
(EX) Joint Live, Virtual, and Constructive 2019/20-2									✧	✧	✧	✧																
GTD-07b (AA) (BMDS Ground Test)										✧																		
(EX) GLOBAL RESPONSE EXERCISE 09										△																		
(WG) Demonstration, Table-top Exercises & Experiments 20										✧	✧	✧																
(WG) BMDS Wargames 21										✧	✧	✧	✧	✧														
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)											△																	
FTO-03 (OTA, OT Intercept Flight Test)											△																	
(EX) AIR AND MISSILE DEFENSE EXERCISE 21											△																	
(EX) ULCHI FREEDOM GUARDIAN 20											△																	
(EX) GLOBAL RESPONSE EXERCISE 10											△																	
GM BVT-03+ (GM, DT Interceptor Only Flight Test)											△																	
GTI-08 (N/P) (BMDS Ground Test)											✧	✧																
(WG) Multi-National Missile Defense Conference (MNC) 20											✧	✧																
(EX) VIGILANT SHIELD 21											✧	✧																
(EX) KEEN SWORD 21											✧	✧																
(EX) GLOBAL THUNDER 21											✧	✧																
(EX) EPOCH PLANEX 22												△																
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20												△																
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)												✧	✧															
(EX) GLOBAL LIGHTNING 21												✧	✧															
(EX) AUSTERE CHALLENGE 21												✧	✧	✧	✧													

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(WG) NIMBLE TITAN 22													✧	✧	✧	✧	✧	✧	✧	✧								
GTD-08 (N/P) (BMDS Ground Test)														✧														
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)														△														
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)														△														
FTT-21 (TH, DT Intercept Flight Test)														△														
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20														△														
(EX) KEY RESOLVE 21														△														
(EX) Joint Project Optic Windmill 2021														✧														
(EX) EUROPEAN TEST BED 21														△														
(EX) RESILIENT SHIELD 21														△														
(EX) STEADFAST ARMOUR 21														✧	✧													
(EX) PACIFIC SENTRY 21														✧	✧	✧												
Warfighter TP 08 (BMDS Ground Test)															✧													
GTI-ISR (21) (BMDS Ground Test)															✧													
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)															✧													
FTP-28 (LTPO, OT Intercept Flight Test)															△													
(WG) Huntsville Wargames 21															△													
(WG) Demonstration, Table-top Exercises & Experiments 21															✧	✧	✧											
(EX) Joint Live, Virtual, and Constructive 2021/22-1															✧	✧	✧											
FTP-25 (LTPO, OT Intercept Flight Test)																△												
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)																△												
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)																△												
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)																△												
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)																△												

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(WG) Space & Missile Defense Symposium 21																△												
(EX) AIR AND MISSILE DEFENSE EXERCISE 22																△												
(EX) ULCHI FREEDOM GUARDIAN 21																△												
(WG) Multi-National Missile Defense Conference (MNC) 21																✧	✧											
(EX) VIGILANT SHIELD 22																✧	✧											
(EX) KEEN EDGE 22																✧	✧	✧										
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21																	△											
(EX) EPOCH PLANEX 23																	△											
GTD-09 (E/C) (BMDS Ground Test)																	✧											
(EX) JUNIPER COBRA 22																	✧	✧										
(EX) GLOBAL LIGHTNING 22																	✧	✧										
GM CTV-03+ (GM, DT Interceptor Only Flight Test)																		△										
(EX) EAGLE RESOLVE 22																		△										
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21																		△										
(EX) KEY RESOLVE 22																		△										
(EX) EUROPEAN TEST BED 22																		△										
(EX) RESILIENT SHIELD 22																		△										
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)																		△										
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)																		✧										
(EX) STEADFAST ALLIANCE 22																		✧	✧									
(EX) PACIFIC SENTRY 22																		✧	✧	✧								
(EX) Joint Live, Virtual, and Constructive 2021/22-2																		✧	✧	✧	✧							
FTX-28 E1 (TH, DT Target Only Flight Test)																			△									
FTX-28 E2 (TH, DT Target Only Flight Test)																			△									

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		**Date:** March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FTX-28 E3 (TH, DT Target Only Flight Test)																		△										
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)																		✧										
(WG) Demonstration, Table-top Exercises & Experiments 22																		✧	✧	✧								
(WG) BMDS Wargames 23																		✧	✧	✧	✧	✧						
(EX) ULCHI FREEDOM GUARDIAN 22																			△									
(EX) AIR AND MISSILE DEFENSE EXERCISE 23																			△									
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																			△									
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)																			✧									
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)																			△									
(WG) Multi-National Missile Defense Conference (MNC) 22																			✧	✧								
(EX) VIGILANT SHIELD 23																			✧	✧								
(EX) KEEN SWORD 23																			✧	✧								
(EX) GLOBAL THUNDER 22																			✧	✧								
FTG-17 (GM, DT Intercept Flight Test)																				△								
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22																				△								
(EX) GLOBAL RESPONSE EXERCISE 11																				△								
(EX) GLOBAL RESPONSE EXERCISE 12																				△								
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)																				✧								
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)																				△								
(EX) GLOBAL LIGHTNING 23																				✧	✧							
(EX) AUSTERE CHALLENGE 23																				✧	✧	✧	✧					
(WG) NIMBLE TITAN 24																				✧	✧	✧	✧	✧	✧	✧	✧	
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22																					△							
(EX) Joint Project Optic Windmill 2023																					✧							

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(EX) EUROPEAN TEST BED 23																					△							
(EX) KEY RESOLVE 23																					△							
(EX) RESILIENT SHIELD 23																					△							
GTD-10 (E/C) (BMDS Ground Test)																					✧							
(EX) STEADFAST ARMOUR 23																					✧	✧						
(EX) PACIFIC SENTRY 23																					✧	✧	✧					
(EX) PACIFIC SENTRY 24																					✧	✧	✧					
(WG) Huntsville Wargames 23																						△						
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)																						✧						
GTI-ISR (23) (BMDS Ground Test)																						✧						
FTT-24 (TH, DT Intercept Flight Test)																						△						
(EX) Joint Live, Virtual, and Constructive 2023/24-1																						✧	✧	✧				
(WG) Demonstration, Table-top Exercises & Experiments 23																						✧	✧	✧				
(WG) Space & Missile Defense Symposium 23																							△					
(EX) ULCHI FREEDOM GUARDIAN 23																							△					
(EX) AIR AND MISSILE DEFENSE EXERCISE 24																							△					
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)																							△					
FS-23 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)																							△					
FS-23 E2 (AEGIS 5.1, DT Target Only Flight Test)																							△					
FS-23 E3 (AEGIS 5.1, DT Target Only Flight Test)																							△					
FS-23 E4 (AEGIS 5.1, DT Intercept Flight Test)																							△					
(WG) Multi-National Missile Defense Conference (MNC) 23																							✧	✧				
(EX) GLOBAL THUNDER 23																							✧	✧				
(EX) VIGILANT SHIELD 24																							✧	✧				

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
GTD-11 (N/P) (BMDS Ground Test)																								✧	✧			
(EX) KEEN EDGE 24																								✧	✧	✧		
Warfighter TP 11 (BMDS Ground Test)																								✧	✧	✧	✧	
Warfighter TP 13 (BMDS Ground Test)																								✧	✧	✧	✧	✧
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23																									△			
FTG-18 (GM, DT/OT Intercept Flight Test)																									△			
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)																									△			
(EX) JUNIPER COBRA 24																									✧	✧		
(EX) GLOBAL LIGHTNING 24																									✧	✧		
(EX) EAGLE RESOLVE 24																										△		
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23																										△		
(EX) EUROPEAN TEST BED 24																										△		
(EX) KEY RESOLVE 24																										△		
(EX) RESILIENT SHIELD 24																										△		
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)																										✧		
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)																										△		
(EX) STEADFAST ALLIANCE 24																										✧	✧	
(EX) Joint Live, Virtual, and Constructive 2023/24-2																										✧	✧	✧
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)																											✧	
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)																											△	
(WG) Demonstration, Table-top Exercises & Experiments 24																											✧	✧
(WG) BMDS Wargames 25																											✧	✧
(EX) ULCHI FREEDOM GUARDIAN 24																												△
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)																												✧

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
(EX) GLOBAL THUNDER 24							✧
(WG) Multi-National Missile Defense Conference (MNC) 24							✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) AIR AND MISSILE DEFENSE EXERCISE 18	1	2018	1	2018
(EX) EPOCH PLANEX 19	1	2018	1	2018
(EX) GLOBAL LIGHTNING 18	1	2018	2	2018
Enterprise Sensor Lab Infrastructure Support	1	2018	4	2024
Warfighter TP 07a (BMDS Ground Test)	2	2018	2	2018
(EX) EUROPEAN TEST BED 18	2	2018	2	2018
(EX) STEADFAST ALLIANCE 18	2	2018	3	2018
(EX) PACIFIC SENTRY 18	2	2018	4	2018
JFTM-05 E1 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
JFTM-05 E2 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
PACIFIC DRAGON-18 (AEGIS 5.0, DT Tracking Exercise Flight Test)	4	2018	4	2018
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 18	4	2018	4	2018
(EX) AIR AND MISSILE DEFENSE EXERCISE 19	4	2018	4	2018
(EX) ULCHI FREEDOM GUARDIAN 18	4	2018	4	2018
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	1	2019	1	2019
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
Israeli Cooperative Intercept Flight Test - FY 2019	1	2019	4	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
GT-18 Sprint 3 (N/P) (BMDS Ground Test)	2	2019	2	2019
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	3	2019	3	2019
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)	3	2019	3	2019
GT-19 Sprint 1 (N/P) (BMDS Ground Test)	3	2019	3	2019
GT-19 Sprint 2 (JEON) (BMDS Ground Test)	3	2019	3	2019
GTD-07b (N/P) (BMDS Ground Test)	3	2019	3	2019
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)	4	2019	4	2019
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)	4	2019	4	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	4	2019	4	2019
Warfighter TP 07b (BMDS Ground Test)	4	2019	4	2019
GTI-07c (N/P) (BMDS Ground Test)	1	2020	1	2020
FTX-39 (LTPO, DT Target Only Flight Test)	1	2020	1	2020
(EX) EPOCH PLANEX 21	1	2020	1	2020
(EX) JUNIPER COBRA 20	1	2020	2	2020
(EX) GLOBAL LIGHTNING 20	1	2020	2	2020
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)	2	2020	2	2020
FTM-33 (AEGIS SBT, DT/OT Intercept Flight Test)	2	2020	2	2020
FTP-21 (LTPO, DT Intercept Flight Test)	2	2020	2	2020
FTP-27 E1 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GT-20 Sprint (JEON) (BMDS Ground Test)	2	2020	2	2020
GT-20 Sprint (BL 5.4) (BMDS Ground Test)	2	2020	2	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
FTP-27 E2 (LTPO, DT/OT Flight Test)	2	2020	2	2020
(EX) EAGLE RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19	2	2020	2	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) KEY RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN TEST BED 20	2	2020	2	2020
(EX) RESILIENT SHIELD 20	2	2020	2	2020
(EX) STEADFAST ALLIANCE 20	2	2020	3	2020
(EX) PACIFIC SENTRY 20	2	2020	4	2020
(EX) Joint Live, Virtual, and Constructive 2019/20-2	2	2020	1	2021
GTD-07b (AA) (BMDS Ground Test)	3	2020	3	2020
(EX) GLOBAL RESPONSE EXERCISE 09	3	2020	3	2020
(WG) Demonstration, Table-top Exercises & Experiments 20	3	2020	1	2021
(WG) BMDS Wargames 21	3	2020	3	2021
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
(EX) AIR AND MISSILE DEFENSE EXERCISE 21	4	2020	4	2020
(EX) ULCHI FREEDOM GUARDIAN 20	4	2020	4	2020
(EX) GLOBAL RESPONSE EXERCISE 10	4	2020	4	2020
GM BVT-03+ (GM, DT Interceptor Only Flight Test)	4	2020	4	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
(WG) Multi-National Missile Defense Conference (MNC) 20	4	2020	1	2021
(EX) VIGILANT SHIELD 21	4	2020	1	2021
(EX) KEEN SWORD 21	4	2020	1	2021
(EX) GLOBAL THUNDER 21	4	2020	1	2021
(EX) EPOCH PLANEX 22	1	2021	1	2021
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20	1	2021	1	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	1	2021	2	2021
(EX) GLOBAL LIGHTNING 21	1	2021	2	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) AUSTERE CHALLENGE 21	1	2021	4	2021
(WG) NIMBLE TITAN 22	1	2021	4	2022
GTD-08 (N/P) (BMDS Ground Test)	2	2021	2	2021
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20	2	2021	2	2021
(EX) KEY RESOLVE 21	2	2021	2	2021
(EX) Joint Project Optic Windmill 2021	2	2021	2	2021
(EX) EUROPEAN TEST BED 21	2	2021	2	2021
(EX) RESILIENT SHIELD 21	2	2021	2	2021
(EX) STEADFAST ARMOUR 21	2	2021	3	2021
(EX) PACIFIC SENTRY 21	2	2021	4	2021
Warfighter TP 08 (BMDS Ground Test)	3	2021	3	2021
GTI-ISR (21) (BMDS Ground Test)	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
FTP-28 (LTPO, OT Intercept Flight Test)	3	2021	3	2021
(WG) Huntsville Wargames 21	3	2021	3	2021
(WG) Demonstration, Table-top Exercises & Experiments 21	3	2021	1	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-1	3	2021	1	2022
FTP-25 (LTPO, OT Intercept Flight Test)	4	2021	4	2021
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	4	2021	4	2021
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)	4	2021	4	2021
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)	4	2021	4	2021
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)	4	2021	4	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(WG) Space & Missile Defense Symposium 21	4	2021	4	2021
(EX) AIR AND MISSILE DEFENSE EXERCISE 22	4	2021	4	2021
(EX) ULCHI FREEDOM GUARDIAN 21	4	2021	4	2021
(WG) Multi-National Missile Defense Conference (MNC) 21	4	2021	1	2022
(EX) VIGILANT SHIELD 22	4	2021	1	2022
(EX) KEEN EDGE 22	4	2021	2	2022
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21	1	2022	1	2022
(EX) EPOCH PLANEX 23	1	2022	1	2022
GTD-09 (E/C) (BMDS Ground Test)	1	2022	1	2022
(EX) JUNIPER COBRA 22	1	2022	2	2022
(EX) GLOBAL LIGHTNING 22	1	2022	2	2022
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
(EX) EAGLE RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21	2	2022	2	2022
(EX) KEY RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN TEST BED 22	2	2022	2	2022
(EX) RESILIENT SHIELD 22	2	2022	2	2022
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)	2	2022	2	2022
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2022	2	2022
(EX) STEADFAST ALLIANCE 22	2	2022	3	2022
(EX) PACIFIC SENTRY 22	2	2022	4	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-2	2	2022	1	2023
FTX-28 E1 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E2 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E3 (TH, DT Target Only Flight Test)	3	2022	3	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)	3	2022	3	2022
(WG) Demonstration, Table-top Exercises & Experiments 22	3	2022	1	2023
(WG) BMDS Wargames 23	3	2022	3	2023
(EX) ULCHI FREEDOM GUARDIAN 22	4	2022	4	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 23	4	2022	4	2022
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	4	2022	4	2022
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	4	2022	4	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022
(WG) Multi-National Missile Defense Conference (MNC) 22	4	2022	1	2023
(EX) VIGILANT SHIELD 23	4	2022	1	2023
(EX) KEEN SWORD 23	4	2022	1	2023
(EX) GLOBAL THUNDER 22	4	2022	1	2023
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 11	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 12	1	2023	1	2023
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)	1	2023	1	2023
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)	1	2023	1	2023
(EX) GLOBAL LIGHTNING 23	1	2023	2	2023
(EX) AUSTERE CHALLENGE 23	1	2023	4	2023
(WG) NIMBLE TITAN 24	1	2023	4	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22	2	2023	2	2023
(EX) Joint Project Optic Windmill 2023	2	2023	2	2023
(EX) EUROPEAN TEST BED 23	2	2023	2	2023
(EX) KEY RESOLVE 23	2	2023	2	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) RESILIENT SHIELD 23	2	2023	2	2023
GTD-10 (E/C) (BMDS Ground Test)	2	2023	2	2023
(EX) STEADFAST ARMOUR 23	2	2023	3	2023
(EX) PACIFIC SENTRY 23	2	2023	4	2023
(EX) PACIFIC SENTRY 24	2	2023	4	2023
(WG) Huntsville Wargames 23	3	2023	3	2023
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)	3	2023	3	2023
GTI-ISR (23) (BMDS Ground Test)	3	2023	3	2023
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
(EX) Joint Live, Virtual, and Constructive 2023/24-1	3	2023	1	2024
(WG) Demonstration, Table-top Exercises & Experiments 23	3	2023	1	2024
(WG) Space & Missile Defense Symposium 23	4	2023	4	2023
(EX) ULCHI FREEDOM GUARDIAN 23	4	2023	4	2023
(EX) AIR AND MISSILE DEFENSE EXERCISE 24	4	2023	4	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
FS-23 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	4	2023	4	2023
FS-23 E2 (AEGIS 5.1, DT Target Only Flight Test)	4	2023	4	2023
FS-23 E3 (AEGIS 5.1, DT Target Only Flight Test)	4	2023	4	2023
FS-23 E4 (AEGIS 5.1, DT Intercept Flight Test)	4	2023	4	2023
(WG) Multi-National Missile Defense Conference (MNC) 23	4	2023	1	2024
(EX) GLOBAL THUNDER 23	4	2023	1	2024
(EX) VIGILANT SHIELD 24	4	2023	1	2024
GTD-11 (N/P) (BMDS Ground Test)	4	2023	1	2024
(EX) KEEN EDGE 24	4	2023	2	2024
Warfighter TP 11 (BMDS Ground Test)	4	2023	3	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Warfighter TP 13 (BMDS Ground Test)	4	2023	4	2025
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23	1	2024	1	2024
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)	1	2024	1	2024
(EX) JUNIPER COBRA 24	1	2024	2	2024
(EX) GLOBAL LIGHTNING 24	1	2024	2	2024
(EX) EAGLE RESOLVE 24	2	2024	2	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23	2	2024	2	2024
(EX) EUROPEAN TEST BED 24	2	2024	2	2024
(EX) KEY RESOLVE 24	2	2024	2	2024
(EX) RESILIENT SHIELD 24	2	2024	2	2024
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	2	2024	2	2024
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)	2	2024	2	2024
(EX) STEADFAST ALLIANCE 24	2	2024	3	2024
(EX) Joint Live, Virtual, and Constructive 2023/24-2	2	2024	1	2025
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)	3	2024	3	2024
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)	3	2024	3	2024
(WG) Demonstration, Table-top Exercises & Experiments 24	3	2024	1	2025
(WG) BMDS Wargames 25	3	2024	3	2025
(EX) ULCHI FREEDOM GUARDIAN 24	4	2024	4	2024
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	4	2024	4	2024
(EX) GLOBAL THUNDER 24	4	2024	1	2025
(WG) Multi-National Missile Defense Conference (MNC) 24	4	2024	1	2025

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Note

FY 2020 USFK JEON tests are funded in PE 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MX01: *Command & Control, Battle Management, Communications (C2BMC) Development Support*	508.427	106.449	112.910	114.876	-	114.876	123.815	123.051	125.377	133.555	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

C2BMC Development Support provides operations engineering, integrated logistics, warfighter integration, deployment, and disposal of the current operational system and/or systems fielded in STRATCOM, NORTHCOM, INDOPACOM, EUCOM, and CENTCOM and the operation of the C2BMC Control Center. This activity provides continuous support of the development, deployment, sustainment of the C2BMC training systems, and updates training material to stay current with fielded capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Operations Engineering	91.023	95.455	92.212
Articles:	-	-	-
Description: This activity funds C2BMC support of current operational, test, and training systems. Recurring efforts include: - On-site maintenance, help-desk support, and developer reach-back support to ensure operational availability - C2BMC Command Center (CCC) 24 hours a day, 365 days a year operations providing system and network monitoring, system administration, and network defense against cyber-attacks - Integrated logistics support by providing a secure supply chain; reliability, availability, and maintainability (RAM) engineering; obsolescence engineering; and sparing to ensure operational availability - Cybersecurity engineering providing C2BMC Commercial-off-the-shelf (COTS) software/hardware updates and CCC upgrades that address system vulnerabilities, field quarterly updates to reduce system component vulnerability to cyber-attacks - Information System Security Officers (ISSOs) ensuring C2BMC compliance with latest cybersecurity requirements and policies - System modifications driven by Warfighter Involvement Process (WIP), Continuous Improvement Process (CIP), RAM and obsolescence engineering, and external systems such as Space-Based Infrared Sensors (SBIRS), Ground-based Midcourse Defense (GMD) Fire Control (GFC), Aegis, Terminal High Altitude Area Defense (THAAD), Navy Link Monitoring and Management Tool (LMMT), AN/TPY-2, standard Army communications, Defense Information Systems Agency (DISA) fiber networks, and Allied/Coalition interfaces			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Combatant command (CCMD) integration providing C2BMC training, on-site Subject Matter Experts (SMEs), and surge SME support for real-world events, flight tests, ground tests, exercises, cyber assessments, and wargames - Facility modifications required to house current or future C2BMC equipment and transportation for moving C2BMC equipment - Integrated product support for tactical satellite communications (SATCOM) used in flight tests, hardened SATCOM, and associated shelters - Provide transportation for flight test equipment and SME support and analysis for numerous test, exercise, and real world events - Provide recurring proficiency training to CCMDs and keep training material and systems consistent with operational capabilities Specific and/or unique accomplishments for each FY are as follow: ***FY 2019 Plans:*** - Complete decommission of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM, and INDOPACOM - Maintain MRBM Defense/EPAA Phase 1 and 2 in EUCOM/CENTCOM and Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/INDOPACOM - Initiate decommissioning activities for MRBM Defense/EPAA Phase 1 and 2 in EUCOM/CENTCOM - Initiate sustainment of EPAA Phase 3/EOR (Spiral 8.2-3) deployed to EUCOM, CENTCOM, NORTHCOM, and INDOPACOM ***FY 2020 Plans:*** - Continue sustainment of fielded EPAA Phase 3/EOR (Spiral 8.2-3) deployed to EUCOM, CENTCOM, NORTHCOM, and INDOPACOM - Complete decommissioning activities for Medium Range Ballistic Missile (MRBM) Defense/European Phased Adaptive Approach (EPAA) Phase 1 and 2 in EUCOM and CENTCOM - Initiate deployment activities for Long Range Discrimination Radar (LRDR) for Homeland Defense (Spiral 8.2-5) ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Concurrent Test, Training, and Operations (CTTO)	15.426	17.455	22.664
Articles:	-	-	-
Description: This element provides the development and sustainment of all C2BMC Training Support System (TSS), EPAA Phase 3/EOR (Spiral 8.2-3), LRDR for Homeland Defense (Spiral 8.2-5) and Distributed Training System (DTS) for INDOPACOM, NORTHCOM, EUCOM, and CENTCOM. C2BMC connects all BMDS Elements through virtual and physical networks to facilitate integrated test, training, and operations within two coexistent realms - Operations and Certification. This enables the warfighter to become proficient on current and future software versions at the operational console; increases the developer's capacity to			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
perform a variety of tests and upgrades on the operational BMDS; and decreases recall-to-mission operations times from weeks and days to hours and minutes. Recurring accomplishments include sustaining current training systems for BMDS training events for the Unified Combatant Command developing the next generation training systems, to include the integration of Red Force / Blue Force capability, to keep current with the operational system capabilities. Specific and/or unique accomplishments for each FY are as follows: ***FY 2019 Plans:*** - Initiate development on BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS ***FY 2020 Plans:*** - Continue development and verification testing on BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS - Initiate deployment of BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS - Initiate development on BMDS Homeland Defense Radar - Hawaii (HDR-H) TSS and DTS ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase in funding from FY 2019 to FY 2020 provides TSS and DTS training system enhancements/new modeling capability for the Homeland Defense Radar - Hawaii (HDR-H) and incorporating core C2BMC algorithm changes and new defense designs elements.			
Accomplishments/Planned Programs Subtotals	106.449	112.910	114.876

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
• 0604672C: *Homeland Defense Radar-Hawaii*	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: *Pacific Discriminating Radar*	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC),

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operations Engineering - Operations Engineering - Contract Support Services (CSS)	MIPR	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	0.000	0.771	Oct 2017	0.795	Oct 2018	0.813	Oct 2019	-		0.813	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Indirect Support	MIPR	DISA DECC/DISA TECC : Various	43.063	3.865	Oct 2017	2.306	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Sustaining Support	C/CPAF	Jacobs Technology : Huntsville, AL; Colorado Springs, CO	0.000	1.003	Mar 2018	1.759	Mar 2019	1.794	Mar 2020	-		1.794	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Training Support	C/FPIF	Boeing : Huntsville, AL	0.000	0.280	Oct 2017	0.750	Oct 2018	1.149	Oct 2019	-		1.149	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Unit Personnel, Control System Improvement Sustaining Support	MIPR	Army, Navy, Air Force : Various	0.912	6.554	Oct 2017	10.780	Oct 2018	9.162	Oct 2019	-		9.162	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering Training Support	SS/CPAF	Northrop Grumman : Huntsville, AL	1.747	0.593	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Operations Engineering - Prior year Operations Engineering no longer funded in the FYDP	Various	Various : Various	7.505	0.000		0.000		0.000		-		0.000	0.000	7.505	7.505
Operations Engineering - Unit Personnel, Control System Improvement, Sustaining Support	SS/CPFF	Lockheed Martin Team : Huntsville, AL	349.219	77.957	Dec 2017	79.065	Dec 2018	79.294	Dec 2019	-		79.294	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - CTTO/Training Enhancements	MIPR	Aviation and Missile Research Development and	8.238	3.979	Dec 2017	4.295	Dec 2018	6.904	Dec 2019	-		6.904	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Engineering Center : Huntsville, AL													
Concurrent Test, Training, and Operations (CTTO) - Prior year CTTO no longer funded in the FYDP	Various	Various : Various	8.443	0.000		0.000		0.000		-		0.000	0.000	8.443	4.610
Concurrent Test, Training, and Operations (CTTO) - Training Enhancements	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	89.300	11.447	Dec 2017	13.160	Dec 2018	15.760	Dec 2019	-		15.760	Continuing	Continuing	Continuing
		Subtotal	508.427	106.449		112.910		114.876		-		114.876	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	Project (Number/Name) MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	508.427	106.449		112.910		114.876		-		114.876	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	106.194	18.051	21.118	23.682	-	23.682	24.674	22.496	25.501	26.156	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	18.051	21.118	23.682
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	18.051	21.118	23.682

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	3.665	1.931	Jul 2018	0.323	Jul 2019	0.358	Jul 2020	-		0.358	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AK/ AL/CA/CO/HI/MD/ VA/NJ/NY/OCONUS	3.111	0.000		0.000		0.000		-		0.000	0.015	3.126	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, HI, VA	3.966	0.000		3.786	Jan 2019	7.264	Oct 2019	-		7.264	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	22.388	0.000		0.000		0.661	Nov 2019	-		0.661	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	47.864	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services Civilian Salaries, Travel, Training	Allot	Various : Multi: AL, CA, CO, VA	24.139	16.120	Nov 2017	17.009	Oct 2018	15.061	Nov 2019	-		15.061	2.800	75.129	0.000
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, VA etc.	0.000	0.000		0.000		0.037	Oct 2019	-		0.037	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	JHU/APL : AL, VA	0.000	0.000		0.000		0.301	Sep 2020	-		0.301	Continuing	Continuing	Continuing
Program Wide Support - Facilities Maintenance SRM	MIPR	Various : Multi: AK, CA, CO, AL, MD, NJ, VA	1.061	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	106.194	18.051		21.118		23.682		-		23.682	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	Project (Number/Name) MD40 / *Program-Wide Support*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	106.194	18.051		21.118		23.682		-		23.682	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603898C *I Ballistic Missile Defense Joint Warfighter Support*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	167.121	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
MD03: *Joint Warfighter Support*	91.269	13.720	15.279	16.904	-	16.904	15.937	17.683	16.577	16.905	Continuing	Continuing
MT03: *Joint Warfighter Support Test*	62.623	32.538	31.142	32.278	-	32.278	32.902	33.578	34.212	34.891	Continuing	Continuing
MC03: *Cyber Operations*	-	0.146	0.154	0.156	-	0.156	0.159	0.161	0.164	0.167	0.000	1.107
MD40: *Program-Wide Support*	13.229	2.170	2.192	2.194	-	2.194	2.413	2.510	2.647	2.683	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

N/A

A. Mission Description and Budget Item Justification

The Joint Warfighter Support Program (JWSP) is Missile Defense Agency's primary means for providing direct technical support to Combatant Commands (CCMDs), the Military Services and the Joint Staff on Ballistic Missile Defense System (BMDS) development, testing, and operational support, to include real world testing and validation of the warfighter's operational Integrated Broadcast Service (IBS). It enables delivery of BMDS capabilities to Warfighters and ensures their participation in identification and development of new Ballistic Missile Defense (BMD) capabilities via the Warfighter Involvement Process (WIP). The JWSP allows the Warfighter and Missile Defense Agency to work together to identify gaps, seams, and needs in warfighting capability and enhance BMDS attributes by submitting modification and fielding requests. It also provides 24 hours a day, 7 days a week, 365 days a year BMD operational support to Warfighters worldwide. The program enables rapid response to Warfighter Requests for Information (RFIs) and Requests for Analyses (RFAs), which are especially critical to mission success in protecting U.S. forces and other defended assets during "Real World" threat events. The program supports improving products delivered to Warfighters through technical reviews and technical analyses supporting strategic and regional BMD planning, development of shot doctrine and BMD defense design. The JWSP also enables the inclusion of both CCMD and MDA BMD objectives in CCMD/Joint Staff-sponsored wargames and exercises, which are used to sharpen and enhance joint BMD warfighting skills.

MD40 Program-Wide Support (PWS) consists of essential non-headquarters management efforts providing integrated and efficient support to MDA functions and activities across the entire BMDS.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603898C *I Ballistic Missile Defense Joint Warfighter Support*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	48.954	48.767	53.418	-	53.418
Current President's Budget	48.574	48.767	51.532	-	51.532
Total Adjustments	-0.380	0.000	-1.886	-	-1.886
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.380	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-1.886	-	-1.886

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	Project (Number/Name) MD03 / *Joint Warfighter Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD03: *Joint Warfighter Support*	91.269	13.720	15.279	16.904	-	16.904	15.937	17.683	16.577	16.905	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

There are six primary functions in Joint Warfighter Support (MD03):

(1) Current Operations Support
(2) Combatant Command Support
(3) Military Department Engagement
(4) Operational BMDS Verification and Validation
(5) Warfighter Training Support
(6) Joint Staff Engagement

Detailed descriptions and accomplishments are provided in the following section

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Strategic Warfighter Integration	13.720	15.279	16.904
Articles:	-	-	-
Description: (1) Current Operations Support: - Manage and operate MDA Operations Support Center (OSC) 24 hours a day, 7 days a week, 365 days a year and two MDA Operations Centers (MOCs) in Virginia and Alabama for daily execution of scheduled BMDS activities; prepare and transmit Logistic Reports. - Manage and execute BMDS Asset Management (BAM) process of planning, coordinating, scheduling and executing access to operational and RDT&E assets operated by MDA and Warfighters dispersed globally with differing missions and competing priorities to facilitate assets in support of Warfighter BMD; Missile Warning/Space Surveillance (MS/SS) operations; MDA RDT&E, training and sustainment activities. - Lead MDA Operations Support Planning Team (OSPT), an MDA-wide task force supporting Warfighters, Services and the Joint Staff to address real-world contingencies and crisis events. - Develop BMDS Annual Plan and BMDS Operating Schedule facilitating key stakeholder coordination and maximizing operational			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
availability of the BMDS; Develop and maintains the Integrated Scheduling Tool. - Facilitates major software/hardware additions to the Operational Capacity Baseline for homeland/regional defenses. - Develops and maintains the BORRS application to collect and report BMDS operational availability and readiness data through the network-based tool to distribute data to OSD, CCMDs, Joint Staff, Military Services, and BMDS Operators. - Provides certification training to BMDS watch officers (BWO), BMDS Safety Officers (BSO), and other Operations Support Center staff. (2) Combatant Command Support (USSTRATCOM, USNORTHCOM): - Supports the Warfighter Involvement Process (WIP) and other MDA Warfighter engagement efforts by assisting Warfighters in their update to the annual BMDS Prioritized Capabilities List (PCL) and Modification and Fielding Request List (MFRL). - Support Joint Functional Component Command Integrated Missile Defense (JFCC IMD) integration by participating in the Warfighter. Forum (WFF); a multi-lateral information and decision event to address CCMD, Service and DoD BMDS equities - Assist USNORTHCOM in broadening homeland defense planning to address the full range of USNORTHCOM threats by conducting the Homeland Defense Architecture Working Group (HDAWG) and Shot Management Analysis Cell (SMAC). (3) Military Department Engagement: - Facilitate and coordinates Service Boards of Directors (BODs) on Lead Service BMDS related equities, POM development and execution; and element fielding, operations and maintenance. - Maintain daily, strategic-level interfaces with Military Services and Joint Staff; plan for the delivery, fielding, and operation of respective Lead Service BMDS capabilities via senior-level working groups, General Officer Air and Missile Defense and Space forums. - Support and provides the BMDS capability delivery process; and transition and transfer to the Military Services through participation in senior-level working groups, Joint staff directorates, and facilitates General Officer forums. (4) Operational BMDS Verification and Validation - Provides 24 hours a day, 7 days a week, 365 days a year, global system verification and validation over the operational Integrated Broadcast Service, Common Integrated Broadcast, and Shared Early Warning System for BMD early warning data. - Support Tactical Data Processor software development, MDA flight tests and other software development efforts using live real-world			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
broadcasts of simulated missile threats. - Support Naval Board of Inspection and Survey (INSURV), Shipboard installation, Aegis On-Demand, Aegis program releases, US and Coalition operational readiness and BMD Exercise requirements to validate equipment, materiel, and tactical readiness while simultaneously providing deployment certification and crew operator qualification; verifies operational readiness of both US and Coalition partners to detect a real-world launch of a ballistic threat. (5) Warfighter Training Support: - Provide Missile Defense Space Warning tool (MDST) support to increase operator proficiency, competence, and confidence; provide initial qualification training; and ship certification for Aegis BMD crews. - Provide technical and programmatic updates for BMD Warfighter training; participates in BMD training and Education Working Group to coordinate BMD training issues with USSTRATCOM and Joint Staff - Supports Fleet Synthetic and Aegis Operator Training to ensure operational readiness of Aegis as the first step in the kill chain for BMD. - Provides Early Warning missile injects for MT03 war games and exercises and tailored support for other Joint Warfighter Support Test events (as listed in the IMTP and R-4/4A schedule. (6) Joint Staff Engagement - Facilitates and coordinates all Joint Staff interactions with the MDA. - Maintains daily, strategic-level interfaces with the Joint Staff. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides the cyclical technical refresh of the Operations Support Center.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
This is not content growth or reduction to the overall program content.			
Accomplishments/Planned Programs Subtotals	13.720	15.279	16.904

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Integrated Research and Development for Enterprise Solutions Contract and the Specialized Warfighter Development Contract are the major performing integrated contracts. The acquisition strategy for Strategic Warfighter Integration mission execution is to employ a contract to perform designated integration and sustainment tasks to conduct BMDS Research, Development, Test and Evaluation (RDT&E). Strategic Warfighter Integration is operated by missile defense subject matter experts composed of Government, military, civilian personnel, Contract Support Services, and major defense contractors.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Strategic Warfighter Integration - Strategic Warfighter Integration - HR A&AS	C/CPFF	MiDAESS : Colorado Springs	0.422	0.129	Aug 2018	0.125	Dec 2018	0.145	Dec 2019	-		0.145	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Administrative A&AS	C/CPFF	MiDAESS : Colorado Springs	1.262	0.260	May 2018	0.190	Nov 2018	0.260	Nov 2019	-		0.260	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Civilian Salaries/ Operations Sustainment	Allot	MDA : Colorado Springs/Huntsville, NCR	30.739	3.801	Oct 2017	4.158	Oct 2018	4.231	Oct 2019	-		4.231	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Current Operations	C/CPAF	JRDC : Colorado Springs	17.769	2.924	Nov 2017	2.470	Nov 2018	3.165	Nov 2019	-		3.165	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - IT Wireless Services (JRDC/ IRES)	C/CPAF	JRDC/IRES : Colorado Springs, Huntsville	3.265	0.530	Nov 2017	0.530	Dec 2018	0.546	Dec 2019	-		0.546	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic	C/CPAF	JRDC : Colorado Springs	17.113	2.475	Nov 2017	3.450	Oct 2018	3.719	Nov 2019	-		3.719	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Warfighter Integration - MDST															
Strategic Warfighter Integration - Strategic Warfighter Integration - Travel and Training	Allot	MDA : Colorado Springs, Huntsville, NCR	1.132	0.234	Oct 2017	0.231	Oct 2018	0.238	Oct 2019	-		0.238	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Warfighter Support A&AS	C/CPFF	MiDAESS : Colorado Springs, Huntsville, NCR	19.567	3.367	Jun 2018	4.125	Nov 2018	4.600	Nov 2019	-		4.600	Continuing	Continuing	Continuing
		Subtotal	91.269	13.720		15.279		16.904		-		16.904	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	Project (Number/Name) MD03 / *Joint Warfighter Support*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	91.269	13.720		15.279		16.904		-		16.904	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Strategic Integration Wargame Events in support of MT03	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Strategic Integration Wargame Events in support of MT03	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	Project (Number/Name) MT03 / *Joint Warfighter Support Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT03: *Joint Warfighter Support Test*	62.623	32.538	31.142	32.278	-	32.278	32.902	33.578	34.212	34.891	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Joint Warfighter Support Test is comprised of two primary responsibilities: Wargames and Exercises (WGEx) and warfighter operational support.

Wargames and exercises:
-Support the Warfighter to plan and conduct worldwide WGEx supporting BMDS development and fielding.
-Enable the Warfighter to define, test, deploy, and employ new missile defense capabilities.
-Support JFCC-IMD BMDS Table Top Exercises (TTX) to facilitate the global missile defense capability and to refine the European capability concept of operations through low-fidelity demonstration Models & Simulation (M&S).
-Examine current and future BMDS operational capabilities for Geographic (i.e., USCENTCOM, USEUCOM, and USPACOM) and Strategic (i.e., USNORTHCOM and USSTRATCOM) Combatant Commands (CCMDs).
-Complete test planning for BMDS events.

Warfighter operational support (program planning and operations):
-Prepare MDA senior leadership for engagements with the Geographic Combatant Commands (GCCs) by providing logistical support and developing briefings for the GCC Assistant Test Directors (ATDs) and MDA Director.
-Interface with the GCCs on BMD operational issues by providing planning and analysis support and capturing/transmitting warfighter responses in the MDA RFI/RFA database.
-Support GCC contingency activation planning for real-world contingencies and theater security cooperation programs by supervising the activation of MDA assets to use in the operational BMDS.
-Aid GCC participation in BMDS capability definition, design, development, integration, and delivery processes through the Warfighter Involvement Process (WIP) to synchronize capability delivery with operational readiness and acceptance.
-Provide resource management and administration of MT03 personnel and funding.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Wargames and Exercises	26.942	25.893	27.027
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: The Missile Defense Agency will continue to focus on providing operational-level interfaces to the Global Combatant Commands (GCCs) and increasing Warfighter participation to develop future missile defense capabilities. The MDA will continue to enhance Warfighter operational support through internal support activities and proactive execution of Combatant Command (CCMD) interface activities. - Work with CCMDs on the inclusion of Allies and regional partners into MDA Ground and Flight tests and WGEx simulations. - Provide warfighter training simulations in direct support of flight and ground tests. - Serve as liaison between internal MDA organizations and the Joint Functional Component Commander for Integrated Missile Defense (JFCC-IMD) across all functional areas to facilitate Geographic Combatant Command (GCC) participation in the BMDS capability definition, design, development, integration and delivery processes. - Support JFCC IMD and EUCOM in the European Phased Adaptive Approach (EPAA) implementation process through the planning, testing, integration and execution of BMDS wargames and exercises. - Support Joint Staff integration of MDA models into Tier I events through the JOINT, LIVE VIRTUAL CONSTRUCTIVE (JLVC) campaign. - Work with Program Offices and the Warfighter; publish a Concept of Operations that will support future MDA Models and Simulation (M&S) support to BMD wargames and exercises. - Coordinate and integrate CCMD requirements into the BMDS Integrated Master Test Plan. - Support the GCC Assistants to the Director (ATDs) and Liaison Officers (LNOs). - Provide support to the development and update of Ballistic Missile Defense (BMD) portions of CCMD Operation Plans (OPLANS) and Contingency Plans (CONPLANS). - Engage in MDA/GCC interface and synchronization of information regarding capabilities and security cooperation strategies. - Develop and provide Wargames, Exercises and Table Top Exercises (TTX) in support of CCMD-specific scenarios as listed in the R4-4A schedule for the EUCOM, PACOM, CENTCOM and NORTHCOM/STRATCOM Geographic Combatant Commands. Additional GCC interface activities by region will include: USEUCOM Engagement: - Coordinate with USEUCOM for continued MDA support of key European Phased Adaptive Approach milestones in order to provide a full range of BMDS capabilities addressing ballistic missile threats to the European theater. - Work with USEUCOM to include NATO Allies and regional partners during MDA Ground tests, Flight tests, Wargames, and Exercises in order to improve Allied - US BMDS interoperability. - Coordinate with MDA program elements to facilitate rapid agency responses to USEUCOM requests for analysis and information. Provide reach-back support for the MDA ATD and LNO in USEUCOM for activities requiring visibility by the MDA Director and Director for Test.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Coordinate with MDA Global Deployment Program Office to plan and execute actions required for deployment of BMDS assets in the USEUCOM theater of operations. USCENTCOM Engagement: - Promote CCMD leadership in developing a regional partner data sharing system supporting USCENTCOM regional IAMD architecture development. - Coordinate with MDA program elements, assisting in planning and execution activities supporting USCENTCOM's regional partners. USPACOM Engagement: - Assist USPACOM leadership in broadening Phased Adaptive Approach planning to address a full range of threats and integration of allies into the BMDS. - Support USPACOM J3 in efforts to promote purchase of an Aegis Ashore system. - Share operational information and knowledge and help allies develop common operational procedures. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Program, Planning and Operations	5.596	5.249	5.251
Articles:	-	-	-
Description: MDA will continue to focus on providing operational-level interface to the GCCs and increasing Warfighter participation in the development of future missile defense capabilities. The key Warfighter interface activities include: MDA Operational Support: - Support the Operations Support Planning Team (OSPT) activation during heightened period of interest. - Support Warfighters, DoD Agencies, and Military Services in identifying desired missile defense capabilities and characteristics. - Obtain Warfighter participation and advice on desired operational features and approaches to system fielding throughout development.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Track analysis and responses for CCMD Requests for Analysis (RFA) and Requests for Information (RFI). - Serve as the immediate link between MDA and the GCCs on all Warfighter activities and requirement. - Prepare MDA senior leadership for U.S. Army, Navy, and Air Force BOD meetings and AMD General Officer Steering Committee meetings. - Provide resource management and administration of BMDS Warfighter personnel and budget. - Manage travel, including travel to support the WGEx and the Assistant to the Director (ATDs) and Liaison Officer (LNOs) as MDA representatives at the GCC HQs. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides additional funding in WGEx to support the robust IMTP schedule.			
Accomplishments/Planned Programs Subtotals	32.538	31.142	32.278

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

In order to optimize the performance of the Ballistic Missile Defense System, MDA leverages Defense Department executive agents as well as the MDA Integrated Research and Development for Enterprise Solutions (IRES) contract.

The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. Products and Services will be acquired by competitive means to the extent that is possible and practical.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Wargames and Exercises - Combatant Commanders (COCOM) Support	C/CPAF	JRDC/IRES/MIPR : Colorado Springs, Huntsville, NCR	36.683	19.757	Nov 2017	18.564	Nov 2018	19.756	Nov 2019	-		19.756	Continuing	Continuing	Continuing
Wargames and Exercises - Wargame Support	C/CPAF	IRES/MIPR : Colorado Springs	12.862	7.185	Nov 2017	7.329	Nov 2018	7.271	Nov 2019	-		7.271	Continuing	Continuing	Continuing
Program, Planning and Operations - Civilian Salaries/Operations Sustainment	Allot	MDA : Colorado Springs, Huntsville, NCR	4.315	2.139	Oct 2017	2.202	Oct 2018	2.022	Oct 2019	-		2.022	Continuing	Continuing	Continuing
Program, Planning and Operations - Combatant Commanders (COCOM) Support A&AS	C/CPFF	TEAMS : Colorado Springs, Huntsville, NCR	2.047	1.227	Oct 2017	0.982	Oct 2018	1.007	Oct 2019	-		1.007	Continuing	Continuing	Continuing
Program, Planning and Operations - Government Travel & Training	Allot	MDA : Colorado Springs, Huntsville, NCR	1.230	0.802	Oct 2017	0.780	Sep 2019	0.780	Oct 2019	-		0.780	Continuing	Continuing	Continuing
Program, Planning and Operations - Support to MDA Leadership A&AS	C/CPFF	TEAMS : Colorado Springs, Huntsville, NCR	5.486	1.428	Oct 2017	1.285	Oct 2018	1.442	Oct 2019	-		1.442	Continuing	Continuing	Continuing
		Subtotal	62.623	32.538		31.142		32.278		-		32.278	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	62.623	32.538		31.142		32.278		-		32.278	Continuing	Continuing	N/A

Remarks

Prior year funding was captured in MD03 budget project.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(EX) Arabian Gulf Shield (AGS) Event 1 18	▲																											
(EX) AIR AND MISSILE DEFENSE EXERCISE 18	▲																											
(EX) EPOCH PLANEX 19	▲																											
(EX) Host Nation 18	✦	✦																										
(EX) GLOBAL LIGHTNING 18	✦	✦																										
(EX) Arabian Gulf Shield (AGS) Event 2 18		▲																										
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 17		▲																										
(EX) EUROPEAN TEST BED 18		▲																										
(EX) GLOBAL RESPONSE EXERCISE 18		✦	✦																									
(EX) STEADFAST ALLIANCE 18		✦	✦																									
(WG) BMDS Wargames 19		✦	✦																									
(EX) PACIFIC SENTRY 18		✦	✦	✦																								
(WG) Demonstration, Table-top Exercises & Experiments 18			✧	✧	✧																							
(EX) Joint Live, Virtual, and Constructive 2017/18-2			✧	✧	✧	✧																						
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 18				▲																								
(EX) AIR AND MISSILE DEFENSE EXERCISE 19				▲																								
(EX) ULCHI FREEDOM GUARDIAN 18				▲																								
(EX) GLOBAL THUNDER 19				✧	✧																							
(EX) KEEN SWORD 19				✧	✧																							
(EX) VIGILANT SHIELD 19				✧	✧																							
(WG) Multi-National Missile Defense Conference (MNC) 18				✧	✧																							
(EX) EPOCH PLANEX 20					△																							
(EX) GLOBAL LIGHTNING 19					✧	✧																						
(WG) NIMBLE TITAN 20					✧	✧	✧	✧	✧	✧	✧	✧																

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 18					△																							
(EX) EUROPEAN TEST BED 19					△																							
(EX) Joint Project Optic Windmill 2019					✧																							
(EX) KEY RESOLVE 19					△																							
(EX) RESILIENT SHIELD 19					△																							
(EX) AUSTERE CHALLENGE 19					✧	✧	✧	✧																				
(EX) Joint Live, Virtual, and Constructive 2019/20-1					✧	✧	✧	✧																				
(WG) Huntsville Wargames 19						△																						
(EX) PACIFIC SENTRY 19						✧	✧																					
(WG) Demonstration, Table-top Exercises & Experiments 19						✧	✧	✧																				
(EX) AIR AND MISSILE DEFENSE EXERCISE 20							△																					
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 19							△																					
(EX) ULCHI FREEDOM GUARDIAN 19							△																					
(WG) Space & Missile Defense Symposium 19							△																					
(EX) GLOBAL THUNDER 20							✧	✧																				
(EX) VIGILANT SHIELD 20							✧	✧																				
(WG) Multi-National Missile Defense Conference (MNC) 19							✧	✧																				
(EX) KEEN EDGE 20							✧	✧	✧																			
(EX) EPOCH PLANEX 21								△																				
(EX) JUNIPER COBRA 20								✧	✧																			
(EX) GLOBAL LIGHTNING 20								✧	✧																			
(EX) EAGLE RESOLVE 20									△																			
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19									△																			
(EX) KEY RESOLVE 20									△																			

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(EX) EUROPEAN TEST BED 20									△																			
(EX) RESILIENT SHIELD 20									△																			
(EX) STEADFAST ALLIANCE 20									✧	✧																		
(EX) PACIFIC SENTRY 20									✧	✧	✧																	
(EX) Joint Live, Virtual, and Constructive 2019/20-2									✧	✧	✧	✧																
(EX) GLOBAL RESPONSE EXERCISE 09										△																		
(WG) Demonstration, Table-top Exercises & Experiments 20										✧	✧	✧																
(WG) BMDS Wargames 21										✧	✧	✧	✧	✧														
(EX) AIR AND MISSILE DEFENSE EXERCISE 21											△																	
(EX) ULCHI FREEDOM GUARDIAN 20											△																	
(EX) GLOBAL RESPONSE EXERCISE 10											△																	
(WG) Multi-National Missile Defense Conference (MNC) 20											✧	✧																
(EX) VIGILANT SHIELD 21											✧	✧																
(EX) KEEN SWORD 21											✧	✧																
(EX) GLOBAL THUNDER 21											✧	✧																
(EX) EPOCH PLANEX 22												△																
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20												△																
(EX) GLOBAL LIGHTNING 21												✧	✧															
(EX) AUSTERE CHALLENGE 21												✧	✧	✧	✧													
(WG) NIMBLE TITAN 22												✧	✧	✧	✧	✧	✧	✧	✧									
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20													△															
(EX) KEY RESOLVE 21													△															
(EX) Joint Project Optic Windmill 2021													✧															
(EX) EUROPEAN TEST BED 21													△															

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(EX) RESILIENT SHIELD 21													△															
(EX) STEADFAST ARMOUR 21													✧	✧														
(EX) PACIFIC SENTRY 21													✧	✧	✧													
(WG) Huntsville Wargames 21														△														
(WG) Demonstration, Table-top Exercises & Experiments 21														✧	✧	✧												
(EX) Joint Live, Virtual, and Constructive 2021/22-1														✧	✧	✧												
(WG) Space & Missile Defense Symposium 21															△													
(EX) AIR AND MISSILE DEFENSE EXERCISE 22															△													
(EX) ULCHI FREEDOM GUARDIAN 21															△													
(WG) Multi-National Missile Defense Conference (MNC) 21															✧	✧												
(EX) VIGILANT SHIELD 22															✧	✧												
(EX) KEEN EDGE 22															✧	✧	✧											
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21																△												
(EX) EPOCH PLANEX 23																△												
(EX) JUNIPER COBRA 22																✧	✧											
(EX) GLOBAL LIGHTNING 22																✧	✧											
(EX) EAGLE RESOLVE 22																	△											
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21																	△											
(EX) KEY RESOLVE 22																	△											
(EX) EUROPEAN TEST BED 22																	△											
(EX) RESILIENT SHIELD 22																	△											
(EX) STEADFAST ALLIANCE 22																	✧	✧										
(EX) PACIFIC SENTRY 22																	✧	✧	✧									
(EX) Joint Live, Virtual, and Constructive 2021/22-2																	✧	✧	✧	✧								

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(WG) Demonstration, Table-top Exercises & Experiments 22																			✧	✧	✧							
(WG) BMDS Wargames 23																			✧	✧	✧	✧	✧					
(EX) ULCHI FREEDOM GUARDIAN 22																				△								
(EX) AIR AND MISSILE DEFENSE EXERCISE 23																				△								
(WG) Multi-National Missile Defense Conference (MNC) 22																				✧	✧							
(EX) VIGILANT SHIELD 23																				✧	✧							
(EX) KEEN SWORD 23																				✧	✧							
(EX) GLOBAL THUNDER 22																				✧	✧							
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22																					△							
(EX) GLOBAL RESPONSE EXERCISE 11																					△							
(EX) GLOBAL RESPONSE EXERCISE 12																					△							
(EX) GLOBAL LIGHTNING 23																					✧	✧						
(EX) AUSTERE CHALLENGE 23																					✧	✧	✧	✧				
(WG) NIMBLE TITAN 24																					✧	✧	✧	✧	✧	✧	✧	✧
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22																						△						
(EX) Joint Project Optic Windmill 2023																						✧						
(EX) EUROPEAN TEST BED 23																						△						
(EX) KEY RESOLVE 23																						△						
(EX) RESILIENT SHIELD 23																						△						
(EX) STEADFAST ARMOUR 23																						✧	✧					
(EX) PACIFIC SENTRY 23																						✧	✧	✧				
(EX) PACIFIC SENTRY 24																						✧	✧	✧				
(WG) Huntsville Wargames 23																							△					
(EX) Joint Live, Virtual, and Constructive 2023/24-1																							✧	✧	✧			

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
(WG) Demonstration, Table-top Exercises & Experiments 23																							✧	✦	✧			
(WG) Space & Missile Defense Symposium 23																								△				
(EX) ULCHI FREEDOM GUARDIAN 23																								△				
(EX) AIR AND MISSILE DEFENSE EXERCISE 24																								△				
(WG) Multi-National Missile Defense Conference (MNC) 23																								✧	✧			
(EX) GLOBAL THUNDER 23																								✧	✧			
(EX) VIGILANT SHIELD 24																								✧	✧			
(EX) KEEN EDGE 24																								✧	✧	✧		
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23																									△			
(EX) JUNIPER COBRA 24																									✧	✧		
(EX) GLOBAL LIGHTNING 24																									✧	✧		
(EX) EAGLE RESOLVE 24																										△		
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23																										△		
(EX) EUROPEAN TEST BED 24																										△		
(EX) KEY RESOLVE 24																										△		
(EX) RESILIENT SHIELD 24																										△		
(EX) STEADFAST ALLIANCE 24																										✧	✧	
(EX) Joint Live, Virtual, and Constructive 2023/24-2																										✧	✧	✧
(WG) Demonstration, Table-top Exercises & Experiments 24																											✧	✧
(WG) BMDS Wargames 25																											✧	✧
(EX) ULCHI FREEDOM GUARDIAN 24																												△
(EX) GLOBAL THUNDER 24																												✧
(WG) Multi-National Missile Defense Conference (MNC) 24																												✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) Arabian Gulf Shield (AGS) Event 1 18	1	2018	1	2018
(EX) AIR AND MISSILE DEFENSE EXERCISE 18	1	2018	1	2018
(EX) EPOCH PLANEX 19	1	2018	1	2018
(EX) Host Nation 18	1	2018	2	2018
(EX) GLOBAL LIGHTNING 18	1	2018	2	2018
(EX) Arabian Gulf Shield (AGS) Event 2 18	2	2018	2	2018
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 17	2	2018	2	2018
(EX) EUROPEAN TEST BED 18	2	2018	2	2018
(EX) GLOBAL RESPONSE EXERCISE 18	2	2018	3	2018
(EX) STEADFAST ALLIANCE 18	2	2018	3	2018
(WG) BMDS Wargames 19	2	2018	3	2018
(EX) PACIFIC SENTRY 18	2	2018	4	2018
(WG) Demonstration, Table-top Exercises & Experiments 18	3	2018	1	2019
(EX) Joint Live, Virtual, and Constructive 2017/18-2	3	2018	2	2019
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 18	4	2018	4	2018
(EX) AIR AND MISSILE DEFENSE EXERCISE 19	4	2018	4	2018
(EX) ULCHI FREEDOM GUARDIAN 18	4	2018	4	2018
(EX) GLOBAL THUNDER 19	4	2018	1	2019
(EX) KEEN SWORD 19	4	2018	1	2019
(EX) VIGILANT SHIELD 19	4	2018	1	2019
(WG) Multi-National Missile Defense Conference (MNC) 18	4	2018	1	2019
(EX) EPOCH PLANEX 20	1	2019	1	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) GLOBAL LIGHTNING 19	1	2019	2	2019
(WG) NIMBLE TITAN 20	1	2019	4	2020
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 18	2	2019	2	2019
(EX) EUROPEAN TEST BED 19	2	2019	2	2019
(EX) Joint Project Optic Windmill 2019	2	2019	2	2019
(EX) KEY RESOLVE 19	2	2019	2	2019
(EX) RESILIENT SHIELD 19	2	2019	2	2019
(EX) AUSTERE CHALLENGE 19	2	2019	1	2020
(EX) Joint Live, Virtual, and Constructive 2019/20-1	2	2019	1	2020
(WG) Huntsville Wargames 19	3	2019	3	2019
(EX) PACIFIC SENTRY 19	3	2019	4	2019
(WG) Demonstration, Table-top Exercises & Experiments 19	3	2019	1	2020
(EX) AIR AND MISSILE DEFENSE EXERCISE 20	4	2019	4	2019
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 19	4	2019	4	2019
(EX) ULCHI FREEDOM GUARDIAN 19	4	2019	4	2019
(WG) Space & Missile Defense Symposium 19	4	2019	4	2019
(EX) GLOBAL THUNDER 20	4	2019	1	2020
(EX) VIGILANT SHIELD 20	4	2019	1	2020
(WG) Multi-National Missile Defense Conference (MNC) 19	4	2019	1	2020
(EX) KEEN EDGE 20	4	2019	2	2020
(EX) EPOCH PLANEX 21	1	2020	1	2020
(EX) JUNIPER COBRA 20	1	2020	2	2020
(EX) GLOBAL LIGHTNING 20	1	2020	2	2020
(EX) EAGLE RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19	2	2020	2	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) KEY RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN TEST BED 20	2	2020	2	2020
(EX) RESILIENT SHIELD 20	2	2020	2	2020
(EX) STEADFAST ALLIANCE 20	2	2020	3	2020
(EX) PACIFIC SENTRY 20	2	2020	4	2020
(EX) Joint Live, Virtual, and Constructive 2019/20-2	2	2020	1	2021
(EX) GLOBAL RESPONSE EXERCISE 09	3	2020	3	2020
(WG) Demonstration, Table-top Exercises & Experiments 20	3	2020	1	2021
(WG) BMDS Wargames 21	3	2020	3	2021
(EX) AIR AND MISSILE DEFENSE EXERCISE 21	4	2020	4	2020
(EX) ULCHI FREEDOM GUARDIAN 20	4	2020	4	2020
(EX) GLOBAL RESPONSE EXERCISE 10	4	2020	4	2020
(WG) Multi-National Missile Defense Conference (MNC) 20	4	2020	1	2021
(EX) VIGILANT SHIELD 21	4	2020	1	2021
(EX) KEEN SWORD 21	4	2020	1	2021
(EX) GLOBAL THUNDER 21	4	2020	1	2021
(EX) EPOCH PLANEX 22	1	2021	1	2021
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20	1	2021	1	2021
(EX) GLOBAL LIGHTNING 21	1	2021	2	2021
(EX) AUSTERE CHALLENGE 21	1	2021	4	2021
(WG) NIMBLE TITAN 22	1	2021	4	2022
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20	2	2021	2	2021
(EX) KEY RESOLVE 21	2	2021	2	2021
(EX) Joint Project Optic Windmill 2021	2	2021	2	2021
(EX) EUROPEAN TEST BED 21	2	2021	2	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) RESILIENT SHIELD 21	2	2021	2	2021
(EX) STEADFAST ARMOUR 21	2	2021	3	2021
(EX) PACIFIC SENTRY 21	2	2021	4	2021
(WG) Huntsville Wargames 21	3	2021	3	2021
(WG) Demonstration, Table-top Exercises & Experiments 21	3	2021	1	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-1	3	2021	1	2022
(WG) Space & Missile Defense Symposium 21	4	2021	4	2021
(EX) AIR AND MISSILE DEFENSE EXERCISE 22	4	2021	4	2021
(EX) ULCHI FREEDOM GUARDIAN 21	4	2021	4	2021
(WG) Multi-National Missile Defense Conference (MNC) 21	4	2021	1	2022
(EX) VIGILANT SHIELD 22	4	2021	1	2022
(EX) KEEN EDGE 22	4	2021	2	2022
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21	1	2022	1	2022
(EX) EPOCH PLANEX 23	1	2022	1	2022
(EX) JUNIPER COBRA 22	1	2022	2	2022
(EX) GLOBAL LIGHTNING 22	1	2022	2	2022
(EX) EAGLE RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21	2	2022	2	2022
(EX) KEY RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN TEST BED 22	2	2022	2	2022
(EX) RESILIENT SHIELD 22	2	2022	2	2022
(EX) STEADFAST ALLIANCE 22	2	2022	3	2022
(EX) PACIFIC SENTRY 22	2	2022	4	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-2	2	2022	1	2023
(WG) Demonstration, Table-top Exercises & Experiments 22	3	2022	1	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(WG) BMDS Wargames 23	3	2022	3	2023
(EX) ULCHI FREEDOM GUARDIAN 22	4	2022	4	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 23	4	2022	4	2022
(WG) Multi-National Missile Defense Conference (MNC) 22	4	2022	1	2023
(EX) VIGILANT SHIELD 23	4	2022	1	2023
(EX) KEEN SWORD 23	4	2022	1	2023
(EX) GLOBAL THUNDER 22	4	2022	1	2023
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 11	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 12	1	2023	1	2023
(EX) GLOBAL LIGHTNING 23	1	2023	2	2023
(EX) AUSTERE CHALLENGE 23	1	2023	4	2023
(WG) NIMBLE TITAN 24	1	2023	4	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22	2	2023	2	2023
(EX) Joint Project Optic Windmill 2023	2	2023	2	2023
(EX) EUROPEAN TEST BED 23	2	2023	2	2023
(EX) KEY RESOLVE 23	2	2023	2	2023
(EX) RESILIENT SHIELD 23	2	2023	2	2023
(EX) STEADFAST ARMOUR 23	2	2023	3	2023
(EX) PACIFIC SENTRY 23	2	2023	4	2023
(EX) PACIFIC SENTRY 24	2	2023	4	2023
(WG) Huntsville Wargames 23	3	2023	3	2023
(EX) Joint Live, Virtual, and Constructive 2023/24-1	3	2023	1	2024
(WG) Demonstration, Table-top Exercises & Experiments 23	3	2023	1	2024
(WG) Space & Missile Defense Symposium 23	4	2023	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) ULCHI FREEDOM GUARDIAN 23	4	2023	4	2023
(EX) AIR AND MISSILE DEFENSE EXERCISE 24	4	2023	4	2023
(WG) Multi-National Missile Defense Conference (MNC) 23	4	2023	1	2024
(EX) GLOBAL THUNDER 23	4	2023	1	2024
(EX) VIGILANT SHIELD 24	4	2023	1	2024
(EX) KEEN EDGE 24	4	2023	2	2024
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23	1	2024	1	2024
(EX) JUNIPER COBRA 24	1	2024	2	2024
(EX) GLOBAL LIGHTNING 24	1	2024	2	2024
(EX) EAGLE RESOLVE 24	2	2024	2	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23	2	2024	2	2024
(EX) EUROPEAN TEST BED 24	2	2024	2	2024
(EX) KEY RESOLVE 24	2	2024	2	2024
(EX) RESILIENT SHIELD 24	2	2024	2	2024
(EX) STEADFAST ALLIANCE 24	2	2024	3	2024
(EX) Joint Live, Virtual, and Constructive 2023/24-2	2	2024	1	2025
(WG) Demonstration, Table-top Exercises & Experiments 24	3	2024	1	2025
(WG) BMDS Wargames 25	3	2024	3	2025
(EX) ULCHI FREEDOM GUARDIAN 24	4	2024	4	2024
(EX) GLOBAL THUNDER 24	4	2024	1	2025
(WG) Multi-National Missile Defense Conference (MNC) 24	4	2024	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	Project (Number/Name) MC03 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC03: *Cyber Operations*	-	0.146	0.154	0.156	-	0.156	0.159	0.161	0.164	0.167	0.000	1.107
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project MC03 is the Defensive Cyber Operations Project established in this Program Element (PE) during PBR 2018. Funds were previously reported in Project MD03 of this PE.

A. Mission Description and Budget Item Justification

The funds in this project are required to verify and validate that cybersecurity and/or cybersecurity-enabled products (firewalls, data/network encryption devices, routers, Intrusion Detection Systems, etc.) used within the MDA infrastructure have a current and Evaluated Assurance Level (EAL) certification and rating. They assure that validated IT products are listed on the DOD Approved Products List (APLITS). There is an additional requirement to routinely identify findings and prepare a report with recommendations. The Warfighter Strategic Integration directorate (DDW) requires this support in the IT product evaluation provided. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act of 2014 (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Strategic Warfighter Integration Software Assurance Support	0.146	0.154	0.156
Articles:	-	-	-
Description: Perform manual and automated software code analysis, using GFE tools (e.g. Fortify 360), to detect false positives, weaknesses, and vulnerabilities. 1) Verify and validate cybersecurity and/or cybersecurity-enabled products (firewalls, data/network encryptors, routers, Intrusion Detection Systems, etc.) used within the MDA infrastructure have a current and Evaluated Assurance Level (EAL) certification and rating. Validate IT products are listed on the DoD Approved Products List (APLITS). 2) Participate in meetings with customers to review software analysis findings and proposed courses of action for remediation. 3) Prepare a comprehensive report detailing the weaknesses and vulnerabilities found. Document the references to files and line numbers. 4) Maintain a record of all software code analysis documentation and organized in accordance with Government policy. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.146	0.154	0.156

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Strategic Warfighter Integration Software Assurance Support - DDW Cyber Support (ICVA)	C/CPFF	TEAMS : COS	0.000	0.146	Mar 2018	0.154	Dec 2018	0.156	Dec 2019	-		0.156	Continuing	Continuing	Continuing
		Subtotal	0.000	0.146		0.154		0.156		-		0.156	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.146		0.154		0.156		-		0.156	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC03 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC03 Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	13.229	2.170	2.192	2.194	-	2.194	2.413	2.510	2.647	2.683	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	2.170	2.192	2.194
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	2.170	2.192	2.194

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various : Multi: AK, AL,CA, CO, VA	1.200	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various Multi: AL, CO, CA, VA : Various	0.847	0.012	Jul 2018	0.033	Jul 2019	0.033	Jul 2020	-		0.033	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	MDA : Multi:AK,AL, CA, CO, VA	4.070	1.300	Nov 2017	1.060	Jan 2019	1.200	Jan 2020	-		1.200	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	ALATEC , INC, : AL, CO, VA	6.855	0.461	Aug 2018	0.000		0.961	May 2020	-		0.961	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi:AK, AL, CA, CO, VA	0.000	0.397	Aug 2018	1.099	Jun 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	MIPR	Naval Surface Warfare Center; VA, AL : Various	0.257	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	13.229	2.170		2.192		2.194		-		2.194	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.229	2.170		2.192		2.194		-		2.194	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603904C *I Missile Defense Integration and Operations Center (MDIOC)*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	420.795	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
MD22: *Missile Defense Integration and Operations Center (MDIOC)*	402.305	48.916	51.841	53.103	-	53.103	54.072	55.156	57.420	58.561	Continuing	Continuing
MC22: *Cyber Operations*	2.014	0.598	0.610	0.634	-	0.634	0.646	0.659	0.672	0.685	Continuing	Continuing
MD40: *Program-Wide Support*	16.476	2.391	5.674	2.424	-	2.424	2.728	2.759	3.052	3.093	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) is the Missile Defense Agency's (MDA) field operating activity in Colorado Springs, Colorado. It provides necessary infrastructure and support services through a mission execution platform for MDA elements/components and designated Combatant Commanders' Ballistic Missile Defense System (BMDS) operations executing missions at the MDIOC. The Integration Center is the organization responsible for providing a single, integrated set of skilled personnel matrixed from across MDA to manage this mission. The MDIOC mission facilities consist of a highly secure research and development complex and a mission support module (area) located at Schriever Air Force Base, adjacent to North American Aerospace Defense Command (NORAD) and United States Northern Command (USNORTHCOM). The MDA Integration Center provides mission critical system technical capabilities and subject matter expertise in a dedicated and adaptable environment that enables developers, testers, and operators to evolve, assess and deliver the capabilities for layered missile defense execution for homeland defense and theater/regional support. The MDIOC interfaces with the Information Technology/Information Assurance Enterprise to provide high availability access to worldwide secure communications, network health and status monitoring, mission critical restoral capability, and technical expertise for all MDA directed activities and events. The MDIOC functions as the mission control for BMDS distributed ground tests and system wide flight tests enabling the mission and test directors to control both main and associated test operations using secure voice, test, and mission network hubs from the MDIOC. The MDIOC also functions as the only system-level integration and interoperability mission execution platform for BMDS fire control; and it provides the physical interface between the developers and the Combatant Command warfighters.

MDIOC mission facilities contribute to the BMDS by directly supporting the concept of Concurrent Test, Training, and Operations (CTTO) for the BMDS by providing engineering integration, resource scheduling, configuration management, and implementation development support for MDA and BMDS-level test, training, and operational mission execution.

MDIOC Major Program Goals:

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603904C *I Missile Defense Integration and Operations Center (MDIOC)*

-Provide the capabilities and services necessary to support engineering integration, resource scheduling for ground and flight tests, configuration management, and implementation development support of on-site activities
-Ensure around the clock support and restoral of designated BMDS operational activities
-Improve interface with designated Combatant Command missile defense activities; host/support the headquarters and operations center for the United States Strategic Command Joint Functional Component Command - Integrated Missile Defense
-Maintain and improve the reliability, availability, and maintainability of MDIOC mission critical systems

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	53.265	54.925	58.498	-	58.498
Current President's Budget	51.905	58.125	56.161	-	56.161
Total Adjustments	-1.360	3.200	-2.337	-	-2.337
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	3.200			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.201	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-0.159	0.000	-2.337	-	-2.337

Change Summary Explanation

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustments for facilities, sustainment, restoration and modernization to support maintenance of current MDA assets.

Decrease in FY 2020 from PB19 to PB20 reflects the decrease for facilities, sustainment, restoration and modernization projects funded in FY 2019 with FY 2019 congressional increase.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	Project (Number/Name) MD22 / *Missile Defense Integration and Operations Center (MDIOC)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD22: *Missile Defense Integration and Operations Center (MDIOC)*	402.305	48.916	51.841	53.103	-	53.103	54.072	55.156	57.420	58.561	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) sustains and operates a 24 hours a day, 365 days a year mission complex for critical research, development, testing, training, and operations for BMDS activities. The MDIOC supports the Ground-based Midcourse Missile Defense Mission Control Center Facility, as well as the Command, Control, Battle Management, and Communications (C2BMC) Integration and Test Centers and the C2BMC Experimentation Laboratories. It provides infrastructure support for the Satellite Tracking and Surveillance System's (STSS) Missile Defense Space Center (MDSC); and the Targets and Countermeasures' (TC) Mission Control Center - Targets (MCC-T). The MDIOC also provides developmental support to the Enterprise Sensors Laboratory (ESL) composed of a common satellite ground station and sensor netting test bed for designated Ballistic Missile Defense System (BMDS) elements. The MDIOC supports BMDS test events based on the Integrated Master Test Plan (IMTP). It supports BMDS Critical Engagement Conditions testing and analysis through the operation of the Test Execution Control node for distributed BMDS ground tests. During system flight tests, the MDIOC provides infrastructure (power; Heating, Ventilation and Air Conditioning; and communications) support to the Flight Test Director and crew, and ensures the protection of facility and test assets throughout the test window. Further, the MDIOC provides the facilities that support operations of the Missile Defense Element, manned by the U.S. Army 100th Missile Defense Brigade, the United States Northern Command (USNORTHCOM) C2BMC Command and Control Center (CCC), the United States Strategic Command's (USSTRATCOM's) Joint Functional Component Command-Integrated Missile Defense (JFCC-IMD) and the Missile Defense Agency (MDA) Warfighter Support Center. In addition, the MDIOC supports the MDA Operations Support Center, which provides situational awareness of the health and status of the end-to-end BMDS, and provides network subject matter expertise and technical reach back for the program elements and Combatant Commanders. The MDIOC hosts BMDS wargames and exercises in support of the warfighter, and delivers the requisite infrastructure to integrate the modeling and simulation assets that form system-level constructive simulations for full-envelope BMDS performance assessments, with surrogate capability for BMDS ground tests. The MDIOC maintains a technical repository of BMDS Implementation Architectures for real-time operations and configuration control; provides state change management and asset management technical support for the BMDS; and provides the technical environment for BMDS Watch Officers, Safety Officers, and Information Assurance Officers to perform their assigned duties. The MDIOC also supports the operations of the Joint Early Warning Laboratory (JEWL), which provides USSTRATCOM with quick response analyses of real-world launches, and rapid anomaly identification and resolution.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Infrastructure Systems and Support	20.587	17.324	18.496
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: RECURRING: MDIOC Communications and Special Purpose Processing Node (SPPN): - Establish a DoD compliant SPPN capable of meeting the unique network and data center services required to develop and deploy a layered BMDS to defend the United States. - Provide distinctive specifications and provisioning requirements associated with the MDA Research, Development, Test and Evaluation (RDT&E) Mission. - Provide capabilities that dynamically interconnect and integrate multiple RDT&E systems to large data sets, and enable collaboration in near real-time with National Research Laboratories and Test Ranges; and Defense Industrial Base industry partners throughout the BMDS acquisition lifecycle. - Construct the SPPN infrastructure with routers, switches, firewalls, and intrusion detection systems that provide IT support to over 10,500 MDA classified/unclassified users worldwide. - Provide network operations and network monitoring; development of detailed solutions, designs, and plans; Disaster Recovery and Continuity of Operations rehearsals; internet access management; and web filtering. - Sustain core communications distribution services across the MDA Enterprise. - Plan, engineer, and implement sustainment projects for general IT services and business systems consistent with the IT architecture roadmap. - Acquire and distribute mission critical unclassified and secure communication capability to resident MDA elements/components and BMDS and Warfighter operational elements. - Provide computer hosting of specified threat models and support the integration of other threat tools as required. End User Support: - Sustain End User core service support 18 hours a day, 6 days a week for administrative and business information systems for unclassified and classified users - Monitor networks for user compliance with DoD policies and report incidents - Maintain Printing and Copy Services - Sustain email services (Exchange servers, BlackBerry Enterprise Services servers and archiving storage area networks) - Sustain file services (file servers and storage area networks) - Maintain Directory Services (Active Directory and domain controller servers) - Maintain Authentication services (Public Key Infrastructure/Common Access Card)			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Maintain current hardware and software licenses for IT operational systems - Maintain an Integrated Service Desk - Maintain IT life-cycle asset management of end user devices (desktops, laptops, monitors, printers, thin clients, and BlackBerrys) Hardware and Software Asset Management: - Manage government property and IT hardware and software in accordance with the Federal Acquisition Regulations (FAR)/DoD FAR Supplements (DFARs) to include accountability, reporting, warehouse management, asset transportation and excess asset management - Maintain an inventory of IT hardware and software assets connected or used in the ULAN, CLAN, SIPRNET and TS/SCI networks Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Facilities and Maintenance	12.819	15.685	14.395
Articles:	-	-	-
Description: RECURRING: Host Tenant Support(Electrical, Gas, Sewer, Water, Steam, Chilled Water, Waste Water, Landscaping, Refuse Removal, and Communications Support): - Procure utility services through 50th Air Force Space Wing (Host Base) - Sustain utility infrastructure and delivery systems Environmental, Safety and Occupational Health (ESOH): - Maintain and update the program accident prevention plan - Provide required industrial safety training to facility services personnel - Procure and distribute personal protection equipment for contracted activities			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Ensure compliance with Hazardous Waste, Hazardous Material Recycling, and National Environmental Policy Act (NEPA) programs - Conduct recurring safety and environmental audits Facilities Operations and Sustainment: - Provide 24 hours a day, 7 days a week, 365 days a year, facility maintenance break/fix response for all facility systems (electrical; Heating, Ventilation, and Air Conditioning; plumbing; locksmith) with a response time of 15 minutes after normal duty hours - Conduct preventative maintenance inspections (PMIs) for all building systems Facilities Engineering: - Conduct Management Process Facility Installation Standard Audits - Provide risk management analysis and mitigation plans - Maintain infrastructure drawings configuration management databases on a limited basis - Develop and document facility long range planning programming - Provide consulting services, preliminary designs and engineering rough order of magnitude estimates for required infrastructure buildout changes Missile Defense Integration and Operations Center (MDIOC) Operating Expenses: - Lease General Services Administration (GSA) vehicles and a commercial warehouse - Fund calibration of measuring and monitoring equipment - Fund repair of classified network switches Facility Services: - Provide custodial services for over 675,000 square feet of floor space in Buildings 720 and 730 - Provide limited Copy Center and Shuttle Services for over 2,000 personnel - Provide in/out processing - Personnel moves to include cubicle and workstation setup, teardown, and reconfiguration Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Engineering and Event Services	7.793	10.180	11.778
Articles:	-	-	-
Description: RECURRING: - Provide Mission Assurance by ensuring the successful execution of Concurrent Test, Training, and Operations (CTTO) activities at the MDIOC facility. - Ensure independent verification, and coordinate customer validation of all activities, work products and requirements fulfilled by MDIOC Engineering. - Provide Risk Management by identifying, assessing, and prioritizing risks. Coordinate resources to minimize, monitor and control the probability and impact of events. Develop strategies to manage threats, including avoidance, reduction, transfer and retention. - Ensure Coordination and Integration through a proactive approach of sharing critical information necessary for the successful conduct of CTTO activities in a dynamic environment. - Provide Systems Engineering by developing effective solutions through a structured, repeatable process for MDIOC engineering activities. Provide governance and training to stakeholders, enforce policy, establish and maintain a unified board structure for the vetting and implementation of requirements. - Ensure Configuration Management so that CTTO events are not disrupted by multiple competing activities. - Maintain the Technical Baseline to establish a common reference, and implement a formalized process that provides stability across the MDIOC. - Provide Change Management to track changes to the IT and MDIOC physical infrastructure. Understand how any change may affect CTTO activities, and determine when any change is least likely to impact key functionality. Ensure all changes, across the technical baseline, are clearly recorded and identified on a near-real-time basis. - Provide effective requirements management by documenting decisions and information generated during requirements development in conjunction with the design solution processes.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Provide Event Architecture and Engineering Design by coordinating design and implementation of technical architectures for all major MDIOC hosted/supported CTTO activities. Maintain a repository of architectures for real-time configuration management. - Provide cradle to grave event management for MDIOC supported CTTO events. - Provide a Mission Planning Element to oversee the event support life cycle provided by the MDIOC engineering and event support platform. Ensure the fulfillment of technical, personnel, facility, and cybersecurity requirements. - Provide a Mission Execution Element to ensure asset protection and incident response for all MDIOC supported CTTO events. - Ensure Organizational Integration by establishing and enforcing seamless integration across the MDIOC. Provide a repeatable process for information sharing and coordination. - Provide Cybersecurity to ensure the protection of MDIOC networks, computers, programs and data from attack, damage or unauthorized access. - Provide Contract Program Management oversight including business, finance, contract administration and management. Identify and manage cross-project dependencies. Conduct activities within established cost, schedule, and performance parameters. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Operations and Sustainment	5.287	5.152	4.934
Articles:	-	-	-
Description: RECURRING: - Fund Civilian and Contract Service Support positions supporting operations and sustainment of all Missile Defense Integration and Operations Center (MDIOC)activities contributing to the mission execution platform - Provide quality event planning, coordination, logistics, security access and host support for all MDIOC			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
events and visitors - Deliver integrated service coordination for all MDIOC event and protocol support. - Fund Training and Travel Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Infrastructure Systems Repair, Sustainment, and Critical Upgrades	2.430	3.500	3.500
Articles:	-	-	-
Description: RECURRING: - Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) - Fire Suppression System Compliance Project (two quadrants) Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	48.916	51.841	53.103

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603294C: *Common Kill Vehicle Technology*	55.562	56.753	13.600	-	13.600	13.475	16.187	18.232	22.949	Continuing	Continuing
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Integrated Research and Development for Enterprise Solutions Contract is the major performing integrated contract. The acquisition strategy for MDIOC mission execution is to employ a contract to perform designated integration and sustainment tasks to conduct BMDS Research, Development, Test and Evaluation (RDT&E). The MDIOC is operated by missile defense subject matter experts composed of Government, military, civilian personnel, MDIOC Contract Support Services, and major defense contractors.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Infrastructure Systems and Support - Infrastructure Systems/Support	C/CPIF	MDIOC/Jacobs Technology Inc. : Colorado Springs, CO	0.000	1.000	Jul 2018	0.000		18.496	Nov 2019	-		18.496	Continuing	Continuing	Continuing
Infrastructure Systems and Support - MDIOC JRDC/ IRES	C/CPAF	MDIOC/Northrop Grumman Mission Systems : Colorado Springs, CO	155.189	19.587	Jan 2018	17.324	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC Custodial/ Mailroom/Drivers	C/FFP	MDIOC/Ability One/ Venturi : Colorado Springs, CO	3.649	1.888	Dec 2017	1.205	Dec 2018	1.992	Dec 2019	-		1.992	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC GSA / Leases / Calibration	MIPR	Various (GSA, Warehouses) : Colorado Springs, CO	7.481	0.220	Oct 2017	0.643	Nov 2018	0.260	Oct 2019	-		0.260	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC IRES	C/CPIF	MDIOC/Jacobs Technology Inc. : Colorado Springs, CO	0.000	7.880	Jul 2018	0.000		8.347	Jan 2020	-		8.347	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC MIPRs	C/FFP	MDIOC/Misc : Colorado Springs, CO	93.111	0.253	Nov 2017	10.561	Oct 2018	0.424	Nov 2019	-		0.424	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC Utilities	MIPR	50th Space Wing : Schriever AFB, CO	20.742	2.578	Oct 2017	3.276	Oct 2018	3.372	Oct 2019	-		3.372	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Event Services - MDIOC IRES	C/CPAF	MDIOC /Jacobs Technology Inc. : Colorado Springs, CO	66.233	7.793	Nov 2017	10.180	Nov 2018	11.778	Nov 2019	-		11.778	Continuing	Continuing	Continuing
Operations and Sustainment - Civilian Salaries	Allot	MDIOC : Colorado Springs, CO	23.617	2.805	Oct 2017	2.836	Oct 2018	2.864	Oct 2019	-		2.864	Continuing	Continuing	Continuing
Operations and Sustainment - Support Services	C/CPFF	MiDAESS/TEAMS Multi : Colorado Springs, CO	18.536	2.422	Nov 2017	2.256	Nov 2018	2.020	Oct 2019	-		2.020	Continuing	Continuing	Continuing
Operations and Sustainment - Travel and Training	Allot	MDIOC : Colorado Springs, CO	0.693	0.060	Nov 2017	0.060	Nov 2018	0.050	Nov 2019	-		0.050	Continuing	Continuing	Continuing
Infrastructure Systems Repair, Sustainment, and Critical Upgrades - MDIOC IRES	C/CPAF	MDIOC/Jacobs Technology Inc. : Colorado Springs, CO	13.054	2.430	Jan 2018	3.500	Jan 2019	3.500	Jan 2020	-		3.500	Continuing	Continuing	Continuing
		Subtotal	402.305	48.916		51.841		53.103		-		53.103	Continuing	Continuing	N/A

Remarks

Funds for utilities and base communications are specified in the Inter-service Support Agreement with the 50th Space Wing. In addition, the Missile Defense Integration and Operations Center (MDIOC) provides Technical Contract Support Services employees, for MDIOC operations and oversight of the Integrated Research and Development for Enterprise Solutions (IRES) contract, as well as funding for IRES work as required by the government.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	402.305	48.916		51.841		53.103		-		53.103	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2018)	✧	✧	✧	✧																								
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase III)	✧	✧	✧	✧																								
Electrical power distribution in two mission quadrants to replace- End-of-Life systems, increase reliability, improve power distribution efficiency, and redundancy to mission critical areas		✧	✧																									
Fire Suppression System Compliance Project (two quadrants)(FY 2018)		✧	✧	✧																								
Replace end-of-life Emergency Lighting Module (Building 730)			✧	✧																								
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2019)					✧	✧	✧	✧																				
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase IV)					✧	✧	✧	✧																				
Replace/repair drainage/sewer system (Phase III -Building 720)					✧	✧	✧	✧																				
Fire Suppression System Compliance Project (two quadrants)(FY 2019)						✧	✧	✧																				
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2020)									✧	✧	✧	✧																
Install Ambient Air Economizer (greening initiative)									✧	✧	✧	✧																
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North and South Loops)									✧	✧	✧	✧																
Fire Suppression System Compliance Project (two quadrants)(FY 2020)										✧	✧	✧																
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2021)													✧	✧	✧	✧												
Fire Suppression System Compliance Project (two quadrants)(FY 2021)														✧	✧	✧												
Availability/Arc Flash/Short Circuit Coordination Study															✧													
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2022)																	✧	✧	✧	✧								

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Fire Suppression System Compliance Project (two quadrants) (FY2022)																	✧	✧	✧	✧								
Fire Suppression System Compliance Project (two quadrants) (FY2023)																					✧	✧	✧	✧				
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2023)																					✧	✧	✧	✧				

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2018)	1	2018	4	2018
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase III)	1	2018	4	2018
Electrical power distribution in two mission quadrants to replace- End-of-Life systems, increase reliability, improve power distribution efficiency, and redundancy to mission critical areas	2	2018	3	2018
Fire Suppression System Compliance Project (two quadrants)(FY 2018)	2	2018	4	2018
Replace end-of-life Emergency Lighting Module (Building 730)	3	2018	4	2018
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2019)	1	2019	4	2019
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase IV)	1	2019	4	2019
Replace/repair drainage/sewer system (Phase III -Building 720)	1	2019	4	2019
Fire Suppression System Compliance Project (two quadrants)(FY 2019)	2	2019	4	2019
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2020)	1	2020	4	2020
Install Ambient Air Economizer (greening initiative)	1	2020	4	2020
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North and South Loops)	1	2020	4	2020
Fire Suppression System Compliance Project (two quadrants)(FY 2020)	2	2020	4	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2021)	1	2021	4	2021
Fire Suppression System Compliance Project (two quadrants)(FY 2021)	2	2021	4	2021
Availability/Arc Flash/Short Circuit Coordination Study	3	2021	3	2021
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2022)	1	2022	4	2022
Fire Suppression System Compliance Project (two quadrants) (FY2022)	1	2022	4	2022
Fire Suppression System Compliance Project (two quadrants) (FY2023)	1	2023	4	2023
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2023)	1	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	Project (Number/Name) MC22 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC22: *Cyber Operations*	2.014	0.598	0.610	0.634	-	0.634	0.646	0.659	0.672	0.685	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) conducts Cyber Defensive Operations through Key Management Infrastructure and Information Assurance Training which interfaces with the Information Technology/Information Assurance Enterprise to provide secure communications, network health and status monitoring, mission critical restoral capability, and technical expertise.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Cyber Defensive Operations	0.598	0.610	0.634
Articles:	-	-	-
Description: RECURRING: The Missile Defense Integration and Operations Center (MDIOC) conducts Defensive Cyber Operations in the following categories: Key Management Infrastructure - Interface with the Information Technology/Information Assurance Enterprise to provide for the generation, production, control and distribution, and training for utilizing the keying material used with the Agency's cryptographic devices. Information Assurance Training - Maintain an Information Assurance (IA) certified workforce through continuous IA training as required by DoD Directive 8570 Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A			
Accomplishments/Planned Programs Subtotals	0.598	0.610	0.634

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cyber Defensive Operations - Cyber Defensive Operations	C/CPAF	MDIOC/IRES : Jacobs Technology Inc.	2.014	0.598	Jan 2018	0.610	Jan 2019	0.634	Jan 2020	-		0.634	Continuing	Continuing	Continuing
		Subtotal	2.014	0.598		0.610		0.634		-		0.634	Continuing	Continuing	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.014	0.598		0.610		0.634		-		0.634	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC22 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC22 Cyber Operations	1	2018	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	16.476	2.391	5.674	2.424	-	2.424	2.728	2.759	3.052	3.093	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	2.391	5.674	2.424
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	2.391	5.674	2.424

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities, Operations, and Maintenance	MIPR	Various : Multi: AK, AL, CA, CO, VA	5.311	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	0.492	0.035	Jul 2018	0.037	Jul 2019	0.036	Jul 2020	-		0.036	0.241	0.841	0.000
Program Wide Support - Agency Operations and Support Services	Reqn	Various : Multi: AK, AL, CA, CO, VA	10.475	2.356	Nov 2017	2.437	Aug 2019	2.388	Oct 2019	-		2.388	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services.	C/CPFF	Various : Alatec INC, AL, CO, VA	0.198	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: CO	0.000	0.000		3.200	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	16.476	2.391		5.674		2.424		-		2.424	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	16.476	2.391		5.674		2.424		-		2.424	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603906C / *Regarding Trench*

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	70.063	8.898	16.916	22.424	-	22.424	12.012	12.348	12.580	12.832	Continuing	Continuing
MD35: *Regarding Trench*	70.063	8.898	16.916	22.424	-	22.424	12.012	12.348	12.580	12.832	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	9.113	16.916	18.712	-	18.712
Current President's Budget	8.898	16.916	22.424	-	22.424
Total Adjustments	-0.215	0.000	3.712	-	3.712
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.215	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	3.712	-	3.712

Change Summary Explanation

Further program details are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603907C *I Sea Based X-Band Radar (SBX)*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	547.093	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
MX46: *Sea Based X-Band Radar Development Support*	527.087	170.031	130.604	123.089	-	123.089	113.857	126.654	121.220	133.078	Continuing	Continuing
MD40: *Program-Wide Support*	20.006	3.957	6.111	5.067	-	5.067	5.595	6.172	6.284	6.831	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2019 to FY 2020 reflects completion of software and x86 processor upgrades.

A. Mission Description and Budget Item Justification

The SBX is an advanced X-band radar that provides the capability for mid-course acquisition, tracking, discrimination and hit-assessment of missile threats. The SBX radar is mounted on a mobile, ocean-going, semi-submersible platform, enabling it to cover any region of the globe. The SBX supports the Ballistic Missile Defense System (BMDS) Homeland Defense mission by tracking and discriminating sophisticated Intercontinental Ballistic Missile (ICBM) threats.

SBX operates at sea for BMDS flight and ground test participation or in an active, operational status when indications and warnings signal the need for enhanced discrimination. The SBX is located in a Pacific port when not required at sea. The SBX maintains vessel certifications for operations at sea as well as software compatibility with the BMDS.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	145.695	149.715	175.013	-	175.013
Current President's Budget	173.988	136.715	128.156	-	128.156
Total Adjustments	28.293	-13.000	-46.857	-	-46.857
• Congressional General Reductions	-1.000	0.000			
• Congressional Directed Reductions	0.000	-13.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	33.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.001	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-3.706	0.000	-46.857	-	-46.857

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603907C *I Sea Based X-Band Radar (SBX)*

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects enacted congressional adjustment for a program increase and to accelerate SBX software upgrades.

Decrease in FY 2019 from PB19 to PB20 reflects enacted congressional adjustment due to FY 2018 forward financing for SBX software upgrades.

Decrease in FY 2020 from PB19 to PB20 reflects delay of dry dock from FY 2020 to FY 2025.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / *Sea Based X-Band Radar (SBX)*	Project (Number/Name) MX46 / *Sea Based X-Band Radar Development Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MX46: *Sea Based X-Band Radar Development Support*	527.087	170.031	130.604	123.089	-	123.089	113.857	126.654	121.220	133.078	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects completion of software and x86 processor upgrades.

A. Mission Description and Budget Item Justification

This project provides developmental operations and support of the SBX Radar and its four major sub-systems: the self-propelled vessel; the X-Band Radar (XBR); the In-Flight Interceptor Communications System Data Terminal; and the communications network. Developmental operations and support activities include operation and sustainment of the vessel, developmental operation and sustainment of the XBR, limited XBR software support and vessel and shore side security. The FY 2020 budget reflects the continued development required to deliver BMDS enhanced discrimination capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Vessel Operations and Support	96.370	72.762	67.563
Articles:	-	-	-
Description: Vessel Operations and Support provides for sustainment of the SBX vessel for full operations. This effort maintains annual surveys and U.S. Coast Guard Certifications to ensure readiness for operational contingencies, provides for resupply of SBX, and conducts in port and underway maintenance. The SBX participates in BMDS ground tests and flight tests per the Integrated Master Test Plan (IMTP). This effort also provides force protection for SBX and military flight deck upgrade. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects a decrease in requirements after FY 2018 Congressional Plus Ups and completion of software and x86 processor upgrades.			
Title: System Force Protection	5.683	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Articles:	-	-	-
Description: Provides force protection for SBX. ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for this effort was transferred to Vessel Operations and Support accomplishments in FY 2019.			
Title: XBR Operations and Support	67.978	57.842	55.526
Articles:	-	-	-
Description: This effort operates and sustains the XBR at full operations, operates and sustains SBX communications systems, performs mission integration functions, and provides support for contingency operations with manning for improved readiness enabling rapid response time from notification to underway. XBR Operations and Support maintains limited software sustainment for system capability with the BMDS and fields additional XBR capability to the Warfighter with the BMDS capability increment. This effort also provides precision track, discrimination, and hit assessment for engagement support in BMDS ground tests and flight tests per the approved IMTP. Additional development efforts include continuing XBR x86 integration to increase the XBR processing capabilities. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	170.031	130.604	123.089

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603891C: *Special Programs - MDA*	356.560	422.348	377.098	-	377.098	357.650	343.919	277.106	277.157	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	88.840	77.405	105.530	-	105.530	114.698	99.088	112.943	96.526	Continuing	Continuing

Remarks

D. Acquisition Strategy

SBX is contractor operated and maintained through a variety of contracts between the Navy and MDA. SBX-1 Vessel Management and Security contracts are managed by Military Sealift Command. The SBX radar is operated and maintained on contracts managed by MDA.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Vessel Operations and Support - Force Protection	MIPR	Military Sealift Command : VA	0.000	0.000		6.014	Feb 2019	6.381	Oct 2019	-		6.381	Continuing	Continuing	Continuing
Vessel Operations and Support - Fuel	MIPR	Military Sealift Command : VA	43.691	11.699	Jan 2018	11.494	Jan 2019	8.256	Oct 2019	-		8.256	Continuing	Continuing	Continuing
Vessel Operations and Support - Navy Program Management Office	MIPR	Military Sealift Command : VA	4.831	1.900	Oct 2017	1.724	Oct 2018	2.639	Oct 2019	-		2.639	Continuing	Continuing	Continuing
Vessel Operations and Support - Navy Transition Office	MIPR	US Navy : AL	5.732	0.000		0.000		0.000		-		0.000	0.000	5.732	0.000
Vessel Operations and Support - Operational Support Vessel (OSV Resupply)	MIPR	Military Sealift Command : VA	10.629	17.670	Feb 2018	17.288	Feb 2019	17.412	Oct 2019	-		17.412	Continuing	Continuing	Continuing
Vessel Operations and Support - SBX Operations & Support (Vessel)	MIPR	Military Sealift Command : VA	143.533	46.128	Oct 2017	26.310	Oct 2018	23.856	Oct 2019	-		23.856	Continuing	Continuing	Continuing
Vessel Operations and Support - SBX Vessel Maintenance	MIPR	Tote : HI/NJ	28.048	8.915	Mar 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Vessel Operations and Support - Vessel Mission Integration	C/FFP	Gryphon Tech. : AL/ HI	48.290	10.058	Dec 2017	9.932	Dec 2018	9.019	Dec 2019	-		9.019	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / *Sea Based X-Band Radar (SBX)*	Project (Number/Name) MX46 / *Sea Based X-Band Radar Development Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Force Protection - Force Protection	SS/CPFF	AQuate : Hi	26.507	5.683	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
XBR Operations and Support - -- Civilians/ Travel	Allot	MDA : Various	0.000	0.000		0.000		2.038	Oct 2019	-		2.038	Continuing	Continuing	Continuing
XBR Operations and Support - Contract Support Services	Various	Various : Various	0.000	0.000		0.000		1.200	Oct 2019	-		1.200	Continuing	Continuing	Continuing
XBR Operations and Support - SBX Communications Support	SS/CPIF	Boeing : AL/HI	10.140	2.701	Nov 2017	2.743	Jan 2019	1.579	Jan 2020	-		1.579	Continuing	Continuing	Continuing
XBR Operations and Support - XBR Operations & Support	SS/CPIF	Raytheon : AL/AK/HI	205.686	65.277	Nov 2017	55.099	Dec 2018	50.709	Dec 2019	-		50.709	Continuing	Continuing	Continuing
		Subtotal	527.087	170.031		130.604		123.089		-		123.089	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / *Sea Based X-Band Radar (SBX)*	Project (Number/Name) MX46 / *Sea Based X-Band Radar Development Support*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	527.087	170.031		130.604		123.089		-		123.089	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
L200 (AEGIS 4.0.3)	✦																											
GT-18 Sprint 2				✦																								
GTI-07c (N/P) (BMDS Ground Test)									✧																			
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)										△																		
GTI-08 (N/P) (BMDS Ground Test)												✧	✧															
GTD-08 (N/P) (BMDS Ground Test)														✧														
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)																		✧										
FTG-17 (GM, DT Intercept Flight Test)																					△							
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)																					✧							
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)																							✧					
GTD-11 (N/P) (BMDS Ground Test)																								✧	✧			
FTG-18 (GM, DT/OT Intercept Flight Test)																									△			
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)																											✧	
FTG-19 (GM, DT/OT Intercept Flight Test)																												

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
L200 (AEGIS 4.0.3)	1	2018	1	2018
GT-18 Sprint 2	4	2018	4	2018
GTI-07c (N/P) (BMDS Ground Test)	1	2020	1	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
GTD-08 (N/P) (BMDS Ground Test)	2	2021	2	2021
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)	3	2022	3	2022
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)	1	2023	1	2023
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)	3	2023	3	2023
GTD-11 (N/P) (BMDS Ground Test)	4	2023	1	2024
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)	3	2024	3	2024
FTG-19 (GM, DT/OT Intercept Flight Test)	1	2025	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / *Sea Based X-Band Radar (SBX)*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	20.006	3.957	6.111	5.067	-	5.067	5.595	6.172	6.284	6.831	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	3.957	6.111	5.067
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	3.957	6.111	5.067

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities, Operations and Maintenance	MIPR	Various : Multi: AK, AL, CA, CO, VA	1.613	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	1.841	0.060	Jul 2018	0.093	Jul 2019	0.076	Jul 2020	-		0.076	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AL, CA, CO, VA	8.808	3.882	Mar 2018	6.018	Mar 2019	4.991	Nov 2019	-		4.991	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (CPAF)	C/CPAF	Northrop Grumman : CO	7.541	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: VA,WA	0.203	0.015		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Dept of Labor : VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	20.006	3.957		6.111		5.067		-		5.067	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	20.006	3.957		6.111		5.067		-		5.067	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603913C / *Israeli Cooperative Programs*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,928.289	373.800	300.000	300.000	-	300.000	300.000	300.000	300.000	300.000	Continuing	Continuing
MD20: *Israeli Upper Tier*	553.698	190.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	743.698
MD26: *Arrow Weapon System*	429.345	82.300	163.000	159.000	-	159.000	173.000	173.000	173.000	173.000	Continuing	Continuing
MD34: *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*	945.246	101.500	137.000	141.000	-	141.000	127.000	127.000	127.000	127.000	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Content supports expected contributions from Israel per international agreements.

A. Mission Description and Budget Item Justification

Since 1986, the United States and the State of Israel have cooperated on missile defense. Currently, Missile Defense Agency (MDA) has three major projects with Israel to develop and improve their indigenous capability to defend against short and medium range ballistic missiles. These include Upper Tier Interceptors (MD20), the Arrow Weapon System (MD26) and the Short-Range Ballistic Missile Defense, also known as the David's Sling Weapon System (MD34). Within these projects MDA develops and produces weapon systems, conducts tests, and exercises interoperability between U.S. Ballistic Missile Defense System (BMDS) and the Israeli Missile Defense Architecture.

The United States and State of Israel entered into a Memorandum of Understanding (MOU) on September 2016, in which `Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of $500 million per year.' These funds will be distributed between the Israeli Programs in Research Development Test & Evaluation (RDT&E) and Procurement Funds.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603913C *I Israeli Cooperative Programs*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	105.354	300.000	300.000	-	300.000
Current President's Budget	373.800	300.000	300.000	-	300.000
Total Adjustments	268.446	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	268.446	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects enacted congressional adjustments that increased MD20: Israeli Upper Tier by $133,139, MD26: Israeli Arrow Program by $71,459 and MD34: Short Range Ballistic Missile Defense (David's Sling Weapon System) by $63,848.

Funds for the Israeli Upper Tier MD20 were incorporated into Arrow Weapon System Development MD26 as part of the MOU beginning in FY 2019.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / *Israeli Cooperative Programs*	Project (Number/Name) MD20 / *Israeli Upper Tier*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD20: *Israeli Upper Tier*	553.698	190.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	743.698
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This project code encompasses the Missile Defense Agency's (MDA) U.S.-Israeli cooperative program for the Israeli Upper Tier Program. Funding for MD20 Israeli Upper Tier was incorporated into MD26 Arrow Weapon System (AWS) Development beginning in FY 2019.

A. Mission Description and Budget Item Justification

Israeli Upper Tier Interceptor (UTI) Project: The Upper Tier Program provides the Arrow-3 missile, increasing the system`s capability against advanced medium range threats by providing approximately four times the current Arrow-2 battle space. The primary near term objective is to complete and demonstrate Upper Tier design, and continue Initial Lot Production (ILP) deliveries.

This project provides funding for the Upper Tier component of the Arrow Weapon System (AWS) development. The United States through the cooperative effort gains knowledge and experience of the Israeli Defense Forces operation of a multi-layered defense architecture. This project also includes the procurement of the Silver Sparrow Air-Launched Target which is necessary to validate the performance of the Arrow-3 Missile and related Block 5 spiral development activities.

Spiral development and UTI upgrades were incorporated into the Arrow Weapon System (MD26: Israeli ARROW Program) as the UTI initial development and Low Rate Initial Production were complete beginning in FY 2019.

The United States and State of Israel entered into a Memorandum of Understanding (MOU) on September 2016, in which `Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of $500 million per year.' These funds will be distributed between the Israeli Programs in Research Development Test & Evaluation (RDT&E) and Procurement Funds.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Upper Tier Interceptor	190.000	0.000	0.000
Articles:	-	-	-
Description: The scope of the Upper Tier Program covers interceptor development, testing, material procurement to include initial lot production, and integration of spiral software development for Block 5 AWS. Accomplishments included: - Testing of the Arrow-3 Interceptor - Algorithm design reviews to verify requirements - Interceptor Spiral Development			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD20 / *Israeli Upper Tier*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Procurement and Delivery of Initial Lot Production assets and Test Articles ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for MD20 Israeli Upper Tier was incorporated into MD26 Arrow Weapon System (AWS) Development beginning in FY 2019.			
Accomplishments/Planned Programs Subtotals	190.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Upper-Tier Interceptor Project Agreement under the Research, Development, Test and Evaluation (RDT&E) Framework agreement between the U.S. and Israel creates a joint program office to manage this program. Missile Defense Agency (MDA) and the Israeli Ministry of Defense (IMoD) continue to implement best management practices that allow for the more effective use of program management tools to ensure risk is adequately managed to include Knowledge Points that assess Israel`s development progress. The DoD U.S. Israeli Cooperative Program Office jointly manages the Upper Tier program with IMoD to ensure that all systems are delivered on time, on budget, and meet the needs of the warfighter. The program is equitably funded between the U.S. and Israel. A portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMoD or MDA dependent on what is most advantageous to the Joint Governments. In regard to the Upper Tier Interceptor, IMoD will contract with Israel Aerospace Industries (IAI). IAI subcontracts with Israeli companies, Boeing and other U.S. companies.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD20 / *Israeli Upper Tier*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Upper Tier Interceptor - Upper Tier Interceptor	C/CPFF	Israel Aerospace Industries (IAI) : Israel	553.698	190.000	Dec 2017	0.000		0.000		-		0.000	0.000	743.698	0.000
		Subtotal	553.698	190.000		0.000		0.000		-		0.000	0.000	743.698	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD20 / *Israeli Upper Tier*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks															
N/A															

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	553.698	190.000		0.000		0.000		-		0.000	0.000	743.698	N/A

Remarks

Contract cost reflect U.S. contribution only. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD20 / *Israeli Upper Tier*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Israeli Cooperative Arrow 3 Intercept Test #2- FY 2018	✦	✦	✦	✦																								
Israeli Cooperative Arrow 3 Intercept Test #3 FY 2018	✦	✦	✦	✦																								

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD20 / *Israeli Upper Tier*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Israeli Cooperative Arrow 3 Intercept Test #2- FY 2018	1	2018	4	2018
Israeli Cooperative Arrow 3 Intercept Test #3 FY 2018	1	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / *Israeli Cooperative Programs*	Project (Number/Name) MD26 / *Arrow Weapon System*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD26: *Arrow Weapon System*	429.345	82.300	163.000	159.000	-	159.000	173.000	173.000	173.000	173.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds for MD20 Israeli Upper Tier were incorporated into this project beginning in FY 2019.

A. Mission Description and Budget Item Justification

Israeli Arrow Weapon System (AWS): This system includes block upgrades to the AWS components which enhances capabilities against evolving medium range threats by increasing the total defended area. AWS elements include the Arrow-2 missile and launcher, Citron Tree Battle Management Center (BMC), Green Pine (GP) and Super Green Pine (SGP) Radars, and the Hazelnut Tree Launcher Control Center (LCC). Also included is the integration of Block 5 assets which include the Arrow-3 missile and launcher.

Arrow Block 5 development will also incorporate a Long Range Detection Suite that consists of an unmanned aerial vehicle Airborne Early Warning System (ABEWS) and Sharp Eye Radar for increased sensor range, early detection and enhanced raid size capacity. The program also includes the continued development of Arrow`s interoperability with U.S. BMDS.

The United States and State of Israel entered into a Memorandum of Understanding (MOU) on September 2016, in which `Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of $500 million per year.' These funds will be distributed between the Israeli Programs in Research Development Test & Evaluation (RDT&E) and Procurement Funds.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Arrow Weapon System	75.938	156.638	153.940
Articles:	-	-	-
Description: The Arrow Weapon System (AWS) continues Block 4 and Block 5 spiral development and target development. Included is the integration of Block 5 assets, which consists of the Arrow-3 missile, launcher, and Long Range Detection Suite (LRDS). Continue proven Interoperability with U.S. Assets and enhancements to existing AWS System Components. Specific and/or unique planned accomplishments to each FY are as follows:			
FY 2019 Plans: -Conduct Block 4 Flight Test proving improved system performance in the U.S.			
FY 2020 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Conduct Block 5 Flight Test proving improved system performance ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for MD20 Israeli Upper Tier was incorporated into MD26 Arrow Weapon System (AWS) Development beginning in FY 2019.			
Title: Israeli Test Bed (ITB)	3.535	3.535	3.535
Articles:	-	-	-
Description: The Israeli Test Bed (ITB) provides experiments to evaluate Human Machine Interface (HMI) battle management and integration of Block 5 Arrow Weapon System Techniques Tactics and Procedures (TTPs) and CONOPs. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -SEE ABOVE. ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Israeli Systems Architecture and Integration (ISA&I)	2.827	2.827	1.525
Articles:	-	-	-
Description: Israeli Systems Architecture and Integration conducts studies to assess Israel's future 2025 Missile Defense Architecture. This identifies the preferred missile defense architecture and reference threat for 10-15 year future epoch and interoperability special studies on regional threats and growth path options. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -SEE ABOVE. ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	82.300	163.000	159.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The DoD U.S. Israeli Cooperative Program Office jointly manages the Arrow Program with Israel Ministry of Defense (IMoD) to ensure that all systems are delivered with quality on time, on budget, and meet the needs of the warfighter. The program funding is equitably funded between the U.S. and Israel with Israel providing matching contributions. However, a portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMoD or MDA dependent on what is most advantageous to the Joint Governments. In regard to AWS, IMoD contracts on behalf of U.S. government with Israel Aerospace Industries (IAI). IAI subcontracts with Israeli and U.S. companies. For the Israeli Test Bed, the Missile Defense Agency (MDA) contracts directly with Elbit Systems, Ltd. while IMoD provides an equitable share of the funding to the U.S. Finally, MDA provides funding and contracts directly with WALES, Ltd for the Israeli System Architecture and Integration program.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / *Israeli Cooperative Programs*	Project (Number/Name) MD26 / *Arrow Weapon System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Arrow Weapon System - Arrow Weapon System	C/CPFF	Israel Aerospace Industries (IAI) : Israel	374.817	75.938	Dec 2017	156.638	Dec 2018	153.940	Dec 2019	-		153.940	Continuing	Continuing	Continuing
Israeli Test Bed (ITB) - Israeli Test Bed	C/FFP	Elbit Systems : Israel	31.815	3.535	Dec 2017	3.535	Nov 2018	3.535	Dec 2019	-		3.535	Continuing	Continuing	Continuing
Israeli Systems Architecture and Integration (ISA&I) - ISA&I	C/FFP	Wales LTD : Israel	22.713	2.827	Dec 2017	2.827	Oct 2018	1.525	Dec 2019	-		1.525	Continuing	Continuing	Continuing
		Subtotal	429.345	82.300		163.000		159.000		-		159.000	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	429.345	82.300		163.000		159.000		-		159.000	Continuing	Continuing	N/A

Remarks

Contract cost reflect U.S. contribution only.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2018	✦	✦	✦	✦																								
Israeli Test Bed Experiments FY 2018	✦	✦	✦	✦																								
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2019					✧	✧	✧	✧																				
Israeli Test Bed Experiments FY 2019					✧	✧	✧	✧																				
Arrow Weapon System Flight Test (1 of 3) FY 2019					✧	✧	✧	✧																				
Arrow Weapon System Flight Test (2 of 3) FY 2019					✧	✧	✧	✧																				
Arrow Weapon System Flight Test (3 of 3) FY 2019					✧	✧	✧	✧																				
Israeli Test Bed Experiments FY 2020									✧	✧	✧	✧																
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2020									✧	✧	✧	✧																
Arrow Weapon System Flight Test FY 2020									✧	✧	✧	✧																
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2021													✧	✧	✧	✧												
Israeli Test Bed Experiments FY 2021													✧	✧	✧	✧												
Arrow Weapon System Flight Test FY 2021													✧	✧	✧	✧												
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2022																	✧	✧	✧	✧								
Israeli Test Bed Experiments FY 2022																	✧	✧	✧	✧								
Arrow Weapon System Flight Test FY 2022																	✧	✧	✧	✧								
Israeli Test Bed Experiments FY 2023																					✧	✧	✧	✧				
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2023																					✧	✧	✧	✧				
Arrow Weapon System Flight Test FY 2023																					✧	✧	✧	✧				
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2024																									✧	✧	✧	✧
Israeli Test Bed Experiments FY 2024																									✧	✧	✧	✧
Arrow Weapon System Flight Test FY 2024																									✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2018	1	2018	4	2018
Israeli Test Bed Experiments FY 2018	1	2018	4	2018
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2019	1	2019	4	2019
Israeli Test Bed Experiments FY 2019	1	2019	4	2019
Arrow Weapon System Flight Test (1 of 3) FY 2019	1	2019	4	2019
Arrow Weapon System Flight Test (2 of 3) FY 2019	1	2019	4	2019
Arrow Weapon System Flight Test (3 of 3) FY 2019	1	2019	4	2019
Israeli Test Bed Experiments FY 2020	1	2020	4	2020
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2020	1	2020	4	2020
Arrow Weapon System Flight Test FY 2020	1	2020	4	2020
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2021	1	2021	4	2021
Israeli Test Bed Experiments FY 2021	1	2021	4	2021
Arrow Weapon System Flight Test FY 2021	1	2021	4	2021
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2022	1	2022	4	2022
Israeli Test Bed Experiments FY 2022	1	2022	4	2022
Arrow Weapon System Flight Test FY 2022	1	2022	4	2022
Israeli Test Bed Experiments FY 2023	1	2023	4	2023
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2023	1	2023	4	2023
Arrow Weapon System Flight Test FY 2023	1	2023	4	2023
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2024	1	2024	4	2024
Israeli Test Bed Experiments FY 2024	1	2024	4	2024
Arrow Weapon System Flight Test FY 2024	1	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD34: *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*	945.246	101.500	137.000	141.000	-	141.000	127.000	127.000	127.000	127.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This project code encompasses the Missile Defense Agency's (MDA) U.S.-Israeli cooperative program for the Israeli David's Sling Weapon System Program.

A. Mission Description and Budget Item Justification

Short Range Ballistic Missile Defense (SRBMD): SRBMD, also known as the David`s Sling Weapon System (DSWS), is designed to counter short range rockets, cruise missiles, and tactical ballistic missiles and will be integrated into the Israeli Missile Defense Architecture adding another layer of defense to the current Arrow System. The David`s Sling Weapon System (DSWS) includes the Stunner Interceptor, Missile Firing Unit (MFU), Multi-Mission Radar (MMR), Launch Site Controller (LSC), Data Link (DL), Elevated Sensor (ES), and the Golden Almond Battle Management Center (BMC).

The United States and State of Israel entered into a Memorandum of Understanding (MOU) on September 2016, in which `Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of $500 million per year.' These funds will be distributed between the Israeli Programs in Research Development Test & Evaluation (RDT&E) and Procurement Funds.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: SRBMD Program	101.500	137.000	141.000
Articles:	-	-	-
Description: The scope of the David's Sling Weapon System covers system development, testing, material procurement to include initial lot production, and integration of spiral software development for Blocks 1-3. Block 1 capability enhances the short range rocket and missile defense capability. Block 2 will add capability to defend against medium range and cruise missiles. Block 3 will provide robust defense capability and add significant detection capability to the Israeli Air Defense Architecture. Recurring Planned Accomplishments include: - Conduct Testing of the DSWS - Continue Blocks 2 and 3 Spiral Development of the DSWS - Establish and Continue Interoperability with Israeli Air Missile Defense Network			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Finalize Elevated Sensor development ***FY 2020 Plans:*** -Continue development of the Next Generation Multi-Mission Radar -Develop enhanced Stunner capability ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	101.500	137.000	141.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Short Range Ballistic Missile Defense (SRBMD), also known as the David's Sling Weapon System (DSWS) Project Agreement under the Research, Development, Test and Evaluation (RDT&E) Framework agreement between the U.S. and Israel creates a joint program office to manage this program. Missile Defense Agency (MDA) and the Israeli Ministry of Defense (IMoD) continue to implement management practices that allow for the more effective use of program management tools to ensure risk is adequately managed to include Knowledge Points that assess Israel`s development progress. The DoD U.S. Israeli Cooperative Program Office jointly manages the SRBMD/DSWS program with IMoD to ensure that all systems are delivered in an effective manner, and meet the needs of the warfighter. The program is equitably funded between the U.S. and Israel. A portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMoD or MDA dependent on what is most advantageous to the Joint Governments. For the Stunner Interceptor, Rafael Advanced Systems (an Israeli company), subcontracts to Raytheon Missile Systems for Stunner interceptor components.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SRBMD Program - SRBMD Program	C/CPFF	Rafael : Israel	945.246	101.500	Dec 2017	137.000	Dec 2018	141.000	Dec 2019	-		141.000	Continuing	Continuing	Continuing
		Subtotal	945.246	101.500		137.000		141.000		-		141.000	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	945.246	101.500		137.000		141.000		-		141.000	Continuing	Continuing	N/A

Remarks

Contract cost reflect U.S. contribution only.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
System Flight Test #6 FY 2019					✧	✧	✧	✧																				
System Flight Test #7 FY 2021													✧	✧	✧	✧												
System Flight Test #8 FY 2022																	✧	✧	✧	✧								
System Flight Test #9 FY 2023																					✧	✧	✧	✧				
System Flight Test #10 FY 2024																									✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
System Flight Test #6 FY 2019	1	2019	4	2019
System Flight Test #7 FY 2021	1	2021	4	2021
System Flight Test #8 FY 2022	1	2022	4	2022
System Flight Test #9 FY 2023	1	2023	4	2023
System Flight Test #10 FY 2024	1	2024	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603914C / *Ballistic Missile Defense Test*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,964.192	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
MD04: *BMDS Consolidated Test Center*	-	0.000	0.000	0.000	-	0.000	31.710	0.000	95.000	73.700	0.000	200.410
MT04: *BMDS Test Program*	1,861.802	383.821	472.673	371.710	-	371.710	360.921	306.746	326.575	306.066	Continuing	Continuing
MC04: *Cyber Operations*	13.792	8.459	28.619	8.710	-	8.710	8.806	8.905	8.904	9.082	Continuing	Continuing
MD40: *Program Wide Support*	88.598	14.526	14.605	15.504	-	15.504	16.509	19.830	21.244	16.288	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2019 to FY 2020 in accordance with the Integrated Master Test Plan (IMTP) 20.1

A. Mission Description and Budget Item Justification

Missile Defense Agency (MDA) utilizes a disciplined system engineering process to develop and integrate the Ballistic Missile Defense System (BMDS) into an effective, layered defense against ballistic missiles of all ranges during all phases of flight. This process consists of the following steps: Plan, Define, Design, Build, Test and Verify, Assess, and Deliver BMDS Capability, followed by transfer of selected capabilities. The BMDS Test Program Element (PE) is responsible for testing that provides critical data to: determine validity of models and simulations used to verify and assess BMDS capabilities; validate that Elements and Components are properly designed, built, and integrated; and provide confidence that the BMDS will perform as designed. Results from the Test and Verify step provide feedback into the Plan, Define, and Design steps to identify areas for system improvements. Key to the systems engineering process is Modeling and Simulation (M&S), which reflects the integrated operational system's performance. Confidence in M&S is based on a comprehensive Verification, Validation, and Accreditation (VV&A) process. The BMDS Test Program, as documented in the Integrated Master Test Plan (IMTP), has a primary emphasis to provide the data necessary to verify and assess BMDS capabilities in support of Technical Capability Declarations, and to anchor BMDS M&S. As models are validated and accredited, MDA and the BMDS Operational Test Agency (OTA) Team will utilize these models to assess BMDS capabilities through a campaign of ground testing.

BMDS Test Program Functions include:
- Represent MDA as the single test authority to the test and evaluation community, international cooperative program representatives, and other organization representatives
- Develop and implement MDA test policy, standards, tools, products, and processes to enable effective tests while balancing MDA and element programmatic needs
- Develop an IMTP that compiles all MDA test objectives, test schedules, and funding requirements from the year of execution through the Future Years Defense Program time period and beyond (through FY 2027)
- Act as the single point of contact in MDA for all external ranges and common test resources
- Provide, maintain, and develop common test resources and infrastructure required to execute tests in the MDA Test Program by leveraging element laboratories, ranges, executing agents, and functional expertise, as applicable

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603914C *I Ballistic Missile Defense Test*

- Certify that test personnel are trained and equipped to conduct safe and effective tests
- Provide test personnel and support services to plan and execute tests
- Collect, archive, and distribute all MDA test data/information

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	316.193	365.681	349.388	-	349.388
Current President's Budget	406.806	515.897	395.924	-	395.924
Total Adjustments	90.613	150.216	46.536	-	46.536
• Congressional General Reductions	-2.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	88.400	150.216			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	4.336	0.000			
• SBIR/STTR Transfer	-0.123	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	46.536	-	46.536

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustments for HALO acquisitions.

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustments for HALO acquisitions, JEON testing, and Facilities, Sustainment, Restoration, and Modernization (FSRM).

Increase in FY 2020 from PB19 to PB20 provides ground and flight tests in accordance with the Integrated Master Test Plan (IMTP) 20.1.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / *Ballistic Missile Defense Test*	Project (Number/Name) MD04 / *BMDS Consolidated Test Center*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD04: *BMDS Consolidated Test Center*	-	0.000	0.000	0.000	-	0.000	31.710	0.000	95.000	73.700	0.000	200.410
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The MD04 project has been added in FY 2021 to provide the procurement and outfitting of the Consolidated Test Center (CTC).

A. Mission Description and Budget Item Justification

The CTC is a two-phase complex of test and development focused buildings to be located on Redstone Arsenal. When completed, this complex will provide a more operationally realistic, secure, and efficient test infrastructure environment. Current Agency test infrastructure consists of 109 labs in 29 facilities across ten states. The consolidation of these geographically dispersed test centers into the CTC allows for future upgrades to capability and efficiently maintains a more robust security posture in accordance with DoD policy. The consolidation into the CTC also aligns the Agency to the mandated Federal Data Center Consolidation Initiative and reduces security vulnerabilities from several disparate security authorities. The Agency will be better positioned to support emerging requirements and address agile integration and testing through a conformed DoD network, not dispersed geographically which adds additional complexity and security issues to an evolving threat response. Agency testing requires agility and complexity to meet the evolving threat, and updating the current test infrastructure requires substantial investment.

CTC-1 will allow the Agency to consolidate developmental testing and Hardware-In-the-Loop (HWIL) assets into a single complex to support the increasing pace of system-level testing. This strategy is critical because several data centers are approaching capacity. It also ensures compliance with Agency commitments to vacate currently leased space and consolidate laboratories into MDA-owned facilities. By synchronizing technology refreshes across the laboratories and data centers, the Agency will reduce the cost of common test infrastructure across the Agency and will provide more efficient infrastructure for continuous operations. CTC-2 will move the majority of MDA developmental laboratories out of Army (AMRDEC/SED) and other premises and under Agency cognizance, with the potential to reduce future infrastructure costs (beyond FYDP) while improving Agency security posture through developmental laboratory consolidation. CTC-1 MILCON is scheduled to begin in FY 2022, with outfitting and equipping beginning simultaneously to ensure complete transition NLT FY 2025. CTC-2 MILCON is planned to begin in FY 2025.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Consolidated Test Center	0.000	0.000	0.000
Articles:	-	-	-
Description: Acquire, move, and build the ground test infrastructure of the Agency in the CTC-1 building. CTC-1 consolidates multiple laboratories and facilities including the Advanced Research Center (ARC), THAAD HWIL laboratories, Tactical Communications Environment Segment (TCES), Network, Systems Integration and Test Environment (NSITE), and Ground Test Communications.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD04 / *BMDS Consolidated Test Center*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
This work is scheduled to begin in FY 2021. ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD04 / *BMDS Consolidated Test Center*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Consolidated Test Center - Test Equipment	MIPR	USACE : AL	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
		Subtotal	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD04 / *BMDS Consolidated Test Center*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Consolidated Test Center One Move and Outfit (CTC-1)													✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD04 / *BMDS Consolidated Test Center*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Consolidated Test Center One Move and Outfit (CTC-1)	1	2021	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / *Ballistic Missile Defense Test*	Project (Number/Name) MT04 / *BMDS Test Program*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT04: *BMDS Test Program*	1,861.802	383.821	472.673	371.710	-	371.710	360.921	306.746	326.575	306.066	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 in accordance with the Integrated Master Test Plan (IMTP) 20.1.

A. Mission Description and Budget Item Justification

The Test Program provides consolidated MDA capabilities and resources to support the management and execution of BMDS and Element-level testing.

The MDA Test Program is responsible for all BMDS testing and relies on BMDS Systems Engineering to provide the system test objectives that define the test architecture by developing, updating, coordinating, and assessing the IMTP. The MDA Test Program plans and executes BMDS test events and develops the necessary test policy, test plans, and test infrastructure to conduct an effective test program. The goals of this budget project are to sustain and improve a robust testing program and to enhance M&S efforts to provide, in conjunction with flight and ground testing, confidence to the Combatant Commanders that the missile defense system works.

Activities are grouped into six major areas: 1) Program Planning and Operations; 2) Flight Test; 3) Ground Test; 4) Test Infrastructure; 5) Engineering Test Analysis; and 6) USFK JEON.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Planning and Operations	100.203	85.841	95.465
Articles:	-	-	-
Description: The BMDS Test program is responsible for the following Program Planning and Operational activities: - Provide BMDS OTA System Team funding for civilian salaries and personnel support of system-level testing and conduct cybersecurity assessments of BMDS. - Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-92, Sec. 1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments - Serve as the MDA Test Interface/Liaison to the DOT&E, the DASD (DT&E), JFCC IMD, JITC and the Service OTAs. - Maintain a professional and diverse civilian workforce for flight and ground test support events. - Establish, maintain and execute the BMDS Test program budget. - Provide Integrated Master Test Plan cost modeling. - Provide day-to-day Test Functional Area (TFA) management.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Provide Test organizational property accountability. - Establish and standardize Test issuance documents. - Provide external interface services to support execution of the Ballistic Missile Defense System (BMDS) test program. - Manage Test contracting and acquisition activities as well as manpower activities ensuring proper integration of contracts, support agreements; oversight and maintenance of the Test Directorate Inter/Intra-agency Acquisition Review (IAR) database. - Provide oversight and coordination of test policy guidance to ensure compliance and strategic synchronization across the Test Directorate and the MDA. - Manage travel, including travel to support IMTP flight and ground test events. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - Transition of all OTA requirements to the BMD Test PE 0603914C, including OTA teams supporting GMD, VV&A, Cyber, and THAAD. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for the consolidation of all OTA requirements to the BMD Test PE 0603914C.			
Title: Flight Test	19.496	51.822	38.786
Articles:	-	-	-
Description: The Flight Test Execution program solely reflects the Integrated Master Test Plan (IMTP) cost model. The program integrates, manages, and executes flight tests using certified personnel and standardized processes and products to support Ballistic Missile Defense System (BMDS) fielding to the warfighter. - Develop flight test training requirements for Test Directors and other console operators. - Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-92, Sec. 1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments. - Develop and manage the cybersecurity test organization including plans, policy and strategy, resources, and tracking of information and coordinating Cyber test schedules in support of Flight Tests. - Identify mission risks and implement mitigation practices as required ensuring safe and successful test outcomes. - Provide a Failure Response Team to ensure implementation of the response plan and capture lessons learned for process improvement.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Train test personnel for each flight test and maintain training records for all test personnel. - Train and resource System Mission Managers to lead Integrated Event Test Team mission management and readiness activities across all four test event phases for System and Element flight test and contingency operations. - Complete test planning for BMDS Flight Test events. - Conduct mission planning and range coordination activities; provide communications security equipment and management for BMDS Flight Test events. - Design and develop the Lessons Learned database. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** Execute Flight Test events in accordance with the R-4 schedule. ***FY 2020 Plans:*** Execute Flight Test events in accordance with the R-4 schedule. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 is in accordance with the IMTP.			
Title: Ground Test	10.102	17.116	78.221
Articles:	-	-	-
Description: The Ground Test Execution program plans, designs, and executes BMDS ground tests in support of flight test risk reduction; BMDS fielding decisions; and Doctrine, Organization, Training, Materiel, Leadership and Education, and Personnel and Facilities (DOTMLPF) assessments. In addition, enables the warfighter to effectively employ, maintain, and sustain the BMDS and participate in the development of future missile defense capabilities through efficient ground testing. - Conduct SPMTs as required to support BMDS Flight Test Risk Reduction Analysis. - Refine and continue development of the Ground Test Mission Directors, System Mission Manager and Mission Director training plan. - Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-328, *1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments. - Develop and manage the cybersecurity test organization including plans, policy and strategy, resources, and tracking of information and coordinating Cyber test schedules in support of the IMTP. Maintain Ground Test Infrastructure:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Execute ground test planning activities supporting MDA test requirements and priorities to include test design, test integration, digital assessment, and international testing. - Maintain the hardware-in-the-loop (HWIL) Labs and communication test assets. - Maintain Advanced Research Center (ARC) infrastructure and networks, complete accreditation activities and ensure cyber compliance of all ARC enclaves Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Initiate planning for cyber requirements in FY 2020 GTD-08 (E/C) and GTD-08 (N/P) test events. - Finalize development of CONOPS to support CI/CAT emerging requirements, which begins execution in FY 2021. - Execute the following Ground Tests in FY 19: GTD-07b (NORTHCOM/CENTCOM), GTI-07c (NORTHCOM/CENTCOM), GTI-19 (USEUCOM/CENTCOM), and GTI-ISR (18) (International). - Initiate planning for the following Ground Test in FY20: GTI-08 (N/P) and CAT Sprints. ***FY 2020 Plans:*** - Execute the following Ground Tests in FY 2020: GTI-07c, GT-20 Sprint (BL 5.4), GT-20 Sprint (JEON), GTI-08 (N/P), GTI-ISR (21) (International) Risk Reduction Test. - Execute planning phase of CONOPS to support CI/CAT requirements, which begin execution first quarter FY 2021. - Initiate planning for the following Ground Tests in FY 2021: GTI-09 Sprint 1 (E/C), GTI-09 Sprint 2 (E/C), GTD-08 (N/P), GTI-ISR (21) Formal Testing. - Plan, coordinate, and execute Cybersecurity Activities in Development and Operations Test (DT/OT) environments (Platform (Element) level and Systems of System Level) as identified in the IMTP for Cyber activities. - Plan, coordinate, and execute Element Cybersecurity Experiments (ECEs) to provide an early cyber assessment of the platforms. - Continue to incorporate cybersecurity testing requirements into the BMDS ground tests to include planning for cyber requirements in FY20 GTI-08 (N/P). - Identify efficiencies gained in NORTHCOM/PACOM cyber activities from lessons learned as documented in previous cyber activities. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides transfer of all Ground Test infrastructure from the Test Infrastructure accomplishment to the Ground Test accomplishment.			
Title: Test Infrastructure	211.895	220.890	114.589
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: The BMDS Test Program procures, maintains, and manages test resource infrastructure and provides all resources and requirements in support of a robust IMTP schedule in six primary functions: 1) Flight Test Ranges 2) Sea Based Mobile Assets 3) Airborne Optics 4) Flight Test Communications 5) IMTP Development & Data Management 6) Test Facilities Sustainment Restoration/Modernization The primary function responsibilities are as follows: Flight Test Ranges: - Maintain the MDA unique range facilities and mobile sensors, communication, data processing and dissemination infrastructure to support a broad spectrum of test requirements including metric tracking, target characterization, and multi-spectral imagery of BMDS phenomena. - Construct the new Wake Island communications facility and provide enhancements to the fiber backbone providing Flight Test Communications Network (FTCN) services to remote sites. - Facilities Sustainment Restoration/Modernization (FSRM) Funds are required to repair, upgrade, and sustain numerous facilities, test infrastructure, and equipment maintained by MDA world-wide Sea Based Mobile Assets: - Provide Sea Based Systems (SBS) continued sustainment of test instrumentation ships, PACIFIC COLLECTOR and PACIFIC TRCKER, and associated telemetry and radar systems. Airborne Optics: - Maintain and procure modified Gulfstream Aircraft (HALOs) that collect radiometric and photo-documentary performance data for strategic and tactical defense systems flight and ground tests. - All three current HALO aircraft and sensors are nearing end-of-life and require replacement in order to meet the Federal Aviation Administration requirement for Next Gen Navigation system by FY 2020. - The key FY 2019 initiative is to replace the first ABS (HALO) Fleet Renewal Program sensor airframe. Flight Test Communications: - Provide operations and maintenance support for the Flight Test Communications Network at Wake Island.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Maintain accreditation for the Transportable Telemetry Systems (TTS), Pacific Collector Range Safety System (PCRSS), and the Flight Test Communications Network (FTCN). IMTP Development & Data Management: - Establish authority and maintain configuration control of the test baseline. - Develop, update, coordinate and deliver the IMTP, coordinated within MDA and External stakeholders (Director, Operational Test and Evaluation (DOT&E); the Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E)); the Joint Functional Component Command for Integrated Missile Defense (JFCC IMD); the Service Operational Test Agencies (OTAs)); and the Joint Interoperability Test Command (JITC)); and provides an affordable and executable test plan to meet Warfighter needs and National Security commitments. - Coordinate the IMTP Special Access Programs (SAP) Annex with respect to changes to SAP Program Test Baseline and synchronize with the collateral IMTP. - Manage the approved test baseline by assessing all proposed changes to the BMDS Test Schedule and Test Configurations for each BMDS test event identified in the IMTP. - Support the Developmental Baseline Reviews and the annual BMDS Accountability Reviews to assess baseline execution risk and verify BMDS components are consistent with the approved test baseline. - Update and maintain the classified Test Resource Mission Planning-Tool (TRMP-T(C)) database. - Execute Flight Test Design Analysis ensuring test designs are safe and sufficient to meet test objectives. - Develop and maintain integrated test tools to support Truth Data Requirements Documents, Truth Data Packages, on-site Truth Quick-Look product development, pre- and post-test analysis test planning, and resource de-confliction; Integrated Data Management Plans (IDMPs), Data Handling Plans (DHPs), Cybersecurity documentation, data planning and management, library operations, deployment process; infrastructure requirements process; and test operations support. - Provide analytical capability for Flight and Ground test planning to include: test design feasibility assessments, truth data and sensor analysis, truth data requirements documentation and data packages; flight safety analysis and flight safety data packages; and telemetry link margin, collision avoidance, and pre- and post-test trajectory analyses. - Review BMDS component programs' content on a quarterly basis to ensure consistency with the approved IMTP. - Maintain and extend the Directorate of Test Support System (DTSS) classified Computer Network Defense Service Provider (CNDSP) to support network cybersecurity defense for ground test network systems. Continue to define cybersecurity investments, risks and benefits used to reduce vulnerabilities and protect critical administrative and test data. - Maintain accreditation of the Orion Voice Switch Conferencing System (VSCS). - Co-chair the Signature Working Group to review all signature models and identify technical limitations associated with radar and optical signatures used to support Ballistic Missile Defense System (BMDS) ground and flight testing. - Manage the Missile Defense Data Center (MDDC) Program and its library, operations, and infrastructure providing centralized data management, archival, and distribution services.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Procure third Gulfstream-550. - Begin modifications on the new Gulfstream-550s as part of the ABS (HALO) Fleet Renewal Program. - Design, test, and integrate the Airborne Sensors Primary Sensor replacement into the first Gulfstream-550. - Replace the Sea Tel primary C-Band SATCOM antennas onboard Pacific Tracker and Pacific Collector to address End of Life (EoL). - Implement a redundant communications hub at the MDA Integration and Operations Center (MDIOC). - Complete construction and initiate outfit of the new Wake Island Test Support Facility that will replace failing and condemned mission support facilities and consolidate multiple test support and test execution functions into a single facility. - Execute a phased repair and modernization project for the Meck Island Power Plant at the Reagan Test Site (RTS) in conjunction with a U.S. Army Garrison-Kwajalein (USAG-KA)/MDA project to establish a green, renewable power generation and distribution system. - Execute deferred test infrastructure sustainment and modernization projects consistent with Independent Facility Condition Assessments (FCAs) conducted at multiple BMDS Test Ranges. - Implement an Operation and Sustainment (O&S) program for a new launch infrastructure at Kauai Test Facility (KTF) to support future target launches using new target variants currently in design. - Execute facility repair and maintenance activities across multiple locations, including: Pacific Missile Range Facility, Wake Island, Reagan Test Site/Meck Island, and Kauai Test Facility. ***FY 2020 Plans:*** - Complete the sensor integration, perform airworthiness flight tests, and mission systems ground and flight tests for the first new HALO system (HALO-IR) prior to fielding in late FY 2020/early FY 2021. - Complete modifications on the second and third Gulfstream-550 as part of the ABS (HALO) Fleet Renewal Program. - Design, test, and integrate the Airborne Sensors Primary Sensor replacement into the second and third Gulfstream-550. - Complete the Business Case Analysis (BCA) on replacement of the Pacific Tracker and Pacific Collector vessels. - Refresh flight test support equipment and the fleet of utility vehicles at Wake Island. - Install phase 2 and 3 of the Maritime Acquisition and Range Safety System (MARSS) on board the Mobile At-Sea Sensor Ship (MATSS) to replace the aging Mobile Range Safety System (MRSS) currently on board. - Implement a distributed communications hub architecture facilitating near-simultaneous flight test mission operations. - Modernize Mobile Communications Suite - 2 (MCS-2) to meet emerging MDA flight test requirements for remote sites.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue execution of the Meck Island Power Plant Replacement Project to include all power generation, switchgear, controls, Life Support Area, and downstream power distribution system components. - Release 2.0 NSITE Software to support all flight and ground test events. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 provides acceleration of ABS (HALO) Fleet Renewal Program improvements into FY 2018 and FY 2019, completion of FSRM activities in FY 2019, and the transfer of Ground Test Infrastructure to the Ground Test accomplishment.			
Title: Engineering and Test Analysis	29.925	25.104	27.049
Articles:	-	-	-
Description: The Engineering and Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event: - Designing test architecture, defining test objectives and evaluation criteria, defining target requirements, and generating ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor Models and Simulations. - Producing the threat data for BMDS ground and flight tests. - Coordinating with BMDS OTA to address test issues, disposition them, coordinate them, with the OTA and recommend action plans to achieve closure. - Delivering HWIL M&S integration test cases. - Integrating, testing, functionally qualifying, and delivering end-to-end BMDS simulations supporting ground test missions. - Analyzing system-level interoperability. - Conducting modeling and technical analysis for Combatant Command wargames and exercises. - Utilizing M&S for pre-test assessment and post-test review, as well as M&S updates. - Providing test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure. - Analyzing test results to identify verification and validation data collection shortfalls and reassigning objectives to future test events as required. - Documenting BMDS test observations for system-level test anomalies and coordinating the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS) - Providing the Quick Look Brief, Mission Data Review (MDR), and Executive MDR. IMTP and infrastructure tasks include: - Providing long-range BMDS IMTP planning and integration strategies related to overarching BMDS analysis product integration. - Upgrading test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Populating the MARS database with data from the most recently completed tests to support as-built analysis and capability assessments. - Providing engineering analysis process software to include System Coordination and Observation Reporting Environment (SCORE), Software Change Analysis Review Environment (SCARE), File Manager (FileMan), and ManPower Loading (MPL). - Incrementally improving and providing infrastructure, software, and MDA/IA compliance for the RApid Scenario Prototyping (RaSP) capability. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: USFK JEON	12.200	71.900	17.600
Articles:	-	-	-
Description: USFK USPACOM Joint Emergent Operational Need Statement (JEON) Testing. ***FY 2019 Plans:*** - Joint Requirements Oversight Council approved USPACOM JEON to deliver integrated Upper Tier and Lower Tier ballistic missile defense capability to expand engagement options and increases coverage area on the Korean Peninsula. - Delivers improved BMDS capability to the Korean Peninsula begun in September 2017. - These funds support USFK JEON testing. ***FY 2020 Plans:*** Continue flight and ground testing associated with USFK JEON program per IMTP schedule. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 is in accordance with the IMTP.			
Accomplishments/Planned Programs Subtotals	383.821	472.673	371.710

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing

Remarks

D. Acquisition Strategy

The BMDS Test Program acquisition strategy is consistent with the MDA capabilities-based acquisition strategy that emphasizes testing, evolutionary acquisition, and knowledge-based funding. Test directs a team of various internal staff (government and scientific, engineering and technical assistance support), executing agents (including DoD agencies, Service Organizations, Laboratories and Program Offices, Federally Funded Research and Development Center (FFRDC) and other MDA programs to execute the various diverse efforts within the BMDS test program through competition. When a specific effort/activity being conducted, acquired, or maintained requires the use of an executing agent, respective headquarter regulations are used to conform the acquisition strategy.

The MDA IMTP establishes and documents the test requirements for the BMDS with the specific focus on collecting the data needed for the Verification, Validation, and Accreditation (VV&A) of the BMDS Models and Simulations. This paradigm uses critical factor analysis to drive test design, planning, and execution for accrediting M&S, which is used to validate and assess system performance. With this test approach, MDA will establish confidence that the M&S used to evaluate the BMDS represent real world behavior, thereby enabling simulation-based performance assessment to verify system functionality.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / *Ballistic Missile Defense Test*	Project (Number/Name) MT04 / *BMDS Test Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Planning and Operations - IMTP Planning and Data Management Tools	C/FP	None : AL	118.365	21.723	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Lab Analysis Infrastructure	MIPR	MIT-LL/Aerospace : AL/CA/MA	65.145	8.059	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Operational Test Agency	MIPR	ATEC/Aberdeen Proving Grounds : MD	84.086	13.166	Feb 2018	23.310	Nov 2018	21.624	Nov 2019	-		21.624	Continuing	Continuing	Continuing
Program Planning and Operations - Support to Flight Testing	C/CPAF	Northrop Grumman/ Lockheed Martin : AL/CO	60.251	12.571	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Planning and Operations - Support to Ground Testing	C/CPAF	MDIOC/JRDC/IRES/ Northrop Grumman : AL/CO/VA/DC	23.030	5.645	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Support to Test Resources	C/CPAF	None : TEAMS/AL	26.615	4.354	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Test Functional Management Office	C/CPFF	None : MDA/ MiDAESS/AL/VA/ CO/MA	317.502	34.685	Mar 2018	62.531	Nov 2018	73.841	Nov 2019	-		73.841	Continuing	Continuing	Continuing
Flight Test - IMTP Flight Testing	MIPR	Air & Missile Def Command/AFGSC/ H'ville Operations Support Center/ NAWC/NRL/Ronald Reagan Test Site /SPAWAR/ Vandenberg AFB/ White Sands Missile Range/AMRDEC/ NSWC/PMRF/611th CES/611th ASUS/ AEDC : AL/CA/CO/ HI	245.006	19.496	Oct 2017	51.822	Oct 2018	38.786	Oct 2019	-		38.786	Continuing	Continuing	Continuing
Ground Test - Ground Test Infrastructure	MIPR	Space and Naval Warfare Command : AL/CA	0.000	0.000		0.000		69.411	Oct 2019	-		69.411	Continuing	Continuing	Continuing
Ground Test - IMTP Ground Testing	MIPR	Aviation & Missile Research & Development/LTPO/ Space & Naval Warfare Command : AL/CO/CA	49.144	10.102	Oct 2017	17.116	Oct 2018	8.810	Oct 2019	-		8.810	Continuing	Continuing	Continuing
Test Infrastructure - Ground Test Infrastructure	MIPR	Space and Naval Warfare Command : AL/CA	23.593	3.908	Nov 2017	43.825	Nov 2018	0.000		-		0.000	0.000	71.326	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Infrastructure - Airborne Optics Mobile Assets	C/IDIQ	None : L3/JHU/APL/ TX/MD/AZ/TN	105.313	102.750	Feb 2018	81.878	Feb 2019	24.424	Feb 2020	-		24.424	Continuing	Continuing	Continuing
Test Infrastructure - Core Ground Test Labs and HWILS	C/IDIQ	None : Colsa/ AMRDEC/AL/MD/FL/ CA/OH/CO	167.741	25.957	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Infrastructure - Enhanced GT Capability Assets	C/IDIQ	None : Colsa/Boeing/ NG/AL/CO/FL/MD/HI	31.664	9.940	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Infrastructure - Facilities Sustainment, Restoration & Modernization	MIPR	SMDC/Northrup Grumman/Colsa : AL/CO/NM	15.803	6.000	Nov 2017	26.049	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Test Infrastructure - Flight Test Communications	C/IDIQ	ASI/WSMR : Gray Research/NRL/ NAWC/CA/MD/NCR/ NM/AL/MA	98.252	18.141	Nov 2017	17.787	Nov 2018	21.015	Nov 2019	-		21.015	Continuing	Continuing	Continuing
Test Infrastructure - Flight Test Ranges	C/IDIQ	SMDC/SNL/PMRF : NAWC/WSMR/ AMRDEC/NG/AK/AL/ CA/HI/NM/CO	77.473	10.018	Nov 2017	12.002	Nov 2018	13.807	Nov 2019	-		13.807	Continuing	Continuing	Continuing
Test Infrastructure - IMTP Planning & Data Management Tools	C/FP	None : AL	0.000	18.894	Nov 2017	19.379	Nov 2018	33.725	Nov 2019	-		33.725	Continuing	Continuing	Continuing
Test Infrastructure - Sea Based Mobile Assets	MIPR	None : MARAD/ NAWC/Hanscom AFB/AL/CA/MD/ NCR/NM/MA	81.931	16.287	Nov 2017	19.970	Nov 2018	21.618	Nov 2019	-		21.618	Continuing	Continuing	Continuing
Test Infrastructure - Support to Test Resources	MIPR	None : TEAMS/AL	146.104	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Test Analysis - CSS Support	C/CPFF	TEAMS : AL	24.440	4.079	Nov 2017	4.162	Nov 2018	6.517	Nov 2019	-		6.517	Continuing	Continuing	Continuing
Engineering and Test Analysis - FFRDA/UARC 2	MIPR	Aerospace : CA	0.755	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Test Analysis - FFRDC/UARC	MIPR	MITRE : VA	3.187	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Test Analysis - Industry Support	C/CPAF	Boeing : AL	22.447	1.856	Nov 2017	2.467	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Test Analysis - Industry Support - NME	C/CPAF	Northrop Grumman-JRDC : CO, AL	0.000	1.848	Nov 2017	0.350	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Test Analysis - Industry Support 2	C/CPAF	COLSA : AL, CO	0.000	0.000		0.000		2.332	Nov 2019	-		2.332	Continuing	Continuing	Continuing
Engineering and Test Analysis - OGA Support	MIPR	AMRDEC : AL	71.603	19.380	Nov 2017	18.125	Nov 2018	18.200	Nov 2019	-		18.200	Continuing	Continuing	Continuing
Engineering and Test Analysis - OGA Support - NME	MIPR	LTPO : AL	2.352	2.762	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
USFK JEON - USFK JEON	SS/IDIQ	Lockheed Martin : Sunnyvale, CA/ Huntsville, AL	0.000	12.200	Nov 2017	71.900	Nov 2018	17.600	Nov 2019	-		17.600	Continuing	Continuing	Continuing
		Subtotal	1,861.802	383.821		472.673		371.710		-		371.710	Continuing	Continuing	N/A

Remarks

Recategorized and streamlined BMDS Test cost category content to better align test priorities.

The FY 2019 to FY 2020 increase of $54.411 million in Ground Test - Ground Test Infrastructure line reflects movement of all Ground Test infrastructure from the Test Infrastructure R-2A accomplishment to the Ground Test R-2A accomplishment.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks															
N/A															

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,861.802	383.821		472.673		371.710		-		371.710	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
SM CTV-03 (AEGIS 3.6.1, Intercept Only Flight Test)	▲																											
FE-1 (DT Tracking Exercise Flight Test)	▲																											
FS 17-2 (DT Tracking Exercise Flight Test)	▲																											
FS 17-4 (DT Tracking Exercise Flight Test)	▲																											
Israeli Cooperative Intercept Flight Test - FY 2018	✦	✦	✦	✦																								
FTM-29 (AEGIS 5.1, Intercept Flight Test)		▲																										
Warfighter TP 07a (BMDS Ground Test)		✦																										
FTX-33 (DT Tracking Exercise Flight Test)		▲																										
GTI-07b E/C (BMDS Ground Test)		✦	✦																									
FTP-12a (P8-3) (LTPO, Intercept Flight Test)		▲																										
FTX-35 (TH, Target Only Flight Test)			▲																									
JFTM-05 E1 (JAPAN, DT Intercept Flight Test)				▲																								
JFTM-05 E2 (JAPAN, DT Intercept Flight Test)				▲																								
PACIFIC DRAGON-18 (AEGIS 5.0, DT Tracking Exercise Flight Test)				▲																								
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)					▲																							
FTI-03 (OTA, OT Intercept Flight Test)					▲																							
Israeli Cooperative Intercept Flight Test - FY 2019					✧	✧	✧	✧																				
FTG-11 (OT) (GM, OT Intercept Flight Test)						△																						
GT-18 Sprint 3 (N/P) (BMDS Ground Test)						✧																						
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)							△																					
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)							△																					
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)							△																					
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)							△																					
GT-19 Sprint 1 (N/P) (BMDS Ground Test)							✧																					

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
GT-19 Sprint 2 (JEON) (BMDS Ground Test)							✧																					
GTD-07b (N/P) (BMDS Ground Test)							✧																					
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)								△																				
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)								△																				
FTT-23 (TH, DT Intercept Flight Test)								△																				
Warfighter TP 07b (BMDS Ground Test)								✧																				
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)								△																				
FEX-01 (OTHER, DT Tracking Exercise FT)									△																			
GTI-07c (N/P) (BMDS Ground Test)									✧																			
FTX-39 (LTPO, DT Target Only Flight Test)									△																			
Israeli Cooperative Intercept Flight Test - FY 2020									✧	✧	✧	✧																
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)										△																		
FTM-33 (AEGIS SBT, DT/OT Intercept Flight Test)										△																		
FTP-21 (LTPO, DT Intercept Flight Test)										△																		
FTP-27 E1 (LTPO, DT/OT Flight Test)										△																		
GT-20 Sprint (JEON) (BMDS Ground Test)										✧																		
GT-20 Sprint (BL 5.4) (BMDS Ground Test)										✧																		
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)										△																		
FTP-27 E2 (LTPO, DT/OT Flight Test)										△																		
FTP-17 (I8-2) (LTPO, DT Intercept Flight Test)											△																	
FTP-22 (LTPO, OT Intercept Flight Test)											△																	
GTD-07b (AA) (BMDS Ground Test)											✧																	
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)												△																
FTO-03 (OTA, OT Intercept Flight Test)												△																

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
GM BVT-03+ (GM, DT Interceptor Only Flight Test)												△																
GTI-08 (N/P) (BMDS Ground Test)												✧	✧															
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)													△															
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)													✧	✧														
Israeli Cooperative Intercept Flight Test - FY 2021													✧	✧	✧	✧												
GTD-08 (N/P) (BMDS Ground Test)														✧														
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)														△														
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)														△														
FTT-21 (TH, DT Intercept Flight Test)														△														
Warfighter TP 08 (BMDS Ground Test)															✧													
FTX-26 (OT) (SN, OT Target Only Flight Test)															△													
GTI-ISR (21) (BMDS Ground Test)															✧													
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)															✧													
FTP-23 (LTPO, DT/OT Intercept Flight Test)															△													
FTP-28 (LTPO, OT Intercept Flight Test)															△													
FTP-25 (LTPO, OT Intercept Flight Test)																△												
FTP-24 (LTPO, DT Intercept Flight Test)																△												
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)																△												
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)																△												
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)																△												
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)																△												
GTD-09 (E/C) (BMDS Ground Test)																	✧											
Israeli Cooperative Intercept Flight Test - FY 2022																	✧	✧	✧	✧								
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)																		△										

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FTP-19 (I8-4) (LTPO, DT Intercept Flight Test)																	△											
FTP-20 (I8-5) (LTPO, OT Intercept Flight Test)																	△											
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)																	✧											
GM CTV-03+ (GM, DT Interceptor Only Flight Test)																	△											
FTX-28 E1 (TH, DT Target Only Flight Test)																		△										
FTX-28 E2 (TH, DT Target Only Flight Test)																		△										
FTX-28 E3 (TH, DT Target Only Flight Test)																		△										
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)																		✧										
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																			△									
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)																			✧									
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)																			△									
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)																				✧								
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)																				△								
FTG-17 (GM, DT Intercept Flight Test)																				△								
GTD-10 (E/C) (BMDS Ground Test)																					✧							
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)																						✧						
Israeli Cooperative Intercept Flight Test - FY 2023																				✧	✧	✧	✧					
GTI-ISR (23) (BMDS Ground Test)																						✧						
FTT-24 (TH, DT Intercept Flight Test)																						△						
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)																							△					
FS-23 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)																							△					
FS-23 E2 (AEGIS 5.1, DT Target Only Flight Test)																							△					
FS-23 E3 (AEGIS 5.1, DT Target Only Flight Test)																							△					
FS-23 E4 (AEGIS 5.1, DT Intercept Flight Test)																							△					

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				
GTD-11 (N/P) (BMDS Ground Test)																								✧	✧				
Warfighter TP 11 (BMDS Ground Test)																								✧	✧	✧	✧		
Warfighter TP 13 (BMDS Ground Test)																								✧	✧	✧	✧	✧	
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)																									△				
FTG-18 (GM, DT/OT Intercept Flight Test)																									△				
Israeli Cooperative Intercept Flight Test - FY 2024																									✧	✧	✧	✧	
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)																										✧			
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)																										△			
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)																											✧		
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)																											△		
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)																												✧	
FTG-19 (GM, DT/OT Intercept Flight Test)																													

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SM CTV-03 (AEGIS 3.6.1, Intercept Only Flight Test)	1	2018	1	2018
FE-1 (DT Tracking Exercise Flight Test)	1	2018	1	2018
FS 17-2 (DT Tracking Exercise Flight Test)	1	2018	1	2018
FS 17-4 (DT Tracking Exercise Flight Test)	1	2018	1	2018
Israeli Cooperative Intercept Flight Test - FY 2018	1	2018	4	2018
FTM-29 (AEGIS 5.1, Intercept Flight Test)	2	2018	2	2018
Warfighter TP 07a (BMDS Ground Test)	2	2018	2	2018
FTX-33 (DT Tracking Exercise Flight Test)	2	2018	2	2018
GTI-07b E/C (BMDS Ground Test)	2	2018	3	2018
FTP-12a (P8-3) (LTPO, Intercept Flight Test)	2	2018	2	2018
FTX-35 (TH, Target Only Flight Test)	3	2018	3	2018
JFTM-05 E1 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
JFTM-05 E2 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
PACIFIC DRAGON-18 (AEGIS 5.0, DT Tracking Exercise Flight Test)	4	2018	4	2018
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	1	2019	1	2019
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
Israeli Cooperative Intercept Flight Test - FY 2019	1	2019	4	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
GT-18 Sprint 3 (N/P) (BMDS Ground Test)	2	2019	2	2019
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	3	2019	3	2019
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)	3	2019	3	2019
GT-19 Sprint 1 (N/P) (BMDS Ground Test)	3	2019	3	2019
GT-19 Sprint 2 (JEON) (BMDS Ground Test)	3	2019	3	2019
GTD-07b (N/P) (BMDS Ground Test)	3	2019	3	2019
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)	4	2019	4	2019
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)	4	2019	4	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
Warfighter TP 07b (BMDS Ground Test)	4	2019	4	2019
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	4	2019	4	2019
FEX-01 (OTHER, DT Tracking Exercise FT)	1	2020	1	2020
GTI-07c (N/P) (BMDS Ground Test)	1	2020	1	2020
FTX-39 (LTPO, DT Target Only Flight Test)	1	2020	1	2020
Israeli Cooperative Intercept Flight Test - FY 2020	1	2020	4	2020
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)	2	2020	2	2020
FTM-33 (AEGIS SBT, DT/OT Intercept Flight Test)	2	2020	2	2020
FTP-21 (LTPO, DT Intercept Flight Test)	2	2020	2	2020
FTP-27 E1 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GT-20 Sprint (JEON) (BMDS Ground Test)	2	2020	2	2020
GT-20 Sprint (BL 5.4) (BMDS Ground Test)	2	2020	2	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
FTP-27 E2 (LTPO, DT/OT Flight Test)	2	2020	2	2020
FTP-17 (I8-2) (LTPO, DT Intercept Flight Test)	3	2020	3	2020
FTP-22 (LTPO, OT Intercept Flight Test)	3	2020	3	2020
GTD-07b (AA) (BMDS Ground Test)	3	2020	3	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
GM BVT-03+ (GM, DT Interceptor Only Flight Test)	4	2020	4	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)	1	2021	1	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	1	2021	2	2021
Israeli Cooperative Intercept Flight Test - FY 2021	1	2021	4	2021
GTD-08 (N/P) (BMDS Ground Test)	2	2021	2	2021
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
Warfighter TP 08 (BMDS Ground Test)	3	2021	3	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
GTI-ISR (21) (BMDS Ground Test)	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
FTP-23 (LTPO, DT/OT Intercept Flight Test)	3	2021	3	2021
FTP-28 (LTPO, OT Intercept Flight Test)	3	2021	3	2021
FTP-25 (LTPO, OT Intercept Flight Test)	4	2021	4	2021
FTP-24 (LTPO, DT Intercept Flight Test)	4	2021	4	2021
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	4	2021	4	2021
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)	4	2021	4	2021
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)	4	2021	4	2021
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)	4	2021	4	2021
GTD-09 (E/C) (BMDS Ground Test)	1	2022	1	2022
Israeli Cooperative Intercept Flight Test - FY 2022	1	2022	4	2022
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)	2	2022	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTP-19 (I8-4) (LTPO, DT Intercept Flight Test)	2	2022	2	2022
FTP-20 (I8-5) (LTPO, OT Intercept Flight Test)	2	2022	2	2022
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2022	2	2022
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
FTX-28 E1 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E2 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E3 (TH, DT Target Only Flight Test)	3	2022	3	2022
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)	3	2022	3	2022
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	4	2022	4	2022
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	4	2022	4	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)	1	2023	1	2023
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)	1	2023	1	2023
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
GTD-10 (E/C) (BMDS Ground Test)	2	2023	2	2023
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)	3	2023	3	2023
Israeli Cooperative Intercept Flight Test - FY 2023	1	2023	4	2023
GTI-ISR (23) (BMDS Ground Test)	3	2023	3	2023
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
FS-23 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	4	2023	4	2023
FS-23 E2 (AEGIS 5.1, DT Target Only Flight Test)	4	2023	4	2023
FS-23 E3 (AEGIS 5.1, DT Target Only Flight Test)	4	2023	4	2023
FS-23 E4 (AEGIS 5.1, DT Intercept Flight Test)	4	2023	4	2023
GTD-11 (N/P) (BMDS Ground Test)	4	2023	1	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Warfighter TP 11 (BMDS Ground Test)	4	2023	3	2024
Warfighter TP 13 (BMDS Ground Test)	4	2023	4	2025
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)	1	2024	1	2024
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
Israeli Cooperative Intercept Flight Test - FY 2024	1	2024	4	2024
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	2	2024	2	2024
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)	2	2024	2	2024
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)	3	2024	3	2024
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)	3	2024	3	2024
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	4	2024	4	2024
FTG-19 (GM, DT/OT Intercept Flight Test)	1	2025	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / *Ballistic Missile Defense Test*	Project (Number/Name) MC04 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC04: *Cyber Operations*	13.792	8.459	28.619	8.710	-	8.710	8.806	8.905	8.904	9.082	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects completion of cybersecurity enhancements, as addressed in House Rpt 115-676, page 232, accompanying the National Defense Authorization Act for Fiscal Year 2019.

A. Mission Description and Budget Item Justification

BMDS Test Cyber Operations sustain Missile Defense Agency Risk Management Framework (RMF) Standards, Computer Network Defense Service Provider and Controls Validation Testing activities: validation results; risk assessments; and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA Ballistic Missile Defense Test program. It maintains the Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&Ms on all MDA information systems. This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Systems Security Officer/Security Controls Assessor (SCA) and AO. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA) of 2014. The MDA Information Technology Networks and Systems (ICTA) and Cross Domain Solution (CDS) provide oversight and guidance for implementing standard CDS security policies across the BMDS. The Network Operations Security Center (DNOSC) is the Local Control Center (LCC) (Tier 3) that protects, detects, characterizes, reports, and mitigates cyber threats through real-time continuous monitoring for flight and ground test assets.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network / System Certification and Accreditation (C&A)	8.459	28.619	8.710
Articles:	-	-	-
Description: The BMDS Test Network/System Certification and Accreditation program will: - Provide cyber security program oversight of all MDA Test Directorate (DT) information systems, networks, sponsored remote sites, ground and flight test infrastructure, and exercise/war game infrastructures. This includes management of: cyber security compliance and authorization; cyber security training and awareness; information system secure configuration; assessment and incident management; and computer network defense. - Fund Ballistic Missile Defense Test Program Information Systems Security Manager (ISSM) civilian salaries. - Conduct cyber security/information assurance engineering and architecture planning for the BMDS Test Program information technology systems. - Plan and test the Cybersecurity controls for BMDS.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Develop DT NIST certification and accreditation packages. - Leverage Cross Domain Solution (CDS) as single authority implementing standard security policies for test and across the BMDS. - Maintain and extend the Support System (DTSS) classified Computer Network Defense Service Provider (CNDSP) to support network cyber security defense for ground test network systems. - Continue to define cyber security investments, risks and benefits used to reduce vulnerabilities and protect critical administrative and test data. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Fund Disaster Recovery (DR) Continuity of Operations (COOP) hardware upgrades to ensure critical MDA test data archival while meeting and maintaining cybersecurity requirements. - Replace end of life hardware and software to reduce cybersecurity risks. - Build required Cross Domain Solution (CDS) with approved COCOM rulesets in support of RDT&E efforts to securely share data with allies during testing. - Build RDT&E development environment to meet DoD cybersecurity separation requirements in support of testing and fielding products to the warfighter. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of cybersecurity enhancements, as addressed in House Rpt 115-676, page 232, accompanying the National Defense Authorization Act for Fiscal Year 2019.			
Accomplishments/Planned Programs Subtotals	8.459	28.619	8.710

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Cybersecurity Civ	MIPR	MDA : Various	1.224	0.473	Oct 2017	0.345	Nov 2018	0.494	Oct 2019	-		0.494	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Cybersecurity Support	C/IDIQ	Torch Technologies : Various	5.630	3.765	Oct 2017	22.233	Oct 2018	3.510	Nov 2019	-		3.510	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - DNOSC	MIPR	Teledyne Brown/ AMRDEC : AL	6.938	4.221	Nov 2017	6.041	Oct 2018	4.706	Nov 2019	-		4.706	Continuing	Continuing	Continuing
		Subtotal	13.792	8.459		28.619		8.710		-		8.710	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.792	8.459		28.619		8.710		-		8.710	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC04 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC04 Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / *Ballistic Missile Defense Test*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	88.598	14.526	14.605	15.504	-	15.504	16.509	19.830	21.244	16.288	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	14.526	14.605	15.504
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	14.526	14.605	15.504

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	5.123	0.000		0.221	Jul 2019	0.232	Jul 2020	-		0.232	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AL, CA, CO, VA	0.000	0.245		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	79.885	9.714	Aug 2018	10.700	Mar 2019	15.272	May 2020	-		15.272	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance - SRM	MIPR	Various : Multi: AK,AL,CA,VA	3.590	4.567	Nov 2017	3.684	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	88.598	14.526		14.605		15.504		-		15.504	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	88.598	14.526		14.605		15.504		-		15.504	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	2,355.581	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
MC05: *Cyber Operations*	0.181	0.572	5.351	0.913	-	0.913	1.075	1.065	1.398	1.426	0.000	11.981
MT05: *BMDS Targets Program*	2,255.079	494.055	539.537	532.413	-	532.413	491.747	420.753	341.426	260.278	Continuing	Continuing
MD40: *Program Wide Support*	100.321	18.211	16.464	20.845	-	20.845	21.142	18.008	15.194	14.404	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

N/A

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) Targets Program provides centrally managed targets and countermeasures development and procurement for a cost effective, integrated system-level approach to BMDS testing. Based on engineering assessments of threat intelligence data, the BMDS Targets Program develops, builds, and supports the launch of Short Range Ballistic Missile (SRBM: Less than 1000 Kilometer range) targets, Medium Range Ballistic Missile (MRBM: 1000-3000 Kilometer Range) targets, Intermediate Range Ballistic Missile (IRBM: 3000-5500 Kilometer Range) targets, Intercontinental Ballistic Missile (ICBM: Greater than 5500 Kilometer range) targets, and Multi-Class Components to test, verify, and validate the performance of the BMDS against threats. The BMDS Targets Program provides an economical and reliable inventory of targets, which are representative of feasible future threats and support demonstration of the capability of the evolving layered missile defense system in a simultaneous test and operations threat environment.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	460.125	517.852	441.827	-	441.827
Current President's Budget	512.838	561.352	554.171	-	554.171
Total Adjustments	52.713	43.500	112.344	-	112.344
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-21.379	-36.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	108.200	79.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-34.096	0.000			
• SBIR/STTR Transfer	-0.012	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	112.344	-	112.344

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603915C *I Ballistic Missile Defense Targets*

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustments to accelerate deployment of 20 additional Ground Based Interceptors (GBI) with Redesigned Kill Vehicle (RKV), Terminal High Altitude Area Defense (THAAD)/Patriot Joint Emergent Operational Need (JEON), and FTM-29 flight test repeat.

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustments to fund cybersecurity upgrades, THAAD/Patriot JEON requirements, and development of an advanced target. The congressional decrease was for acceleration of boosters - requirement forward funded in FY 2018.

Increase in FY 2020 from PB19 to PB20 provides the advanced target, fully funding the USFK JEON, target obsolescence, and Integrated Master Test Plan flight test adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MC05 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC05: *Cyber Operations*	0.181	0.572	5.351	0.913	-	0.913	1.075	1.065	1.398	1.426	0.000	11.981
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2019 reflects congressional adjustment to address cybersecurity threats.

A. Mission Description and Budget Item Justification

Defense Cyber Operations sustains Missile Defense Agency DoD Information Assurance Certification and Accreditation Program (DIACAP), Risk Management Framework Standards, Computer Network Defense Service Provider and Controls Validation Testing activities; analysis of validation results; risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Ballistic Missile Defense Test program. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&M on all MDA information systems. This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer/Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network / System Certification and Accreditation (C&A)	0.572	5.351	0.913
Articles:	-	-	-
Description: The Network/Systems Certification and Accreditation project sustains the MDA DoD Information Assurance Certification and Accreditation Program (DIACAP) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Command and Control Battle Management and Communications (C2BMC) mission systems. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority [DAA] accreditation decisions) and POA&M on all MDA information systems. Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Implement Department of Defense mandated upgrades to Windows 10 to improve Information Technology effectiveness and increase information system security. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of the congressional addition for cybersecurity enhancements in FY 2019.			
Accomplishments/Planned Programs Subtotals	0.572	5.351	0.913

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Windows 10 Upgrade	C/CPAF	Northrop Grumman Innovative Systems (NGIS) : Chandler, AZ	0.000	0.000		5.000	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		5.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Information Assurance 1	MIPR	Missile Defense Agency : Huntsville, AL	0.098	0.123	Nov 2017	0.163	Nov 2018	0.176	Nov 2019	-		0.176	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Information Assurance 2	C/IDIQ	MiDAESS/TEAMS : Various	0.083	0.449	Nov 2017	0.188	Nov 2018	0.737	Nov 2019	-		0.737	Continuing	Continuing	Continuing
		Subtotal	0.181	0.572		0.351		0.913		-		0.913	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.181	0.572		5.351		0.913		-		0.913	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC05 Cyber Activities	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC05 Cyber Activities	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MT05 / *BMDS Targets Program*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT05: *BMDS Targets Program*	2,255.079	494.055	539.537	532.413	-	532.413	491.747	420.753	341.426	260.278	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The mission of the BMDS Targets Program is to provide an economical and reliable inventory of targets that are representative of feasible future threats. These targets enable demonstration of BMDS capabilities in operationally realistic scenarios. The BMDS Targets Program develops and acquires four target types across four target classes. The classes include: Short Range Ballistic Missiles (SRBM), Medium Range Ballistic Missiles (MRBM), Intermediate Range Ballistic Missiles (IRBM), and Intercontinental Ballistic Missiles (ICBM). The target types (Type 1-4) designate the complexity of the target within its class. Type-1 targets are simple baseline configurations. Type-2 targets have increased capability or complexity. Type-3 targets have unique configurations. Type-4 targets are subscale targets.

The BMDS Targets Program develops and provides Modified Ballistic Re-Entry Vehicles (MBRV) and Countermeasures that can be used across the spectrum of target types and classes. The BMDS Targets Program provides target digital models that enable MDA weapon system program offices to simulate end to end sensor and interceptor performance during pre-mission analysis. The BMDS Targets Program also provides maintenance, aging surveillance, refurbishment, and routine testing of government furnished equipment boosters and target components.

The BMDS Targets Program carefully plans the year of execution to assure the best use of appropriated funds. However, the BMDS Targets Program must be flexible in its execution of the program in order to respond to emerging real world threats or changes in the intelligence community estimates of when a threat will be deployed. The BMDS Targets Program must also work with BMDS systems engineers on a continuing basis to align the targets program to the BMDS need to demonstrate capabilities as reflected in MDA's Integrated Master Test Plan (IMTP). The BMDS Targets Program makes every effort to reduce instability in contracts, production base and budget while managing in this dynamic work environment.

The BMDS Targets Program develops and builds targets and countermeasures at multiple locations including: Courtland, AL; Orlando, FL; Huntsville, AL; and Chandler, AZ. Storage and maintenance facilities are also located throughout the country including: Huntsville, AL; White Sands, NM; Ogden, UT; Tooele, UT; Cape Canaveral Air Force Station, FL, and Courtland, AL.

The BMDS Targets Program consists of four major areas: Consumables, Program Planning and Operations, Resources, and Flight Test Execution.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Consumables - Short Range Ballistic Missiles (SRBM)	21.895	29.832	51.437
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: Consumables include SRBM target hardware development and manufacturing. Target development includes non-recurring engineering, MBRVs, Countermeasures, and launch support equipment for BMDS flight testing as required by the BMDS IMTP. Target development provides air, sea, and ground launch capabilities to maximize flexibility in MDA test design. Development activities include requirements decomposition, design, modeling and simulation, qualification testing, and characterization. The BMDS Targets Program Office manages target configuration, component interface specifications, range integration, reliability, mission assurance, and costs. The BMDS Targets Program ensures target designs are producible, reliable, and affordable. Target manufacturing includes the build of targets and target components that are required to execute the BMDS IMTP. Manufacturing includes government furnished equipment and new component acquisition, assembly, and integration. Also included are target characterization, quality and mission assurance, transportation, and logistics support. The BMDS Targets Program delivers fully assembled and integrated targets to the BMDS Test Program. Future revisions to the IMTP will likely affect target types and quantities noted in the Planned Accomplishments. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Short Range Ballistic Missile T4-G (SRBM T4-G) - deliver Ship Sets 1 and 2 to support pre-ship readiness reviews and flight tests in FY 2019 -SRBM T4-B - deliver Ship Set 25 to support a pre-ship readiness review and flight test in FY 2019; continue manufacture of Ship Set 26 to support a pre-ship readiness review in FY 2020 -Award contract and initiate development of future short range (subscale) targets to include initiation of SRBM T4 manufacture of Ship Sets 1, 2, and 3 to support pre-ship readiness reviews in FY 2022 ***FY 2020 Plans:*** -SRBM T4-B - deliver Ship Set 26 to support a pre-ship readiness review and flight test in FY 2020 -Future short range ballistic missile (subscale) targets - continue development efforts, continue manufacture of SRBM T4 Ship Sets 1, 2, and 3 to support pre-ship readiness reviews in FY 2022, and initiate manufacture of SRBM T4 Ship Set 4 to support pre-ship readiness review in FY 2023 ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Increase from FY 2019 to FY 2020 provides the first full year of non-recurring engineering development efforts and hardware purchases associated with the future short range (subscale) ballistic missile targets contract.			
Title: Consumables - Medium Range Ballistic Missiles (MRBM)	148.162	177.888	147.066
Articles:	-	-	-
Description: MRBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** -MRBM Type 3 Configuration 2 (MRBM T3C2) - deliver Ship Set 5 to support a flight test in FY 2019, continue manufacture of Ship Sets 6 and 7 to support a pre-ship readiness reviews and flight tests in FY 2020 (Ship Set 6) and FY 2022 (Ship Set 7) -MBRV-7 - continue recurring engineering efforts; deliver MBRV-7 front section to support MRBM T1/T2 Ship Set 4; continue manufacturing MBRV-7 front sections to support MRBM T1/T2 Ship Sets 5 and 6 -MRBM T1/T2 - complete non-recurring engineering efforts; deliver Ship Set 1 to support first target acceptance review and pre-ship readiness review in FY 2019; continue manufacturing of Ship Sets 2-4 to support pre-ship readiness reviews in FY 2022 (Ship Set 2) and FY 2023 (Ship Sets 3 and 4) -MRBM T4 - continue manufacture of Ship Sets 5-7 to support flight tests in FY 2021; initiate manufacture of Ship Set 8 to support a pre-ship readiness review in FY 2021 -Continue non-recurring engineering efforts for the MRBM Re-Entry Vehicle development and build -Develop and manufacture advanced target in accordance with FY 2019 Congressional enactment. ***FY 2020 Plans:*** -MRBM Type 3 Configuration 2 (MRBM T3C2) - deliver Ship Set 6 to support a flight test in FY 2020, continue manufacturing of Ship Set 7 to support a pre-ship readiness review and flight test in FY 2022 -MBRV-7 - continue recurring engineering efforts and manufacturing of MBRV-7 front sections to support MRBM flight tests -MRBM T1/T2 - continue manufacturing of Ship Sets 2-4 to support pre-ship readiness reviews in FY 2020 (Ship Set 2), FY 2021 (Ship Set 3), and FY 2022 (Ship Set 4); initiate manufacturing of Ship Sets 5 and 6 to support pre-ship readiness reviews in FY 2023 -MRBM T4 - continue manufacturing of Ship Sets 5-7 to support flight tests in FY 2021; initiate manufacturing of Ship Set 8 to support a pre-ship readiness review in FY 2021 -Continue non-recurring engineering efforts for the MRBM Re-Entry Vehicle development and build -Continue development and manufacture of advanced target ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Decrease from FY 2019 to FY 2020 reflects congressional enactment of FY 2019 program increase for the advanced target.			
Title: Consumables - Intermediate Range Ballistic Missiles (IRBM) ***Articles:*** ***Description:*** IRBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** -IRBM T1/T2 - continue manufacturing and integration of Ship Sets 10-14 to support pre-ship readiness reviews in FY 20 (Ship Set 10), FY 2021 (Ship Set 12), FY 2022 (Ship Set 11), FY 2024 (Ship Set 14) and FY 2026 (Ship Set 13) -MBRV-8 - perform additional characterization on the MBRV-8 -Initiate development efforts on the competitively awarded IRBM Countermeasures contract ***FY 2020 Plans:*** -IRBM T1/T2 - deliver Ship Set 10 to support pre-ship readiness review and a flight test in FY 2020; continue manufacturing and integration of Ship Sets 11-14 to support pre-ship readiness reviews in FY 2021 (Ship Set 12), FY 2022 (Ship Set 11), FY 2024 (Ship Set 14) and FY 2026 (Ship Set 13) -MBRV-8 - perform additional characterization on the MBRV-8 and continue recurring engineering efforts and manufacturing of MBRV-8 front sections to support IRBM flight tests -Continue development efforts for IRBM Countermeasures ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of hardware purchases for option 2 of the IRBM T1/T2 prime contract (Ship Sets 13-18).	71.752 -	88.346 -	82.752 -
Title: Consumables - Intercontinental Ballistic Missiles (ICBM) ***Articles:*** ***Description:*** ICBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** -ICBM T1/T2 - continue manufacturing Ship Set 3, 4, and 5 to support pre-ship readiness reviews in FY 2020 (Ship Set 3), FY 2023 (Ship Set 4), and FY 2024 (Ship Set 5) -MBRV-8 - continue performing characterization on the MBRV-8	75.071 -	86.069 -	74.281 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Continue efforts to provide an ICBM target for an Aegis SM-3 Block IIA Missile Test ***FY 2020 Plans:*** -ICBM T1/T2 - deliver Ship Set 3 to support pre-ship readiness review and Aegis SM-3 Block IIA Missile flight test in FY 2020 (Ship Set 3); continue manufacturing Ship Sets 4 and 5 to support pre-ship readiness reviews in FY 2023 (Ship Set 4), and FY 2024 (Ship Set 5) -MBRV-8 - perform additional characterization on the MBRV-8 and continue recurring engineering efforts and manufacturing of MBRV-8 front sections to support ICBM flight tests ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects full year production of Ship Set 3, 4, and 5 in FY 2019, and delivery of Ship Set 3 in first quarter FY 2020.			
Title: Consumables - Joint Emergent Operational Need Statement (JEON) ***Articles:*** ***Description:*** Target development and build to support near term capability improvements and Priority 1, 2 and 3 efforts for US Forces Korea (USFK) Joint Emergent Operational Need (JEON). The 3 priorities include: 1) PATRIOT launch on remote from THAAD battery data; 2) THAAD / Missile Segment Enhancement (MSE) Integration Part 1; 3) THAAD remote launcher Part 1. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides increased target hardware for FTT-21 USFK JEON testing.	34.900 -	4.500 -	9.600 -
Title: Program Planning & Operations ***Articles:*** ***Description:*** Program Planning and Operations provides for government management of the BMDS Targets Program. Included in this effort is program and business management, program administration, technical and testing oversight, verification of hardware and software development, government manpower and infrastructure to develop, test and sustain the BMDS Targets Program	71.115 -	64.922 -	62.759 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Office system and components. Other Government Agency (OGA) and Federally Funded Research and Development Research Centers (FFRDC) are used for highly specialized skill sets not available internal to Targets for specific time periods. Recurring yearly planned accomplishments include the following: -Provide technical and business management support activities, financial management, cost and schedule performance analysis cost estimation and analysis, and integration activities -Provide program oversight, subcontract management, quality assurance, verification of hardware and software development, and technical and testing oversight -Ensure BMDS Targets compliance with internal and external direction, policies, and regulations -Conduct Internal Program Plans that align with the MDA approved IMTP -Provide program and technical management of target launch operations activities to include oversight of mission planning, range coordination, and mission requirements Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Resources	40.970	51.239	51.040
Articles:	-	-	-
Description: BMDS Target Resources consist of two sub-elements: Systems Engineering/Program Management and Logistics. Systems Engineering/Program Management provides technical direction to meet Target Program requirements while balancing cost, schedule, performance, and risk. It conducts functional requirements allocation to product lines, defines product line specifications/interfaces, performs configuration and data management, and follows guidelines for design reviews. It performs target system analysis to verify system performance, defines target program baselines, controls flight test configurations, and conducts pre and post-flight analysis. It identifies treaty and environmental issues and develops plans for issue resolution. It provides Quality, Safety, and Mission Assurance operations to ensure compliance with MDA requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered for test events. It also includes Single			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Stimulation Framework (SSF)/Objective Simulation Framework (OSF) compatible Modeling and Simulation (M&S) execution and improvements to evolve M&S capability; trajectory analyses; signature analyses and characterization; studies to assess alternative target and platform solutions; assessments of risk management; and design approval of government furnished equipment. Specific Systems Engineering Planned Accomplishments include: -Continue Program Management and Business Operations for target components to provide a framework for overall management of the BMDS Targets Program -Continue providing classified network connections to OGAs so their subject matter experts can be used to support Target requirements -Continue analyses of future target Launch Vehicles, Re-Entry Vehicles, and launch platforms to ensure they are threat representative and that the Agency is making use of available technology in our future designs -Continue performing Pedigree Reviews to ensure high probability of mission success -Continue information technology and classified network support to ensure sensitive target information is not compromised -Continue Software Independent Verification and Validation (IV&V) to provide risk reduction of flight missions for target systems under development BMDS Targets Program Logistics support provides target storage, aging surveillance, and transportation of target hardware in support of BMDS testing. Also included are integrated logistics support for facilities, inventory maintenance, spare parts, aging surveillance, disposal, special testing for rocket motor propellants, and other hazardous material handling. This task manages and oversees accountability of all government furnished equipment and contractor acquired property. Logistics also provides common support equipment for launch vehicles, MBRVs, countermeasures, and all up integrated target rounds. It also supports launch site activations through the transportation of support equipment to various test sites. Specific Targets Logistics Planned Accomplishments include: -Continue Multi-Class Inventory storage, aging surveillance, maintenance of existing assets, and transportation support that ensured availability of MBRV and ground support equipment -Conduct disposal actions of inert assets Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A			
Title: Flight Test Execution	30.190	36.741	53.478
Articles:	-	-	-

Description: Flight Test Execution is performed by the Target Launch Operations group. This group conducts target mission planning, coordinates target range and mission requirements, and provides target technical information to the MDA's General Counsel to support treaty approvals. The Target Launch Operations Group is the primary link between the target developer and the BMDS test community, incorporating target system constraints into the BMDS mission countdown and launch constraints. Specific and/or unique planned accomplishments to each FY are as follows:

FY 2019 Plans:
-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of two IRBM targets and one MRBM target in support of an operational engagement using a Regional / Theater BMDS Architecture (Aegis / THAAD / PATRIOT)
-Conduct final target integration with the test range and launch operations of two SRBM targets in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) Missile Segment Enhancement firing four SM-6 Dual II
-Conduct final target integration with the test range and launch operations of an MRBM target in support of Aegis BMD 4.0.3 BL 9.C1 Software demonstrating SM-SM-3 Blk 1B Launch on Remote (Reaper)
-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of an MRBM target in support of Aegis BMD BL 9.C2 Software data collection
-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of an MRBM target in support of Upgraded Early Warning Radar Cape Cod sensor tracking test

FY 2020 Plans:
-Conduct final target integration with the test range and launch operations of a MRBM target in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) firing two SM-6 Dual II
-Conduct final target integration with the test range and launch operations of two SRBM targets in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) Missile Segment Enhancement firing four SM-6 Dual II
-Conduct final target integration with the test range and accomplish launch operations of an ICBM target in support of an Aegis BL 9.C2 DDG demonstration of lethal intercept with a SM-3 Blk IIA missile using Engage-on-Remote (EoR) quality tracks via C2BMC from AN/TPY-2
-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of two IRBM targets and one MRBM target in support of an operational engagement using a Regional / Theater BMDS Architecture

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Conduct final target integration with the test range and launch operations of a MRBM target in support of Aegis BMD BL 9.C2 Software demonstrating an engagement firing an SM-3Blk II ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides the number and types of targets required for the mix of flight tests in the BMDS IMTP.			
Accomplishments/Planned Programs Subtotals	494.055	539.537	532.413

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The BMDS Targets Program provides for the development and purchase of ballistic missile targets and countermeasures for the BMDS in support of the MDA's flight test program. The BMDS Targets Program requirements are derived from the BMDS Integrated Master Test Plan (IMTP).

The BMDS Targets Program is currently in various stages of planning or execution for procurement of ballistic missile targets by range class: SRBM, MRBM, IRBM, and ICBM. These targets are procured using a Target Performance Specification to support flight test requirements as identified in the IMTP. Each target class may be solicited, evaluated, and competitively awarded independently in IMTP 'need date' priority order.

The BMDS Targets Program competitively awarded a prime contract in 2011 to Orbital Sciences Corporation (now Northrop Grumman Innovation Systems (NGIS)) with a period of performance (PoP) of March 2011 through September 2025 for air-launched IRBM targets. This award included two follow-on options, one for eight IRBM targets exercised in 2014 and another for six IRBM targets exercised in 2017.

The BMDS Targets Program conducted a limited competition in 2012 and awarded a contract modification to Orbital Sciences Corporation (now NGIS) with a PoP of October 2012 through September 2025 for the development of ICBM targets. This award included two ICBM Stage Zero Kits to be used with an existing air-launched IRBM target. Four ICBM Stage Zero Kits were added in 2018.

The BMDS Targets Program competitively awarded a prime contract in 2016 to Orbital Sciences Corporation (now NGIS) with a period of performance (PoP) of July 2016 to December 2020 for three MRBM T3c2 targets. This award included an option for up to four MRBM T3c2 targets.

The BMDS Targets competitively awarded a prime contract to L-3 Communications/Coleman Aerospace Corporation with a PoP of October 2013 through December 2027 to provide six MRBM targets. This award includes one follow-on option, for up to twelve additional MRBM targets. The first target from this contract will be delivered in 4QFY19.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

The SRBM T4 and MRBM T4 (previously called the Aegis Readiness Assessment Vehicles (ARAVs)) target efforts are managed by BMDS Targets Program and the Naval Surface Warfare Center Port Hueneme Division White Sands (NSWC PHD WS). NSWC PHD WS has unique sounding rocket expertise and access to existing contracts managed by White Sands Missile Range that makes this a beneficial relationship for both parties. BMDS Targets Program provides targets funding via Military Interdepartmental Purchase Orders that NSWC PHD WS expends on its hardware development and engineering contracts. The BMDS Targets Program Office will be transitioning the NSWC subscale efforts to a new competitively awarded contract anticipated in FY 2019. This transitioning reduces the mission and schedule risk of ensuring the Program Office maintains a relationship with NSWC as a backup plan/surge need to have NSWC quick turn and deliver targets.

The BMDS Targets Program Future Acquisition Strategy is based on two premises. The first is to utilize existing capabilities/infrastructure and sustain an industrial base to deliver targets. The second is to initiate acquisitions that delivers low cost/affordable targets that replicate evolving threats. The Acquisition Strategy is proceeding through the MDA Acquisition Panel/Board reviews for decision-making. Depending on the approved outcome, multiple Request for Proposals may be released for future target acquisitions.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Consumables - Short Range Ballistic Missiles (SRBM) - 10	FFRDC	Sandia National Lab : Albuquerque, NM	0.000	4.771	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 2	MIPR	Naval Surface Warfare Center, Port Hueneme : Port Hueneme, CA	67.998	11.597	Nov 2017	7.682	Nov 2018	5.413	Nov 2019	-		5.413	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 7	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	20.965	0.000		0.000		0.000		-		0.000	0.000	20.965	20.965
Consumables - Short Range Ballistic Missiles (SRBM) - 8	C/CPIF	Future Subscale Target : TBD	0.000	0.000		21.760	Apr 2019	45.804	Nov 2019	-		45.804	0.000	67.564	4.192
Consumables - Short Range Ballistic Missiles (SRBM) - 9	FFRDC	Johns Hopkins University Applied Physics Laboratory : Laurel, MD	7.026	5.527	Nov 2017	0.390	Dec 2018	0.220	Dec 2019	-		0.220	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 1	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	451.102	4.471	Nov 2017	0.893	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 10	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	38.497	68.335	Nov 2017	38.096	Nov 2018	35.894	Nov 2019	-		35.894	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 11	MIPR	Naval Surface Warfare Center : Crane, IN	0.000	0.011	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 15	FFRDC	Applied Physics Lab/Johns Hopkins University : Laurel, MD	0.000	2.151	Dec 2017	4.658	Dec 2018	2.878	Dec 2019	-		2.878	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Consumables - Medium Range Ballistic Missiles (MRBM) - 16	MIPR	Naval Surface Warfare Center : Port Hueneme, CA	0.000	0.000		5.495	Nov 2018	2.966	Nov 2019	-		2.966	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 17	MIPR	Space and Missile Systems Center : Albuquerque, NM	0.000	3.321	Nov 2017	5.750	Nov 2018	6.446	Nov 2019	-		6.446	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 18	MIPR	Yuma Proving Grounds : Yuma, AZ	0.000	0.316	Nov 2017	0.070	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 19	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.000	0.187	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 2	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	235.458	44.675	Nov 2017	47.739	Nov 2018	59.465	Nov 2019	-		59.465	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 20	MIPR	Defense Finance and Accounting Service : Indianapolis, IN	0.000	0.010	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 21	MIPR	Cape Canaveral 45th Space Wing : Cape Canaveral, FL	0.000	0.742	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 22	FFRDC	Georgia Tech Research Institute : Huntsville, AL	0.000	4.946	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 23	MIPR	Pacific Missile Range Facility : Barking Sands, HI	0.000	1.058	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 24	MIPR	US Army Redstone Test Center : Huntsville, AL	0.000	0.404	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 25	MIPR	30th Space Wing : Vandenberg AFB, CA	0.000	0.242	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Consumables - Medium Range Ballistic Missiles (MRBM) - 3	FFRDC	Sandia National Laboratories : Albuquerque, NM	0.000	4.600	Dec 2017	43.460	Dec 2018	20.200	Dec 2019	-		20.200	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 4	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	0.000	8.324	Dec 2017	18.740	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 7	MIPR	Space and Missile Defense Command : Huntsville, AL	1.818	4.295	Dec 2017	0.000		0.000		-		0.000	0.000	6.113	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 8	C/CPAF	Future Subscale MRBM : RFP TBD	0.000	0.000		12.911	Mar 2019	19.138	Nov 2019	-		19.138	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 9	MIPR	Defense Information Systems Agency : Fort Meade, MD	0.031	0.074	Nov 2017	0.076	Nov 2018	0.079	Nov 2019	-		0.079	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 1	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	512.095	55.299	Nov 2017	60.797	Nov 2018	68.081	Nov 2019	-		68.081	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 12	MIPR	Naval Air Weapons Station : China Lake, CA	0.000	0.000		0.082	Nov 2018	0.121	Nov 2019	-		0.121	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 15	FFRDC	Sandia National Laboratories : Albuquerque, NM	1.786	8.983	Dec 2017	13.674	Dec 2018	5.717	Dec 2019	-		5.717	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 16	FFRDC	Georgia Tech Research Institute : Atlanta, GA	1.923	0.000		9.933	Dec 2018	3.417	Dec 2019	-		3.417	Continuing	Continuing	Continuing
Consumables - Intermediate Range	MIPR	Naval Surface Warfare Center : Dahlgren, VA	0.000	0.000		0.026	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MT05 / *BMDS Targets Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ballistic Missiles (IRBM) - 17															
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 18	MIPR	Naval Surface Warfare Center : Crane, IN	0.000	0.003	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 4	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	57.140	7.467	Nov 2017	3.834	Nov 2018	5.416	Nov 2019	-		5.416	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 1	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	186.535	54.814	Nov 2017	85.960	Nov 2018	74.101	Nov 2019	-		74.101	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 10	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	10.848	11.528	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 14	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.000	0.330	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 15	FFRDC	MIT Lincoln Laboratory : Hanscom AFB, Lexington, MA	0.000	8.399	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 4	MIPR	Naval Air Weapons Station : China Lake, CA	0.605	0.000		0.083	Nov 2018	0.096	Nov 2019	-		0.096	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 5	MIPR	Naval Surface Warfare Center, Dahlgren Division : Dahlgren, VA	0.071	0.000		0.026	Dec 2018	0.084	Nov 2019	-		0.084	0.000	0.181	0.000
Consumables - Joint Emergent Operational Need Statement (JEON) - 1	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	0.000	34.900	Dec 2017	4.500	Feb 2019	9.600	Nov 2019	-		9.600	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Planning & Operations - Program Planning and Operations - 1	C/CPAF	Targets TEAMS Support : Huntsville, AL	186.706	42.899	Nov 2017	35.117	Nov 2018	35.165	Nov 2019	-		35.165	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 10	MIPR	Missile Defense Agency : Huntsville, AL	143.466	26.097	Oct 2017	27.601	Nov 2018	26.153	Nov 2019	-		26.153	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 12	C/FFP	Network Management Resources : Chantilly, VA	2.849	0.134	Nov 2017	0.137	Nov 2018	0.123	Nov 2019	-		0.123	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 13	MIPR	Naval Surface Warfare Center : Crane, IN	0.000	0.048	Nov 2017	0.302	Nov 2018	0.111	Nov 2019	-		0.111	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 14	FFRDC	Mitre Corporation : Huntsville, AL	0.000	0.314	Dec 2017	0.320	Dec 2018	0.162	Dec 2019	-		0.162	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 6	FFRDC	Johns Hopkins University, Applied Physics Lab : Baltimore, MD	2.945	1.496	Dec 2017	1.022	Dec 2018	0.834	Dec 2019	-		0.834	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 7	MIPR	US Army Aviation & Missile Command : Huntsville, AL	5.275	0.127	Nov 2017	0.423	Nov 2018	0.211	Nov 2019	-		0.211	0.000	6.036	0.000
Resources - Resources/ Logistics - 37	FFRDC	Aerospace Corporation : El Segundo, CA	0.000	2.978	Nov 2017	3.525	Nov 2018	1.843	Nov 2019	-		1.843	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 40	MIPR	Army Information Management Command : San Antonio, TX	0.000	0.081	Dec 2017	0.674	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resources - Resources/ Logistics - 41	MIPR	Marshall Space Flight Center : Huntsville, AL	0.000	0.012	Dec 2017	0.011	Dec 2018	0.011	Dec 2019	-		0.011	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 42	MIPR	Dugway Proving Ground : Dugway, UT	0.000	0.015	Dec 2017	0.012	Dec 2018	0.013	Dec 2019	-		0.013	Continuing	Continuing	Continuing
Resources - Resources - TBD	TBD	Future ILS/Systems Engineering Support : TBD	0.000	0.000		25.374	Dec 2018	32.424	Nov 2019	-		32.424	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 1	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	44.142	4.011	Nov 2017	0.266	Nov 2018	0.198	Nov 2019	-		0.198	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 12	MIPR	Redstone Arsenal Garrison : Huntsville, AL	3.261	0.149	Nov 2017	0.012	Nov 2018	0.014	Nov 2019	-		0.014	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 18	MIPR	Defense Finance & Accounting Service : Indianapolis, IN	3.050	0.210	Nov 2017	0.144	Nov 2018	0.148	Nov 2019	-		0.148	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 2	C/CPFF	Orbital/Alliant Techsystems : Magna, UT	1.045	0.404	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 25	MIPR	Tooele Army Depot : Tooele, UT	1.171	0.205	Dec 2017	0.487	Dec 2018	0.450	Dec 2019	-		0.450	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 34	C/CPFF	Inuteq, Corp. : Beltsville, MD	2.276	0.384	Nov 2017	0.809	Nov 2018	0.832	Nov 2019	-		0.832	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 36	MIPR	Tobyhanna Army Depot : Tobyhanna, PA	1.089	1.492	Nov 2017	0.984	Nov 2018	0.884	Nov 2019	-		0.884	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 5	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	9.183	0.270	Nov 2017	0.274	Nov 2018	0.281	Nov 2019	-		0.281	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resources - Resources/ Logistics - 7	MIPR	Missile Defense Agency : Huntsville, AL	8.038	0.682	Nov 2017	0.148	Nov 2018	0.174	Nov 2019	-		0.174	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 1	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	105.288	6.172	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 14	MIPR	Naval Air Warfare Center : Point Mugu, CA	5.949	0.739	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 17	MIPR	Defense Finance & Accounting Service : Indianapolis, IN	0.000	0.244	Nov 2017	0.336	Nov 2018	0.287	Nov 2019	-		0.287	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 18	MIPR	Redstone Arsenal Garrison : Huntsville, AL	0.000	0.000		0.033	Nov 2018	0.035	Nov 2019	-		0.035	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 19	FFRDC	Sandia National Lab : Albuquerque, NM	0.000	5.821	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 2	FFRDC	Aerospace Corporation : El Segundo, CA	16.728	4.825	Dec 2017	4.376	Dec 2018	3.969	Dec 2019	-		3.969	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 20	MIPR	Space and Missile Defense Command : Huntsville, AL	0.000	0.720	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 6	FFRDC	Johns Hopkins University, Applied Physics Lab : Baltimore, MD	3.513	1.814	Nov 2017	0.919	Nov 2018	0.823	Nov 2019	-		0.823	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 8	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	54.202	9.742	Nov 2017	12.855	Nov 2018	8.654	Nov 2019	-		8.654	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MT05 / *BMDS Targets Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - 1	MIPR	Missile Defense Agency : Huntsville, AL	0.756	6.376	Oct 2017	3.196	Oct 2018	2.829	Oct 2019	-		2.829	Continuing	Continuing	Continuing
Flight Test Execution - 10	MIPR	Hickam Field : Pearl Harbor, HI	0.389	0.021	Dec 2017	0.017	Dec 2018	0.052	Dec 2019	-		0.052	Continuing	Continuing	Continuing
Flight Test Execution - 11	MIPR	Redstone Army Airfield : Redstone Arsenal, AL	0.038	0.037	Dec 2017	0.057	Dec 2018	0.062	Dec 2019	-		0.062	Continuing	Continuing	Continuing
Flight Test Execution - 12	MIPR	Redstone Test Center : Huntsville, AL	0.226	0.012	Nov 2017	0.008	Nov 2018	0.075	Nov 2019	-		0.075	Continuing	Continuing	Continuing
Flight Test Execution - 13	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	3.560	6.253	Nov 2017	3.022	Nov 2018	3.894	Nov 2019	-		3.894	Continuing	Continuing	Continuing
Flight Test Execution - 14	MIPR	Naval Air Warfare Center : Pt. Mugu, CA	0.865	0.000		1.153	Dec 2018	3.848	Dec 2019	-		3.848	Continuing	Continuing	Continuing
Flight Test Execution - 15	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	0.000	0.000		0.129	Dec 2018	0.089	Dec 2019	-		0.089	Continuing	Continuing	Continuing
Flight Test Execution - 17	MIPR	Columbus Air Force Base : Columbus, MS	0.000	0.000		0.023	Dec 2018	0.025	Dec 2019	-		0.025	Continuing	Continuing	Continuing
Flight Test Execution - 18	MIPR	Naval Surface Warfare Center : Dahlgren, VA	0.000	0.147	Nov 2017	0.000		0.275	Nov 2019	-		0.275	Continuing	Continuing	Continuing
Flight Test Execution - 19	MIPR	National Security Agency : Fort Meade, MD	0.000	0.026	Dec 2017	0.068	Dec 2018	0.068	Dec 2019	-		0.068	Continuing	Continuing	Continuing
Flight Test Execution - 2	MIPR	Defense Finance and Accounting Services : Indianapolis, IN	15.440	2.716	Oct 2017	8.220	Oct 2018	10.364	Nov 2019	-		10.364	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MT05 / *BMDS Targets Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - 20	MIPR	Naval Surface Warfare Center : Port Hueneme, CA	0.000	2.168	Dec 2017	6.912	Dec 2018	7.137	Dec 2019	-		7.137	Continuing	Continuing	Continuing
Flight Test Execution - 21	MIPR	Aviation and Missile Research Dev and Eng Center : Huntsville, AL	0.000	0.040	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 22	MIPR	Andersen AFB : Guam	0.000	0.577	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 23	MIPR	Defense Logistics Agency : Fort Belvoir, VA	0.000	0.126	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 24	MIPR	Kauai Test Facility : Kauai, HI	0.000	0.202	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 3	MIPR	Pacific Missile Range Facility : Barking Sands, HI	17.888	1.604	Nov 2017	3.477	Nov 2018	4.925	Nov 2019	-		4.925	Continuing	Continuing	Continuing
Flight Test Execution - 4	MIPR	Reagan Test Site : Kwajalein Atoll	9.155	0.515	Nov 2017	3.237	Nov 2018	7.228	Nov 2019	-		7.228	Continuing	Continuing	Continuing
Flight Test Execution - 5	MIPR	Edwards Air Force Base : Lancaster, CA	8.434	7.346	Dec 2017	4.608	Nov 2018	7.627	Nov 2019	-		7.627	Continuing	Continuing	Continuing
Flight Test Execution - 6	MIPR	US Army Yuma Proving Ground : Yuma, AZ	0.583	0.919	Nov 2017	0.417	Nov 2018	1.593	Nov 2019	-		1.593	Continuing	Continuing	Continuing
Flight Test Execution - 7	MIPR	Eglin Air Force Base : Eglin AFB, FL	0.304	0.380	Nov 2017	0.130	Nov 2018	0.210	Nov 2019	-		0.210	Continuing	Continuing	Continuing
Flight Test Execution - 8	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	2.393	0.000		1.385	Nov 2018	1.448	Nov 2019	-		1.448	Continuing	Continuing	Continuing
Flight Test Execution - 9	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.974	0.725	Dec 2017	0.682	Dec 2018	1.729	Dec 2019	-		1.729	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MT05 / *BMDS Targets Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			2,255.079	494.055		539.537		532.413		-		532.413	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MT05 / *BMDS Targets Program*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,255.079	494.055		539.537		532.413		-		532.413	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	▲																											
ICBM Pre-Ship Readiness Review (Ship Set 2)				▲																								
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)				▲																								
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 7)				▲																								
SRBM T4-G Pre-Ship Readiness Review (Ship Set 1)					△																							
SRBM T4-G Pre-Ship Readiness Review (Ship Set 2)					△																							
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 1)						△																						
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 8)						△																						
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 9)						△																						
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 5)						△																						
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 25)						△																						
Award Future Subscale Targets Contract						△																						
ICBM Pre-Ship Readiness Review (Ship Set 3)									△																			
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 6)									△																			
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 2)											△																	
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 10)											△																	
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 26)											△																	
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 6)													△															
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 7)													△															
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 5)													△															
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 3)														△														
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 12)														△														
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 8)														△														
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 1)																	△											

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 2)																	△											
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 3)																	△											
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 7)																		△										
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)																			△									
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 11)																			△									
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)																					△							
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 4)																					△							
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)																						△						
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)																							△					
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 14)																									△			
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)																												△

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	1	2018	1	2018
ICBM Pre-Ship Readiness Review (Ship Set 2)	4	2018	4	2018
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)	4	2018	4	2018
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 7)	4	2018	4	2018
SRBM T4-G Pre-Ship Readiness Review (Ship Set 1)	2	2019	2	2019
SRBM T4-G Pre-Ship Readiness Review (Ship Set 2)	2	2019	2	2019
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 1)	3	2019	3	2019
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 8)	3	2019	3	2019
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 9)	3	2019	3	2019
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 5)	3	2019	3	2019
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 25)	3	2019	3	2019
Award Future Subscale Targets Contract	3	2019	3	2019
ICBM Pre-Ship Readiness Review (Ship Set 3)	1	2020	1	2020
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 6)	1	2020	1	2020
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 2)	3	2020	3	2020
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 10)	3	2020	3	2020
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 26)	3	2020	3	2020
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 6)	1	2021	1	2021
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 7)	1	2021	1	2021
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 5)	1	2021	1	2021
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 3)	2	2021	2	2021
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 12)	2	2021	2	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 8)	2	2021	2	2021
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 1)	2	2022	2	2022
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 2)	2	2022	2	2022
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 3)	2	2022	2	2022
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 7)	3	2022	3	2022
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)	4	2022	4	2022
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 11)	4	2022	4	2022
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	2	2023	2	2023
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 4)	2	2023	2	2023
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)	3	2023	3	2023
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)	4	2023	4	2023
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 14)	1	2024	1	2024
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	4	2024	4	2024

Note

FY 2020 USFK JEON tests are funded in PE 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / *Ballistic Missile Defense Targets*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	100.321	18.211	16.464	20.845	-	20.845	21.142	18.008	15.194	14.404	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	18.211	16.464	20.845
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	18.211	16.464	20.845

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various Multi: : AL, CO, CA, VA etc.	20.377	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Facilities and Maintenance (Reqn)	Reqn	Various Multi : AL, CO, CA, VA etc.	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Infrastructure Support (MIPR)	MIPR	Various; Multi : AL, VA	27.237	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Infrastructure Support (FFP)	C/FFP	Northrop Grumman; Multi : AL, VA	9.460	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various; Multi : AL, CA, CO, VA	6.383	0.358	Jul 2018	0.249	Jul 2019	0.313	Jul 2020	-		0.313	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	Mantech Security Mission Assurance Corporation : Multi: AL, CO, CA, VA	0.000	0.000		2.422	Apr 2019	2.968	Dec 2019	-		2.968	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi:AL, CA, CO, VA	12.205	10.591	Aug 2018	11.000	Apr 2019	17.054	Jun 2020	-		17.054	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	MIPR	Various Multi: : AK, AL, CA, CO, HI, VA	0.623	0.000		0.000		0.510	Jul 2020	-		0.510	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various, Multi : AL, CO, CA, VA etc	5.074	1.500	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: AK, AL, CA, VA	18.962	5.762	Jan 2018	2.793	May 2019	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	100.321	18.211		16.464		20.845		-		20.845	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks															
N/A															

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	100.321	18.211		16.464		20.845		-		20.845	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	64.073	163.947	316.822	303.458	-	303.458	336.139	380.195	300.126	201.668	Continuing	Continuing
MD98: *Directed Energy Demonstrator Development*	10.395	81.179	224.317	116.266	-	116.266	110.697	125.704	172.040	136.171	Continuing	Continuing
MD94: *Neutral Particle Beam (NPB)*	-	0.000	0.000	34.000	-	34.000	142.950	177.250	25.800	0.000	0.000	380.000
MD99: *Discrimination Sensor Demonstrator Development*	37.622	71.111	78.608	132.187	-	132.187	73.619	65.914	92.394	56.045	Continuing	Continuing
MT99: *Technology Maturation Initiatives Test*	6.918	4.974	1.982	11.262	-	11.262	1.684	4.145	0.824	0.000	0.000	31.789
MC98: *Cyber Operations*	0.471	0.162	5.254	0.475	-	0.475	0.477	0.467	0.472	0.478	Continuing	Continuing
MD40: *Program Wide Support*	8.667	6.521	6.661	9.268	-	9.268	6.712	6.715	8.596	8.974	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Increase in FY 2019 reflects congressional adjustments to continue research and development for three separate laser scaling efforts, to retain three performers for Low Power Laser Demonstrator (LPLD) through Critical Design Review (CDR) and to address cyber threats.

Increase in FY 2020 provides the continued Electro Optical/Infrared (EO/IR) participation in Ballistic Missile Defense System (BMDS) level tests and the addition of Neutral Particle Beam (NPB), a new directed energy capability to defeat the emerging threat.

A. Mission Description and Budget Item Justification

Technology Maturation Initiatives (TMI) demonstrates the utility of directed energy for missile defense. MDA's directed energy plan incrementally demonstrates and improves the constituent components required to execute a directed energy kill chain; acquisition, tracking and lethality. The efforts shape future BMDS acquisition choice by advancing the technology readiness levels of emerging and developing technology, while simultaneously assessing the performance and contributions to the BMDS architecture. TMI includes development, demonstration, systems engineering and test efforts to improve performance of lasers, EO/IR sensors, and disruptive directed energy concepts

MDA will develop cost effective technology demonstrators to address specific risks:
- An advanced sensor integrated into an airborne or space platform to provide discrimination of lethal objects and other advanced sensor applications
- A compact, ruggedized advanced sensor that builds on the airborne discrimination program to demonstrate persistent overhead discrimination coverage from space
- Sensor system tests to validate performance against emerging advanced threats

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*

- Component technology development leading to future advancements of strategic laser weapons
- Technology risk reduction for a disruptive directed energy concept

The Directed Energy Demonstrator Development (DEDD) addresses technology risk reduction and maturation for high powered strategic lasers as well as beam control and steering. The laser scaling effort is tightly coupled with the Office of the Assistant Secretary of Defense for Research and Engineering (ASD R&E) Laser Road map, and is essential to mature strategic laser technology sufficient to enter into the ASD R&E approach. Once strategic laser concepts meet the minimum requirements, they can be transitioned into the R&E laser scaling program for further development.

The Neutral Particle Beam is a game changing space-based directed energy capability for strategic and regional missile defense. MDA will design, develop and conduct a feasibility demonstration of a first stage accelerator subsystem.

The Discrimination Sensor Demonstrator Development (DSDD) program includes the development of an advanced sensor to discriminate lethal objects and uses MDA configured airborne platforms to introduce EO/IR sensors into the BMDS. The advanced sensor incorporates incrementally developed, integrated, and tested next-generation sensors and electronics to demonstrate Launch-on-Remote, Engage-on-Remote, discrimination and handover improvements for missile defense from the air and/or space. These advanced sensors improve the probability of engagement success for stressing threats, expand the Ballistic Missile Defense (BMD) battle space and increase the ability to negate larger raid sizes. The MDA configured airborne platforms are used to obtain additional EO/IR data by tracking targets in MDA flight tests. They also help develop the associated concept of operations and provide the basis for a quick reaction precision tracking capability to augment radar. To address emerging advanced threats, MDA may use MDA-configured airborne platforms to support hypersonic threat testing scenarios.

TMI Test and Cyber Operations provide enabling capabilities to support all directed energy technical maturation initiatives.

MDA collaborates with the ASD R&E, the Defense Advanced Research Projects Agency (DARPA), the High Energy Laser Joint Technology Office, Department of Energy, and the Air Force, and national laboratories in a systems engineering based strategy to research, develop and test directed energy weapons technology. MDA is developing a set of common core disruptive technologies that will enable both missile defense and air dominance missions.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	128.406	148.822	172.423	-	172.423
Current President's Budget	163.947	316.822	303.458	-	303.458
Total Adjustments	35.541	168.000	131.035	-	131.035
• Congressional General Reductions	-0.700	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	90.000			
• Congressional Directed Transfers	36.000	78.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-3.702	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	3.943	0.000	131.035	-	131.035

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustments for retaining three vendors for the Low Power Laser Demonstrator (LPLD).

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustments to continue research and development for three separate laser scaling efforts, to retain three performers for LPLD through Critical Design Review (CDR), and to address cyber threats.

Increase in FY 2020 from PB19 to PB20 provides for the addition of the Neutral Particle Beam (NPB), a new directed energy capability to defeat the emerging threat, laser scaling, and Electro Optical/Infrared (EO/IR) participation in Ballistic Missile Defense System (BMDS) level tests.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MD98 / *Directed Energy Demonstrator Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD98: *Directed Energy Demonstrator Development*	10.395	81.179	224.317	116.266	-	116.266	110.697	125.704	172.040	136.171	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects the Department's priorities for laser scaling.

A. Mission Description and Budget Item Justification

The DEDD project develops, integrates, and tests the component technologies required to demonstrate the complete acquisition, tracking and lethality engagement sequence of a high energy laser system for missile defense. Laser scaling focuses on maturing strategic laser capability to levels sufficient to enter into the ASD R&E Laser Scaling Road map efforts. The DEDD project provides the necessary technology, test data, and operations familiarity to successfully transition to a higher power directed energy weapon.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Directed Energy Demonstrator Development	81.179	224.317	116.266
Articles:	-	-	-
Description: Laser scaling develops, integrates, and tests the component technologies required to demonstrate the complete acquisition, tracking and lethality engagement sequence of a high energy strategic laser system. MDA will maintain partnerships with Industry and National Laboratories to focus on laser scaling, the highest technology risk.			
Specific and/or unique planned accomplishments to each FY are as follows:			
FY 2019 Plans:			
Incrementally develop scalable, efficient, and compact high-energy laser components for integration into high power systems			
- Demonstrate robust high power diodes			
- Complete beam quality measurement of a next generation Diode Pumped Alkali Laser (DPAL)			
- Complete Fiber Combining Laser (FCL) beam quality and power demonstration			
- Complete Distributed Gain Laser (DGL) concept design			
Continue the LPLD design work, retaining three performers through CDR			
- Conduct a CDR			
-- Complete final engineering analysis			
-- Complete test planning requirements			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-- Complete beam control, laser, and platform interface drawings			
FY 2020 Plans: Continue to develop scalable, efficient, and compact high-energy laser components for integration into high power systems - Maintain partnerships with Industry and National Laboratories to focus on laser scaling. - Perform component and sub-assembly testing, including pump diode integration design and test - Finish detailed engineering drawing for components - Verify DPAL power maturation, while maintaining beam quality demonstrated in the prior year - Conduct DPAL preliminary design review (PDR) - Verify FCL power maturation, while maintaining beam quality demonstrated in the prior year - Conduct FCL PDR - Conduct FCL laboratory demonstration - Conduct DGL PDR - Conduct DGL laboratory demonstration			
FY 2019 to FY 2020 Increase/Decrease Statement: Decrease from FY 2019 to FY 2020 reflects the Department's priorities for laser scaling.			
Accomplishments/Planned Programs Subtotals	81.179	224.317	116.266

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy consists of contracts to industry via the Advanced Technology Innovation Broad Agency Announcement (BAA) and competitive procurement(s) and agreements with FFRDCs and National Laboratories. MDA will leverage agency partner subject matter experts and use government model based assessments for Better Buying Power 3.0 philosophy acquisition decisions.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Energy Demonstrator Development - Industry Laser Scaling	C/CPFF	TBD : TBD	0.000	0.000		0.000		54.320	Jan 2020	-		54.320	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - LPLD Preliminary Design A	C/CPFF	Lockheed Martin : CA	3.588	20.550	Nov 2017	12.404	Nov 2018	0.000		-		0.000	0.000	36.542	0.000
Directed Energy Demonstrator Development - LPLD Preliminary Design B	C/CPFF	General Atomics : CA	1.000	22.728	Nov 2017	10.157	Nov 2018	0.000		-		0.000	0.000	33.885	0.000
Directed Energy Demonstrator Development - LPLD Preliminary Design C	C/CPFF	Boeing : CA	0.000	23.261	Nov 2017	10.414	Nov 2018	0.000		-		0.000	0.000	33.675	0.000
Directed Energy Demonstrator Development - LPLD System Critical Design A	C/CPFF	Lockheed Martin : CA	0.000	0.000		26.000	Feb 2019	0.000		-		0.000	0.000	26.000	0.000
Directed Energy Demonstrator Development - LPLD System Critical Design B	C/CPFF	General Atomics : CA	0.000	0.000		26.000	Feb 2019	0.000		-		0.000	0.000	26.000	0.000
Directed Energy Demonstrator Development - LPLD System Critical Design C	C/CPFF	Boeing : CA	0.000	0.000		26.000	Feb 2019	0.000		-		0.000	0.000	26.000	0.000
Directed Energy Demonstrator Development - Laser Build/ Test	C/CPFF	TBD : TBD	0.000	0.000		12.619	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Directed Energy Demonstrator	C/CPFF	General Atomics, AFRL, Redstone Testing Center,	0.000	3.089	Jun 2018	0.756	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development - Laser Lethality Demonstration		White Sand Missile Range : CA, AL, NM													
Directed Energy Demonstrator Development - Laser Scaling	C/Various	MIT, LL, LLNL : GA, MA, CA	0.000	0.000		85.000	Feb 2019	50.000	Feb 2020	-		50.000	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Technology Transfer/Component Development	MIPR	MIT LL, LLNL, AF : MA, CA, NM	4.212	6.090	Oct 2017	4.750	Feb 2019	4.847	Feb 2020	-		4.847	Continuing	Continuing	Continuing
		Subtotal	8.800	75.718		214.100		109.167		-		109.167	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Energy Demonstrator Development - Advisory and Assistance Services	C/CPFF	MDA Multi : AL, NM	0.000	0.000		5.148	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Civilian Salaries and Travel	Allot	MDA Multi : AL, NM	0.000	0.000		0.000		0.228	Oct 2019	-		0.228	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Engineering and Technical Services	MIPR	Aviation and Missile Research Development and Engineering Center (AMRDEC), Combat Capabilities	0.950	1.271		0.000		1.590	Oct 2019	-		1.590	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Development Command - Aviation and Missile Center (CCDC-AMC) : AL													
Directed Energy Demonstrator Development - FFRDC	MIPR	Aerospace : AL, NM	0.395	1.055	Nov 2017	0.000		0.760	Nov 2019	-		0.760	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Facility Support	Various	377th ABW, Phoenix : NM	0.000	0.150		0.141	Dec 2018	0.153	Nov 2019	-		0.153	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Facility Sustainment	C/CPFF	TBD : AL, NM	0.000	0.000		0.800	May 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Information Technology	C/CPFF	Northrop Grumman, Jacobs Technology : CO	0.000	1.031		0.718	Nov 2018	0.890	Nov 2019	-		0.890	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Performance Analysis	MIPR	MIT LL, Aviation and Missile Research Development and Engineering Center (AMRDEC),Combat Capabilities Development Command - Aviation and Missile Center (CCDC-AMC) : MA, AL	0.250	1.954	Jan 2018	3.410	Dec 2018	3.478	Jan 2020	-		3.478	Continuing	Continuing	Continuing
		Subtotal	1.595	5.461		10.217		7.099		-		7.099	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MD98 / *Directed Energy Demonstrator Development*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.395	81.179		224.317		116.266		-		116.266	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
LPLD PDR				▲																								
LPLD CDR								△																				
Laser Scaling Concept Design and Evaluation - Distributed Gain Laser								△																				
Laser Scaling Beam Quality and Power Demonstration - Fiber Combined Laser								△																				
Laser Scaling Beam Quality Measurement - Diode Pumped Alkali Laser								△																				
Industry Laser Scaling									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
Laser Scaling DGL Laboratory Demonstration										△																		
Industry Laser Scaling Technology Design Review										△																		
Laser Scaling DPAL and FCL Preliminary Design Review												△																
Industry Laser Scaling Technology Design Review II												△																
Laser Scaling FCL Laboratory Demonstration													△															
Laser Scaling DPAL Laboratory Demonstration															△													
Industry Laser Scaling Prototype Build & Integration																△												
Industry Laser Scaling First Light																		△										
Industry Laser Scaling Independent Power & Beam Quality Assessment																		△										
Complete Transition of National Laboratory Technologies to Industry																			☆									
Strategic Laser Build																			✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
LPLD PDR	4	2018	4	2018
LPLD CDR	4	2019	4	2019
Laser Scaling Concept Design and Evaluation - Distributed Gain Laser	4	2019	4	2019
Laser Scaling Beam Quality and Power Demonstration - Fiber Combined Laser	4	2019	4	2019
Laser Scaling Beam Quality Measurement - Diode Pumped Alkali Laser	4	2019	4	2019
Industry Laser Scaling	1	2020	4	2022
Laser Scaling DGL Laboratory Demonstration	2	2020	2	2020
Industry Laser Scaling Technology Design Review	2	2020	2	2020
Laser Scaling DPAL and FCL Preliminary Design Review	4	2020	4	2020
Industry Laser Scaling Technology Design Review II	4	2020	4	2020
Laser Scaling FCL Laboratory Demonstration	2	2021	2	2021
Laser Scaling DPAL Laboratory Demonstration	4	2021	4	2021
Industry Laser Scaling Prototype Build & Integration	1	2022	1	2022
Industry Laser Scaling First Light	3	2022	3	2022
Industry Laser Scaling Independent Power & Beam Quality Assessment	3	2022	3	2022
Complete Transition of National Laboratory Technologies to Industry	4	2022	4	2022
Strategic Laser Build	4	2022	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MD94 / *Neutral Particle Beam (NPB)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD94: *Neutral Particle Beam (NPB)*	-	0.000	0.000	34.000	-	34.000	142.950	177.250	25.800	0.000	0.000	380.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 reflects the addition of the Neutral Particle Beam (NPB), a directed energy capability to defeat the emerging threat.

A. Mission Description and Budget Item Justification

The NPB provides a game changing space-based directed energy weapon capability for strategic missile defense. MDA explores game changing approaches that address the evolving threat to the homeland.

The NPB initiative will consist of a robust systems engineering process and continued cost and programmatic refinements as the concept and technologies mature. The NPB is planned to be a proof of concept culminating in an initial on-orbit space prototype demonstration of the NPB capability in FY 2023. The early NPB work includes design, development, and conducting a feasibility demonstration of a first stage accelerator subsystem.

The NPB neutralizer, system power, and thermal management are the key technology sub-components to be matured to lower risks for early demonstration.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Neutral Particle Beam	0.000	0.000	34.000
Articles:	-	-	-
Description: The NPB is a space-based, directed energy capability for homeland defense, providing a defense for boost phase and mid-course phase. A beam of neutral particles bombards its target with energy sufficient to disrupt, incapacitate, or kill the threat.			
Specific and/or unique planned accomplishments to each FY are as follows:			
FY 2019 Plans: N/A			
FY 2020 Plans: - Conduct detailed systems engineering design and lethality requirements trade studies - Conduct technology risk assessment, establish technical risk baseline for initial and follow-on development phases, and align program plan to mitigate risk			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD94 / *Neutral Particle Beam (NPB)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Design and develop low size, weight, and power prototype technologies - Initiate plans to demonstrate beam generation, first stage acceleration, beam steering, pointing and neutralization, instrumentation and controls, radio frequency and platform prime power, and thermal management subsystem technologies - Incrementally build-up demonstrator technologies in a laboratory environment - Prepare for a feasibility demonstration of the first stage accelerator subsystem - Explore new and innovative directed energy concepts and technology - Develop government reference concepts for independent performance predictions via government simulations to establish baseline for prototype assessments ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides the addition of the NPB, a directed energy capability to defeat the emerging threat.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	34.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0604115C: *Technology Maturation Initiatives*	163.947	316.822	303.458	-	303.458	336.139	380.195	300.126	201.668	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy consists of partnering with industry, other Government Agencies, FFRDCs and University Affiliated Research Centers. MDA will leverage agency and partner subject matter experts and use government model based assessments to inform Better Buying Power philosophy acquisition decisions. MDA will then award contracts to industry and universities via competitive procurements to develop and demonstrate promising components and integrated systems in realistic test environments.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD94 / *Neutral Particle Beam (NPB)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Neutral Particle Beam - Neutral Particle Beam - Various	Various	Various : TBD	0.000	0.000		0.000		34.000	Dec 2019	-		34.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		34.000		-		34.000	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		34.000		-		34.000	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD94 / *Neutral Particle Beam (NPB)*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Concept Development									✧	✧	✧	✧																
Systems Evaluation and Lab Demonstration									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧										
Relevant Environment Engineering and Development									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧					
Design Review 1										△																		
Design Review 2												△																
On Orbit Space Demonstration																							△					

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD94 / *Neutral Particle Beam (NPB)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Concept Development	1	2020	4	2020
Systems Evaluation and Lab Demonstration	1	2020	2	2022
Relevant Environment Engineering and Development	1	2020	3	2023
Design Review 1	2	2020	2	2020
Design Review 2	4	2020	4	2020
On Orbit Space Demonstration	3	2023	3	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MD99 / *Discrimination Sensor Demonstrator Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD99: *Discrimination Sensor Demonstrator Development*	37.622	71.111	78.608	132.187	-	132.187	73.619	65.914	92.394	56.045	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase in FY 2019 to FY 2020 provides for increased participation in EO/IR tests through aircraft lease and ground support costs for BMDS level tests and flight qualification efforts leading to advanced sensor flight tests.

A. Mission Description and Budget Item Justification

Areas of concentration include tracking lasers, advanced detectors, infrared sensors, and precision tracking and discrimination algorithms. DSDD demonstrates precision track of advanced threats at extended ranges, simple scene discrimination, and then complex scene discrimination through ground, flight, and space demonstrations.

Develops and tests high-precision advanced sensors that improve, identify, acquire, track, and discriminate incoming threats, specifically addressing U.S. Strategic Command's Prioritized Capabilities List requirements. DSDD activities and software maturation enhances the BMDS capability to discriminate lethal objects in a threat cluster, and track and hand over the threat object with Aegis Launch on Remote and Engage on Remote precision. The increased kinematics envelope of the SM-3 Block IIA, when combined with Engage on Remote capability, will expand battlespace and increase the number of threats engaged.

Development of next-generation advanced sensor systems to include tracking lasers, specialized detectors, unique processors and the corollary ground, airborne and space subsystems. These advanced sensors operate at strategic ranges required to augment BMDS radar, improve BMDS discrimination capability and provide precision track of large raids. They also promise to track multiple targets simultaneously, substantially reducing the number of sensor assets required for large raids. The program will leverage the technology demonstrated from the ground and in the air to develop compact ruggedized advanced sensor technology. These include cost-effective focal plane arrays and advanced sensor components to inform future BMDS layer decisions for persistent tracking and discrimination.

Promising advanced sensor technology is tested at the Mount Wilson Aerospace Facility for Integrated Optical Test (MAFIOT) in conjunction with BMDS tests. This system provides line of sight viewing of missile launches from Vandenberg AFB and San Nicolas Island. The Massachusetts Institute of Technology / Lincoln Laboratory (MIT/LL) will also conduct advanced sensor testing to assess system performance. Additionally, MDA uses a transportable ground test bed to test advanced sensors.

Provides sensor integration into an MDA configured airborne platform to test in operationally relevant environments and demonstrations. Airborne platforms equipped with an EO/IR sensor could provide the MDA a viable quick reaction capability to augment BMDS radar. MDA may explore options to partner with the Services and develop concepts for cost effective integration of sensor technology into limited fielding upgrade kits, which may inform follow-on development decisions. These kits could be installed on platforms deployed in theater to add missile defense capabilities on short notice.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

MDA will continue EO/IR capability of Multi-Spectral Targeting System -C airborne sensors for precision track Launch on Remote and discrimination.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Discrimination Sensor Demonstrator Development	71.111	78.608	132.187
Articles:	-	-	-
Description: This project develops an advanced sensor system (tracking laser, advanced detector, infrared sensor, and precision tracking and discrimination algorithms) for participation in BMDS tests under operationally relevant conditions and at operationally relevant ranges. The sensors upgrade will provide capability for tracking and discrimination of lethal objects. In addition it provides passive stereo tracking and discrimination algorithms for the same. The sensors provide capability for tracking and discrimination of missile representative objects. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Complete missile tracking tests with advanced sensor ground test beds at MAFIOT and the Pacific Missile Range Facility - Transition algorithms and models based on data from advanced sensor ground test beds to the flight system - Complete development of an advanced sensor system in addition to a laser, detector and unique advanced processor - Complete integration of flight qualified advanced sensor system components onto an airborne platform - Conduct first flight test of the advanced sensor platform - Exercise passive EO/IR sensors in MDA fight tests for EO/IR data gathering ***FY 2020 Plans:*** Continue airborne advanced sensor design maturation to incorporate advanced threat and discrimination -- Begin test design for active flight tests -- Begin ground test for next generation advanced sensor - Integrate FY 2019 ground test results into follow-on technology transfer for next generation advanced sensor - Develop Technology Design Review criteria for a compact ruggedized advanced sensor for future space application - Award compact ruggedized advanced sensor contract Continue passive EO/IR missile tracking tests and demonstrations to complete data gathering for model baselining . ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase in FY 2019 to FY 2020 provides for increased participation in EO/IR tests through aircraft lease and ground support costs for BMDS level tests and flight qualification efforts leading to advanced sensor flight tests.			
Accomplishments/Planned Programs Subtotals	71.111	78.608	132.187

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for DSDD consists of a contract(s) to industry via the Advanced Technology Innovation BAA and competitive procurements and agreements with FFRDCs to develop and demonstrate an advanced sensor system in realistic test environments. MDA will leverage agency partner subject matter experts and use government model based assessments for Better Buying Power 3.0 philosophy acquisition decisions.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Discrimination Sensor Demonstrator Development - Advanced Sensor Flight Demonstrator	Various	General Atomics, MIT/LL, TBD : C, MA, TBD	4.209	29.470	Aug 2018	50.783	Jan 2019	51.447	Nov 2019	-		51.447	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Advanced Sensor Ground Test	MIPR	MIT LL, Aerospace : MA, CA	15.073	5.710	Oct 2017	5.400	Oct 2018	2.000	Nov 2019	-		2.000	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Advanced Sensor Performance Analysis Aegis Engage on Remote Hardware in the Loop (HWIL)	MIPR	MIT LL, Aviation and Missile Research, Development, Engineering Center (AMRDEC), and Combat Capabilities Development Command - Aviation and Missile Center (CCDC-AMC) : MA, AL	5.663	4.572	Nov 2017	5.400	Dec 2018	5.900	Dec 2019	-		5.900	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Compact Ruggedized Advanced Sensor	Various	MIT LL, Industry (TBD) : MA, TBD	0.000	0.000		0.000		12.715	Jan 2020	-		12.715	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - EO/IR Flight Tests	C/CPFF	General Atomics : CA	0.000	20.423	Sep 2018	0.000		44.100	Nov 2019	-		44.100	Continuing	Continuing	Continuing
		Subtotal	24.945	60.175		61.583		116.162		-		116.162	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Discrimination Sensor Demonstrator Development - Advisory and Assistance Services	C/CPFF	Various : NM, AL	1.673	3.821	Oct 2017	2.930	Oct 2018	3.049	Nov 2019	-		3.049	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Civilian Salaries and Travel	Allot	MDA Multi : AL, NM	3.773	4.031	Oct 2017	8.699	Oct 2018	8.283	Oct 2019	-		8.283	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Engineering and Technical Services	MIPR	Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Combat Capabilities Development Command - Aviation and Missile Center (CCDC-AMC), Aerospace Aerospace : AL, CA	2.269	0.000		2.120	Dec 2018	0.844	Oct 2019	-		0.844	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Facility Support	MIPR	377th ABW : NM	0.311	0.000		0.000		0.470	Oct 2019	-		0.470	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Information Management and Technology	C/CPAF	Northrop Grumman, Jacobs Technology : CO	4.651	3.084	Feb 2018	3.276	Oct 2018	3.379	Oct 2019	-		3.379	Continuing	Continuing	Continuing
		Subtotal	12.677	10.936		17.025		16.025		-		16.025	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MD99 / *Discrimination Sensor Demonstrator Development*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	37.622	71.111		78.608		132.187		-		132.187	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Advanced Sensor System Ground Test	▲																											
Advanced Sensor Development and Demonstration Contract Award				▲																								
Passive Flight Test					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧														
Advanced Sensor Development					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧														
Passive Flight Test Contract Extension								△																				
Compact Ruggedized Advanced Sensor Contract Award										△																		
Passive Flight Software Maturation										△																		
Compact Ruggedized Advanced Sensor Development											✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Advanced Sensor Testing											✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Advanced Sensor Discrimination Contract Award																	△											
Advanced Sensor Discrimination Development																		✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Advanced Sensor Discrimination Test																				✧	✧	✧						

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Advanced Sensor System Ground Test	1	2018	1	2018
Advanced Sensor Development and Demonstration Contract Award	4	2018	4	2018
Passive Flight Test	1	2019	2	2021
Advanced Sensor Development	1	2019	2	2021
Passive Flight Test Contract Extension	4	2019	4	2019
Compact Ruggedized Advanced Sensor Contract Award	2	2020	2	2020
Passive Flight Software Maturation	2	2020	2	2020
Compact Ruggedized Advanced Sensor Development	3	2020	4	2024
Advanced Sensor Testing	3	2020	4	2024
Advanced Sensor Discrimination Contract Award	2	2022	2	2022
Advanced Sensor Discrimination Development	3	2022	4	2024
Advanced Sensor Discrimination Test	1	2023	3	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MT99 / *Technology Maturation Initiatives Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT99: *Technology Maturation Initiatives Test*	6.918	4.974	1.982	11.262	-	11.262	1.684	4.145	0.824	0.000	0.000	31.789
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides increased passive sensor participation test costs such as asset shipment, range support and Command, Control, Battle Management and Communications (C2BMC).

Costs associated with lease, maintenance and operation of the aircraft are included in budget project MD99.

A. Mission Description and Budget Item Justification

The TMI test project funds the management and execution of TMI system participation in BMDS level tests, hardware-in-the-loop testing, and performance analysis costs for flight test data. This includes test asset shipment to test ranges, labor, travel, range support, C2BMC test support specific to TMI.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Technology Maturation Initiatives Test	4.974	1.982	11.262
Articles:	-	-	-

Description: The TMI Test project tests the systems developed under the DEDD and DSDD projects under realistic conditions in conjunction with on-going BMDS testing and through dedicated live fire tests to inform continued testing, full development and limited fielding decisions. This effort also demonstrates potential sensors, systems, and architectures to integrate the BMDS for left through right of launch.

Specific and/or unique planned accomplishments to each FY are as follows:

FY 2019 Plans:
- Conduct system level hardware-in-the-loop testing in conjunction with Enterprise Sensor Laboratory and Experimental Laboratory for a BMDS level test
- Shipping, labor, travel, and range support for a BMDS level test

FY 2020 Plans:
- Conduct system level hardware-in-the-loop testing in conjunction with Enterprise Sensor Laboratory and Experimental Laboratory for BMDS level tests

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Shipping, labor, travel, and range support for BMDS level tests			
FY 2019 to FY 2020 Increase/Decrease Statement: Increase from FY 2019 to FY 2020 provides increased passive sensor participation test costs such as asset shipment, range support and C2BMC.			
Accomplishments/Planned Programs Subtotals	4.974	1.982	11.262

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing

Remarks

D. Acquisition Strategy

The MDA Integrated Master Test Plan establishes and documents the test requirements for the BMDS with the specific focus on collecting the data needed for the Verification, Validation, and Accreditation of the BMDS models and simulations. This paradigm uses critical factor analysis to drive test design, planning, and execution for accrediting models & simulations, which is used to validate and assess system performance. With this test approach, the MDA will establish confidence that the models and simulations used to evaluate the BMDS represent real world behavior, thereby enabling simulation-based performance assessment to verify system functionality.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Maturation Initiatives Test - Command Control Battle Management and Communications/Aegis	Various	Northrop Grumman, Lockheed Martin, Space and Naval Warfare Center, National Air and Space Intelligence Center, Naval Surface Warfare Center Dahlgren Division : CO, CA, OH, VA	3.279	1.295	Mar 2018	0.728	Jan 2019	6.262	Oct 2019	-		6.262	Continuing	Continuing	Continuing
Technology Maturation Initiatives Test - Range Facility Test Prep	MIPR	Pacific Missile Range Facility, Edwards AFB : HI, CA	0.274	0.155	Mar 2018	1.254	Jan 2019	0.600	Oct 2019	-		0.600	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Maturation Initiatives Test - Reagan Test Site Prep	MIPR	Reagan Test Site : Kwajalein Atoll	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Technology Maturation Initiatives Test - Transportation Costs	MIPR	US Air Force : CA	3.365	3.524	Nov 2017	0.000		4.400	Oct 2019	-		4.400	Continuing	Continuing	Continuing
		Subtotal	6.918	4.974		1.982		11.262		-		11.262	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.918	4.974		1.982		11.262		-		11.262	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)					▲																							
FTI-03 (OTA, OT Intercept Flight Test)					△																							
GT-228					▲																							
FTG-11 (OT) (GM, OT Intercept Flight Test)						△																						
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)								△																				
FEX-01 (OTHER, DT Tracking Exercise FT)									△																			
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)										△																		
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)												△																
GM CTV-03+ (GM, DT Interceptor Only Flight Test)																	△											
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																				△								
FTG-17 (GM, DT Intercept Flight Test)																					△							
FTG-19 (GM, DT/OT Intercept Flight Test)																												

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	1	2019	1	2019
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
GT-228	1	2019	1	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)	4	2019	4	2019
FEX-01 (OTHER, DT Tracking Exercise FT)	1	2020	1	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	4	2022	4	2022
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
FTG-19 (GM, DT/OT Intercept Flight Test)	1	2025	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MC98 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC98: *Cyber Operations*	0.471	0.162	5.254	0.475	-	0.475	0.477	0.467	0.472	0.478	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects the enacted congressional adjustment in FY 2019 to support cyber threats.

A. Mission Description and Budget Item Justification

Cyber Operations sustains MDA DoD Risk Management Framework and Controls Validation Testing activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager Plans of Action and Milestones for all Technology Maturation Initiative mission systems. It maintains Certification and Accreditation data repository, capturing DoD Information Assurance Certification and Accreditation Program documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority accreditation decisions) and Plans of Action and Milestones on all MDA information systems.

This project monitors and tracks Cybersecurity mitigations detailed in Information Technology security Plans of Action and Milestones. Activities include preparation of Certification and Accreditation documentation and accreditation recommendations to MDA Senior Information Assurance Officer /Certification Authority and Designated Approving Authority. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of MDA mission, test and administrative systems. Activities in the project are necessary to comply with the Federal Information Security Management Act.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network / System Certification and Accreditation (C and A)	0.162	5.254	0.475
Articles:	-	-	-
Description: The Cyber Operations project sustains MDA DoD Risk Management Framework (RMF) certification and Controls Validation Testing activities for the TMI PE. - Conduct cyber security and information assurance engineering and architecture planning for TMI information technology systems - Plan and test the information assurance controls for BMDS TMI systems - Develop TMI DoD RMF certification and accreditation packages - Conduct controls validation testing for TMI mission systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies - Conduct annual information assurance reviews on the TMI enclaves to assess compliance in implementing and maintaining Information Assurance controls			
Specific and/or unique planned accomplishments to each FY are as follows:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - Development of an enhanced security footprint with a flexible virtual environment that will aid in the development of new technologies, concepts, and cyber solutions - Develop a virtual cloud infrastructure enabling access to data in a secure environment -- Brings the user to the data instead of sending the data to the user - Prototype a cyber test bed to blue/red team functionality assessments - Implement exemplar secure processor solution ***FY 2020 Plans:*** - Conduct cyber security and information assurance engineering and architecture planning for TMI information technology systems - Plan and test the information assurance controls for BMDS TMI systems - Develop TMI DoD RMF certification and accreditation packages - Conduct controls validation testing for TMI mission systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies - Conduct annual information assurance reviews on the TMI enclaves to assess compliance in implementing and maintaining Information Assurance controls ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the enacted congressional adjustment in FY 2019 to support cyber threats.			
Accomplishments/Planned Programs Subtotals	0.162	5.254	0.475

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603178C: *Weapons Technology*	28.894	13.400	10.000	-	10.000	10.000	10.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	23.765	42.565	20.674	-	20.674	21.154	21.521	22.041	22.465	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for Cyber Operations, consists of using MDA civilian employees and the existing competitively awarded contractor support services.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MC98 / *Cyber Operations*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C and A) - Cyber Development and Engineering	C/CPFF	Davidson Technologies, JHU, Raytheon : AL, MD, MA	0.000	0.000		5.000	Jan 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C and A) - Cybersecurity Management and Computer Network Defense	C/CPFF	TEAMS : AL, NM	0.000	0.000		0.094	Jan 2019	0.300	Oct 2019	-		0.300	0.000	0.394	0.000
Network / System Certification and Accreditation (C and A) - Network / System Certification and Accreditation (C and A) - Agency Operations – Civilian Salaries and Travel	Allot	Missile Defense Agency : NM	0.140	0.162	Oct 2017	0.160	Oct 2018	0.175	Oct 2019	-		0.175	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C and A) - Network / System Certification and Accreditation (C and A) - CDS Implementation	C/CPFF	Northrop Grumman : CO	0.331	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.471	0.162		5.254		0.475		-		0.475	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MC98 / *Cyber Operations*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.471	0.162		5.254		0.475		-		0.475	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Cyber Security Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cybersecurity Contract Award - 2					△																							
Cybersecurity Contract Award - 1					△																							
Cybersecurity Contract Award - 3						△																						
Controls Validation Certification 1							△																					
Controls Validation Certification 2																			△									

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Security Support	1	2018	4	2024
Cybersecurity Contract Award - 2	1	2019	1	2019
Cybersecurity Contract Award - 1	1	2019	1	2019
Cybersecurity Contract Award - 3	2	2019	2	2019
Controls Validation Certification 1	3	2019	3	2019
Controls Validation Certification 2	3	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / *Technology Maturation Initiatives*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	8.667	6.521	6.661	9.268	-	9.268	6.712	6.715	8.596	8.974	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	6.521	6.661	9.268
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	6.521	6.661	9.268

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various : Multi: AL, VA	0.000	0.000		0.000		9.129	Nov 2019	-		9.129	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.091	0.033	Jul 2018	0.101	Jul 2019	0.139	Jul 2020	-		0.139	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	8.576	6.488	Aug 2018	6.560	Jun 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (MIPRS)	MIPR	Various : Multi: AK/ AL/CO/CA/HI/MD/ VA/NJ/NY/OCONUS	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	8.667	6.521		6.661		9.268		-		9.268	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.667	6.521		6.661		9.268		-		9.268	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604181C / *Hypersonic Defense*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
MD29: *Hypersonic Defense*	-	63.032	125.554	150.727	-	150.727	135.716	111.735	113.871	116.148	0.000	816.783
MD40: *Program Wide Support*	-	0.000	5.390	6.698	-	6.698	6.675	5.196	5.909	5.930	0.000	35.798
Program MDAP/MAIS Code: 362												

Note

Increase from FY 2019 to FY 2020 provides for the transition of Hypersonic Defense weapon system concept development to technology risk reduction activities.

A. Mission Description and Budget Item Justification

This program element supports a focused program that includes executing the systems engineering process, full kill chain technology identification and maturation, providing analysis and assessment of target of opportunity events, and executing near term sensor and command and control capability upgrades to address defense from hypersonic threats, which pose a significant threat.

The Hypersonic Defense effort will develop and deliver a series of material solutions to defeat hypersonic threats informed by a set of near term technology demonstrations. The Missile Defense Agency (MDA) continues to assess architecture alternatives and provide recommendations for future BMDS configurations to keep pace with evolving threats. MDA will leverage and upgrade existing systems, pursue hypersonic threat defeat weapon system capabilities, and develop disruptive technologies that augment future hypersonic defense architectures. These integrated sets of enhancements will provide incremental capabilities measured by progress and knowledge points in the following areas:

- Systems Engineering (Architecture Analysis, technology prioritization, requirements development, integration planning, test planning & assessment and lethality)
- Modification of existing Ballistic Missile Defense System (BMDS) sensors and Command, Control, Battle Management, and Communications (C2BMC) element for hypersonic threats
- Hypersonic Defense Weapon Systems Technology Development to enable a broad set of solutions including kinetic and non-kinetic means
- Advanced development of Sensor and C2 Technology to include ground, airborne and space-based technologies, to inform the development strategy

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	75.300	120.444	157.672	-	157.672
Current President's Budget	63.032	130.944	157.425	-	157.425
Total Adjustments	-12.268	10.500	-0.247	-	-0.247
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-15.200	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	4.350	0.000			
• SBIR/STTR Transfer	-1.418	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.247	-	-0.247

Change Summary Explanation

Decrease in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustments of:
- $15.200 million reduction to Hypersonic Defense for funds request early to need pending completion of the Analysis of Alternatives
- $4.350 million Reprogramming add for Hypersonic Defense

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustment for hypersonic defense.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / *Hypersonic Defense*	Project (Number/Name) MD29 / *Hypersonic Defense*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD29: *Hypersonic Defense*	-	63.032	125.554	150.727	-	150.727	135.716	111.735	113.871	116.148	0.000	816.783
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides initiation of Hypersonic Defense concept development and technology risk reduction activities following completion of the Hypersonic Defense Analysis of Alternatives.

A. Mission Description and Budget Item Justification

The Hypersonic Defense effort will develop and deliver a series of material solutions to defeat hypersonic threats informed by a series of near term technology demonstrations.

MDA will conduct systems engineering activities required to develop Missile Defense System capabilities to defeat advanced threats. Efforts will include full kill chain and component allocations for requirements development, performance analysis, integration planning, and ground/flight test planning & assessment for near term and far term architectures.

MDA will continue operationalization and integration of the initial hypersonic tracking capability developed under Pacific Command Joint Emergent Operational Need PC-0015 into the C2BMC program of record, Spiral 8.2-5. MDA plans to leverage the lessons learned and analysis from this capability development for the design and development of additional sensors for potential advanced threat applications. In addition, MDA will begin integrating these additional sensors into C2BMC and continue to enhance advanced threat ground processing to leverage data from these new sensors.

To address the weapon technology required to defeat the hypersonic threat, MDA will focus on the development of weapon concepts through competitive development efforts with industry. MDA will assess those concepts and identify technology component risk reduction efforts for cost, risk, and performance, and refine requirements to inform future development efforts. The Agency will also enhance analysis tools to assess concept designs and provide input to the requirements process.

MDA will conduct sensor demonstrations and develop sensor technology for hypersonic threats. The demonstrations build on ground, air, and space sensor technology to demonstrate capabilities to detect and track hypersonic threats. Demonstrations will employ tracking capability in all three phases of flight: boost phase, mid-phase using airborne, and terminal phase using ground, airborne, or tracking. MDA will also conduct pre and post demonstration performance assessment to analyze data collects.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Hypersonic Defense	63.032	125.554	150.727
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Description: This effort includes the systems engineering, technology development, and near term component capability development activities required to evolve the BMDS to address hypersonic threats, to include architecture analysis, capability roadmap development, and requirements development. It also includes an assessment of existing and new capabilities, identification, development, and demonstration of new technology and capabilities needed across the kill chain in support of architecture alternatives, and their ability to address advanced threats. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** Systems Engineering: - Conduct integrated architecture and performance analysis of end-to-end hypersonic threat capabilities. - Complete Analysis of Alternatives. - Complete analysis and assessments of target of opportunity events. - Complete requirements and initial system integration activities. - Finalize capability roadmap. - Develop Initial concept requirements. Missile Defense System Element Upgrades: - Command and Control, Battle Management, Communication (C2BMC): -- Conduct C2BMC 8.2-5 Critical Design Review (CDR) and complete development and integration for the following Hypersonic Defense capabilities. -- Complete design, development, and integration activities for sensor data exploitation tracking algorithms, leveraging the initial limited contingency capability enhancements. -- Develop Link 16 track forwarding of the hypersonic threat tracks. - AN/TPY-2: -- Complete System Engineering, Analysis and Requirements development for initial capability. -- Initiate Software Design, Development, and Testing for initial capability. -- Initiate System Engineering, Analysis and Requirements development for objective capability. - LRDR: -- Complete System Engineering, Analysis and Requirements development for objective capability. -- Initiate Software Design and Development for objective capability. -- Begin incorporation of hypersonic threat defense capabilities into LRDR software. Sensors & Weapons Technology & Demonstration:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Identify and demonstrate sensor and weapons component technology - Test and demonstrate sensor and weapons components for future hypersonic applications. - Conduct sensor-to-tactical network experiments to lower latency of sensor data to user. - Ground test data processing and algorithms for wide field of view threat scenes. Hypersonic Defense Weapon Systems Concept Definition: - Complete concept definition initial phase for the hypersonic intercept weapons with industry partners. The weapon systems concepts will aid the Agency in establishing the foundation for hypersonic defense capability - Deliver initial hypersonic defense weapon systems contractor concepts for future development and demonstration activities. ***FY 2020 Plans:*** Systems Engineering: - Execute the Hypersonic Defense program systems engineering process for integrating hypersonic defense capabilities into a layered missile defense system. - Lead Hypersonic Defense program; synchronizing element execution. - Complete analysis and assessments of target of opportunity events. - Perform architectural analysis to define initial Hypersonic Defense missile defense architectures, functional and performance needs. - Develop plans for capability integration; identify and resolve cross element integration technical and scheduling issues. - Update Hypersonic Defense architecture roadmap. Missile Defense System Element Upgrades: - Command and Control, Battle Management, Communication (C2BMC): -- Conduct Enterprise Sensor Laboratory (ESL)/C2BMC Hypersonic Defense capability development. -- Perform C2BMC Hypersonic Defense integration. -- Develop Organic sensor cueing. - Ground Sensor Upgrades: AN/TPY-2 and LRDR update and develop: -- Hypersonic threat profiles (database updates). -- Impact point prediction updates (threat/non-threat calls). -- Track filter techniques. -- Electronic Protection techniques. -- Interfaces. -- Other (higher classification). Sensors Technology & Demonstration:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Identify, develop, and demonstrate advanced technologies across the hypersonic defense full kill chain in the key areas of: -- Large field of view, digital focal plane array. -- High speed processing & algorithm development. -- High data rate, low latency processing and communications. Hypersonic Defense Weapon Systems Concept Definition: - Complete concept definition follow-on phase for the hypersonic weapon system architecture with industry partners. The weapon system concepts will aid the Agency in establishing the foundation for hypersonic defense capability - Conduct hypersonic weapon systems technology risk reduction to lower technical risk. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for the transition of Hypersonic defense weapon system efforts from concept development to technology risk reduction activities.			
Accomplishments/Planned Programs Subtotals	63.032	125.554	150.727

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	17.683	13.017	14.208	-	14.208	14.904	15.142	16.262	16.574	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing

Remarks

D. Acquisition Strategy

To optimize Missile Defense System performance, MDA leverages the nation's engineering centers of excellence at government agencies, Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry. The executing agents use varying contracting strategies in a flexible manner to maximize their contribution to the Missile Defense System. MDA acquires products and services by competitive means to the extent that is possible, practical and uses the Advanced Technology Broad Area Announcement process to award concept definition contracts.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / *Hypersonic Defense*	Project (Number/Name) MD29 / *Hypersonic Defense*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic Defense - BMDS C2BMC Upgrades	C/Various	Various : AL	0.000	13.375	Nov 2017	20.270	Nov 2018	19.115	Nov 2019	-		19.115	Continuing	Continuing	Continuing
Hypersonic Defense - BMDS Sensor Upgrades - AN/TPY-2	SS/CPFF	Raytheon : MA	0.000	1.896	Nov 2017	14.578	Nov 2018	16.624	Nov 2019	-		16.624	Continuing	Continuing	Continuing
Hypersonic Defense - BMDS Sensor Upgrades - LRDR	C/FFP	Lockheed Martin : NJ	0.000	1.822	Nov 2017	10.185	Feb 2019	6.948	Nov 2019	-		6.948	Continuing	Continuing	Continuing
Hypersonic Defense - Component Technology for Sensors and Weapons	MIPR	Various : AL	0.000	10.949	Nov 2017	9.551	Nov 2018	16.660	Nov 2019	-		16.660	Continuing	Continuing	Continuing
Hypersonic Defense - Sensor Technology - Advanced Threat Tracking and Analysis / Low Latency Processing	MIPR	Various : AL, CA	0.000	7.368	Jun 2018	5.648	Dec 2018	6.623	Nov 2019	-		6.623	Continuing	Continuing	Continuing
Hypersonic Defense - Sensor Technology - Sensor Concept and Development	MIPR	Various : AL	0.000	6.714	Nov 2017	14.808	Nov 2018	5.500	Nov 2019	-		5.500	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering	Allot	MDA : AL, VA	0.000	3.914	Oct 2017	3.000	Oct 2018	3.000	Nov 2019	-		3.000	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering - CSS	C/CPFF	TEAMS : AL, VA	0.000	3.250	Nov 2017	2.000	Nov 2018	2.000	Nov 2019	-		2.000	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering - FFRDC/UARC	MIPR	Various : VA, AL	0.000	2.000	Nov 2017	2.000	Nov 2018	2.000	Nov 2019	-		2.000	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering - Industry	C/CPAF	Boeing : AL	0.000	2.500	Nov 2017	2.596	Nov 2018	2.496	Nov 2019	-		2.496	Continuing	Continuing	Continuing
Hypersonic Defense - Technology Development Program Operations	Allot	MDA : AL, VA	0.000	4.466	Nov 2017	7.395	Nov 2018	6.759	Nov 2019	-		6.759	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / *Hypersonic Defense*	Project (Number/Name) MD29 / *Hypersonic Defense*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic Defense - Weapon Concept Definition & Risk Reduction	C/Various	Various : AL	0.000	4.778	Sep 2018	33.523	Feb 2019	63.002	Feb 2020	-		63.002	Continuing	Continuing	Continuing
		Subtotal	0.000	63.032		125.554		150.727		-		150.727	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	63.032		125.554		150.727		-		150.727	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Hypersonic Threat Sensor Tracking Demonstration	▲																											
C2BMC Capability Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧			
Hypersonic Threat Sensor Technology Development and Demo	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	
Hypersonic Defense Sensor & Weapons Component Technology Capability Development			✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Weapon Systems Concept Definition Contract Award #1				▲																								
AN/TPY-2 Capability Development				✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
LRDR Capability Development				✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
Weapon Systems Concept Definition & Risk Reduction				✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧		
AoA Completion					▲																							
C2BMC System Requirements Review / Preliminary Design Review					▲																							
Hypersonic Defense Sensor and Weapons Component Technology Development Contract Award						△																						
Weapon Systems Concept Definition Contract Award #2							△																					
Hypersonic Defense Sensor and Weapons Component Technology Performance Testing							✧	✧	✧	✧	✧	✧	✧	✧	✧	✧												
LRDR System Requirements Review									△																			
AN/TPY-2 System Requirements Review									△																			
Weapons Technology Risk Reduction Contract(s) Award										△																		

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Hypersonic Threat Sensor Tracking Demonstration	1	2018	1	2018
C2BMC Capability Development	1	2018	1	2024
Hypersonic Threat Sensor Technology Development and Demo	1	2018	3	2024
Hypersonic Defense Sensor & Weapons Component Technology Capability Development	3	2018	4	2024
Weapon Systems Concept Definition Contract Award #1	4	2018	4	2018
AN/TPY-2 Capability Development	4	2018	4	2023
LRDR Capability Development	4	2018	4	2023
Weapon Systems Concept Definition & Risk Reduction	4	2018	2	2024
AoA Completion	1	2019	1	2019
C2BMC System Requirements Review / Preliminary Design Review	1	2019	1	2019
Hypersonic Defense Sensor and Weapons Component Technology Development Contract Award	2	2019	2	2019
Weapon Systems Concept Definition Contract Award #2	3	2019	3	2019
Hypersonic Defense Sensor and Weapons Component Technology Performance Testing	3	2019	4	2021
LRDR System Requirements Review	1	2020	1	2020
AN/TPY-2 System Requirements Review	1	2020	1	2020
Weapons Technology Risk Reduction Contract(s) Award	2	2020	2	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / *Hypersonic Defense*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	-	0.000	5.390	6.698	-	6.698	6.675	5.196	5.909	5.930	0.000	35.798
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	0.000	5.390	6.698
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	0.000	5.390	6.698

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi, AL, CA, CO, VA	0.000	0.000		0.082	Aug 2019	0.100	Aug 2020	-		0.100	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	0.000		5.308	Aug 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities Maintenance	MIPR	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	0.000		0.000		6.598		-		6.598	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		5.390		6.698		-		6.698	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		5.390		6.698		-		6.698	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604672C *I Homeland Defense Radar-Hawaii*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	0.000	62.221	267.901	-	267.901	197.867	125.382	80.789	36.330	0.000	770.490
MD40: *Program-Wide Support*	-	0.000	0.000	6.813	-	6.813	12.747	10.245	6.984	4.442	0.000	41.231
Program MDAP/MAIS Code: 362												

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41

Increase from FY 2019 to FY 2020 provides purchase of radar equipment.

A. Mission Description and Budget Item Justification

The HDR-H Program Element (PE) 0604672C is comprised of a persistent discrimination sensor for the Ballistic Missile Defense System (BMDS). HDR-H addresses United States Northern Command (NORTHCOM) and United States Indo-Pacific Command (INDOPACOM) operational requirements for a near term persistent solution against advancing threats and closes capability gaps. HDR-H provides 24 hours a day, 7 days a week, and 365 days a year tracking and discrimination capability against increasingly complex threats, improve capability of Ballistic Missile Defense (BMD) interceptors, and supports multi-mission areas (e.g., Space Situational Awareness and Intelligence Collection). The radars will leverage development efforts from other sensor projects to enhance discrimination, tracking, and hit assessment to maximize interceptor usage. The HDR-H final testing, integration and delivery is planned for FY 2023.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604672C *I Homeland Defense Radar-Hawaii*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	62.221	274.714	-	274.714
Total Adjustments	0.000	62.221	274.714	-	274.714
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	62.221			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	274.714	-	274.714

Change Summary Explanation

Increase in FY 2019 and FY 2020 from PB19 to PB20 provides the transfer of HDR-H from Pacific Discriminating Radar (0604673C) to this new Homeland Defense Radar - Hawaii (0604672C) and provides purchase of radar equipment.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604672C / *Homeland Defense Radar-Hawaii*	Project (Number/Name) MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	0.000	62.221	267.901	-	267.901	197.867	125.382	80.789	36.330	0.000	770.490
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41
Increase from FY 2019 to FY 2020 provides purchase of radar equipment.

A. Mission Description and Budget Item Justification

The Homeland Defense Radar-Hawaii (HDR-H) is a persistent discrimination radar that will provide additional capability to the Ballistic Missile Defense System (BMDS) to support the defense of Hawaii. HDR-H's primary mission is to provide autonomous acquisition and persistent precision tracking and discrimination to optimize the defensive capability of the BMDS and counter evolving threats. The HDR-H radar will be integrated into the BMDS through the C2BMC system and will feature a scalable and open system architecture to mitigate evolving threats. HDR-H's inherent capability will support additional mission areas, including but not limited to, Space Situational Awareness (SSA). The HDR-H radar is comprised of an equipment shelter housing a singled-faced array, a Mission Control Facility (MCF) which supports radar operations, a Radar Antenna Base, a Thermal Control System, and supporting facilities and infrastructure. The radar prime contractor will be responsible for building and fielding the radar equipment with associated Radar Antenna Base and Thermal Control, and the HDR-H Equipment Shelter (HES). Siting surveys will be conducted and EIS will be completed to determine the final recommended site. The HDR-H radar is anticipated to be operational in Hawaii in FY 2023.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Homeland Defense Radar Hawaii (HDRH)	0.000	62.221	267.901
Articles:	-	-	-
Description: The HDR-H program includes requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and Models and Simulation (M&S) efforts for radar development. Efforts include site activation and preparation of site infrastructure for construction activities. The program will develop and integrate C2BMC systems for HDR-H functionality. The program will develop and deliver radar software Build 1 and establish independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, and test of long lead components.			
Specific and/or unique accomplishments to each FY are as follows:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: -Initiate preparations for system-level Preliminary Design Review (PDR) -Initiate Environmental Impact statements -Complete System Requirements Review (SRR) -Complete Integrated Baseline Review (IBR) ***FY 2020 Plans:*** -Continue system level PDR in FY 2020 -Initiate long lead procurements of critical components for the Sub-Array Suites (SAS), Radar Processing Group (RPG), and Mission Processing Group (MPG) -Initiate Critical Design Review (CDR) at the component and subsystem level -Initiate production activities for critical components: Transmit Receive (T/R) modules, Wide Band Limiter (WBLR) modules, T/R Low Power Module Circuit Card Assemblies (CCAs), T/R High Power Module CCAs, Power Line Replaceable Units (LRUs), Digital Receiver/Exciter (DREX) LRUs, DREX Radio Frequency (RF) CCAs, DREX Processor CCAs, Column Processors, Long Lead Column Processor CCAs, Subarray Suite Assembly materials, and Synthesizer Cabinets -Initiate production in FY 2020 as required for DD250 in FY 2023 ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for the award of the radar prime contract and purchase of radar equipment.			
Accomplishments/Planned Programs Subtotals	0.000	62.221	267.901

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603884C: *SENSORS MILCON*	0.000	174.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	174.000
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0604672C: *Homeland Defense Radar - Hawaii - IDT*	0.000	0.000	0.000	-	0.000	89.710	0.000	0.000	0.000	0.000	89.710

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604672C: *Homeland Defense Radar - Hawaii - MILCON*	0.000	0.000	0.000	-	0.000	138.000	183.000	0.000	0.000	0.000	321.000
• 0604672C: *Homeland Defense Radar-Hawaii*	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: *Pacific Discriminating Radar*	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604673C: *Pacific Discriminating Radar - MILCON*	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	365.970	0.000	365.970
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

Remarks

D. Acquisition Strategy

The HDR-H acquisition strategy was approved in December 2017 for a single radar. In May of 2018 a change was approved to the acquisition strategy to a multiple-award IDIQ contract for up to three radars. The HDR-H procurement will be the first delivery order of the competitively awarded IDIQ contract and HDR-H is a full/open competitive award. An additional two radar delivery orders will be awarded competitively. MDA awarded the HDR-H in December 2018. The prime contractor will manage, develop, build and integrate, test, and field the radar. The prime contract includes other fixed price and cost-reimbursable line items (to include the antenna base and radar thermal control and options in order to properly balance acquisition costs and risks. Performance and cost incentives were included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. The HDR-H is expected to complete DD250 and initial fielding in 2023.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604672C / *Homeland Defense Radar-Hawaii*	Project (Number/Name) MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Homeland Defense Radar – Hawaii (HDR–H) - Homeland Defense Radar - Hawaii (HDR-H) - Communications Integration	SS/CPIF	Lockheed Martin : AL	0.000	0.000		16.100	Mar 2019	12.800	Mar 2020	-		12.800	Continuing	Continuing	Continuing
Homeland Defense Radar – Hawaii (HDR–H) - Homeland Defense Radar - Hawaii (HDR-H) - IV&V	MIPR	TBD : TBD	0.000	0.000		3.145	Feb 2019	3.497	Dec 2019	-		3.497	Continuing	Continuing	Continuing
Homeland Defense Radar – Hawaii (HDR–H) - Homeland Defense Radar - Hawaii (HDR-H) - Prime Contractor	C/FPIF	Lockheed Martin : AL	0.000	0.000		36.198	Dec 2018	241.656	Dec 2019	-		241.656	Continuing	Continuing	Continuing
Homeland Defense Radar – Hawaii (HDR–H) - Homeland Defense Radar - Hawaii (HDR-H) - Site Activation & Studies	C/TBD	TBD : TBD	0.000	0.000		2.390	Mar 2019	3.990	Mar 2020	-		3.990	Continuing	Continuing	Continuing
Homeland Defense Radar – Hawaii (HDR–H) - Homeland Defense Radar - Hawaii (HDR-H) –– Civilians/Travel	Allot	MDA : Various	0.000	0.000		1.000	Nov 2018	2.570	Oct 2019	-		2.570	Continuing	Continuing	Continuing
Homeland Defense Radar – Hawaii (HDR–H) - Homeland Defense Radar – Hawaii (HDR–H)-Contractor Support Services	Various	Various : Various	0.000	0.000		3.388	Nov 2018	3.388	Oct 2019	-		3.388	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		62.221		267.901		-		267.901	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604672C / *Homeland Defense Radar-Hawaii*	Project (Number/Name) MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		62.221		267.901		-		267.901	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Homeland Defense Radar - Hawaii (HDR-H)			✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
System Requirements Review (SRR)							✧																					
Preliminary Design Review (PDR)											✧																	
Developmental Baseline Review (DBR)												✧																
Critical Design Review (CDR)													✧															
MILCON													✧	✧	✧	✧	✧	✧	✧	✧	✧							
DD-250																							✧					
Initial fielding																								✧				

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Homeland Defense Radar - Hawaii (HDR-H)	3	2018	4	2023
System Requirements Review (SRR)	3	2019	3	2019
Preliminary Design Review (PDR)	3	2020	3	2020
Developmental Baseline Review (DBR)	4	2020	4	2020
Critical Design Review (CDR)	1	2021	1	2021
MILCON	1	2021	1	2023
DD-250	3	2023	3	2023
Initial fielding	4	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604672C / *Homeland Defense Radar-Hawaii*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	0.000	0.000	6.813	-	6.813	12.747	10.245	6.984	4.442	0.000	41.231
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 20 Program Wide Support (PWS) is allocated to the Homeland Defense Radar-Hawaii PE. PWS is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS and supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	0.000	0.000	6.813
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS and supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	6.813

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		6.813	Dec 2019	-		6.813	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		6.813		-		6.813	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		6.813		-		6.813	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program Wide Support									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program Wide Support	1	2020	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604673C *I Pacific Discriminating Radar*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	59.564	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	59.564
MD40: *Program Wide Support*	-	0.000	0.000	1.555	-	1.555	2.839	15.716	15.859	13.619	0.000	49.588
MD51: *Pacific Radar (PAC Radar)*	-	0.000	15.926	5.156	-	5.156	56.961	37.728	263.490	384.954	0.000	764.215
Program MDAP/MAIS Code: 362												

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41 FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41 FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41.

Decrease in FY 2020 reflects a delay in PAC Radar initial fielding by two years from FY 2024 to FY 2026.

A. Mission Description and Budget Item Justification

The Pacific Discriminating Radar Program Element is comprised of the PAC Radar program, a persistent discrimination sensor for the Ballistic Missile Defense System (BMDS). PAC Radar addresses USNORTHCOM and USINDOPACOM operational requirements for a near term persistent solution against advancing threats and closes capability gaps throughout the Pacific region. PAC Radar provides 24/7 persistent tracking and discrimination capability against Homeland and Regional threats within an increasingly complex countermeasure environment, improves capability of Ballistic Missile Defense (BMD) interceptors and supports multi-mission areas (e.g., Space Situational Awareness & Intelligence Collection). The radar will leverage development efforts from other sensor projects to enhance discrimination, tracking, and hit assessment to maximize interceptor usage.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604673C *I Pacific Discriminating Radar*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	0.000	95.765	164.167	-	164.167
Current President's Budget	59.564	15.926	6.711	-	6.711
Total Adjustments	59.564	-79.839	-157.456	-	-157.456
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-22.618			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	61.000	-57.221			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.436	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-157.456	-	-157.456

Change Summary Explanation

Decrease in FY 2019 from PB19 to PB20 reflects congressional transfer of Homeland Defense Radar - Hawaii (HDR-H) Budget Project MD41 from this PE to the new HDR-H PE 0604672C, and congressional adjustment --early to need.

Decrease in FY 2020 from PB19 to PB20 reflects the transfer of Homeland Defense Radar - Hawaii (HDR-H) (MD41) from this PE to the new HDR-H PE 0604672C and a delay in PAC Radar initial fielding by two years from FY 2024 to FY 2026.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / *Pacific Discriminating Radar*	Project (Number/Name) MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	59.564	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	59.564
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

HDRH funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41.

A. Mission Description and Budget Item Justification

Details are contained in PE 0604672C: Homeland Defense Radar-Hawaii.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Homeland Defense Radar - Hawaii	59.564	0.000	0.000
Articles:	-	-	-
Description: Details are contained in PE 0604672C: Homeland Defense Radar-Hawaii. ***FY 2019 Plans:*** - N/A ***FY 2020 Plans:*** - N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	59.564	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *SENSORS MILCON*	0.000	174.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	174.000
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0604672C: *Homeland Defense Radar - Hawaii - IDT*	0.000	0.000	0.000	-	0.000	89.710	0.000	0.000	0.000	0.000	89.710
• 0604672C: *Homeland Defense Radar - Hawaii - MILCON*	0.000	0.000	0.000	-	0.000	138.000	183.000	0.000	0.000	0.000	321.000
• 0604672C: *Homeland Defense Radar-Hawaii*	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: *Pacific Discriminating Radar*	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604673C: *Pacific Discriminating Radar - MILCON*	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	365.970	0.000	365.970
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	88.840	77.405	105.530	-	105.530	114.698	99.088	112.943	96.526	Continuing	Continuing
• 31299903: *MILCON PLANNING and DESIGN*	0.000	6.184	35.472	-	35.472	20.848	30.185	42.000	19.543	0.000	154.232

Remarks

D. Acquisition Strategy

Details are contained in PE 0604672C: Homeland Defense Radar-Hawaii.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Homeland Defense Radar - Hawaii - Communications Integration	SS/CPIF	Lockheed Martin : AL	0.000	16.100	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii - IV&V	MIPR	TBD : TBD	0.000	3.173	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii - Prime Contractor	C/TBD	TBD : TBD	0.000	31.264	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii - Program Office	Various	MDA : AL	0.000	6.627	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii - Site Activation & Studies	C/TBD	TBD : TBD	0.000	2.400	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	59.564		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	59.564		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Homeland Defense Radar - Hawaii (HDR-H)			✦	✦																								

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Homeland Defense Radar - Hawaii (HDR-H)	3	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / *Pacific Discriminating Radar*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	-	0.000	0.000	1.555	-	1.555	2.839	15.716	15.859	13.619	0.000	49.588
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2020, Program Wide Support (PWS) was proportionately reallocated to the Pacific Discriminating Radar program element. PWS is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	0.000	0.000	1.555
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS and supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	1.555

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / *Pacific Discriminating Radar*	Project (Number/Name) MD40 / *Program Wide Support*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various : Multi: AL, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA, and Aust,	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	0.000	0.000		0.000		1.555	Dec 2019	-		1.555	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		1.555		-		1.555	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		1.555		-		1.555	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2020	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / *Pacific Discriminating Radar*	Project (Number/Name) MD51 / *Pacific Radar (PAC Radar)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD51: *Pacific Radar (PAC Radar)*	-	0.000	15.926	5.156	-	5.156	56.961	37.728	263.490	384.954	0.000	764.215
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2019, Pacific Radar (PAC Radar) (Formerly known as Medium Range Discriminating Radar (MRDR)) was transferred from BMD Sensors Program Element 0603884C.

A. Mission Description and Budget Item Justification

The mission of the PAC Radar program office is to define, develop, acquire, field, and sustain the radar as an element of the BMDS. Initial fielding of the PAC Radar is planned for FY 2026 and it will provide persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of the Homeland against long-range missile threats and defense against regional threats in the USINDOPACOM area of responsibility. The PAC Radar will be integrated into the BMDS through the C2BMC system and will feature a scalable and open system architecture to mitigate evolving threats. The radar also supports additional mission areas including Space Situational Awareness. The PAC Radar is comprised of an equipment shelter housing multiple array faces, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure. The radar prime contractor will be responsible for building and fielding the radar equipment with associated cooling system and the radar equipment shelter to include foundation. Siting surveys will be conducted and EIS will be completed to determine final recommended site.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Pacific Radar (PAC Radar)	0.000	15.926	5.156
Articles:	-	-	-
Description: Formerly Homeland Defense Radar-Pacific (HDR-P), the Pacific Radar (PAC Radar) program includes requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and M&S efforts for radar development. Efforts include refining final site selection and site survey. - Development of C2BMC systems for PAC Radar functionality. - Development of radar software. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Develop requirements and Element Specifications - Location refinement ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Complete requirements definition ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects a delay in Pacific Discriminating Radar initial fielding by two years from FY 2024 to FY 2026.			
Accomplishments/Planned Programs Subtotals	0.000	15.926	5.156

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *SENSORS MILCON*	0.000	174.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	174.000
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0604672C: *Homeland Defense Radar - Hawaii - MILCON*	0.000	0.000	0.000	-	0.000	138.000	183.000	0.000	0.000	0.000	321.000
• 0604672C: *Homeland Defense Radar-Hawaii*	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: *Pacific Discriminating Radar*	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604673C: *Pacific Discriminating Radar - MILCON*	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	365.970	0.000	365.970
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	88.840	77.405	105.530	-	105.530	114.698	99.088	112.943	96.526	Continuing	Continuing
• 31299903: *MILCON PLANNING and DESIGN*	0.000	6.184	35.472	-	35.472	20.848	30.185	42.000	19.543	0.000	154.232

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

D. Acquisition Strategy

The PAC Radar acquisition strategy was approved in December 2017. The PAC Radar procurement will be part of the Multi-Award IDIQ (MAIDIQ) contract that will include the full/open competitive award of the first Delivery Order for the PAC Radar no later than FY 2022. The prime contractor will manage, develop, build and integrate, test, and deliver the radar. The prime contract will include other fixed price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives will be included to motivate on-time delivery. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. Initial fielding for PAC Radar is planned for FY 2026.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / *Pacific Discriminating Radar*	Project (Number/Name) MD51 / *Pacific Radar (PAC Radar)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Pacific Radar (PAC Radar) - –– Civilian/Travel	Allot	MDA : Various	0.000	0.000		0.625	Nov 2018	1.225	Oct 2019	-		1.225	Continuing	Continuing	Continuing
Pacific Radar (PAC Radar) - Communications Integration	SS/CPIF	Lockheed Martin : AL	0.000	0.000		9.354	Mar 2019	2.984	Oct 2019	-		2.984	Continuing	Continuing	Continuing
Pacific Radar (PAC Radar) - Contractor Support Services	Various	Various : Various	0.000	0.000		0.947	Nov 2018	0.947	Oct 2019	-		0.947	Continuing	Continuing	Continuing
Pacific Radar (PAC Radar) - Site Activation & Studies	MIPR	TBD : TBD	0.000	0.000		5.000	Feb 2019	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		15.926		5.156		-		5.156	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		15.926		5.156		-		5.156	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Pacific Radar															✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
System Requirements Review (SRR)																	△											
Preliminary Design Review (PDR)																			△									
Developmental Baseline Review (DBR)																						△						
Critical Design Review (CDR)																								△				
MILCON																									✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Pacific Radar	3	2021	1	2025
System Requirements Review (SRR)	1	2022	1	2022
Preliminary Design Review (PDR)	3	2022	3	2022
Developmental Baseline Review (DBR)	2	2023	2	2023
Critical Design Review (CDR)	4	2023	4	2023
MILCON	1	2024	1	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604873C *I Long Range Discrimination Radar (LRDR)*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	363.561	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing
MD96: *Long Range Discrim Radar (LRDR)*	339.765	354.735	158.597	131.446	-	131.446	114.141	94.952	83.729	60.987	Continuing	Continuing
MC96: *Cyber Operations*	-	0.000	0.000	0.000	-	0.000	3.245	0.000	0.000	0.000	0.000	3.245
MD40: *Program Wide Support*	23.796	15.781	7.946	4.977	-	4.977	5.491	4.968	4.474	3.582	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2019 to FY 2020 reflects completion of development and manufacturing of radar hardware and transition to on site radar assembly and integration.

A. Mission Description and Budget Item Justification

The mission of the Long Range Discrimination Radar (LRDR) program is to design, develop, integrate, deliver, field, and sustain the LRDR as an element of the Ballistic Missile Defense System (BMDS) Increment 6b Homeland Defense (HLD) Capability. This capability is representative of LRDR Configuration 1. Initial fielding of the LRDR is planned for 2020 leading to an Operational Capability Declaration in FY 2022. The LRDR is comprised of a LRDR Equipment Shelter (LES), housing two radar array faces, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure. The Secretary of the Air Force approved Clear Air Force Station, Alaska as the LRDR site. The Air Force Space Command (AFSPC) is the designated Lead Major Command (MAJCOM).

The LRDR operates in the S-band frequency, features scalable and open systems architecture to mitigate evolving threats, and integrates into the BMDS through the Command and Control, Battle Management, and Communications (C2BMC) system. This Program Element includes BMDS threat discrimination improvements to enhance BMDS effectiveness against the evolving threat. The result will be a BMDS architecture more capable of discriminating and intercepting re-entry vehicles with a higher degree of confidence to improve Warfighter shot doctrine, and conserve Ground-Based Defense (GMD) interceptor inventory. LRDR also supports additional mission areas including Space Situational Awareness.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604873C *I Long Range Discrimination Radar (LRDR)*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	357.659	164.562	91.603	-	91.603
Current President's Budget	370.516	166.543	136.423	-	136.423
Total Adjustments	12.857	1.981	44.820	-	44.820
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	12.500	0.000			
• Congressional Directed Transfers	0.000	1.981			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-8.357	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	8.714	0.000	44.820	-	44.820

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustment for Ballistic Missile Early Warning Radar System (BMEWS) removal.

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustment for Facility Restoration Sustainment and Maintenance (FSRM).

Increase in FY 2020 from PB19 to PB20 provides pre-transition and transfer logistics activities, data collection events to support system acceptance, and prime contract costs.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / *Long Range Discrimination Radar (LRDR)*	Project (Number/Name) MD96 / *Long Range Discrim Radar (LRDR)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD96: *Long Range Discrim Radar (LRDR)*	339.765	354.735	158.597	131.446	-	131.446	114.141	94.952	83.729	60.987	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects completion of development and manufacturing of radar hardware and transition to on site radar assembly and integration.

A. Mission Description and Budget Item Justification

This project provides for the development and initial fielding of a Long Range Discrimination Radar (LRDR) by 2020 leading to an Operational Capability Declaration in FY 2022. This provides an improved persistent midcourse BMDS discrimination capability in the Pacific sensor architecture. The LRDR will also increase the defensive capacity of the Ground-Based Midcourse Defense (GMD) interceptor inventory and address evolving threats. MDA's request includes funding for the design and development of the LRDR, delivery of spares for initial fielding, system engineering, software development, software Independent Verification and Validation (IV&V), hardware manufacturing, qualification testing, developmental testing support and Modeling and Simulation (M&S) efforts. M&S includes development of LRDR digital simulations and their integration into the BMDS, M&S architecture, and Verification, Validation, and Accreditation (VV&A) of LRDR models. The United States Air Force (USAF) will leverage the LRDR inherent capabilities to augment ancillary missions including Space Object Identification and Space Situational Awareness.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Long Range Discrimination Radar (LRDR)	354.735	158.597	131.446
Articles:	-	-	-
Description: The LRDR program includes requirement development activities associated with systems engineering, software development, discrimination improvements, design reviews, testing, and M&S efforts for radar development. Efforts include LRDR site activation and preparation of site infrastructure for construction activities. The program will develop and integrate C2BMC systems for LRDR functionality. The program will develop, maintain, and deliver radar software Build 1 and establish the Independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, integration and test of radar materials. This program will also establish the operational baseline, initiate radar operations and communication, and initiate sustainment operations. The program also includes logistics management; reliability, availability, maintainability (RAM) efforts; data management; and operations support for the LRDR program office.			
Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans:			
Radar Assembly and Integration			
-- Complete receipt of hardware, manufacturing and assembly of Array #1 and #2			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-- Complete Factory Acceptance Testing (FAT) on Array #1 and #2 -- Continue Front End Electronics Integration into Array #1 and #2 Panels -- Initiate packaging, shipment, emplacement, and installation of Arrays on-site at Clear Air Force Station (CAFS), AK -- Initiate Mission Control Facility (MCF) / LRDR Equipment Shelter (LES) site Integration with MILCON and C2BMC -- Initiate execution of the Transition & Transfer (T2) checklist items including facility walk-throughs and open storage certification -- Initiate Space Missile Defense Command Warfighter training of C2BMC for LRDR functionality in preparation for operational radar -- Initiate Logistics Business Case Analysis and Depot Maintenance Planning -- Complete qualification and subsystem testing -- Complete final SAS assemblies -- Software -- Complete and deliver software Build 1.1, integrate into government IV&V lab -- Complete software Build 1.1 Formal Qualification Testing (FQT) -- Complete delivery of hardware-in-the-loop (HWIL) components to government ground test lab -- Initiate HWIL pairwise /cycle 2 Testing with C2BMC -- Initiate participation in BMDS ground and flight tests in accordance with the BMDS Integrated Master Test Plan (IMTP) -- Complete final SAS and FEE assembly ***FY 2020 Plans:*** Radar Assembly and Integration -- Complete shipment and installation of Arrays on-site at Clear Air Force Station (CAFS), AK -- Complete Mission Control Facility (MCF) / LRDR Equipment Shelter (LES) site integration with MILCON and C2BMC -- Continue execution of the Transition & Transfer (T2) checklist items -- Complete Space Missile Defense Command Warfighter training of C2BMC for LRDR functionality -- Complete Logistics Business Case Analysis and Depot Maintenance Planning -- Continue Independent Validation & Verification (IV&V) of tactical software on Hardware-in-the-Loop equipment -- Continue C2BMC pairwise testing and cyber security testing ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of development and manufacturing of radar hardware and transition to on site radar assembly and integration.			
Accomplishments/Planned Programs Subtotals	354.735	158.597	131.446

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603884C: *SENSORS MILCON*	0.000	174.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	174.000
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	88.840	77.405	105.530	-	105.530	114.698	99.088	112.943	96.526	Continuing	Continuing
• 31299903: *MILCON PLANNING and DESIGN*	0.000	6.184	35.472	-	35.472	20.848	30.185	42.000	19.543	0.000	154.232

Remarks

D. Acquisition Strategy

The LRDR acquisition strategy, which was approved on January 7, 2015, incorporates robust acquisition practices to ensure delivery of a best value solution that meets mission performance requirements and reduces lifecycle costs. MDA awarded a fixed-price incentive contract to Lockheed Martin Corporation of Moorestown, New Jersey, on October 21, 2015 to design, develop, manufacture, integrate & test, and field the LRDR prime mission equipment. The prime contract included other fixed-price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives were included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. MDA will synchronize the radar development contract efforts with a simultaneous MILCON effort which will be executed through the US Army Corps of Engineers. The LRDR is expected to complete development and initial fielding in 2020 for BMDS integration and testing.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Long Range Discrimination Radar (LRDR) - BMEWS Remediation and Removal	MIPR	USACE : AL, AK	12.610	12.500		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Communications Integration	C/TBD	Lockheed Martin : Moorestown, NJ	13.719	10.000	May 2018	4.000	May 2019	6.418	May 2020	-		6.418	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - IV&V	MIPR	AMRDEC : Huntsville, AL	5.529	3.100	Nov 2017	3.400	Nov 2018	3.400	Nov 2019	-		3.400	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Long Range Discrimination Radar (LRDR)- FFRDC/ UARC	MIPR	JHU/APL GSA : AL, MA, IL	0.000	0.000		3.216	Oct 2018	3.274	Oct 2019	-		3.274	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Long Range Discrimination Radar (LRDR)- CiviliansTravel	Allot	MDA : AL	0.000	0.000		2.859	Oct 2018	3.203	Oct 2019	-		3.203	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Long Range Discrimination Radar (LRDR)-Contract Support Services	Various	Various : Various	0.000	0.000		4.197	Oct 2018	4.197	Oct 2019	-		4.197	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Long Range Discrimination Radar (LRDR)-Hybrid Program Office	MIPR	Various : Various	0.000	0.000		0.000		2.947	Oct 2019	-		2.947	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Prime Contractor	C/FPIF	Lockheed Martin : Moorestown, NJ	243.211	310.578	Nov 2017	114.053	Nov 2018	86.920	Nov 2019	-		86.920	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Program Office	Various	MDA, JHU/APL, GSA : AL, MA, IL	10.616	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Long Range Discrimination Radar (LRDR) - Site Activation & Studies	C/TBD	MDA : AL	54.080	18.557	Feb 2018	23.412	Feb 2019	17.058	Feb 2020	-		17.058	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Transition & Transfer	C/TBD	MDA : AL	0.000	0.000		3.460	Jan 2019	4.029	Jan 2020	-		4.029	Continuing	Continuing	Continuing
		Subtotal	339.765	354.735		158.597		131.446		-		131.446	Continuing	Continuing	N/A

Remarks

Increase in Program Office costs from FY 2019 to FY 2020 provides for the staffing of the joint MDA-U.S. Air Force Hybrid Program Office

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	339.765	354.735		158.597		131.446		-		131.446	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Long Range Discrimination Radar Capability	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Build 1.0 Software Delivery			△																									
Build 1.1 Software Delivery					△																							
Initial Fielding													△															
Technical Capability Declaration (TCD)															△													
FTX-26 (OT) (SN, OT Target Only Flight Test)															△													
Operational Capability Declaration (OCD)																	△											

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Long Range Discrimination Radar Capability	1	2018	4	2024
Build 1.0 Software Delivery	3	2018	3	2018
Build 1.1 Software Delivery	1	2019	1	2019
Initial Fielding	1	2021	1	2021
Technical Capability Declaration (TCD)	3	2021	3	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
Operational Capability Declaration (OCD)	1	2022	1	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / *Long Range Discrimination Radar (LRDR)*	Project (Number/Name) MC96 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC96: *Cyber Operations*	-	0.000	0.000	0.000	-	0.000	3.245	0.000	0.000	0.000	0.000	3.245
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Cyber Operations funds Sensors Directorate Information System Security Manager (ISSM) civilian salaries and cybersecurity engineering and architecture planning for program information technology systems. This project plans and tests the cybersecurity controls for the BMDS and maintains Sensors Risk Management Framework (RMF) authorizations for Sensors-managed information systems, conducts Controls Validation Testing (CVT)/ Security Controls Assessment (SCA) of sensors mission and support systems and provides and maintains Plans of Action and Milestones to mitigate cybersecurity deficiencies. Cyber Operations conducts annual cybersecurity program reviews on the LRDR enclaves to assess compliance in implementing and maintaining controls.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Cyber	0.000	0.000	0.000
Articles:	-	-	-
Description: N/A			
FY 2019 Plans: N/A			
FY 2020 Plans: N/A			
FY 2019 to FY 2020 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MC96 / *Cyber Operations*

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / *Long Range Discrimination Radar (LRDR)*	Project (Number/Name) MC96 / *Cyber Operations*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MC96 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Integrated Cyber Security Service Provider				✧			

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MC96 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Integrated Cyber Security Service Provider	1	2021	1	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / *Long Range Discrimination Radar (LRDR)*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	23.796	15.781	7.946	4.977	-	4.977	5.491	4.968	4.474	3.582	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	15.781	7.946	4.977
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	15.781	7.946	4.977

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance SRM (MIPR)	MIPR	Various : Multi: AL, VA, Aust, Japan	11.582	8.418	Nov 2017	4.395	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	0.460	0.000		0.090	Jul 2019	0.075	Jul 2020	-		0.075	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Sustainment and GPC	Allot	Various : Multi: AL, CA, CO, VA etc.	0.000	0.735		1.592	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA, VA	5.126	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	6.628	6.628	Jul 2018	1.869	Jun 2019	4.902	Jul 2020	-		4.902	Continuing	Continuing	Continuing
		Subtotal	23.796	15.781		7.946		4.977		-		4.977	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	23.796	15.781		7.946		4.977		-		4.977	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604874C *I Improved Homeland Defense (HLD) Interceptors*

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	627.693	742.842	421.820	412.363	-	412.363	326.922	197.386	137.553	86.423	Continuing	Continuing
MD97: *Improved HD Interceptors*	604.608	725.478	399.940	398.944	-	398.944	322.554	193.811	135.848	83.646	Continuing	Continuing
MD40: *Program Wide Support*	23.085	17.364	21.880	13.419	-	13.419	4.368	3.575	1.705	2.777	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) element of the BMDS provides combatant commanders with a continuously available (24 hours a day, 7 days a week, 365 days a year) capability to defend the Homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The improved Homeland Defense interceptor includes a RKV and the All Up Round (AUR) engineering necessary to integrate the RKV with new and existing booster configurations. The RKV improves interceptor reliability, reduces unit cost, improves maintainability in the field, and improves performance against emerging threats. The AUR engineering enables RKV integration with new and existing boost vehicles for flight testing and operational fielding.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	636.430	561.220	485.755	-	485.755
Current President's Budget	742.842	421.820	412.363	-	412.363
Total Adjustments	106.412	-139.400	-73.392	-	-73.392
• Congressional General Reductions	-2.000	0.000			
• Congressional Directed Reductions	-11.200	-139.400			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	139.400	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-19.788	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-73.392	-	-73.392

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustment for an additional 20 GBIs and the congressional reduction for C3 booster early to need.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604874C *I Improved Homeland Defense (HLD) Interceptors*

Increase in FY 2019 from PB19 to PB20 reflects the congressional reductions for forward financing in FY 2018.

Decrease in FY 2020 from PB19 to PB20 reflects the cancellation of the C3 booster development effort.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	Project (Number/Name) MD97 / *Improved HD Interceptors*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD97: *Improved HD Interceptors*	604.608	725.478	399.940	398.944	-	398.944	322.554	193.811	135.848	83.646	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The GMD element of the BMDS provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the Homeland against limited Intercontinental ICBM attacks. The improved Homeland Defense interceptor includes a RKV and the AUR engineering necessary to integrate the RKV with new and existing booster configurations. The RKV improves interceptor reliability, reduces unit cost, improves maintainability in the field, and improves performance against emerging threats. The AUR engineering enables RKV integration with new and existing boost vehicles for flight testing and operational fielding.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Improved Homeland Defense (HLD) Interceptor Development	712.457	390.298	389.333
Articles:	-	-	-
Description: HLD development objectives include: redesigning the GMD kill vehicle, implementing tactical booster modifications, and conducting AUR system engineering. The RKV will be built with a modular, open architecture and designed with common interfaces and standards, making upgrades easier and broadening MDA's vendor and supplier base. The design for growth allows future upgradability. The AUR development approach integrates the RKV with the boost vehicle. The goal of all of these efforts is to develop and field an integrated set of capabilities to improve the reliability, survivability, lethality, and discrimination to defeat future threats. Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans: -Continue In-Flight Interceptor Communications System (IFICS) End-to-End Test to demonstrate communication between the RKV and the GMD Ground System -Conduct Integrated Communications Radio Kill Vehicle (KV) to Kill Vehicle (KV) Integration to demonstrate and validate the design approach of the new RKV communication capability -Conduct Production Highly Accelerated Life Testing to support RKV reliability improvements, identify stable operating and destruct limits, and improve the probability of first pass success during qualification -Continue KV to KV Antenna demonstrations to characterize engineering parameters, gather data and validate the design approach of the new RKV communication capability			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Continue development of kill vehicle algorithms and software, and conduct software independent verification and validation testing at contractor and government facilities to conduct independent testing and analysis ensuring the RKV software meets its requirements and that the delivered software system satisfies requirements, the intended use, and warfighter needs -Continue AUR systems engineering to support the testing and fielding of RKV on Integrated Boost Vehicles -Accelerate RKV efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads -Continue software builds and design verification testing prior to critical design review to reduce program risk -Execute risk reduction strategy by developing a radiation hardened avionics architecture through system engineering, prototype development, and parts testing -Initiate Consolidated Integration Facility effort to correct safety issues and increase throughput capacity; needed to reach a 64 GBI fleet ***FY 2020 Plans:*** -Continue IFICS End-to-End Test to demonstrate communications between the RKV and the GMD Ground System -Continue KV to KV Antenna demonstrations to characterize engineering parameters, gather data and validate the design approach of the new RKV communications capability -Continue development of kill vehicle algorithms and software, and conduct software independent verification and validation testing at contractor and government facilities to conduct independent testing and analysis ensuring the RKV software meets its requirements and that the delivered software system satisfies requirements, the intended use, and warfighter needs -Continue AUR systems engineering to support the testing and fielding of RKV on Integrated Boost Vehicles -Continue RKV efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads -Continue software builds and design verification testing prior to critical design review to reduce program risk -Continue Consolidated Integration Facility effort to correct safety issues and increase throughput capacity; needed to reach a 64 GBI fleet -Continue component and payload design and qualification testing prior to the critical design ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Program Operations	13.021	9.642	9.611
Articles:	-	-	-
Description: Program Operations provides for integrated program management of the Improved Homeland Defense Interceptor efforts. This effort includes: Technical and business management support, financial management, cost and schedule performance analysis, cost estimation and analysis, configuration management, and integration activities to ensure the program			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
meets cost, schedule, and performance goals; GMD RKV program compliance with internal and external direction, policies, and regulations to deliver critical capability via a consistent and disciplined process; Mission Assurance and Manufacturing Engineering Program to include quality, configuration management, manufacturing, engineering, and safety in all phases of the system life cycle, throughout the supply chain and at all levels of assembly emphasizing high yield rates which minimize test and rework costs; technical and testing oversight, verification of hardware and software development, quality / safety / mission assurance, integrated logistics support, and government manpower and infrastructure to develop, test, and sustain the RKV. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	725.478	399.940	398.944

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0203882C: MD08: *GMD O&M*	138.751	139.204	153.218	-	153.218	146.614	159.376	165.746	165.790	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603882C: MD08: *GMD Procurement*	268.000	532.600	9.471	-	9.471	323.466	532.975	467.001	244.663	0.000	2,378.176
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604887C: *Ballistic Missile Defense Midcourse Defense Segment Test*	85.030	72.634	98.139	-	98.139	91.955	116.709	110.937	101.103	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

MDA is executing an acquisition strategy to develop an integrated RKV with a Cross-Industry team design solution. This concept includes potential production sources from industry and provides a consolidated product that includes the collective knowledge of and leverages capabilities from the industry leaders in kill vehicle design and development. The industry teaming method incorporates the most viable technical approaches from each contractor and allows for combination of resources to shorten the learning curve and reduce the time needed to develop and begin initial production. This strategy allows for industry to provide the best value and best design solution for the MDA while setting the conditions for future competition of production. The development phase is followed by initial production and then a competitive full rate production phase. The competitive production phase encompasses the purchase, production, and the integration of the proven components demonstrated in the development phase and provides competitive benefits to the Government. This strategy allows for industry to provide the best value and best design solution for the MDA while setting the conditions for future competition of production. The Government, as the design authority, retains responsibility for the execution of the program cost, schedule, and the technical performance of the RKV to meet requirements levied on the contractor. The Government has implemented a rigorous systems engineering process to ensure that the design and development efforts meet requirements. This acquisition strategy is documented in the RKV Acquisition Plan signed by the Defense Acquisition Executive in October 2015.

In January of 2018, the MDA Director signed an Acquisition Strategy Decision Memorandum (ASDM) changing the acquisition strategy to execute the Missile Defeat and Defense Enhancement scope. The Development and Sustainment Contract (DSC) will continue with the Boeing Company to Q1 FY2024 to build the 20 GBI's and 20 Silo's with supporting test, engineering, software, and performance based logistics scope. This additional capability will provide 64 interceptors as well as maintain operation and support capabilities and support upcoming ground and flight tests. The Justification and Approval for this action was signed by the MDA Director on 2 January 2018.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Homeland Defense (HLD) Interceptor Development - GBI Consolidated Integration Facility Improvements	C/CPIF	Boeing : AL/AK/AZ	0.000	0.000		9.279	Nov 2018	2.503	Nov 2019	-		2.503	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - OGA/ FFRDC Booster Avionics Risk Reduction	MIPR	Draper : AL/CA	0.000	1.644	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - PRIME AUR System Engineering and Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	49.840	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - PRIME RKV Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	511.841	623.111	Nov 2017	357.917	Oct 2018	355.749	Nov 2019	-		355.749	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - Post-Intercept Assessment	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - Prior year no longer funded in the FYDP	Various	Various : Various	21.114	0.000		0.000		0.000		-		0.000	0.000	21.114	0.000
Improved Homeland Defense (HLD) Interceptor Development - RKV Development Lab and System Support	MIPR	AMRDEC : Redstone Arsenal, AL	38.965	37.862	Nov 2017	23.102	Oct 2018	31.081	Nov 2019	-		31.081	Continuing	Continuing	Continuing
		Subtotal	571.920	712.457		390.298		389.333		-		389.333	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Contract Support Services	C/CPFF	Various AL/AK/ : CA/ CO/VA	18.130	8.460	Oct 2017	5.830	Oct 2018	5.698	Oct 2019	-		5.698	Continuing	Continuing	Continuing
Program Operations - FFRDC Support	MIPR	MIT : LL AL	3.132	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA : AL/VA	6.121	1.945	Oct 2017	2.352	Oct 2018	2.270	Oct 2019	-		2.270	Continuing	Continuing	Continuing
Program Operations - Other Government Agencies	MIPR	Various AL/VA : FL/ CO	4.377	2.341	Oct 2017	1.460	Oct 2018	1.289	Oct 2019	-		1.289	Continuing	Continuing	Continuing
Program Operations - Prior year no longer funded in the FYDP	Various	Various : Various	0.552	0.000		0.000		0.000		-		0.000	0.000	0.552	0.000
Program Operations - Travel	MIPR	MDA : AL/VA	0.376	0.275	Oct 2017	0.000		0.354	Oct 2019	-		0.354	Continuing	Continuing	Continuing
		Subtotal	32.688	13.021		9.642		9.611		-		9.611	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	Project (Number/Name) MD97 / *Improved HD Interceptors*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks N/A															
Project Cost Totals			604.608	725.478		399.940		398.944		-		398.944	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
RKV Critical Design Review													△															
CTV-03+																	△											
FTG-17																					△							
FTG-18																									△			

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
RKV Critical Design Review	1	2021	1	2021
CTV-03+	2	2022	2	2022
FTG-17	1	2023	1	2023
FTG-18	1	2024	1	2024

Note

Flight test schedule at a higher classification.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	23.085	17.364	21.880	13.419	-	13.419	4.368	3.575	1.705	2.777	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	17.364	21.880	13.419
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	17.364	21.880	13.419

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various Multi : AL, VA	4.368	4.503	Mar 2018	14.724	Mar 2019	5.218	Apr 2020	-		5.218	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Various	Various Multi : AL, VA	0.000	0.424	Jul 2018	0.331	Jul 2019	0.201	Jul 2020	-		0.201	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various Multi : AL, VA	5.836	4.677	May 2018	4.573	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various Multi : AL, VA	12.881	7.760	Jul 2018	2.252	Jul 2019	8.000	Jun 2020	-		8.000	Continuing	Continuing	Continuing
		Subtotal	23.085	17.364		21.880		13.419		-		13.419	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	23.085	17.364		21.880		13.419		-		13.419	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense (HLD) Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604876C *I Ballistic Missile Defense Terminal Defense Segment Test*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	185.590	35.738	61.017	25.137	-	25.137	32.124	48.087	61.224	22.584	Continuing	Continuing
MT07: *THAAD Test*	178.130	32.863	57.892	24.417	-	24.417	31.011	46.216	58.579	21.840	Continuing	Continuing
MD40: *Program Wide Support*	7.460	2.875	3.125	0.720	-	0.720	1.113	1.871	2.645	0.744	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2019 to FY 2020 is in accordance with the Integrated Master Test Plan (IMTP).

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Terminal Defense Segment Test provides the Terminal High Altitude Area Defense (THAAD) program's participation in Ballistic Missile Defense System (BMDS) Flight Tests and Ground Tests in accordance with the BMDS Integrated Master Test Plan (IMTP). THAAD Test coordinates with Operational Test Agencies, conducts pretest planning, coordination and analysis, conducts flight test operations, performs post-flight test reporting, and performs data distribution and storage.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	36.239	61.017	16.917	-	16.917
Current President's Budget	35.738	61.017	25.137	-	25.137
Total Adjustments	-0.501	0.000	8.220	-	8.220
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.501	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	8.220	-	8.220

Change Summary Explanation

Increase in FY 2020 from PB19 to PB20 reflects transfer of test related Program Operations from the Terminal Defense Segment 0603881C Program Element to this Program Element.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	Project (Number/Name) MT07 / *THAAD Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT07: *THAAD Test*	178.130	32.863	57.892	24.417	-	24.417	31.011	46.216	58.579	21.840	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 is in accordance with the Integrated Master Test Plan (IMTP).

A. Mission Description and Budget Item Justification

THAAD Test conducts BMDS Flight Tests and Ground Tests with other BMDS elements (such as Army Navy / Transportable Radar Surveillance (AN/TPY-2), BMDS Command, Control, Battle Management, and Communication (C2BMC), PATRIOT, and Aegis) in accordance with the BMDS IMTP. THAAD Test coordinates with Operational Test Agencies, conducts all pre and post flight test, ground test, cyber security enhancements, and war-games and exercises requirements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Flight Test Execution	12.387	46.482	7.081
Articles:	-	-	-
Description: Performs all requirements to support flight test execution such as mission planning, pre-flight integration testing, conduct of readiness reviews, test asset transportation, flight test execution and data collection, post flight test reporting and data distribution in accordance with IMTP. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 is in accordance with the Integrated Master Test Plan (IMTP).			
Title: Ground Test Execution	7.149	7.669	5.717
Articles:	-	-	-
Description: Ground Test Execution includes: - THAAD participation in MDA Ground Test operational scenario events to ensure THAAD`s ability to conduct coordinated engagements with Aegis and PATRIOT operating with C2BMC and AN/TPY-2,			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Pre-mission planning, pre- and post-mission analyses, reporting, and execution to support BMDS Ground and Flight Test campaigns, - Provide continuous integration of element hardware and software prior to hardware-in-the-loop (HWIL) testing enabling a more efficient process for ground testing - Continued performance assessments to evaluate system performance and interoperability within the integrated BMDS Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Continue THAAD participation in BMDS Ground Test operational scenario events GT-07, GT-08 and GTI-ISR campaigns. - Initiation of Continuous Integration of element hardware and software to conduct replication activities prior to hardware-in-the-loop (HWIL) testing. ***FY 2020 Plans:*** - Continue THAAD participation in variable ground test operational scenario events GT-07, GT-08, and GT-20. - Initiate THAAD participation in ground test system pre-mission analyses for FTO-03. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 is in accordance with the Integrated Master Test Plan (IMTP).			
Title: Resources	13.012	3.279	2.954
Articles:	-	-	-
Description: Resources include efforts to: - Provide on-site range support for THAAD maintenance, repair, and pre-mission analysis to ensure THAAD test asset readiness, - Provide data management, facilities operations, and post-test reporting in support of BMDS tests to ensure data collection and readiness for mission execution, - Continue Performance Assessments to evaluate system performance and interoperability within the integrated BMDS Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: War-games and Exercises	0.315	0.462	0.459
Articles:	-	-	-
Description: War-games and Exercises support the Combatant Commands (CCMDs) with model and simulations and subject matter expertise during exercise events. Continue to assist in developing/refining Tactics, Techniques, and Procedures and Pre-Planned Responses to incorporate in future events. Demonstrate THAAD capability to the warfighter community in the Integrated and Missile Defense (IAMD) environment. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Test Program Operations	0.000	0.000	8.206
Articles:	-	-	-
Description: Program Operations provides strategic planning, program integration, acquisition, engineering, financial management, internal reviews and audits, and program assessments for THAAD Test Activities. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2019 Plans:*** -SEE ABOVE. ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Increase from FY 2019 to FY 2020 reflects transfer of test related Program Operations from the Terminal Defense Segment 0603881C Program Element to this Program Element.			
Accomplishments/Planned Programs Subtotals	32.863	57.892	24.417

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD OM*	70.044	87.560	99.819	-	99.819	97.801	101.010	99.504	107.618	Continuing	Continuing
• 0208866C: MD07: *THAAD Procurement*	1,125.732	1,014.068	425.863	-	425.863	430.719	381.628	417.431	432.831	0.000	4,228.272
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing

Remarks

D. Acquisition Strategy

THAAD awards Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders on the Advanced Capability Development (ACD) contract for the continuation of THAAD development and test as described and approved in the MDA Integrated Master Test Plan. The discrete task orders allow management and tracking of IMTP-related work.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Program Operations - Program Operations	Various	Missile Defense Agency (MDA) : Ft. Belvoir, VA/ Huntsville, AL	0.000	0.000		0.000		8.206	Nov 2019	-		8.206	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		8.206		-		8.206	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - Execution, Support and Planning	MIPR	MDA / AMRDEC / KLC / Wake Island / RTS : AL / CO / AK / HI / Wake Island / Kwaj	98.917	7.485	Nov 2017	25.262	Nov 2018	3.541	Nov 2019	-		3.541	Continuing	Continuing	Continuing
Flight Test Execution - Planning, Analysis, and Execution	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	48.361	4.902	Nov 2017	21.220	Nov 2018	3.540	Nov 2019	-		3.540	Continuing	Continuing	Continuing
Ground Test Execution - BMDS Ground Test Support	MIPR	US Army AMRDEC : Huntsville, AL	12.280	7.149	Dec 2017	7.669	Dec 2018	5.717	Dec 2019	-		5.717	Continuing	Continuing	Continuing
Resources - All Prior Years	Various	Various : Various	5.961	0.000		0.000		0.000		-		0.000	0.000	5.961	0.000
Resources - Test and Range Infrastructure	MIPR	US Army AMRDEC / White Sands Missile Range / Lincoln Labs : Huntsville, AL / White Sands, NM / MA	11.856	13.012	Dec 2017	3.279	Dec 2018	2.954	Dec 2019	-		2.954	Continuing	Continuing	Continuing
War-games and Exercises - Wargames and Exercises	MIPR	MDA / Space and Missile Defense	0.755	0.315	Nov 2017	0.462	Nov 2018	0.459	Nov 2019	-		0.459	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Command : Huntsville, AL													
		Subtotal	178.130	32.863		57.892		16.211		-		16.211	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	178.130	32.863		57.892		24.417		-		24.417	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FTX-35 (TH, Target Only Flight Test)			▲																									
GT-19 Sprint 2 (JEON) (BMDS Ground Test)							✧																					
FTT-23 (TH, DT Intercept Flight Test)								△																				
GTI-07c (N/P) (BMDS Ground Test)									✧																			
FTX-39 (LTPO, DT Target Only Flight Test)									△																			
FTP-27 E1 (LTPO, DT/OT Flight Test)										△																		
GT-20 Sprint (JEON) (BMDS Ground Test)										✧																		
FTP-27 E2 (LTPO, DT/OT Flight Test)										△																		
FTO-03 (OTA, OT Intercept Flight Test)												△																
GTI-08 (N/P) (BMDS Ground Test)												✧	✧															
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)													△															
FTT-21 (TH, DT Intercept Flight Test)														△														
FTP-28 (LTPO, OT Intercept Flight Test)															△													
FTX-28 E1 (TH, DT Target Only Flight Test)																		△										
FTX-28 E2 (TH, DT Target Only Flight Test)																		△										
FTX-28 E3 (TH, DT Target Only Flight Test)																		△										
FTT-24 (TH, DT Intercept Flight Test)																							△					

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTX-35 (TH, Target Only Flight Test)	3	2018	3	2018
GT-19 Sprint 2 (JEON) (BMDS Ground Test)	3	2019	3	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
GTI-07c (N/P) (BMDS Ground Test)	1	2020	1	2020
FTX-39 (LTPO, DT Target Only Flight Test)	1	2020	1	2020
FTP-27 E1 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GT-20 Sprint (JEON) (BMDS Ground Test)	2	2020	2	2020
FTP-27 E2 (LTPO, DT/OT Flight Test)	2	2020	2	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)	1	2021	1	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
FTP-28 (LTPO, OT Intercept Flight Test)	3	2021	3	2021
FTX-28 E1 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E2 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E3 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023

Note

FY 2020 USFK JEON tests are funded in PE 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	7.460	2.875	3.125	0.720	-	0.720	1.113	1.871	2.645	0.744	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	2.875	3.125	0.720
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	2.875	3.125	0.720

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA, Aust, Japan	0.024	0.000		0.047	Jul 2019	0.011	Jul 2020	-		0.011	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : VA	4.174	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support International and Materiel and Readiness	MIPR	Various : Multi: AL, VA, Aust, Japan	0.000	0.000		0.000		0.360	Jul 2020	-		0.360	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	3.262	2.301	Aug 2018	3.078	Apr 2019	0.349	Jun 2020	-		0.349	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	0.000	0.574		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	7.460	2.875		3.125		0.720		-		0.720	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	7.460	2.875		3.125		0.720		-		0.720	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	297.521	128.757	92.160	169.822	-	169.822	76.270	149.764	137.058	147.923	Continuing	Continuing
MT09: *AEGIS BMD Test*	291.098	119.715	88.937	163.861	-	163.861	73.148	144.099	132.646	141.902	Continuing	Continuing
MD40: *Program Wide Support*	6.423	9.042	3.223	5.961	-	5.961	3.122	5.665	4.412	6.021	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Increase in FY 2020 from PB19 to PB20 is in accordance with the Integrated Master Test Plan (IMTP) 20.1. This PE also provides transition of flight test execution support costs from PE 0603892C Aegis BMD to ensure continued transparency and program efficiency.

A. Mission Description and Budget Item Justification

The Aegis Ballistic Missile Defense (BMD) mission is to deliver an enduring, operationally effective, and supportable BMD capability to defend the nation, deployed forces, friends, and allies and to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. The Aegis BMD element of the BMDS capitalizes upon and evolves from the existing U.S. Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track Ballistic Missiles of all ranges and the ability to destroy Short-Range Ballistic Missiles (SRBMs), Medium-Range Ballistic Missiles (MRBMs), and Intermediate-Range Ballistic Missiles (IRBMs) in the midcourse phase of flight in addition to shorter range missiles in the terminal phase of flight. Aegis BMD also provides a Long Range Surveillance and Track (LRS&T) capability to the BMDS. Upgrades to both the Aegis BMD Weapon System and the SM-3 configuration enable Aegis BMD to provide effective and supportable defensive capability against longer range more sophisticated threats and an enduring Aegis Ashore defensive capability.

- Working with all U.S. Armed Services that participate in the BMDS level Operational Test Agency (OTA) Team, with the support of the Director of Operational Test and Evaluation (DOT&E), MDA has developed a test program to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable.
- As part of the MDA's rigorous test program, System Pre-Flight predictions provide confidence in test execution by predicting element performance and exercising element interfaces. System Post-Flight Reconstruction replicates the BMDS configuration, actual environmental conditions, and target dynamics observed in flight to anchor Modeling and Simulation (M&S) results.
- The IMTP is event-oriented and extends until the collection of all identified data is completed ensuring adequate test investments.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604878C *I Aegis BMD Test*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	137.783	95.756	80.684	-	80.684
Current President's Budget	128.757	92.160	169.822	-	169.822
Total Adjustments	-9.026	-3.596	89.138	-	89.138
• Congressional General Reductions	-11.300	-3.596			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	25.700	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-6.413	0.000			
• SBIR/STTR Transfer	-0.014	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-11.999	0.000	89.138	-	89.138

Change Summary Explanation

Decrease in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustments for flight test delays and general reductions

Decrease in FY 2019 from PB19 to PB20 is in accordance with the Integrated Master Test Plan (IMTP)

Increase in FY 2020 from PB19 to PB20 is in accordance with the Integrated Master Test Plan (IMTP) 20.1. This PE also provides transition of flight test execution support costs from PE 0603892C Aegis BMD to ensure continued transparency and program efficiency.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT09: *AEGIS BMD Test*	291.098	119.715	88.937	163.861	-	163.861	73.148	144.099	132.646	141.902	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase in FY 2020 from PB19 to PB20 is in accordance with the Integrated Master Test Plan (IMTP) 20.1. This PE also provides transition of flight test execution support costs from PE 0603892C Aegis BMD to ensure continued transparency and program efficiency.

A. Mission Description and Budget Item Justification

The FY 2020 Aegis BMD Test Program concentrates on critical IMTP flight tests that support the BMDS incremental development strategy and the U.S. Navy, European Phased Adaptive Approach (EPAA).

The FY 2019 Aegis BMD Test Program concentrates on critical IMTP flight tests that support the U.S. Navy and European Phased Adaptive Approach (EPAA), Weapon System Certification, and Missile Production Decision requirements. Aegis BMD will concentrate on Aegis Baseline (BL) 9.C2 (BMD 5.x) and Standard Missile SM-3 Block IIA operational testing.

- Working with the U.S. Navy Integrated Warfare System (IWS) Services' Operational Test Agencies (OTA), with the support of the Director of Operational Test and Evaluation (DOT&E), MDA has developed a test program to improve missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable
- As part of MDA's rigorous test program, System Pre-Flight predictions provide confidence in test execution by predicting element performance and exercising element interfaces. System Post-Flight Reconstruction replicates the Ballistic Missile Defense System configuration and actual environmental conditions and target dynamics observed in flight to anchor M&S results
- The IMTP is event-oriented and extends until the collection of all identified data is completed ensuring adequate test investments

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Aegis BMD Flight Test Execution	64.194	33.707	106.315
Articles:	-	-	-
Description: Aegis BMD Flight Test Program performs comprehensive testing of Aegis BMD components and their interoperability with the BMDS using accredited Modeling & Simulation (M&S) that provides the evidence required for the MDA and Combatant Commanders to transition the capability to the Operational Capacity Baseline. All flight testing is reflected in the R4 and IMTP. Recurring Accomplishments include: -Prepare for and conduct BMDS Flight Test events as reflected in the IMTP and the R-4 schedule. -Collect Aegis BMD data for Modeling and Simulation anchoring used in comprehensive flight testing.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Conduct Aegis BMD specific analysis during pre- and post-mission analysis phases to confirm pre-mission predictions of mission success and validate post-test results. -Conduct test milestone reviews to ensure readiness for test execution and accomplishment of test objectives. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** Support of flight tests scheduled in the IMTP and Aegis BMD 5.0 with Counter Measures. These operational tests support the U.S. Navy, BMDS Increment 5 - Robust IRBM Defense, and the EPAA for the defense of Europe. ***FY 2020 Plans:*** - Complete test event data collection, conduct post-test analysis supporting assessments and fielding decisions for BMDS Testing - Prepare for and execute Flight Tests scheduled in the IMTP ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 is in accordance with the Integrated Master Test Plan (IMTP) 20.1 and reflects transition of flight test execution support costs from PE 0603892C Aegis BMD to this PE to ensure continued transparency and program efficiency			
Title: Aegis BMD Ground Test Execution	17.561	24.339	18.504
Articles:	-	-	-
Description: Aegis BMD Ground Test Program performs comprehensive testing of Aegis BMD Components and their interoperability with the BMDS using accredited M&S that provides the evidence required for the MDA and Combatant Commanders to transition the capability to the Operational Capacity Baseline. More specifically, ground testing is used to collect data for Aegis BMD characterization and assessment, flight test risk reduction, and exploration of scenarios where flight testing is either impracticable or impossible. Recurring Accomplishments include: -Participate in BMD System Ground Tests to include pre-mission analysis, mission execution, and post-mission analysis. -Conduct planning to ensure BMDS Test Site (BTS) capabilities support Aegis BMD testing, exercises, flight tests, and demonstration requirements. This includes upgrades to the ground testing labs to ensure compliance with operational and test baselines. -Continue testing of U.S. Navy C4I systems and Aegis BMD baselines to ensure BMDS interoperability. -Continue to participate in System Level Ground Testing as an element of the layered BMDS to collect data for Aegis BMD characterization and assessment and exploration of scenarios where flight testing is either impracticable or impossible. -Continue operation support of HWIL M&S for Element ground testing. -Prepare and conduct a Hardware Ground Test of cooled gas Attitude Control System (ACS).			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Aegis BMD HWIL lab participation align to the IMTP Ground Test schedule and early integration to provide risk reduction for Ground Test runs for the record and implementation of CI/CAT CONOPS pathfinders. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - Prepare and execute Ground Test (GT) support activities specific to IMTP v 20.1. - Conduct ground and flight testing to improve the missile defense capabilities and ensure the capabilities transferred to the warfighter are effective. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects Aegis BMD HWIL lab participation aligned to the IMTP Ground Test schedule.			
Title: Aegis BMD Test Resources	25.130	18.508	17.287
Articles:	-	-	-
Description: This effort provides resources to conduct ground and flight testing to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable. Recurring Accomplishments include: - Provide Core Test and Evaluation support for Aegis BMD test and evaluation missions and laboratories, field activities, range support activities, analysis activities, and shipboard and land-based test site test teams. - Provide Test & Evaluation (T&E) infrastructure support for Aegis BMD Test Missions as reflected in the IMTP to collect truth data for post-event analysis. - Conduct core Element M&S validation and accreditation activities. - Exercise tactical communications during testing to ensure interoperability with the BMDS and Combatant Command (CCMD) systems. - Continue core test planning for Aegis BMD test missions to include assessment of target requirements, development of M&S, and preparation of the range to ensure all missions are executable and apply to the technical program objectives. - Develop and execute risk-reduction activities to minimize or mitigate shipboard and missile test and programs risks. - Develop and execute data collection plans and supporting instrumentation requirements. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Maintain core test and evaluation capability. Conduct ground and flight testing to improve the missile defense capabilities and ensure the capabilities transferred to the warfighter are effective. Begin Continuous Integration implementation in preparation for Continuous Agile Testing. ***FY 2020 Plans:*** SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: Engineering & Analysis	12.830	12.383	13.686
Articles:	-	-	-
Description: The Engineering and Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event. Recurring Accomplishments: - Design test architecture, define test objectives and evaluation criteria, define target requirements, and generate ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor M&S. - Coordinate with BMDS Operational Test Agency (OTA) to address, coordinate, and disposition test issues to achieve closure through recommended action plans. - Deliver HWIL M&S integration test cases. - Conduct M&S HWIL integration benchmarking, and integrate the BMDS HWIL M&S framework with MDA and non-MDA Elements into the test event BMDS architecture. - Integrate, test, and deliver end-to-end BMDS simulations supporting ground test missions. - Analyze System-level interoperability. - Conduct modeling and technical analysis for Combatant Command wargames and exercises. - Utilize M&S for pre-test assessment, post-test review, and M&S updates. - Provide test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure. - Analyze test results to identify verification and validation data collection shortfalls and reassign objectives to future test events as required. - Document BMDS test observations for system-level test anomalies and coordinate the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS) - Provide the Quick Look Brief, Mission Data Review (MDR), and Executive MDR. - Provide long-range BMDS IMTP planning and integration strategies related to overarching BMDS analysis product integration. - Upgrade test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency. - Populate the MARS database with data from the most recently completed tests to support as-built analysis and capability assessments.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Provide engineering analysis process software, to include System Coordination and Observation Reporting Environment (SCORE), Software Change Analysis Review Environment (SCARE), File Manager (FileMan), and ManPower Loading (MPL). Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** Aligned to IMTP events. - Validate test event data collection and conduct post-test analyses supporting assessments and fielding decisions for BMDS Increments 5 and 6A ***FY 2020 Plans:*** - Conduct system pre-mission testing and analyses for FTO-03. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase in FY 2019 to FY 2020 in accordance with the Integrated Master Test Plan (IMTP)			
Title: Test Program Operations ***Articles:*** ***Description:*** This activity funds the Government and contractor workforce that manage the overall Aegis Ballistic Missile Defense (BMD) program and enables the program to develop, build, and test standard missiles and the associated Aegis Weapon Systems. This project includes all operations support for the Aegis program office in Engineering and Testing. ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** -SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides transition of flight test related program management costs from PE 0603892C Aegis BMD to this PE to ensure continued transparency and program efficiency	0.000 -	0.000 -	8.069 -
Accomplishments/Planned Programs Subtotals	119.715	88.937	163.861

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0604880C: *Land Based SM-3 (LBSM3)*	29.652	27.692	38.352	-	38.352	36.348	28.029	22.733	30.463	Continuing	Continuing
• 0604881C: *AEGIS SM-3 Block IIA Co-Development*	9.531	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.531

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis BMD Flight Test Execution - Aegis BMD 5.x Development - MD09 - 20117142323680	MIPR	NSWC/DD : Dahlgren VA	0.000	0.000		0.000		2.179	Nov 2019	-		2.179	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD 5.x Development - MD09 - 20117142323689	SS/CPAF	Lockheed Martin : Moorestown NJ	0.000	0.000		0.000		7.752	Nov 2019	-		7.752	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD 5.x Development - MD09 - Various	MIPR	Various : MA, MD, VA, NJ	0.000	0.000		0.000		1.005	Nov 2019	-		1.005	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution	MIPR	Various - DT : HI,VA,CA,MA,NC	0.000	0.000		4.790	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - Flight Test Execution - ARMY- SMDC	MIPR	Army : SMDC	0.000	3.056	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - Flight Test Execution - DOT MARAD	MIPR	DOT : MARAD	0.000	5.084	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - Flight Test Execution - MT09 - SECOTEC	SS/CPFF	SECOTEC : Huntsville AL	0.000	2.166	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09 - CPF	MIPR	COMPACTFLT : HI	0.000	0.330	Dec 2017	1.300	Dec 2018	4.703	Dec 2019	-		4.703	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD	SS/CPFF	Corvid : NC	1.911	2.097	Dec 2017	0.560	Dec 2018	2.058	Dec 2019	-		2.058	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - MT09 - Corvid															
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09 -JHU/APL	SS/CPFF	JHU/APL : Columbia MD	9.594	4.137	Dec 2017	4.750	Dec 2018	6.200	Dec 2019	-		6.200	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09- Corona	MIPR	NSWC Corona : CA	5.461	4.668	Dec 2017	1.770	Dec 2018	5.173	Dec 2019	-		5.173	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-DMEA	MIPR	DMEA : McClellan, CA	0.000	0.000		0.400	Dec 2018	1.566	Dec 2019	-		1.566	0.000	1.966	0.000
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-L3 Communications	C/CPFF	L3 Communications : Waco, TX	0.824	3.022	Dec 2017	1.430	Dec 2018	2.803	Dec 2019	-		2.803	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NAWC/AD	MIPR	NAWC/AD-PHX Air : Pax River, MD	2.938	2.693	Dec 2017	1.870	Dec 2018	2.273	Dec 2019	-		2.273	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NAWC/PM	MIPR	NAWC/PM : Pt. Mugu, CA	3.108	6.860	Dec 2017	0.060	Dec 2018	5.463	Dec 2019	-		5.463	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NRL	MIPR	Naval Research Lab : Washington, DC	0.000	0.135	Dec 2017	0.860	Dec 2018	0.890	Dec 2019	-		0.890	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NSWC DD	MIPR	NSWC Dahlgren : Dahlgren, VA	2.793	2.763	Dec 2017	0.670	Dec 2018	7.073	Dec 2019	-		7.073	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD	MIPR	NSWC Carderock : Potomac, MD	0.248	1.404	Dec 2017	6.820	Dec 2018	7.670	Dec 2019	-		7.670	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - MT09-NSWCCR															
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	8.307	1.100	Dec 2017	6.190	Dec 2018	8.300	Dec 2019	-		8.300	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-PMRF	MIPR	PMRF Barking Sands : Kauai, HI	11.765	8.735	Dec 2017	0.410	Dec 2018	15.642	Dec 2019	-		15.642	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-SSCPAC	MIPR	SPAWAR : San Diego, CA	1.792	1.684	Dec 2017	1.150	Dec 2018	5.406	Dec 2019	-		5.406	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-Various	MIPR	Various : HI, VA, CA, MA, NC, NJ, AZ	63.300	10.633	Dec 2017	0.327	Dec 2018	7.886	Dec 2019	-		7.886	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-Xontech	C/CPFF	Xontech : Colorado Spring, CO	0.000	1.155	Dec 2017	0.350	Dec 2018	1.656	Dec 2019	-		1.656	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Flight Test Execution	SS/CPFF	Lockheed Martin : NJ	12.307	2.472	Dec 2017	0.000		0.000		-		0.000	0.000	14.779	0.000
Aegis BMD Flight Test Execution - Flight Test Execution - RMS	SS/CPFF	Raytheon : AZ	9.494	0.000		0.000		0.000		-		0.000	0.000	9.494	0.000
Aegis BMD Flight Test Execution - Standard Missile - 3 (SM-3) Block IIA Development - Block IIA Flight Test Support - Various	MIPR	Various : CA, VA, MD	0.000	0.000		0.000		1.100	Nov 2019	-		1.100	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Standard	SS/CPIF	Raytheon : Tucson AZ	0.000	0.000		0.000		8.017	Apr 2020	-		8.017	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Missile - 3 (SM-3) Block IIA Development - MT09 - SM-3 BLK IIA Flight Test Support															
Aegis BMD Flight Test Execution - Standard Missile - 3 (SM-3) Block IIA Development - MT09 - SM-3 BLK IIA Flight Test Support - DD	MIPR	NSWC DD : Dahlgren VA	0.000	0.000		0.000		0.500	Nov 2019	-		0.500	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Standard Missile - 3 (SM-3) Block IIA Development - MT09 - SM-3 BLK IIA Flight Test Support APL	MIPR	JHU/APL : Laurel MD	0.000	0.000		0.000		1.000	Dec 2019	-		1.000	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - ATK	MIPR	ATK : Elkton MD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - NSWCDD	MIPR	NSWC Dahlgren : Dahlgren VA	0.000	0.353	Nov 2017	1.604	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 -Navy	MIPR	PEO : IWS	0.000	0.146	Nov 2017	0.202	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - CORONA	MIPR	NSWC Corona : CA	2.100	0.695	Nov 2017	0.782	Dec 2018	1.982	Dec 2019	-		1.982	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - JHU/APL MDA	SS/CPFF	JHU/APL : MDA	0.500	2.700	Nov 2017	3.355	Dec 2018	2.480	Dec 2019	-		2.480	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - LM	MIPR	Lockheed Martin : Moorestown, NJ	16.515	7.529	Nov 2017	10.900	Dec 2018	3.731	Dec 2019	-		3.731	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	1.334	0.866	Nov 2017	0.920	Dec 2018	3.156	Dec 2019	-		3.156	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - SSCPAC	MIPR	SPAWAR : San Diego, CA	11.940	5.272	Nov 2017	6.576	Dec 2018	7.155	Dec 2019	-		7.155	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - DT - Various	MIPR	Various : HI, VA, CA, MA, MD	0.000	0.587	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - APL	SS/CPFF	JHU/APL : Columbia MD	29.784	1.500	Nov 2017	6.405	Dec 2018	2.500	Dec 2019	-		2.500	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - Aegis	MIPR	Aegis BMD : VA	0.745	1.626		0.000		0.000		-		0.000	0.000	2.371	0.000
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - CORONA	MIPR	NSWC Corona : CA	11.346	4.863	Nov 2017	2.865	Dec 2018	4.000	Dec 2019	-		4.000	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - NAWC/PM	MIPR	NAWC/PM : Pt. Mugu, CA	2.000	0.875	Nov 2017	0.594	Dec 2018	0.850	Dec 2019	-		0.850	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - NSWCDD	MIPR	NSWC Dahlgren : Dahlgren, VA	10.831	2.581	Nov 2017	2.507	Dec 2018	2.500	Dec 2019	-		2.500	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	14.265	5.150	Nov 2017	2.865	Dec 2018	4.865	Dec 2019	-		4.865	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - PMRF	MIPR	PMRF Barking Sands : Kauai, HI	2.375	0.500	Nov 2017	0.981	Dec 2018	0.430	Dec 2019	-		0.430	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - SSCPAC	MIPR	SPAWAR : San Diego, CA	6.122	1.910	Nov 2017	1.289	Dec 2018	1.089	Dec 2019	-		1.089	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - Various	MIPR	Various : HI, VA, CA, MA, MD	10.850	5.538	Nov 2017	1.002	Dec 2018	1.053	Dec 2019	-		1.053	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis	TBD	Teledyne Brown Engineering : Huntsville ,AL	0.000	0.000		0.000		4.500	Nov 2019	-		4.500	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - Engineering Support	C/CPAF	Northrop Grumman : AL, CO	4.223	2.160	Nov 2017	2.121	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - FFRDC/UARC	MIPR	Various : AL, CO, VA	12.514	2.305	Nov 2017	2.347	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - Industry	C/CPAF	Boeing : AL	3.696	0.000		0.000		0.000		-		0.000	0.000	3.696	0.000
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - OGA	MIPR	AMRDEC : AL	15.494	6.565	Nov 2017	6.411	Nov 2018	2.065	Nov 2019	-		2.065	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Analysis - Engineering & Analysis - NME	C/CPAF	Northrop Grumman-JRDC : CO, AL	0.000	0.500	Nov 2017	0.000		5.387	Nov 2019	-		5.387	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis NME Support	MIPR	SPAWAR : CA	0.622	1.300	Nov 2017	1.504	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis- Various	Various	Various : Huntsville, AL	0.000	0.000		0.000		1.734	Nov 2019	-		1.734	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - Civ Salary	MIPR	MDA : Arlington VA	0.000	0.000		0.000		2.343	Nov 2019	-		2.343	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - MDA Travel	MIPR	MDA : Arlington VA	0.000	0.000		0.000		0.475	Nov 2019	-		0.475	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - MIDAESS	MIPR	MDA : Arlington VA	0.000	0.000		0.000		4.570	Nov 2019	-		4.570	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - NAVSEA Civ Sal	MIPR	NAVSEA : Washington DC	0.000	0.000		0.000		0.681	Nov 2019	-		0.681	Continuing	Continuing	Continuing
		Subtotal	291.098	119.715		88.937		163.861		-		163.861	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	291.098	119.715		88.937		163.861		-		163.861	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

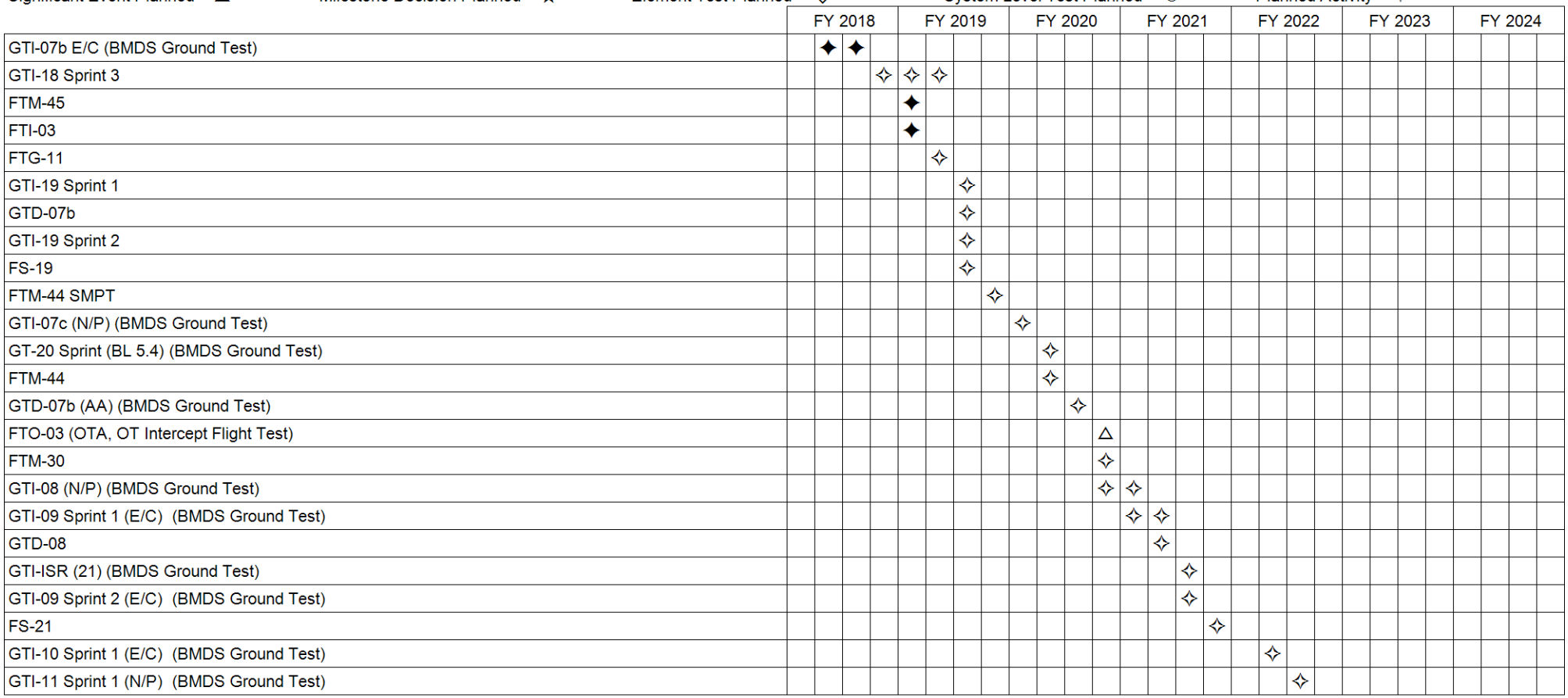

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)																				✧								
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)																				△								
FTM-38																				✧								
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)																					✧							
FTM-37																					✧							
GTD-10 (E/C) (BMDS Ground Test)																						✧						
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)																							✧					
GTI-ISR (23) (BMDS Ground Test)																							✧					
GT-ISR (23)																							✧					
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)																								△				
FS-23																								✧				
GTD-11 (N/P) (BMDS Ground Test)																								✧	✧			
FTX-38																									✧			
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)																										✧		
FTM-40																										✧		
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)																											✧	
FTM-41																											✧	
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)																												✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTI-07b E/C (BMDS Ground Test)	2	2018	3	2018
GTI-18 Sprint 3	4	2018	2	2019
FTM-45	1	2019	1	2019
FTI-03	1	2019	1	2019
FTG-11	2	2019	2	2019
GTI-19 Sprint 1	3	2019	3	2019
GTD-07b	3	2019	3	2019
GTI-19 Sprint 2	3	2019	3	2019
FS-19	3	2019	3	2019
FTM-44 SMPT	4	2019	4	2019
GTI-07c (N/P) (BMDS Ground Test)	1	2020	1	2020
GT-20 Sprint (BL 5.4) (BMDS Ground Test)	2	2020	2	2020
FTM-44	2	2020	2	2020
GTD-07b (AA) (BMDS Ground Test)	3	2020	3	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
FTM-30	4	2020	4	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	1	2021	2	2021
GTD-08	2	2021	2	2021
GTI-ISR (21) (BMDS Ground Test)	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
FS-21	4	2021	4	2021
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2022	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)	3	2022	3	2022
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	4	2022	4	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022
FTM-38	4	2022	4	2022
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)	1	2023	1	2023
FTM-37	1	2023	1	2023
GTD-10 (E/C) (BMDS Ground Test)	2	2023	2	2023
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)	3	2023	3	2023
GTI-ISR (23) (BMDS Ground Test)	3	2023	3	2023
GT-ISR (23)	3	2023	3	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
FS-23	4	2023	4	2023
GTD-11 (N/P) (BMDS Ground Test)	4	2023	1	2024
FTX-38	1	2024	1	2024
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	2	2024	2	2024
FTM-40	2	2024	2	2024
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)	3	2024	3	2024
FTM-41	3	2024	3	2024
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	4	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	6.423	9.042	3.223	5.961	-	5.961	3.122	5.665	4.412	6.021	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	9.042	3.223	5.961
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	9.042	3.223	5.961

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.117	0.528	Jul 2018	0.049	Jul 2019	0.089	Jul 2020	-		0.089	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		0.324	Dec 2019	-		0.324	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA, VA,	2.353	5.908	Nov 2017	2.500	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	Various : Multi: AL, CA, CO, VA	3.952	2.552	Jun 2018	0.674	Apr 2019	5.548	Apr 2020	-		5.548	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPR)	MIPR	Various : Multi: AL, CA, CO, VA	0.001	0.054	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	6.423	9.042		3.223		5.961		-		5.961	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.423	9.042		3.223		5.961		-		5.961	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604879C *I Ballistic Missile Defense Sensor Test*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	212.951	88.840	77.405	105.530	-	105.530	114.698	99.088	112.943	96.526	Continuing	Continuing
MT11: *BMDS Radars Test*	204.445	85.489	74.499	101.053	-	101.053	109.323	94.467	107.374	91.815	Continuing	Continuing
MD40: *Program Wide Support*	8.506	3.351	2.906	4.477	-	4.477	5.375	4.621	5.569	4.711	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Increase from FY 2019 to FY 2020 provides Sensors' participation in Ballistic Missile Defense System (BMDS) ground and flight test in accordance with Integrated Master Test Plan (IMTP) 20.1.

A. Mission Description and Budget Item Justification

MDA Sensors executes a robust test program that includes flight and ground tests to support both strategic and regional BMDS capabilities against medium- and long-range threats. The Sensors elements of the Ballistic Missile Defense System (BMDS) Integrated Master Test Plan (IMTP) are intended to demonstrate the integrated missile defense capabilities under development to ensure the capabilities delivered to the Warfighter are operationally effective, suitable, and survivable. The Sensors Test Program Element specifically includes the planning, execution, and analysis of flight and ground tests and the associated infrastructure.

The Sensors Test program provides data required for the Technical Capability Declaration for European Phased Adaptive Approach (EPAA) Phase III Robust Intermediate Range Ballistic Missile (IRBM) Defense, Enhanced Homeland Defense, and Mid-term Discrimination Improvements. It supports Operational Test and Evaluation of the regional and strategic BMDS architecture.

The Sensors Test program supports Long Range Discrimination Radar (LRDR) integration into the BMDS, Ground Based Midcourse Defense Redesigned Kill Vehicle (RKV) developmental testing, mid and far-term Discrimination Improvements, and Operational Test and Evaluation of the theater/regional and strategic BMDS architecture.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604879C *I Ballistic Missile Defense Sensor Test*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	101.839	81.001	77.654	-	77.654
Current President's Budget	88.840	77.405	105.530	-	105.530
Total Adjustments	-12.999	-3.596	27.876	-	27.876
• Congressional General Reductions	-3.000	-3.596			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	14.400	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-14.400	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-9.999	0.000	27.876	-	27.876

Change Summary Explanation

Decrease in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustments to support a SM-3 Block IIA Missile Test. These funds were adjusted through an Above Threshold Reprogramming. Additional adjustment to support IMTP.

Decrease in FY 2019 from PB19 to PB20 reflects the enacted Congressional General Reduction.

Increase in FY 2020 from PB19 to PB20 provides flight and ground tests and sensor participation in accordance with IMTP 20.1.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / *Ballistic Missile Defense Sensor Test*	Project (Number/Name) MT11 / *BMDS Radars Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT11: *BMDS Radars Test*	204.445	85.489	74.499	101.053	-	101.053	109.323	94.467	107.374	91.815	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides Sensor participation in Ballistic Missile Defense System (BMDS) ground and flight tests in accordance with the Integrated Master Test Plan (IMTP) 20.1.

A. Mission Description and Budget Item Justification

This project provides activities for planning, analysis, and execution of BMDS flight test events, including pre- and post-test ground testing such as Digital and Hardware-in-the-Loop (HWIL) Pre-Mission Tests (PMTs) and Post-Flight Reconstruction (PFR). Sensors Test provides planning, analysis, and execution for BMDS system level ground tests identified in the IMTP. Test infrastructure funding provides for HWIL labs and program management required to operate and maintain a flight and ground test capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Test Resources	16.703	19.312	27.851
Articles:	-	-	-
Description: Test Resources efforts include configuration and maintenance of Sensors HWILs for use in ground test execution (BMDS and element developmental testing) and in BMDS flight test execution pre-mission testing, and technical oversight to all BMDS system level activities with Sensors participation. It also includes conducting the detailed test event planning and design, integration, and execution for all BMDS flight and ground test campaigns. Test Resources provides support for evolving Objective Stimulation Framework (OSF) (software upgrades) integration into the BMDS HWIL ground test execution and flight test execution Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for Sensors participation in BMDS flight and ground tests in accordance with the IMTP 20.1.			
Title: Flight Test Execution	40.286	28.950	41.392

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Articles:	-	-	-
Description: Flight Test Execution includes test planning, pre-flight analysis, transportation of radars, test execution, and post-flight analysis for Sensors' participation in BMDS flight tests in accordance with the BMDS IMTP. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for Sensors participation in BMDS flight tests in accordance with the IMTP 20.1.			
Title: Ground Test Execution	28.500	26.237	31.810
Articles:	-	-	-
Description: Ground Test Execution includes event planning, asset integration, execution and post-mission analysis for Sensors' participation in BMDS ground tests in accordance with the BMDS IMTP. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - Plan and execute Sensors' participation in BMDS Ground Tests in accordance with IMTP and the new Ground Test Concept of Operations (CONOPS) ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for increased Sensors' participation in BMDS ground tests in accordance with the IMTP 20.1.			
Accomplishments/Planned Programs Subtotals	85.489	74.499	101.053

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.574	48.767	51.532	-	51.532	51.411	53.932	53.600	54.646	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0604873C: *Long Range Discrimination Radar (LRDR)*	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing
• 13999903: *Planning and Design, Defense Wide*	8.397	8.525	8.822	-	8.822	0.000	0.000	0.000	0.000	Continuing	Continuing
• D1400634: *Upgrade Early Warning Radar (UEWR), Clear AFS, AK*	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Remarks

D. Acquisition Strategy

Test & Evaluation projects use multiple existing development contracts depending on the system(s) involved in the testing.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / *Ballistic Missile Defense Sensor Test*	Project (Number/Name) MT11 / *BMDS Radars Test*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Resources - AN/TPY-2 & SBX SSF Integration & Infrastructure, Sys Test Lab	SS/CPFF	Raytheon : MA	40.327	12.770	Dec 2017	13.269	Dec 2018	10.112	Nov 2019	-		10.112	Continuing	Continuing	Continuing
Test Resources - Cyber Win10 Implementation - MDDC Lab Analysis Infrastructure	C/IDIQ	Analytical Services, Inc. : AL	0.825	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Resources - Cybersecurity - BGTC and SBIRS	C/IDIQ	Northrop Grumman Space & Mission System : CO	1.600	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Resources - Cybersecurity - Tactical Communication Environment Segment (TCES)	MIPR	SPAWAR : CA	0.190	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Resources - LRDR SSF Integration & Infrastructure, Sys Test Lab	C/FFP	Lockheed Martin : NJ	0.000	0.000		1.973	Jan 2019	9.570	Jan 2020	-		9.570	Continuing	Continuing	Continuing
Test Resources - Test Resources- Civilians/ Travel	Allot	MDA : AL/VA	0.000	0.000		0.000		5.086	Oct 2019	-		5.086	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Resources - Test Resources- Contract Support Services	Various	Various : Various	0.000	0.000		0.000		3.083	Oct 2019	-		3.083	Continuing	Continuing	Continuing
Test Resources - UEWR SSF Integration & Infrastructure, Sys Test Lab	C/FPIF	deciBel : AL	10.722	3.933	Nov 2017	4.070	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - AN/TPY-2 & SBX BMDS Level Testing	SS/CPAF	Raytheon : MA	83.745	25.595	Mar 2018	21.090	Mar 2019	41.392	Mar 2020	-		41.392	Continuing	Continuing	Continuing
Flight Test Execution - FT Security, Site Activation & Deployments	Various	Various : HI, CO, AL	18.001	13.507	Jan 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - LRDR BMDS Level Testing	SS/TBD	Lockheed Martin : NJ	0.000	0.032	Nov 2017	5.568	Jan 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - UEWR/CD BMDS Level Testing	C/FPIF	deciBel : AL	0.000	1.152	Nov 2017	2.292	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Test Execution - AN/TPY-2, SBX, UEWR/CD BMDS Level Testing	SS/CPFF	Raytheon : MA	49.035	28.500	Feb 2018	26.237	Feb 2019	31.810	Feb 2020	-		31.810	Continuing	Continuing	Continuing
		Subtotal	204.445	85.489		74.499		101.053		-		101.053	Continuing	Continuing	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / *Ballistic Missile Defense Sensor Test*	Project (Number/Name) MT11 / *BMDS Radars Test*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	204.445	85.489		74.499		101.053		-		101.053	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FS 17-4 (DT Tracking Exercise Flight Test)	▲																											
L200 (AEGIS 4.0.3)	✦																											
FTM-29 (AEGIS 5.1, Intercept Flight Test)		▲																										
GT-18 Sprint 1 (JEON)		✦																										
GTI-07b E/C (BMDS Ground Test)		✦	✦																									
FTX-35 (TH, Target Only Flight Test)			▲																									
GT-18 Sprint 2				✦																								
FTI-03 (OTA, OT Intercept Flight Test)					△																							
FTG-11 (OT) (GM, OT Intercept Flight Test)						△																						
FTT-23 (TH, DT Intercept Flight Test)								△																				
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)								△																				
GTI-07c (N/P) (BMDS Ground Test)									✧																			
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)										△																		
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)											△																	
FTO-03 (OTA, OT Intercept Flight Test)											△																	
GTI-08 (N/P) (BMDS Ground Test)											✧	✧																
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)												✧	✧															
GTD-08 (N/P) (BMDS Ground Test)													✧															
FTX-26 (OT) (SN, OT Target Only Flight Test)														△														
FTP-28 (LTPO, OT Intercept Flight Test)														△														
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)														○														
GTD-09 (E/C) (BMDS Ground Test)															○													
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)																○												
FTX-28 E1 (TH, DT Target Only Flight Test)																	△											

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FTX-28 E2 (TH, DT Target Only Flight Test)																			△									
FTX-28 E3 (TH, DT Target Only Flight Test)																			△									
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)																			✧									
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)																				○								
FTG-17 (GM, DT Intercept Flight Test)																					△							
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)																					✧							
GTD-10 (E/C) (BMDS Ground Test)																						○						
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)																							✧					
FTT-24 (TH, DT Intercept Flight Test)																							△					
GTD-11 (N/P) (BMDS Ground Test)																								✧	✧			
FTG-18 (GM, DT/OT Intercept Flight Test)																									△			
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)																										○		
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)																											✧	
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)																												○
FTG-19 (GM, DT/OT Intercept Flight Test)																												

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FS 17-4 (DT Tracking Exercise Flight Test)	1	2018	1	2018
L200 (AEGIS 4.0.3)	1	2018	1	2018
FTM-29 (AEGIS 5.1, Intercept Flight Test)	2	2018	2	2018
GT-18 Sprint 1 (JEON)	2	2018	2	2018
GTI-07b E/C (BMDS Ground Test)	2	2018	3	2018
FTX-35 (TH, Target Only Flight Test)	3	2018	3	2018
GT-18 Sprint 2	4	2018	4	2018
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	4	2019	4	2019
GTI-07c (N/P) (BMDS Ground Test)	1	2020	1	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	1	2021	2	2021
GTD-08 (N/P) (BMDS Ground Test)	2	2021	2	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
FTP-28 (LTPO, OT Intercept Flight Test)	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
GTD-09 (E/C) (BMDS Ground Test)	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2022	2	2022
FTX-28 E1 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E2 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E3 (TH, DT Target Only Flight Test)	3	2022	3	2022
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)	3	2022	3	2022
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	4	2022	4	2022
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)	1	2023	1	2023
GTD-10 (E/C) (BMDS Ground Test)	2	2023	2	2023
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)	3	2023	3	2023
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
GTD-11 (N/P) (BMDS Ground Test)	4	2023	1	2024
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	2	2024	2	2024
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)	3	2024	3	2024
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	4	2024	4	2024
FTG-19 (GM, DT/OT Intercept Flight Test)	1	2025	1	2025

Note

FY 2020 USFK JEON tests are funded in PE 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / *Ballistic Missile Defense Sensor Test*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	8.506	3.351	2.906	4.477	-	4.477	5.375	4.621	5.569	4.711	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	3.351	2.906	4.477
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	3.351	2.906	4.477

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / *Ballistic Missile Defense Sensor Test*	Project (Number/Name) MD40 / *Program Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.074	0.168	Jul 2018	0.044	Jul 2019	0.067	Jul 2020	-		0.067	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	MIPR	Various : Multi: AL, VA	8.432	3.183	Aug 2018	2.862	Feb 2019	4.410	Jul 2020	-		4.410	Continuing	Continuing	Continuing
		Subtotal	8.506	3.351		2.906		4.477		-		4.477	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.506	3.351		2.906		4.477		-		4.477	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,133.199	29.652	27.692	38.352	-	38.352	36.348	28.029	22.733	30.463	Continuing	Continuing
MD68: *AEGIS Ashore*	1,094.886	25.282	23.033	33.741	-	33.741	32.313	25.759	21.613	27.714	Continuing	Continuing
MC68: *Cyber Operations*	-	2.724	3.255	2.980	-	2.980	2.618	0.970	0.000	1.258	Continuing	Continuing
MD40: *Program-Wide Support*	38.313	1.646	1.404	1.631	-	1.631	1.417	1.300	1.120	1.491	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Increase from FY 2019 to FY 2020 provides site activation requirements due to Poland construction delays and increased Aegis Ashore Missile Defense Test Complex activities to include installation of hardware and infrastructure repairs and maintenance

A. Mission Description and Budget Item Justification

This program supports development of the Land-Based Standard Missile-3 (LBSM3) capability, Aegis Ashore. On 17 September 2009, the President announced an overarching plan to provide regional missile defense to U.S. deployed forces, allies, and partners in Europe called the European Phased Adaptive Approach (EPAA). The EPAA policy specifically defines a timeline to deploy a mix of afloat and land-based Ballistic Missile Defense (BMD) capabilities. Aegis Ashore represents one of these land-based capabilities. The U.S. can also build on current efforts to pursue Phased Adaptive Approaches (PAAs) in the Asia Pacific and the Middle East regions. The PAA tailors U.S. BMD capabilities to specific theater needs enhancing integrated regional missile defenses to protect defended assets against medium, intermediate, and ultimately intercontinental range ballistic missiles.

Aegis Ashore is a key component of EPAA Phases II (Romania) and III (Poland) and provides Aegis BMD capability against short to intermediate-range ballistic missiles in an ashore configuration. Aegis Ashore provides sophisticated engagement strategies and can adapt to threat updates while also being deployed/redeployed worldwide where needed to provide persistent coverage for the Geographic Combatant Commanders. Aegis Ashore re-hosts the required BMD components of a U.S. Navy Destroyer, including: SPY-1 Radio Direction and Ranging (Radar); Vertical Launch System (VLS), Computing Infrastructure; Command Control; Communications; Computers and Intelligence (C4I) Systems; and Operator Consoles.

This program element will continue to modernize, develop, and test Aegis Ashore capability improvements at Aegis Ashore Missile Defense Test Complex (AAMDTC) in Hawaii for implementation at operational sites.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604880C *I Land Based SM-3 (LBSM3)*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	30.486	27.692	29.263	-	29.263
Current President's Budget	29.652	27.692	38.352	-	38.352
Total Adjustments	-0.834	0.000	9.089	-	9.089
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.687	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-0.147	0.000	9.089	-	9.089

Change Summary Explanation

Increase in FY 2020 from PB19 to PB20 provides site activation requirements due to Poland construction delays and increased Aegis Ashore Missile Defense Test Complex activities to include installation of hardware and repairs and maintenance of infrastructure

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MD68 / *AEGIS Ashore*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD68: *AEGIS Ashore*	1,094.886	25.282	23.033	33.741	-	33.741	32.313	25.759	21.613	27.714	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 provides site activation requirements due to Poland construction delays and increased Aegis Ashore Missile Defense Test Complex (AAMDTC) activities to include installation of hardware and repairs and maintenance of infrastructure.

A. Mission Description and Budget Item Justification

Deployed sites, referred to as Aegis Ashore Missile Defense Systems (AAMDS), will be modified to support future computer programs and missile variants in step with the U.S. Navy's Destroyer Modernization Plan. MDA is responsible for maintaining and modernizing the test center at the Pacific Missile Range Facility (PMRF), while the U.S. Navy is responsible for maintaining and modernizing all deployed Aegis Ashore sites. The initial AAMDS deployed to Romania in 2015 employing Aegis BMD 5.0 CU (Capabilities Upgrade) and SM-3 Block IB. A second AAMDS deploys to Poland and is scheduled to become operational in 2020. These sites provide an Aegis Ashore exo-atmospheric defense against short to intermediate-range ballistic missile threats in the later stages of flight. If the threat dictates, additional systems can be purchased and deployed globally.

Research and Development efforts include design of modifications to adapt the Aegis Weapon System for land-based use, modernization in pace with the U.S. Navy's Destroyer Modernization Plan, development and testing of Aegis Ashore capability improvements at the AAMDTC in Hawaii, and modifications, as required, to enhance co-existence with Broadband Wireless Access systems in the European theater.

In support of EPAA Phase III, Aegis Ashore integrates the Aegis BMD 5.1 and Standard Missile (SM-3) Block IIA capabilities into the Aegis Ashore sites. MDA is responsible for any upgrade to BMD capability, BMD specific mission equipment, and integration with existing Ballistic Missile Defense System (BMDS) nodes for all Aegis Ashore sites.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Aegis Weapon System Development	16.579	18.085	19.869
Articles:	-	-	-
Description: Maintain and modernize the AAMDTC at the PMRF in Hawaii. Develop and test Aegis Ashore capability improvements prior to implementation at operational sites, and support SPY-1 Radar and Broadband Wireless Access (BWA) coexistence efforts at Aegis Ashore sites. Recurring Accomplishments: - Determine the minimum hardware refresh of element components and spares that are projected to be removed from the production to ensure the test capability at AAMDTC remains current with the U.S Navy's Destroyer Modernization efforts			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Provide system engineering, technical, and logistics support for the AAMDS facility and tactical elements to ensure appropriate system adaptation, readiness, availability, and effectiveness - Modernize the AAMDTC Weapons System, C4I, VLS, and other equipment to align with the U.S. Navy's Destroyer Modernization Plan and ensure the test site configuration is ready to support BMDS testing - Maintain Aegis Ashore Technical Data Package with modernization implementation to include drawings and installation plans for U.S. Navy use in implementation at operational sites Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** -Install hardware at AAMDTC to increase processing capabilities, network capacities, and update storage space -Provide Facilities, Sustainment, Restoration, and Modernization (FSRM) to initiate critical repairs and maintenance of infrastructure at AAMDTC ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from 2019 to 2020 provides hardware installation and FSRM (preventative maintenance, roof repair, renovation, and erosion control)			
Title: Site Activation	8.703	4.948	13.872
Articles:	-	-	-
Description: Provide site design, unexploded ordnance clearing; spectrum analysis studies; temporary facilities; utilities; administrative communications equipment and services; infrastructure modifications; generator and commercial power; leased vehicles; material handling equipment; generator fuel; supplies, barriers; guard shacks; temporary lighting; transportation of materials and equipment; translators; and emerging requirements as site activation progresses and until sites are transferred to the Navy. Recurring Accomplishments include: - Provide site activation for Aegis Ashore site in Poland to include temporary site activation facilities, base operations support, utilities, administrative communications, on-site material handling equipment services, and equipment installation - Fuel for facility commissioning activities, backup generators, and on-site vehicle support - Technical support to facilitate processing facility change proposals and construction modifications - Post-award technical services (structural, mechanical, and electrical) to ensure quality standards and construction schedule is met - Continue providing Defense Threat Reduction Agency (DTRA) support to ensure High-Altitude Electromagnetic Pulse (HEMP) validation and verification testing is completed			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides requirements for base operations support, utilities, administrative communications, on-site material handling equipment services, and equipment installation due to Poland construction delays.			
Accomplishments/Planned Programs Subtotals	25.282	23.033	33.741

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0208866C: *PROCUREMENT*	3,052.841	2,572.400	1,493.793	-	1,493.793	1,670.987	1,834.709	1,971.280	1,822.396	0.000	14,418.406
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	128.757	92.160	169.822	-	169.822	76.270	149.764	137.058	147.923	Continuing	Continuing
• 0604881C: *AEGIS SM-3 Block IIA Co-Development*	9.531	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.531

Remarks

D. Acquisition Strategy

The Aegis Ashore Engineering Agent (AAEA) is responsible for the design, development, integration and test of the Aegis Weapons System capability into a reconstitutable deckhouse. The AAEA will also support Aegis Ashore deployment to Romania.

The Global Deployment (GD) program office is utilizing Naval Facilities Engineering Command (NAVFAC) and U. S. Corps of Engineers Europe District (Core of Engineers North Atlantic Union) CENAU to award and administer contracts for base operating support, commercial power, temporary site activation facilities, and integrated electronic security systems for Romania and Poland sites.

E. Performance Metrics

Cost Plus Award Fee Contracts

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MD68 / *AEGIS Ashore*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis Weapon System Development - AWS Development-NAVFAC	MIPR	NAVFAC : HI	1.469	1.869	Nov 2017	1.954	Nov 2018	2.600	Nov 2019	-		2.600	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NAVSEA-MD68	MIPR	NAVSEA-LM/BAE, SPAWAR, NSWC CD : San Diego, CA; Baltimore, MD; Minneapolis, MN	8.802	0.084	Nov 2017	2.984	Nov 2018	3.150	Nov 2019	-		3.150	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NSWC DD-MD68	MIPR	NSWC Dahlgren : Dahlgren, VA	46.354	0.476	Nov 2017	0.500	Nov 2018	1.214	Nov 2019	-		1.214	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NSWC PHD-MD68	MIPR	NSWC PHD, NSWC, DOI, Aegis Techrep : CA, NJ, ID, MD, IN	37.290	3.292	Nov 2017	1.500	Nov 2018	2.125	Nov 2019	-		2.125	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-PMRF - MD68	MIPR	PMRF : Hawaii	12.630	2.726	Nov 2017	1.100	Nov 2018	1.238	Nov 2019	-		1.238	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-SPAWAR-MD68	MIPR	SSC PAC : San Diego,CA	45.979	2.998	Nov 2017	0.047	Nov 2018	2.000	Nov 2019	-		2.000	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-SSC PAC Pearl Harbor	MIPR	SSC PAC Pearl Harbor : HI	0.000	0.000		2.500	Nov 2018	2.090	Nov 2019	-		2.090	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-Various-MD68: No longer funding in the FYDP	Various	Various : AL,VA,CA, APO, HI, NJ	837.719	0.000		0.000		0.000		-		0.000	0.000	837.719	0.000
Aegis Weapon System Development - Aegis	SS/CPIF	MDA Lockheed Martin : Moorestown, NJ	25.060	5.134	Jan 2018	0.000		5.452	Nov 2019	-		5.452	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MD68 / *AEGIS Ashore*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Weapon System Development - MD68-															
Aegis Weapon System Development - MD68	MIPR	MDA : Arlington, VA	1.076	0.000		7.500	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - DTRA support to construction in Romania and Poland	MIPR	DTRA : Ft. Belvoir, VA	1.150	0.400	Nov 2017	2.868	Nov 2018	0.426	Nov 2019	-		0.426	Continuing	Continuing	Continuing
Site Activation - IESS Support	MIPR	USAF LCMC : Wright-Patterson AFB, OH	0.000	0.145	Sep 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - Poland Admin Communication	MIPR	Northrop Grumman : Poland	1.644	0.124	Nov 2017	0.437	Nov 2018	0.423	Nov 2019	-		0.423	Continuing	Continuing	Continuing
Site Activation - Poland Base Operating Support	MIPR	NAVFAC : Poland	3.697	2.258	Nov 2017	1.007	Nov 2018	7.763	Nov 2019	-		7.763	Continuing	Continuing	Continuing
Site Activation - Poland Commerical and Temporary Utilities	MIPR	NAVFAC : Poland	0.000	0.545	Sep 2018	0.000		2.223	Nov 2019	-		2.223	Continuing	Continuing	Continuing
Site Activation - Poland Fuel	MIPR	DLA : Fort Belvoir, Virginia	0.000	0.089	Jun 2018	0.000		0.247	Nov 2019	-		0.247	Continuing	Continuing	Continuing
Site Activation - Prior year no longer funded in the FYDP	Various	Various : Various	64.185	0.000		0.000		0.000		-		0.000	0.000	64.185	0.000
Site Activation - Romainia/ Poland Security Guards / Escorts	C/FFP	Chenega Infinity : Chantilly, VA	0.000	0.829	Jul 2018	0.000		0.252	Nov 2019	-		0.252	Continuing	Continuing	Continuing
Site Activation - Site Activation – Transportation of Aegis Weapon System	MIPR	SDDC : Scotts AFB, IL	5.786	0.095	Nov 2017	0.012	Nov 2018	0.012	Nov 2019	-		0.012	Continuing	Continuing	Continuing
Site Activation - Site Activation- Poland Admin Communications	MIPR	DISA : Scott AFB, IL	0.000	0.160	Nov 2017	0.009	Nov 2018	0.125	Nov 2019	-		0.125	Continuing	Continuing	Continuing
Site Activation - Site Activation- Poland Navy Leases / Material Handling Services	MIPR	NAVFAC : Naples, Italy	0.000	1.324	Nov 2017	0.000		0.000		-		0.000	0.000	1.324	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MD68 / *AEGIS Ashore*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Site Activation - USACE in-house support in Poland	MIPR	CEHNC : Huntsville, AL	1.131	0.708	Oct 2017	0.000		1.899	Nov 2019	-		1.899	Continuing	Continuing	Continuing
Site Activation - USACE support in Poland	MIPR	CENAU : Poland	0.914	2.026	Oct 2017	0.615	Nov 2018	0.502	Nov 2019	-		0.502	Continuing	Continuing	Continuing
		Subtotal	1,094.886	25.282		23.033		33.741		-		33.741	Continuing	Continuing	N/A

Remarks

Increase from FY 2019 to FY 2020 for Poland Base Operating Support due to Poland construction delays

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MD68 / *AEGIS Ashore*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks N/A															

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,094.886	25.282		23.033		33.741		-		33.741	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for inactive contracts and MIPRs on the R-3.
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
B/L 5.1 Certification Testing	✧	✧	✧	✧																								
Facility Support for NAVEUR Exercise	✧	✧	✧	✧	✧																							
IMTP	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
AAMDTC Upgrades				✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Poland Beneficial Occupancy Date (BOD)								✧																				
EPAA Phase III Technical Capability Demonstration (TCD)											✧																	
Poland Construction Complete											✧																	

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
B/L 5.1 Certification Testing	1	2018	4	2018
Facility Support for NAVEUR Exercise	1	2018	1	2019
IMTP	1	2018	4	2024
AAMDTC Upgrades	4	2018	4	2024
Poland Beneficial Occupancy Date (BOD)	4	2019	4	2019
EPAA Phase III Technical Capability Demonstration (TCD)	3	2020	3	2020
Poland Construction Complete	3	2020	3	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MC68 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC68: *Cyber Operations*	-	2.724	3.255	2.980	-	2.980	2.618	0.970	0.000	1.258	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Sustain Missile Defense Agency (MDA) DoD Information Assurance Certification and Accreditation Program (DIACAP) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Aegis Ballistic Missile Defense (BMD) mission systems. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) on all MDA Information Systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network/System Certification and Accreditation (C&A)	2.724	3.255	2.980
Articles:	-	-	-
Description: Monitor and track cybersecurity mitigation detailed in Information Technology Security Guidance. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/ Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA). Recurring Accomplishments: - Provide Cybersecurity engineering and architecture requirements planning for Aegis BMD systems - Coordinate the development and implementation of Aegis BMD Risk Management Framework (RMF) accreditation packages - Conduct regular Controls Validation Testing (CVT) of Aegis BMD systems and provide a Risk Assessment Report (RAR) to mitigate cybersecurity deficiencies - Conduct annual cybersecurity reviews on the Aegis BMD systems to assess compliance in implementing and maintaining RMF controls - Implement HW/SW to conduct continuous daily monitoring - Conduct monthly reviews of systems in eMass - Provide daily management of eMass Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Install Global Positioning System (GPS)Based Positioning, Navigation and Timing Service (GPNTS) - Purchase Consolidated Afloat Networks and Enterprise Services (CANES) ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	2.724	3.255	2.980

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Full and Open contract support through Missile Defense Agency Program Management Office.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MC68 / *Cyber Operations*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network/System Certification and Accreditation (C&A) - Cyber Operations	MIPR	PMRF : HI	0.000	0.000		0.000		0.252	Nov 2019	-		0.252	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - NSWC Corona	MIPR	NSWC Corona : CA	0.000	0.000		0.250	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - NSWC Philadelphia	MIPR	Pennsylvania, PA : NSWC Philadephia	0.000	0.942	Nov 2017	0.250	Nov 2018	0.133	Nov 2019	-		0.133	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - SPAWAR	MIPR	SPAWAR : CA	0.000	1.782	Jun 2018	2.755	Nov 2018	2.595	Nov 2019	-		2.595	Continuing	Continuing	Continuing
		Subtotal	0.000	2.724		3.255		2.980		-		2.980	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	2.724		3.255		2.980		-		2.980	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	38.313	1.646	1.404	1.631	-	1.631	1.417	1.300	1.120	1.491	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	1.646	1.404	1.631
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	1.646	1.404	1.631

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / *Land Based SM-3 (LBSM3)*	Project (Number/Name) MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various; Multi : AL, CA, CO, VA	11.024	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Facilities and Maintenance (Reqn)	Reqn	Various; Multi : AL, CA, CO, VA	4.383	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various: Multi : AL, CA, CO, VA	1.973	0.146	Jul 2018	0.021	Jul 2019	0.024	Jul 2020	-		0.024	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	20.412	1.500	Aug 2018	1.383	Mar 2019	1.607	Jul 2020	-		1.607	9.005	33.907	0.000
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	MIPR	Department of State; : Washington, DC, Japan, Australia	0.181	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi:AL,VA	0.340	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	38.313	1.646		1.404		1.631		-		1.631	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.313	1.646		1.404		1.631		-		1.631	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency												Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604881C *I AEGIS SM-3 Block IIA Co-Development*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	2,271.722	9.531	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2,281.253
MD09: *SM-3 Block IIA Co-Development*	2,195.799	8.608	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2,204.407
MD40: *Program-Wide Support*	75.923	0.923	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	76.846
Program MDAP/MAIS Code: 362												

Note

Aegis SM-3 Block IIA Co-Development RDT&E completed in FY 2018.

A. Mission Description and Budget Item Justification

The Aegis Ballistic Missile Defense (BMD) mission is to deliver an operationally effective and supportable BMD capability to defend the nation, deployed forces, and allies. Aegis BMD aims to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. Aegis BMD provides a forward-deployable, mobile capability to detect and track ballistic missiles of all ranges, and the ability to destroy Short-Range Ballistic Missiles (SRBM), Medium-Range Ballistic Missiles (MRBM), and Intermediate-Range Ballistic Missiles (IRBM) in the midcourse phase of flight. Upgrades to both the Aegis BMD Weapon System and the Standard Missile-3 (SM-3) configuration enable Aegis BMD to provide effective, supportable defensive capability against longer range, more sophisticated threats and an enduring Aegis Ashore defensive capability.

Beginning in 2006, Aegis BMD and the Japanese Ministry of Defense (JMOD) have undertaken an SM-3 Cooperative Development (SCD) Project. The objective of the SCD project is the development and initial at-sea flight test of the SM-3 Block IIA. The U.S. and Japan will bear equitable burden to complete the project, as documented in the U.S./Japan Memorandum of Understanding (MOU) SCD Annex. Each nation will fund the full extent of its participation in the project. No funds are transferred between the U.S. and Japan under the MOU.

The SM-3 Block IIA provides important improvements over SM-3 Block IB capability, including increased velocity and range provided by a 21-inch diameter rocket motor propulsion stack, more than doubled seeker sensitivity, and more than tripled divert capability incorporated in an advanced Kinetic Warhead (KW). New component technologies include, but are not limited to: lightweight nosecone, advanced kinetic warhead, 21-inch second stage rocket motor, and 21-inch third stage rocket motor. The effort includes risk reduction for key components and supports EPAA Phase III.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604881C *I AEGIS SM-3 Block IIA Co-Development*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	9.739	0.000	0.000	-	0.000
Current President's Budget	9.531	0.000	0.000	-	0.000
Total Adjustments	-0.208	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.208	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	Project (Number/Name) MD09 / *SM-3 Block IIA Co-Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD09: *SM-3 Block IIA Co-Development*	2,195.799	8.608	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2,204.407
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Aegis SM-3 Block IIA Co-Development RDT&E completed in FY 2018.

A. Mission Description and Budget Item Justification

The Scope of Work of the SCD project is defined in three phases:
Phase I took the program through System Design Review (SDR) in FY 2009. Aegis BMD executed risk reduction efforts for the Propulsion, Nosecone, Seeker, Divert Attitude Control System (DACS) development efforts, and test plans. Phase I Included requirements definition for the SM-3 Block IIA.
Phase II encompassed the work from SDR through the Critical Design Review (CDR) in FY 2014. Aegis BMD refined requirements and defined the performance allocation and component configuration for the development of the SM-3 Block IIA. The U.S. and Japan designed, fabricated, tested, and evaluated the SM-3 Block IIA sections per the agreed work-share agreement.
Phase III extends from CDR to the completion of the SCD flight test program as defined in the Agreement. This phase defines developmental cost share agreements between the United States and the Government of Japan, completes component engineering and integration, executes cooperative flight tests, and continues discussions on production and maintenance options. Phase III is planned to complete in FY 2018.

The SCD project will:
- Develop and integrate components for the SM-3 Block IIA into an All Up Round (AUR). Japan's work share includes 21 inch 2nd and 3rd stage components and the 21 inch nosecone. The U.S. work share includes the advanced kinetic warhead, advanced seeker, large diameter divert and attitude control system, and lightweight Vertical Launch System (VLS) canister.
- Integrate the SM-3 Block IIA VLS with Aegis Ship Systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: SM-3 Block IIA Cooperative Development (SCD)	8.608	0.000	0.000
Articles:	-	-	-
Description: This activity develops the SM-3 Block IIA which will increase the area that can be defended by Aegis Ballistic Missile Defense (BMD) and increase the probability of kill against a larger threat set. It will leverage enhanced capability provided by Ballistic Missile Defense System (BMDS) sensor upgrades. Recurring Accomplishments: - Prepare for and support BMDS Flight Test events as reflected in the IMTP and the Exhibit R-4 schedule			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD09 / *SM-3 Block IIA Co-Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Develop and deliver lightweight VLS canisters in support of SCD testing events ***FY 2019 Plans:*** N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease in funding from FY 2018 to FY 2019 due to completion of the Aegis SM-3 Block IIA Co-Development Program.			
Accomplishments/Planned Programs Subtotals	8.608	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing

Remarks

D. Acquisition Strategy

The SM-3 Cooperative Development program for the SM-3 Block IIA missile utilizes a performance-based approach that ties program decision milestones to the performance of development prototypes, as well as Propulsion Test Vehicle and Controlled Test Vehicle flight test article performance. Acquisition of hardware, software modifications and required services will occur in conjunction with contractual and tasking efforts to U.S. Navy work and events, and as defined by signed agreements between the Governments of the United States and Japan.

E. Performance Metrics

SM-3 Block IIA Program Office is utilizing Incentive-based contracts to ensure project completes on time.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	Project (Number/Name) MD09 / *SM-3 Block IIA Co-Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SM-3 Block IIA Cooperative Development (SCD) - SM-3 Block IIA Cooperative Development (SCD) - SM-3 Blk IIA Development - MD09	SS/CPAF	RAYTHEON : AZ	1,901.793	4.265	Nov 2017	0.000		0.000		-		0.000	0.000	1,906.058	0.000
SM-3 Block IIA Cooperative Development (SCD) - SM-3 Block IIA Cooperative Development (SCD) - SM-3 Blk IIA Development and Canister - MD09. No longer funding in the FYDP	Various	Various : MD, VA, MA, CA, IN	294.006	0.000		0.000		0.000		-		0.000	0.000	294.006	0.000
SM-3 Block IIA Cooperative Development (SCD) - SM-3 Block IIA Cooperative Development (SCD) - SM-3 IIA Cooperative Development (SCD) - SM-3 Blk IIA Development - MD09	SS/CPAF	JHU APL : Laurel, MD	0.000	4.343	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	2,195.799	8.608		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD09 / *SM-3 Block IIA Co-Development*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,195.799	8.608		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for all contracts.
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD09 / *SM-3 Block IIA Co-Development*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD09 SM-3 Block IIA Co-Development	✦	✦	✦	✦																								

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD09 / *SM-3 Block IIA Co-Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD09 SM-3 Block IIA Co-Development	1	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	75.923	0.923	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	76.846
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2017 and FY 2018, Program Wide Support (PWS) reflects proportional changes as a result of a budget decrease and a FY 2019 elimination of the SM-3 Block IIA Co-Development program element.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603891C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	0.923	0.000	0.000
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally,PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.923	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various: Multi : ALless than CAless than COless than VA	6.594	0.018	Jul 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Defense Manpower Data Center : AL,CA, CO, VA	0.009	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Service	C/CPFF	Various : Multi: AL, CA, CO, VA	13.931	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/Various	Various; Multi : AL, CO, VA	51.716	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance	MIPR	Various: Multi : AK, AL, CA, VA	3.673	0.905	Aug 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	75.923	0.923		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	75.923	0.923		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧																								

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604881C / *AEGIS SM-3 Block IIA Co-Development*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2018

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604887C *I Ballistic Missile Defense Midcourse Defense Segment Test*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	194.423	85.030	72.634	98.139	-	98.139	91.955	116.709	110.937	101.103	Continuing	Continuing
MT08: *Midcourse Test*	188.594	81.776	69.011	95.231	-	95.231	88.351	113.656	107.317	97.553	Continuing	Continuing
MD40: *Program Wide Support*	5.829	3.254	3.623	2.908	-	2.908	3.604	3.053	3.620	3.550	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

Increase from FY 2019 to FY 2020 reflects the realignment of test related funding from the Ballistic Missile Defense Midcourse Segment (0603882C) to this PE for flight test execution and analysis. Also, provides ground test Continuous Development, Continuous Integration and Continuous Agile Testing (CIT/CAT). Ground testing was previously performed sequentially but will now be performed in parallel to reduce the test cycle time, with periods of 3 lab-based activities simultaneously. These new sequential test flows require additional test teams, off shift work to de-conflict assets and network infrastructure, and additional data packages and test reviews. In addition, the increase provides for new Cybersecurity testing events which will use a crawl, walk, run approach for each future GMD Ground Systems build which will require earlier and additional installation and checkout in the labs to support earlier learning, feedback to the product development team, and final evaluation of cyber capability prior to operational cyber testing.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Midcourse Defense Segment Test provides flight and ground testing of GMD functionality to demonstrate Enhanced Homeland Defense capabilities against long-range threats. The GMD components are tested in an integrated environment with BMDS sensors; C2BMC; Warfighters; and national collection assets to assess the ability to defend the United States and its territories against ballistic missile attack.

Primary programs include Resource's, Flight Test Execution, Ground Test Execution and Program Operations for which detailed descriptions and accomplishments are provided in section B.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604887C *I Ballistic Missile Defense Midcourse Defense Segment Test*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	76.757	81.934	95.458	-	95.458
Current President's Budget	85.030	72.634	98.139	-	98.139
Total Adjustments	8.273	-9.300	2.681	-	2.681
• Congressional General Reductions	0.000	-9.300			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	9.300	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.027	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-1.000	0.000	2.681	-	2.681

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the enacted congressional adjustment of +$9.300M for an additional 20 GBIs.

Decrease in FY 2019 from PB19 to PB20 reflects the congressional adjustment for forward financing in FY 2018.

Increase in FY 2020 from PB19 to PB20 reflects the realignment of test funding previously budgeted in Ballistic Missile Defense Midcourse Segment (0603882C) for flight test execution and analysis.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	Project (Number/Name) MT08 / *Midcourse Test*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT08: *Midcourse Test*	188.594	81.776	69.011	95.231	-	95.231	88.351	113.656	107.317	97.553	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2019 to FY 2020 reflects the realignment of test related funding from the Ballistic Missile Defense Midcourse Segment (0603882C) to this PE for flight test execution and analysis. Also, provides ground test Continuous Development, Continuous Integration and Continuous Agile Testing (CIT/CAT). Ground testing was previously performed sequentially but will now be performed in parallel to reduce the test cycle time, with periods of 3 lab-based activities simultaneously. These new sequential test flows require additional test teams, off shift work to de-conflict assets and network infrastructure, and additional data packages and test reviews. In addition, the increase provides for new Cybersecurity testing events which will use a crawl, walk, run approach for each future GMD Ground Systems build which will require earlier and additional installation and checkout in the labs to support earlier learning, feedback to the product development team, and final evaluation of cyber capability prior to operational cyber testing.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Midcourse Defense Segment Test provides flight and ground testing of GMD functionality to demonstrate Enhanced Homeland Defense capabilities against long-range threats. The GMD components are tested in an integrated environment with BMDS sensors; C2BMC; Warfighters; and national collection assets to assess the ability to defend the United States and its territories against ballistic missile attack.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Resources	19.518	23.560	20.791
Articles:	-	-	-
Description: Provides support associated with day-to-day operations of the flight and ground test programs to include engineering support for ground test planning, execution, and post-event reconstruction. Recurring work: provides test infrastructure and coordination of flight test range support from Vandenberg Air Force Base (VAFB), California, for all range activities, engineering, operators and GBI transportation; provides command and control and situational awareness for the GMD flight and ground test events at the MDA Integration and Operations Center (MDIOC) in Colorado Springs, Colorado and the Readiness and Control Facility (R&C) in Ft. Greely, Alaska; provides test communication plans, test communication control, satellite communication bandwidth, test network certification and accreditation for GMD flight and ground tests to integrate the range in VAFB, California, MDIOC in Colorado Springs, Colorado, Ft. Greely, Alaska and Pacific Missile Range Facility (PMRF) in Hawaii; provides engineering, operations and maintenance of the integrated system test labs in Huntsville, Alabama, to conduct BMDS flight test pre-mission risk reduction and system level ground testing for fielding warfighter capabilities that defend the homeland; provides operations and maintenance and equipment upgrades of the Prime Consolidated Integration Lab (PCIL) in Huntsville, Alabama to support flight test pre-mission risk reduction and post-flight reconstruction to			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
provide confidence in models and simulations used for evaluation of performance of GMD homeland defense capabilities; and provides equipment upgrades at VAFB and the MDIOC to test support systems. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** See above for recurring efforts. -Support and execute a new BMDS test process and capability called Continuous Integration/Continuous Agile Testing(CI/CAT) to conduct system level integrated ground testing allowing more find and fix opportunities, and increased flexibility to meet agency additional Hard-Ware-In-the-Loop (HWIL) events -Support and execute Cybersecurity Testing per DOT&E requirement for Cooperative Vulnerability and Penetration Assessment (CV PA) and Adversarial Assessment (AA) to support operational acceptance for BMDS weapon system fielding -Support and execute internal test events in both the laboratory and field environments to test incident response procedures, cyber resiliency capabilities, and vulnerability assessments ***FY 2020 Plans:*** -Support and execute external test events at various locations per DOT&E requirement for data collection on external test events to support evaluation of performance of GMD homeland defense capabilities -Support and execute internal test events in both the laboratory and field environments to test incident response procedures, cyber resiliency capabilities, and vulnerability ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of Salvo intercept test requirements to support multiple interceptors resulting in reductions in range support for mission execution, safety systems, and data collectors.			
Title: Flight Test Execution	42.264	29.701	54.787
Articles:	-	-	-
Description: Flight tests demonstrate the capabilities and/or phenomenology that cannot be adequately tested or obtained during ground testing. Flight tests also provide opportunities to test actual hardware and to demonstrate BMDS Element interoperability under operationally realistic conditions. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Conduct Flight Test Ground-based Midcourse Defense-11 (FTG-11), a 3-stage CE-II Block I and 3-stage CE-II Salvo intercept using GBIs launched from VAFB, against an Intercontinental Ballistic Missile (ICBM) target with associated objects, launched from Reagan Test Site (RTS) to test operational realism of the GMD salvo capability. Salvo intercept test requires additional resources			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
from previous missions to support multiple interceptors: additional range support for mission execution and safety systems, silo refurbishment of two silos, additional data collectors, and additional post mission analyses -Initiate planning of range and data collection assets for Flight Test Ground-based Midcourse Defense Booster Verification Test 03 (BVT-03), a mission in support of 2- or 3-Stage selectable boost vehicle software that will provide additional engagement battlespace to the warfighter using a GBI launched from VAFB, California ***FY 2020 Plans:*** -Conduct Flight Test Ground-based Midcourse Defense Flight Test, BVT-03, a mission in support of 2- or 3-Stage selectable boost vehicle software that will provide additional engagement battlespace to the warfighter using a GBI launched from VAFB, California ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the realignment of test related funding from the Ballistic Missile Defense Midcourse Segment (0603882C) to this PE for flight test execution and analysis. Additionally, increase provides for silo refurbishment after FTG-11.			
Title: Ground Test Execution	9.279	5.777	9.965
Articles:	-	-	-
Description: Ground tests demonstrate and validate Warfighter tactics, techniques, and procedures. Ground tests are executed both in the Hardware-in-the-loop (HWIL) lab and in the field. HWIL lab tests integrate and assess BMDS system-level performance based on new element capabilities. Ground tests in the field use existing fielded element assets and tactical communication networks, to integrate, assess and demonstrate the element capabilities. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Support execution of GTI-18 Sprint 3 (N/P) and GTI-19 Sprint 1 (N/P) and GTD-07b to assess BMDS capabilities and the mission functionality of the GMD GS version 7A BMDS capabilities for Future Sensor Utilization and GS Technology Refresh -Support planning and integration of Warfighter TP 07b, 14-day Trial Period following the GTD-07b, to allow the new software to soak on the operational system ensuring that there are no degrading effects or anomalies that were not identified in previous testing. -Support planning, integration and execution of GTI-07c (NORTHCOM/PACOM) (N/P) to support fielding of the GMD Increment 6B capability with GS 8 early integration. -Support planning of GTI-08 (N/P) to assess BMDS-level interoperability with maturing Element capabilities, asset allocations, and geographical content (GS 8 and other BMDS elements software) ***FY 2020 Plans:*** -Support planning, integration, execution and analysis of GTI-07c (NORTHCOM/PACOM) (N/P);			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Support planning, integration, and initial execution of GTI-08 (NORTHCOM/PACOM) (N/P) to assess BMDS-level interoperability with maturing Element capabilities, asset allocations, and geographical content (GS 8 and other BMDS elements software) -Support early planning of GTD-08 (N/P) with GMD Increment 6B capability with GS 8 ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides the new ground test Continuous Development, CIT and CAT effort which will reduce the test cycle time. Additional funding is required for new Cyber Security testing events which will require earlier and additional installation and checkout in the labs to support earlier learning, feedback to the product development team, and final evaluation of cyber capability prior to operational cyber testing.			
Title: Program Operations	10.715	9.973	9.688
Articles:	-	-	-
Description: Program Operations provides for government management of the GMD Test program. This effort includes program and business management support activities, financial management, cost and schedule performance analyses, cost estimation and analyses, configuration management, and integration. It also includes activities to provide critical program status and decision quality data and GMD test program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process and technical and testing oversight, quality/safety/mission assurance, integrated logistics support, and government manpower and infrastructure to test the GMD system and components. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	81.776	69.011	95.231

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0203882C: MD08: *GMD O&M*	138.751	139.204	153.218	-	153.218	146.614	159.376	165.746	165.790	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603882C: MD08: *GMD Procurement*	268.000	532.600	9.471	-	9.471	323.466	532.975	467.001	244.663	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604874C: *Improved Homeland Defense (HLD) Interceptors*	742.842	421.820	412.363	-	412.363	326.922	197.386	137.553	86.423	Continuing	Continuing

Remarks

D. Acquisition Strategy

GMD awarded a competitive Development and Sustainment Contract (DSC) on December 30, 2011. This contract included development, fielding, test, systems engineering, integration, and configuration management; equipment manufacturing and upgrade; training, operations and sustainment of the GMD system and associated support facilities.

In January of 2018 the MDA Director approved the extension of the DSC to execute the Missile Defeat and Defense Enhancement scope (20 silos and 20 GBIs). On January 31, 2018, the DSC Extension was awarded to the Boeing Company with a period of performance through Q1 FY2024. In addition to the MDDE requirements, the DSC Extension also includes supporting test, engineering, software, and performance based logistics scope. The DSC structure breaks out major efforts into separate Contract Line Item Numbers with individual incentives for management insight, accounting and property accountability.

GM is also implementing a more robust Program Board structure allowing more Government insight and decisions into the technical baseline and has changed business processes for greater Government involvement in Program decisions. In addition, GM utilizes Government laboratory modeling & simulation, and analysis capabilities to augment Boeing's efforts.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Contract Support Services	C/CPFF	Various AL/AK/ : CA/ CO/VA	5.000	6.057	Oct 2017	4.994	Oct 2018	4.882	Oct 2019	-		4.882	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA AL/ : VA	4.280	4.658	Oct 2017	4.979	Oct 2018	4.806	Oct 2019	-		4.806	Continuing	Continuing	Continuing
Program Operations - Range, Resources, and Engineering	C/CPAF	Various : AL/AK/CA/ CO/VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	9.280	10.715		9.973		9.688		-		9.688	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resources - Cyber Security - Advanced Research Center Cyber Support	C/IDIQ	COLSA Corp : AL	4.162	0.000		0.000		0.000		-		0.000	0.000	4.162	0.000
Resources - Cyber Security - NSITE/GT Communications	MIPR	Aviation & Missile Research & Development : AL	0.138	0.000		0.000		0.000		-		0.000	0.000	0.138	0.000
Resources - Cyber Win10 Implementation - MDDC Lab Analysis Infrastructure	C/IDIQ	Analytical Services, In. : Al	1.449	0.000		0.000		0.000		-		0.000	0.000	1.449	0.000
Resources - Engineering & Analysis - Industry Support	C/CPAF	Boeing : AL	4.221	0.000		0.000		0.000		-		0.000	0.000	4.221	0.000
Resources - Engineering & Analysis - OGA Support	MIPR	AMRDEC : AL	4.098	0.000		0.000		0.000		-		0.000	0.000	4.098	0.000
Resources - Government Infrastructure	MIPR	VAFB : CA/AL/CO	17.903	8.191	Nov 2017	8.257	Nov 2018	9.625	Nov 2019	-		9.625	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support, Labs, and Communications															
Resources - Prime Infrastructure Support, Labs, and Communications	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/OR/TX//VA	21.939	11.327	Nov 2017	15.303	Nov 2018	11.166	Nov 2019	-		11.166	Continuing	Continuing	Continuing
Flight Test Execution - Planning and Silo Refurbishment	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/OR/TX/VA	69.424	31.610	Nov 2017	7.127	Nov 2018	30.899	Nov 2019	-		30.899	Continuing	Continuing	Continuing
Flight Test Execution - Range, Resources, and Engineering	MIPR	VAFB/PMRF : CA/HI	38.806	10.654	Nov 2017	22.574	Nov 2018	23.888	Nov 2019	-		23.888	Continuing	Continuing	Continuing
Ground Test Execution - Cybersecurity Testing	C/CPFF	Various : Various	0.000	4.300	Nov 2017	0.000		6.320	Nov 2019	-		6.320	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test Sprints	C/CPFF	Various : Various	0.000	0.000		1.000	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-04 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	3.355	0.000		0.000		0.000		-		0.000	0.000	3.355	0.000
Ground Test Execution - Ground Test-06 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	8.163	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-07 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	5.656	4.888	Nov 2017	4.777	Nov 2018	0.138	Nov 2019	-		0.138	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-08 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	0.091	Nov 2017	0.000		3.507	Nov 2019	-		3.507	Continuing	Continuing	Continuing
		Subtotal	179.314	71.061		59.038		85.543		-		85.543	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	188.594	81.776		69.011		95.231		-		95.231	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	Project (Number/Name) MT08 / *Midcourse Test*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
GTD-07a (N/P) (BMDS Ground Test)	✦																											
GT-18 Sprint 2				✦																								
FTG-11 DT, OT Intercept Flight Test					✧																							
GT-18 Sprint 3					✧																							
GT-19 Sprint 1 (N/P) (BMDS Ground Test)						✧																						
GTI-07c (N/P) (BMDS Ground Test)									✧																			
GM BVT-03 (GM, DT Interceptor Only Flight Test)											△																	
GTI-08 (N/P) (BMDS Ground Test)											✧	✧																
GTD-08 (N/P) (BMDS Ground Test)													✧															
Warfighter TP 08 (BMDS Ground Test)														✧														
FTX-26 (OT) (SN, OT Target Only Flight Test)														△														
GM CTV-03+ (GM, DT Interceptor Only Flight Test)																	△											
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)																		✧										
FTG-17 (GM, DT Intercept Flight Test)																					△							
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)																					✧							
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)																							✧					
GTD-11 (N/P) (BMDS Ground Test)																								✧	✧			
Warfighter TP 11 (BMDS Ground Test)																								✧	✧	✧	✧	
Warfighter TP 13 (BMDS Ground Test)																								✧	✧	✧	✧	✧
FTG-18 (GM, DT/OT Intercept Flight Test)																									△			
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)																										✧		

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTD-07a (N/P) (BMDS Ground Test)	1	2018	1	2018
GT-18 Sprint 2	4	2018	4	2018
FTG-11 DT, OT Intercept Flight Test	2	2019	2	2019
GT-18 Sprint 3	2	2019	2	2019
GT-19 Sprint 1 (N/P) (BMDS Ground Test)	3	2019	3	2019
GTI-07c (N/P) (BMDS Ground Test)	1	2020	1	2020
GM BVT-03 (GM, DT Interceptor Only Flight Test)	4	2020	4	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021
GTD-08 (N/P) (BMDS Ground Test)	2	2021	2	2021
Warfighter TP 08 (BMDS Ground Test)	3	2021	3	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)	3	2022	3	2022
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)	1	2023	1	2023
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)	3	2023	3	2023
GTD-11 (N/P) (BMDS Ground Test)	4	2023	1	2024
Warfighter TP 11 (BMDS Ground Test)	4	2023	3	2024
Warfighter TP 13 (BMDS Ground Test)	4	2023	4	2025
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)	3	2024	3	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Note

Notes: CTV - Controlled Test Vehicle; GTI - Ground Test Integrated; GTD - Ground Test Distributed; GTX - Ground Test Exercise; GDEx - Global Defender Exercise; FTG - Flight Test Ground-Based Interceptor; FTO - Flight Test Operational; FTX - Flight Test Exercise; N/P - NORTHCOM/PACOM

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	Project (Number/Name) MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program Wide Support*	5.829	3.254	3.623	2.908	-	2.908	3.604	3.053	3.620	3.550	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	3.254	3.623	2.908
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	3.254	3.623	2.908

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations User Services	Reqn	Various : Multi: AL, CA, CO, VA	0.000	0.870	Aug 2018	1.987	Jun 2019	1.924	Jun 2020	-		1.924	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA	2.798	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AL, VA	0.000	0.016	Aug 2018	0.016	Aug 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	3.031	2.103	Aug 2018	0.661	Jul 2019	0.250	Dec 2019	-		0.250	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness (MIPRs)	MIPR	Naval Surface Warfare Center : VA, AL	0.000	0.249	Aug 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency OperationsManagement	Allot	Various : Multi: AL, VA, Aust, Japan	0.000	0.016	Jun 2018	0.319	Jul 2019	0.044	Jul 2020	-		0.044	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	MIPR	MITRE Corporation : Multi: AL, VA	0.000	0.000		0.640	Aug 2019	0.690	Nov 2019	-		0.690	Continuing	Continuing	Continuing
		Subtotal	5.829	3.254		3.623		2.908		-		2.908	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.829	3.254		3.623		2.908		-		2.908	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	Project (Number/Name) MD40 / *Program Wide Support*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604894C / *Multi Object Kill Vehicle*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	6.347	6.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.847
MD85: *Multi Object Kill Vehicle*	-	6.347	6.130	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.477
MD40: *Program-Wide Support*	-	0.000	0.370	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.370
Program MDAP/MAIS Code: 362												

Note

FY 2020 MOKV funding realigned to other Department of Defense priorities.

A. Mission Description and Budget Item Justification

The MOKV program will enhance the BMDS Homeland Defense Interceptor performance to enable the Warfighter to counter more numerous and complex threats to the Homeland by enabling engagement of multiple objects from a single interceptor. The Missile Defense Agency (MDA) is developing the concepts for a MOKV based on a modular, open systems architecture designed to common interfaces and standards, making upgrades easier and broadening MDA's vendor and supplier base.

The MOKV will rely on a Ballistic Missile Defense System (BMDS) architecture that balances performance across the Sensors, Command, Control, Battle Management and Communications (C2BMC), and GMD elements. Analyses show that having multiple kill vehicles on each interceptor can dramatically improve the performance of the system, significantly reduce the burden on interceptor inventory, and reduce cost to defend the Homeland.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	6.500	8.256	33.935	-	33.935
Current President's Budget	6.347	6.500	0.000	-	0.000
Total Adjustments	-0.153	-1.756	-33.935	-	-33.935
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-1.756			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-0.153	0.000	-33.935	-	-33.935

Change Summary Explanation

FY 2020 MOKV funding realigned to other Department of Defense priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / *Multi Object Kill Vehicle*	Project (Number/Name) MD85 / *Multi Object Kill Vehicle*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD85: *Multi Object Kill Vehicle*	-	6.347	6.130	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.477
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2020 MOKV funding realigned to other Department of Defense priorities.

A. Mission Description and Budget Item Justification

MDA has implemented a structured, disciplined systems engineering process to assure the MOKV is a BMDS solution. The systems engineering effort will define the requirements for a deployable MOKV. The Government will develop MOKV system engineering guidelines from industry concepts, government analysis, modeling, and simulation. Results from MOKV concept development and follow on technology risk reduction efforts will inform the Top Level Requirements development needed in order to execute a feasible, affordable future MOKV Product Development. MDA anticipates deploying this capability in the next decade to address the evolving threat.

As part of MOKV concept development, industry identified technology component risk reduction efforts that support their concepts. MOKV technology risk reduction efforts include maturation of engagement management algorithms, communications, seekers, advanced sensors, Divert and Attitude Control Systems (DACS) propulsion, integrated avionics, and Guidance, Navigation and Control (GNC) technology.

The GMD element of the BMDS provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the United States Homeland against Intercontinental Ballistic Missile (ICBM) attacks. In order to address the evolving and expanding threat of ballistic missile attacks on the Homeland, MDA is developing a more capable ground-based interceptor with a MOKV that will be able to defeat complex future threats.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Multi-Object Kill Vehicle	6.347	6.130	0.000
Articles:	-	-	-
Description: In order to address the evolving and expanding threat of ballistic missile attacks on the Homeland, MDA is developing a more capable ground-based interceptor with a MOKV that will be able to defeat complex future threats. The MOKV replaces a unitary kill vehicle (KV) on current GBIs with a payload containing multiple, smaller kill vehicles (KVs). The MOKV concept also allows for a potentially substantial reduction of the GBI inventory required to protect the homeland, as multiple GBIs with a unitary KV will no longer be required to address a target complex with multiple threats. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - Complete and document initial market research			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Complete an initial basic acquisition strategy for competitive development, engineering, test, manufacture, and production for the MOKV ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 MOKV funding realigned to other Department of Defense priorities.			
Accomplishments/Planned Programs Subtotals	6.347	6.130	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603294C: *Common Kill Vehicle Technology*	55.562	56.753	13.600	-	13.600	13.475	16.187	18.232	22.949	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for Technology Risk Reduction consists of three focus areas. First, through competition with missile integration contractors, develop kill vehicle architectures and interfaces with competitive design of MOKV concepts incorporating engagement management concept of operations, kill vehicles and enhanced discrimination capability. Second, conduct risk reduction activities to identify and mature the technology necessary to increase the reliability and performance of our kill vehicles using the Advanced Technology Innovation Broad Agency Announcement (BAA) and competitive procurements. Make investments that mitigate the component development gaps for future MOKV, and enhance the competitive environment. Make the necessary investments to maturing component technology; enhanced inertial navigation and kill vehicle-to-kill vehicle communications. Third, leverage the technical expertise of Federally Funded Research and Development Centers (FFRDCs), University Applied Research Centers (UARCs), and Universities and government laboratories to independently develop reference concept using proven modeling/analysis techniques.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / *Multi Object Kill Vehicle*	Project (Number/Name) MD85 / *Multi Object Kill Vehicle*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Multi-Object Kill Vehicle - MOKV Technology Development	C/CPFF	Various : Various	0.000	0.444		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.444		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Multi-Object Kill Vehicle - Contract Support Services	C/CPFF	Various : AL/AK/CA/ CO/VA	0.000	1.211	Nov 2017	3.265	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - FFRDC Support Services	MIPR	Various : Various	0.000	1.427	Nov 2017	1.011	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - MOKV Development	C/CPFF	Various : AL/AK/CA/ CO/VA	0.000	0.000		0.236	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - Other Government Agencies	MIPR	Various : Various	0.000	3.265	Nov 2017	1.618	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	5.903		6.130		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / *Multi Object Kill Vehicle*	Project (Number/Name) MD85 / *Multi Object Kill Vehicle*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	6.347		6.130		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

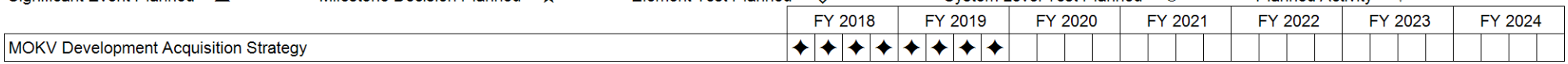

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MOKV Development Acquisition Strategy	1	2018	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / *Multi Object Kill Vehicle*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	0.000	0.370	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.370
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2020 reflects proportional PWS changes as a result of the consolidation of the CKV Technology program element 0603294 with this program element 0604894C.

A. Mission Description and Budget Item Justification

Program Wide Support (PWS) contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	0.000	0.370	0.000
Articles:	-	-	-

Description: Program Wide Support (PWS) contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

FY 2019 Plans:

- SEE ABOVE.

FY 2020 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease in FY 2020 reflects proportional PWS changes as a result of the consolidation of the CKV Technology program element 0603294 with this program element 0604894C.			
Accomplishments/Planned Programs Subtotals	0.000	0.370	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.370	Jul 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance	MIPR	Various : Multi: AK, AL, CA, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.370		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.370		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					**R-1 Program Element (Number/Name)** PE 0305103C *I Cyber Security Initiative*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	3.742	0.964	0.985	1.138	-	1.138	1.160	1.184	1.206	1.230	Continuing	Continuing
MDCS: *Cyber Security Initiative*	3.742	0.964	0.985	1.138	-	1.138	1.160	1.184	1.206	1.230	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

N/A

A. Mission Description and Budget Item Justification

The MDA Counterintelligence (CI) Division conducts CI in Cyberspace activities pursuant to DoD Directive DoDD 5240.02 (Counterintelligence) and DoD Instruction S-5240.23 (CI Activities in Cyberspace) to identify, disrupt, neutralize and mitigate foreign intelligence services and international terrorist organizations, hereafter referred to as foreign entities, to act in observable or exploitable ways. To this end, the MDA CI Division conducts activities to detect, neutralize and mitigate foreign entity-directed malicious and insider threat activities targeting MDA administrative and Ballistic Missile Defense fire control networks and mobile devices.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	0.986	0.985	1.140	-	1.140
Current President's Budget	0.964	0.985	1.138	-	1.138
Total Adjustments	-0.022	0.000	-0.002	-	-0.002
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.022	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.002	-	-0.002

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0305103C / *Cyber Security Initiative*	Project (Number/Name) MDCS / *Cyber Security Initiative*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MDCS: *Cyber Security Initiative*	3.742	0.964	0.985	1.138	-	1.138	1.160	1.184	1.206	1.230	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The DoD Counterintelligence in Cyberspace mission initiative is externally funded and falls under the functional and fiscal management of the Director, Defense Intelligence Agency. The MDA Counterintelligence (CI) Division conducts defensive CIC activities pursuant to DoD Directive DoDD 5240.02 (Counterintelligence), DoD Instruction S-5240.23 (CI Activities in Cyberspace) and DoD Instruction 5240.26 (Countering Espionage, International Terrorism, and the CI Insider Threat), and an MDA Annex within an annual DIA-approved Implementation Plan.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: DoD CI in Cyberspace Initiative	0.964	0.985	1.138
Articles:	-	-	-
Description: This activity detects, identifies, neutralizes and mitigates malicious activities directed by foreign entities that target MDA cyber assets. The following actions are required on a continuing basis to accomplish the DoD CI in Cyberspace Initiative: -- Collaborate with the MDA Computer Emergency Response Team (CERT) to detect, neutralize and mitigate potential foreign entity directed malicious and insider threat activities targeting MDA administrative and fire control networks, and mobility devices. -- Conduct CI Preliminary Inquiries into potential foreign entity directed malicious or insider threat activities and refers suspected incidents or events to the FBI or military department CI organizations for further investigation. -- Conduct CI forensics analysis of MDA computer network activity logs to identify potential indicators of foreign entity directed malicious, insider threat or computer network attack/exploitation activities targeting MDA information. -- Coordinate with national and DoD level intelligence, CI and law enforcement agencies to identify foreign entity cyber actor intrusion sets and the tactics, techniques and procedures used to target MDA and its Cleared Defense Contractor computer networks. -- Coordinate with MDA cleared defense contractors that have been compromised by foreign intelligence entities to capture and triage exfiltrated MDA related data, allowing BMDS engineering teams to perform proper damage assessments. -- Provide required initial and periodic training to ensure the MDA workforce is kept apprised of foreign entity threats to DoD personnel, facilities, information, activities, and information technology systems. -- Protect MDA SCIF/SAP areas from cellular/wireless device monitoring. -- Provide support to the MDA Insider Threat program.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides for additional CI resources to address the growth encountered in foreign entity malicious cyber activity.			
Accomplishments/Planned Programs Subtotals	0.964	0.985	1.138

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing

Remarks

D. Acquisition Strategy

This project leverages expertise in the intelligence community, counterintelligence community, and information assurance community, including the Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0305103C / *Cyber Security Initiative*	Project (Number/Name) MDCS / *Cyber Security Initiative*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DoD CI in Cyberspace Initiative - CI in Cyberspace	Allot	MDA : VA	0.498	0.201	Oct 2017	0.160	Oct 2018	0.146	Oct 2019	-		0.146	Continuing	Continuing	Continuing
DoD CI in Cyberspace Initiative - Counterintelligence	C/CPFF	TEAMS : VA, AL	2.550	0.741	Nov 2017	0.732	Nov 2018	0.883	Nov 2019	-		0.883	Continuing	Continuing	Continuing
DoD CI in Cyberspace Initiative - Technical Surveillance & Countermeasures	MIPR	USA-TAO : Ft. Detrick, MD	0.694	0.022	Nov 2017	0.093	Nov 2018	0.109	Nov 2019	-		0.109	Continuing	Continuing	Continuing
		Subtotal	3.742	0.964		0.985		1.138		-		1.138	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.742	0.964		0.985		1.138		-		1.138	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MDCS Cyber Security Initiative	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MDCS Cyber Security Initiative	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206893C / *Space Tracking and Surveillance System (STSS)*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	35.008	36.955	35.849	-	35.849	35.623	36.334	37.235	37.966	Continuing	Continuing
MD12: *Space Tracking and Surveillance System (STSS)*	-	32.051	32.217	32.633	-	32.633	33.202	33.793	34.530	35.188	Continuing	Continuing
MC12: *Cyber Operations*	-	1.424	2.997	1.690	-	1.690	0.750	0.851	0.868	0.916	Continuing	Continuing
MD40: *Program-Wide Support*	-	1.533	1.741	1.526	-	1.526	1.671	1.690	1.837	1.862	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

N/A

A. Mission Description and Budget Item Justification

The two Space Tracking and Surveillance System (STSS) satellites launched in 2009 provide an on-orbit capability to validate remote sensor fire control integration to inform design and operation of Missile Defense Agency (MDA) space-layer capabilities. MDA uses STSS data to characterize contribution of space data into the Ballistic Missile Defense System (BMDS) and to provide sensor measurements and background data supporting trade studies and analyses for MDA space-layer options for both Homeland and Regional Defense.

STSS continues to provide risk reduction for MDA space capabilities, models, algorithms, interface definitions, communications architectures, and performance across threat object acquisition, tracking, complex target signatures, discrimination and multi-mission support. STSS also informs the Ballistic Missile Defense System (BMDS) Concept of Operations, timelines and performance requirements for remote space sensor cuing for ballistic missile engagements, expanding battle space for weapon systems such as Aegis Ballistic Missile Defense (BMD).

The STSS program demonstrates the functions and interfaces required for space data delivery to the BMDS, validating the data quality necessary for interceptors to launch and/or engage on STSS sensor data. The two STSS satellites are operated from the ground station processing center at the Missile Defense Space Center (MDSC). The STSS satellites demonstrate MDA space-layer capabilities and reduce risk for systems by viewing high-value Targets of Opportunity and participating in BMDS flight tests.

Though the STSS satellites are operating beyond their life expectancy, MDA will continue STSS operations for as long as possible due to the continued contributions STSS provides to the BMDS mission.

The MDSC provides MDA's only centralized collaboration and integration environment that leverages existing Overhead Persistent Infrared (OPIR) enterprise integration in support of BMDS research and development test, and sensor operations. The MDSC capabilities and infrastructure support flight tests, operational concept and prototype development, technology demonstrations, experiments, and algorithm development within a multi-security, collaborative environment to integrate and exploit

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206893C *I Space Tracking and Surveillance System (STSS)*

national space asset data. The MDSC also conducts studies and experiments with MDA assets such as the Spacebased Kill Assessment (SKA), and STSS, as well as other agencies' assets.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	34.907	36.955	37.134	-	37.134
Current President's Budget	35.008	36.955	35.849	-	35.849
Total Adjustments	0.101	0.000	-1.285	-	-1.285
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.787	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.888	0.000	-1.285	-	-1.285

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / *Space Tracking and Surveillance System (STSS)*	Project (Number/Name) MD12 / *Space Tracking and Surveillance System (STSS)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD12: *Space Tracking and Surveillance System (STSS)*	-	32.051	32.217	32.633	-	32.633	33.202	33.793	34.530	35.188	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Two Space Tracking and Surveillance System (STSS) satellites provide a low earth orbit sensor capability with visible and infrared sensors for integrated testing with other Ballistic Missile Defense System (BMDS) elements. STSS demonstrates space-based capabilities including persistent tracking and integrated BMDS discrimination improvements. These two satellites provide valuable risk reduction for acquisition, tracking, complex scenes, and discrimination functionality to include stereo data fusion, cueing radars over the horizon and over-the-horizon fire control.

The on-orbit sensors collect invaluable background, scene, and target signature data to support MDA space-layer and other weapon sensor development trade studies. STSS activities provide information for integration of space-based missile tracking (midcourse phase); remote sensor and weapons cueing via the Command and Control, Battle Management and Communications (C2BMC); features and discrimination; and hit/impact point assessments. STSS enables early capability assessment to address the Warfighter's need for highly available early missile tracking from space, providing an operationally suitable means of global persistent surveillance and engagement. Capabilities being assessed for MDA space-layer capabilities include detecting and acquiring missiles; tracking missiles and their deployed objects; performing autonomous acquisition-to-track handover within a satellite; performing tracking handover to a satellite from a ground cue; performing uplink and downlink of mission, health, and status data both directly and via crosslink between two satellites; reporting missile and intercept event to close the fire-control loop; filtering reports to C2BMC; and providing near real-time object data to external users. STSS support to other mission areas improves definition for Enterprise system approaches.

The Missile Defense Space Center (MDSC) provides capabilities and infrastructure to support space operations, integration and testing with the BMDS. It provides a multi-level security environment for sensor data management and integration across space and terrestrial sensor data activities. MDSC experiments leverage DoD and national security space capabilities. MDSC activities support analyses, demonstration and integration of space sensor capabilities into developmental and operational MDA elements. MDSC enables the development of advanced technology and algorithms including fusion of multiple sensor types (radar, overhead persistent infrared, electro-optical and other emerging sensor technologies). It also supports mission integration of space-based missile tracking, sensor and weapons cueing via C2BMC, features and discrimination, kill and impact point assessments into the BMDS and other non-MDA mission areas, including Space Situational Awareness, technical intelligence, and battle space characterization. This effort is a continuation of work previously performed in program element 0603895C that supported the STSS program.

Lessons learned and data gathered from the STSS demonstration satellites program provide valuable information for MDA space-layer modeling and simulation activities in assessing the capability provided by Overhead Persistent Infrared sensors.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Demonstration Satellites	32.051	32.217	32.633
Articles:	-	-	-
Description: The STSS demonstration satellites collect and deliver critical space and missile characterization data used to design and inform the BMDS and space-layer capabilities. The MDSC facilities and activities are required for safe STSS satellite operations and sustainment. STSS activities include: - Perform risk reduction for MDA tracking and surveillance initiatives and OPIR Enterprise integration and demonstrations across OPIR cueing, Joint Tasking Operations, and data utility - Collect data to support joint OPIR mission utility assessments across Space Situational Awareness, Battle Space Awareness, and Technical Intelligence missions to include integration, analyses, and studies to confirm data sharing capabilities - Participate in Integrated Master Test Plan events - Conduct satellite testing to demonstrate critical space capabilities, including: -- Ability to support BMDS integrated discrimination efforts -- Ability to support Hit/Kill assessment from space -- Ability to cue BMDS sensors from space -- Ability to provide precision cue to BMDS sensors - Perform satellite functionality testing and calibration as part of the satellite operations - Conduct missile tracking experiments as identified in the test specific sections - Provide Air Force Space Command Space Situational Awareness support MDSC efforts related to STSS include: - Analyze space radiation environment and its influence on MDA space system performance - Analyze space based sensor data from STSS and OPIR observations, both individually and combined, to identify phenomenology and techniques to aid tracking and discrimination architectures - Provide data for concept studies and analyses for alternative sensor payload configurations - Sustain MDSC resources for all participant activities, including data, voice, and/or video communications, and support MDA Cyber Security directives - Document requirements and perform tracking, design, implementation, and verification necessary for the MDSC facility - Implement emerging cyber security requirements Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- SEE ABOVE ***FY 2020 Plans:*** - SEE ABOVE ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	32.051	32.217	32.633

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 1206895C: *Ballistic Missile Defense System Space Programs*	45.123	94.484	27.565	-	27.565	21.236	20.483	20.872	21.497	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

D. Acquisition Strategy

The STSS demonstration satellites program follows MDAs capability-based acquisition strategy that emphasizes testing, incremental development, and evolutionary acquisition. The STSS effort utilizes a single prime contractor, Northrop Grumman Aerospace Systems (NGAS) with the subcontractor Raytheon providing the sensor payload. This contract implements MDA`s capability-based acquisition strategy by using existing satellite hardware as a low risk opportunity, building upon the lessons learned from previous development efforts, and establishing a series of planned enhancements to bring added capability to the BMDS.

MDSC efforts will be acquired on the Specialized Warfighter Development Contract vehicle. This contract is responsible for integrating Research, Development, Test and Evaluation, operations support, resource and infrastructure management for the MDSC.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Satellites - Capability Based R&D	SS/CPAF	NGAS : Redondo Beach, CA, Schriever AFB, CO	0.000	21.306	Nov 2017	20.279	Nov 2018	20.544	Nov 2019	-		20.544	Continuing	Continuing	Continuing
Demonstration Satellites - STSS Support to Missile Defense Space Center (MDSC)	C/CPFF	Northrop Grumman : Schriever AFB, CO	0.000	3.467	Nov 2017	3.733	Nov 2018	4.087	Nov 2019	-		4.087	Continuing	Continuing	Continuing
Demonstration Satellites - Systems Engineering	FFRDC	Aerospace : Los Angeles, CA	0.000	0.501	Nov 2017	0.284	Nov 2018	0.573	Nov 2019	-		0.573	Continuing	Continuing	Continuing
		Subtotal	0.000	25.274		24.296		25.204		-		25.204	Continuing	Continuing	N/A

Remarks

All efforts listed above are a continuation of PE 0603893C, MD12

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Satellites - Contract Support Services (CSS)	C/Various	MDA : AL, CO	0.000	2.881	Nov 2017	3.361	Nov 2018	2.687	Nov 2019	-		2.687	Continuing	Continuing	Continuing
Demonstration Satellites - IT User Services	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	0.000	0.590	Dec 2017	0.628	Dec 2018	0.646	Dec 2019	-		0.646	Continuing	Continuing	Continuing
Demonstration Satellites - MDA Civilian	Allot	MDA : AL, CO	0.000	2.181	Oct 2017	3.108	Oct 2018	3.131	Oct 2019	-		3.131	Continuing	Continuing	Continuing
Demonstration Satellites - Other Government Agency (OGA) Civilian	MIPR	SMC : Schriever AFB, CO	0.000	0.161	Nov 2017	0.164	Nov 2018	0.167	Nov 2019	-		0.167	Continuing	Continuing	Continuing
Demonstration Satellites - Program Mission Support	Various	Various : Various	0.000	0.556	Nov 2017	0.232	Nov 2018	0.358	Nov 2019	-		0.358	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Satellites - UARC	C/CPFF	Utah University, Space Dynamics Laboratory : AL, AK, CA, CO, HI, MA, UT, VA	0.000	0.408	Nov 2017	0.428	Nov 2018	0.440	Nov 2019	-		0.440	Continuing	Continuing	Continuing
		Subtotal	0.000	6.777		7.921		7.429		-		7.429	Continuing	Continuing	N/A

Remarks

All efforts listed above are a continuation of PE 0603893C, MD12

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	32.051		32.217		32.633		-		32.633	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2018	▲																											
STSS Demonstration Satellites On-Orbit Operations - 1Q2018-4Q2018	✦	✦	✦	✦																								
MIS Operations - 1Q2018-4Q2018	✦	✦	✦	✦																								
Mission Planning, Tasking and Analysis - 1Q2018-4Q2018	✦	✦	✦	✦																								
MDSC TIL Operations - 1Q2018-4Q2018	✦	✦	✦	✦																								
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2018		▲																										
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2018			▲																									
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2018				▲																								
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2019					△																							
STSS Demonstration Satellites On-Orbit Operations - 1Q2019-4Q2019					✧	✧	✧	✧																				
MIS Operations - 1Q2019-4Q2019					✧	✧	✧	✧																				
Mission Planning, Tasking and Analysis - 1Q2019-4Q2019					✧	✧	✧	✧																				
MDSC TIL Operations - 1Q2019-4Q2019					✧	✧	✧	✧																				
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2019						△																						
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2019							△																					
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2019								△																				
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2020									△																			
STSS Demonstration Satellites On-Orbit Operations - 1Q2020-4Q2020									✧	✧	✧	✧																
MIS Operations - 1Q2020-4Q2020									✧	✧	✧	✧																
Mission Planning, Tasking and Analysis - 1Q2020-4Q2020									✧	✧	✧	✧																
MDSC TIL Operations - 1Q2020-4Q2020									✧	✧	✧	✧																
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2020										△																		
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2020											△																	
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2020												△																

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2021				△			
STSS Demonstration Satellites On-Orbit Operations - 1Q2021-4Q2021				✧ ✧ ✧ ✧			
MIS Operations - 1Q2021-4Q2021				✧ ✧ ✧ ✧			
Mission Planning, Tasking and Analysis - 1Q2021-4Q2021				✧ ✧ ✧ ✧			
MDSC TIL Operations - 1Q2021-4Q2021				✧ ✧ ✧ ✧			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2021				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2021				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2021				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2022				△			
STSS Demonstration Satellites On-Orbit Operations - 1Q2022-4Q2022				✧ ✧ ✧ ✧			
MIS Operations - 1Q2022-4Q2022				✧ ✧ ✧ ✧			
Mission Planning, Tasking and Analysis - 1Q2022-4Q2022				✧ ✧ ✧ ✧			
MDSC TIL Operations - 1Q2022-4Q2022				✧ ✧ ✧ ✧			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2022				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2022				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2022				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2023				△			
MDSC TIL Operations - 1Q2023-4Q2023				✧			
Mission Planning, Tasking and Analysis - 1Q2023-4Q2023				✧			
STSS Demonstration Satellites On-Orbit Operations - 1Q2023-4Q2023				✧ ✧ ✧ ✧			
MIS Operations - 1Q2023-4Q2023				✧ ✧ ✧ ✧			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2023				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2023				△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2023				△			

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MDSC TIL Operations - 1Q2024-4Q2024																									✧			
Mission Planning, Tasking and Analysis - 1Q2024-4Q2024																									✧			
STSS Demonstration Satellites On-Orbit Operations - 1Q2024-4Q2024																									✧	✧	✧	✧
MIS Operations - 1Q2024-4Q2024																									✧	✧	✧	✧
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2024																									△			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2024																										△		
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2024																											△	
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2024																												△

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2018	1	2018	1	2018
STSS Demonstration Satellites On-Orbit Operations - 1Q2018-4Q2018	1	2018	4	2018
MIS Operations - 1Q2018-4Q2018	1	2018	4	2018
Mission Planning, Tasking and Analysis - 1Q2018-4Q2018	1	2018	4	2018
MDSC TIL Operations - 1Q2018-4Q2018	1	2018	4	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2018	2	2018	2	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2018	3	2018	3	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2018	4	2018	4	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2019	1	2019	1	2019
STSS Demonstration Satellites On-Orbit Operations - 1Q2019-4Q2019	1	2019	4	2019
MIS Operations - 1Q2019-4Q2019	1	2019	4	2019
Mission Planning, Tasking and Analysis - 1Q2019-4Q2019	1	2019	4	2019
MDSC TIL Operations - 1Q2019-4Q2019	1	2019	4	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2019	2	2019	2	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2019	3	2019	3	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2019	4	2019	4	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2020	1	2020	1	2020
STSS Demonstration Satellites On-Orbit Operations - 1Q2020-4Q2020	1	2020	4	2020
MIS Operations - 1Q2020-4Q2020	1	2020	4	2020
Mission Planning, Tasking and Analysis - 1Q2020-4Q2020	1	2020	4	2020
MDSC TIL Operations - 1Q2020-4Q2020	1	2020	4	2020
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2020	2	2020	2	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2020	3	2020	3	2020
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2020	4	2020	4	2020
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2021	1	2021	1	2021
STSS Demonstration Satellites On-Orbit Operations - 1Q2021-4Q2021	1	2021	4	2021
MIS Operations - 1Q2021-4Q2021	1	2021	4	2021
Mission Planning, Tasking and Analysis - 1Q2021-4Q2021	1	2021	4	2021
MDSC TIL Operations - 1Q2021-4Q2021	1	2021	4	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2021	2	2021	2	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2021	3	2021	3	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2021	4	2021	4	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2022	1	2022	1	2022
STSS Demonstration Satellites On-Orbit Operations - 1Q2022-4Q2022	1	2022	4	2022
MIS Operations - 1Q2022-4Q2022	1	2022	4	2022
Mission Planning, Tasking and Analysis - 1Q2022-4Q2022	1	2022	4	2022
MDSC TIL Operations - 1Q2022-4Q2022	1	2022	4	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2022	2	2022	2	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2022	3	2022	3	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2022	4	2022	4	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2023	1	2023	1	2023
MDSC TIL Operations - 1Q2023-4Q2023	1	2023	1	2023
Mission Planning, Tasking and Analysis - 1Q2023-4Q2023	1	2023	1	2023
STSS Demonstration Satellites On-Orbit Operations - 1Q2023-4Q2023	1	2023	4	2023
MIS Operations - 1Q2023-4Q2023	1	2023	4	2023
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2023	2	2023	2	2023
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2023	3	2023	3	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2023	4	2023	4	2023
MDSC TIL Operations - 1Q2024-4Q2024	1	2024	1	2024
Mission Planning, Tasking and Analysis - 1Q2024-4Q2024	1	2024	1	2024
STSS Demonstration Satellites On-Orbit Operations - 1Q2024-4Q2024	1	2024	4	2024
MIS Operations - 1Q2024-4Q2024	1	2024	4	2024
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2024	1	2024	1	2024
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2024	2	2024	2	2024
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2024	3	2024	3	2024
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2024	4	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / *Space Tracking and Surveillance System (STSS)*	Project (Number/Name) MC12 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC12: *Cyber Operations*	-	1.424	2.997	1.690	-	1.690	0.750	0.851	0.868	0.916	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects completion of hardware replacement and executing steady-state support to meet cyber security requirements.

A. Mission Description and Budget Item Justification

Space Tracking and Surveillance System (STSS) Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/ Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA STSS mission systems. Activities in this Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network/System Certification and Accreditation (C&A)	1.424	2.997	1.690
Articles:	-	-	-
Description: This activity maintains the Assessment and Authorization (A&A) and C&A data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&Ms on all MDA information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) /Certification Authority and the DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of MDA mission, test, and administrative systems. Recurring accomplishments include the following: - Monitor and track cybersecurity and mitigations detailed in Information Technology security POA&Ms - Conduct cybersecurity design, engineering, and architecture planning for STSS information technology systems - Plan and test the cybersecurity controls for STSS and MDSC systems - Conduct SCA testing continuous monitoring of STSS and MDSC mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities Specific and/or unique accomplishments to each FY are as follows:			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MC12 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Initiates STSS system hardware replacement for cyber security requirements compliance ***FY 2020 Plans:*** - Completes STSS system hardware replacement for cyber security requirements compliance and executes steady-state support to meet cyber security requirements ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of hardware replacement and executing steady-state support to meet cyber security requirements.			
Accomplishments/Planned Programs Subtotals	1.424	2.997	1.690

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MC12 / *Cyber Operations*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network/System Certification and Accreditation (C&A) - Civ Cyber Labor	Allot	MDA : Various	0.000	0.176	Oct 2017	0.179	Oct 2018	0.180	Oct 2019	-		0.180	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Contractor Support	C/Various	MDA : AL, CO	0.000	0.352	Nov 2017	0.218	Nov 2018	0.571	Nov 2019	-		0.571	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Information Assurance	C/CPAF	NGAS : Schriever AFB, CO/Redondo Beach, CA	0.000	0.896	Nov 2017	2.600	Nov 2018	0.939	Nov 2019	-		0.939	Continuing	Continuing	Continuing
		Subtotal	0.000	1.424		2.997		1.690		-		1.690	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	1.424		2.997		1.690		-		1.690	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MC12 / *Cyber Operations*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC12 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MC12 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC12 Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / *Space Tracking and Surveillance System (STSS)*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	1.533	1.741	1.526	-	1.526	1.671	1.690	1.837	1.862	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	1.533	1.741	1.526
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	1.533	1.741	1.526

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / *Space Tracking and Surveillance System (STSS)*	Project (Number/Name) MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations and Support Services	C/CPAF	Northrop Grumman : CO	0.000	1.260	Jan 2018	1.332	Aug 2019	1.503	Jul 2020	-		1.503	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various Multi: AL, CA, CO, : VA	0.000	0.054	Jul 2018	0.409	Jul 2019	0.023	Jul 2020	-		0.023	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Support Services	Reqn	Various Multi: AK, AL, CA : CO, HI, VA	0.000	0.219		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	1.533		1.741		1.526		-		1.526	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	1.533		1.741		1.526		-		1.526	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System (STSS)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206895C *I Ballistic Missile Defense System Space Programs*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	45.123	94.484	27.565	-	27.565	21.236	20.483	20.872	21.497	Continuing	Continuing
MD33: *MD Space Exp Center (MDSEC)*	-	43.905	15.745	26.013	-	26.013	19.851	19.131	19.433	20.026	Continuing	Continuing
MD37: *Space Sensor Layer*	-	0.000	73.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	73.000
MC33: *MD Space Exp Center (MDSEC)*	-	0.469	5.000	0.380	-	0.380	0.390	0.400	0.410	0.420	Continuing	Continuing
MD40: *Program-Wide Support*	-	0.749	0.739	1.172	-	1.172	0.995	0.952	1.029	1.051	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

FY 2019 includes $73.000 million congressional plus up for development of the Space Sensor Layer (SSL), formerly named Missile Defense Tracking System.

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. Beginning in FY20, funds for continuing SSL efforts are included in the SDA and DARPA budget.

A. Mission Description and Budget Item Justification

This program element primarily funds the Spacebased Kill Assessment (SKA) project, a Missile Defense Agency (MDA) experiment, demonstrating kill assessment from space. MDA Aegis BMD (Ballistic Missile Defense) program intercept testing experience provided a solid understanding of kill assessment physics.

Several events set the stage for the kill assessment experiment that later became known as SKA:
- Section 237 in the FY 2014 National Defense Authorization Act directed MDA to improve kill assessment for the GMD program with an initial kill assessment capability by December 31, 2019
- An MDA study called the Space Layer Option Study found that disaggregated systems could provide sensor capabilities at lower costs
- A once in a decade opportunity became available when the commercial sector offered hosted payload services at costs far below what MDA could expect if it used traditional DOD space acquisition models

SKA incorporates Government Accountability Office (GAO) recommendations to examine the operational feasibility of disaggregating large satellites (report number GAO-15-7) and to provide data for the business case for shared or dedicated satellite control, including the ground antenna networks (report number GAO-13-315). The favorable cost and schedule performance on SKA is also consistent with the GAO's assessment of commercially hosted payload programs (report number GAO-18-493). The SKA experiment will utilize a network of small IR sensors integrated onto commercial host satellites which, while on orbit, will observe missile defense

intercepts and deliver a kill assessment declaration to the BMDS. SKA has the opportunity to change the economics of the defense of the American homeland from enemy missiles.

Space Sensor Layer: In FY 2019 the MDA, in collaboration with U.S. Air Force, Defense Advanced Research Projects Agency (DARPA), and the Space Development Agency (SDA) is defining a capabilities-based spiral acquisition space program, referred to as the Space Sensor Layer (SSL). SSL is an integral part of a resilient, multi-tiered Overhead Persistent Infrared (OPIR) Enterprise Architecture. This multi-tiered architecture will consist of systems in different orbits that provide and integrated capability to meet critical warfighter requirements in a contested space environment.

This program element also funds Cyber Security efforts necessary to support BMDS Space Programs.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	30.994	16.484	19.555	-	19.555
Current President's Budget	45.123	94.484	27.565	-	27.565
Total Adjustments	14.129	78.000	8.010	-	8.010
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	78.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	13.500	0.000			
• SBIR/STTR Transfer	-0.533	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	1.162	0.000	8.010	-	8.010

Change Summary Explanation

Increase in FY 2018 from PB19 to PB20 reflects the Omnibus Above Threshold Reprogramming which provided funding to support the Space Sensor Layer (SSL).

Increase in FY 2019 from PB19 to PB20 reflects congressional plus ups for SSL development ($73.000 million) and funding Cyber Security Initiatives ($5.000 million) as outlined in Public Law 115-245.

Increase in FY 2020 from PB19 to PB20 provides the conversion of an experimental SKA to an operational SKA by replacing the administrative quality communications lines with ruggedized, BMDS-quality communications lines, BMDS integration for operationalization, and adds a training capability necessary for the new operators in the Missile Defense Integration and Operations Center (MDIOC) Payload Analysis Center.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD33 / *MD Space Exp Center (MDSEC)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD33: *MD Space Exp Center (MDSEC)*	-	43.905	15.745	26.013	-	26.013	19.851	19.131	19.433	20.026	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase from FY 2019 to FY 2020 provides the conversion of an experimental SKA to an operational SKA by replacing the administrative quality communications lines with ruggedized, BMDS-quality communications lines, BMDS integration for operationalization, and adds a training capability necessary for the new operators in the Missile Defense Integration and Operations Center (MDIOC) Payload Analysis Center.

A. Mission Description and Budget Item Justification

The SKA system is composed of two segments: a space segment and a ground segment.
- The space segment is composed of a network of small infrared (IR) sensors (sensors, processor cards and cabling), each mated to a different satellite. The total number of sensors and their network placement are specifically tailored for the kill assessment mission. The space segment includes key design features to improve its resiliency.
- The ground segment is a small network of desktop computers, servers and routers that monitor the health of the on-orbit sensors, command the sensors to perform the kill assessment mission and analyze the data to make a kill assessment determination for the Ballistic Missile Defense System (BMDS). The ground segment also includes the equipment necessary for communications security and information assurance. The Missile Defense Space Center (MDSC) is the communications hub for SKA data, routing SKA data between the commercial payload integrator and the SKA Payload Analysis Center.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Spacebased Kill Assessment	16.405	15.745	26.013
Articles:	-	-	-
Description: The SKA project is an experimental system designed to demonstrate kill assessment for Homeland Defense. It includes: - SKA sensor-host satellite integration and testing - On-orbit operations by experimenting and participating in BMDS flight tests - Analysis of operations and test data to inform future decision to add SKA to BMDS operational baseline - Development of kill assessment algorithms required to add SKA to the operational BMDS - Supporting engineering trade studies and concept evaluations for current and future space based sensors Specific and/or unique accomplishments to each FY are as follows:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - Complete on-orbit checkout, calibration and commissioning of the sensor network - Begin development of capability for ground test participation required to add SKA to the operational BMDS - Begin integration support required to add SKA to the operational BMDS - Build out SKA Payload Analysis Center at the MDIOC ***FY 2020 Plans:*** - Continue on-orbit operations by experimenting and participating in BMDS flight tests - Continue development of kill assessment algorithms required to add SKA to the operational BMDS - Continue development of capability for ground test participation required to add SKA to the operational BMDS - Begin network upgrades and an operational training program - Complete build out of SKA Payload Analysis Center at the MDIOC ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 provides the conversion of an experimental SKA to an operational SKA by replacing the administrative quality communication lines with ruggedized, BMDS-quality communication lines, BMDS integration for operationalization, and a training capability necessary for the new operators at the MDIOC Payload Analysis Center.			
Title: Space Sensor Layer (SSL)	27.500	0.000	0.000
Articles:	-	-	-
Description: Space Sensor Layer (SSL) is a future space-based missile tracking sensor/system concept to address warfighter requirements. The goal of this effort is to develop prototype space sensor concepts to: -Detect and track traditional and emerging threats -Support Missile Warning (MW)/Missile Defense (MD) mission -Leverage inherent multi-domain capabilities to provide as capable support to the Overhead Persistent Infrared (OPIR) Enterprise Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** FY 2019 Space Sensor Layer effort is funded in Budget Project MD37 ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. Beginning in FY20, funds for continuing SSL efforts are in the SDA and DARPA budget.			
Accomplishments/Planned Programs Subtotals	43.905	15.745	26.013

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603892C: *AEGIS BMD*	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing

Remarks

D. Acquisition Strategy

SKA leverages experience that the Johns Hopkins University Applied Physics Laboratory (JHU/APL) has with its extensive history of performing kill assessment activities and conducting experiments associated with the Aegis BMD program. JHU/APL is the developer of the SKA experiment and its primary subcontractor will be responsible for payload integration and hosting accommodation using a firm fixed price contract to contain costs. The SKA experiment uses a commercial satellite program as the platform host for a DOD payload, taking full advantage of a multi-billion dollar space and ground system that already exists.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Spacebased Kill Assessment - Development and Experimentation	C/CPFF	JHU/APL : Laurel, MD	0.000	14.729	Nov 2017	9.447	Nov 2018	9.814	Nov 2019	-		9.814	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Experimental Ops Team	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		1.056	Nov 2018	1.082	Nov 2019	-		1.082	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Integrate SKA into BMDS Comms Network	C/TBD	TBD : Various	0.000	0.000		0.000		4.353	Dec 2019	-		4.353	Continuing	Continuing	Continuing
Spacebased Kill Assessment - MDSC Support	C/CPFF	Northrop Grumman : Schriever AFB, CO	0.000	0.185	Apr 2018	0.744	Nov 2018	0.284	Nov 2019	-		0.284	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Post Intercept Assessment	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		0.000		2.273	Nov 2019	-		2.273	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Transition To Ops	C/Various	Various : MDA CO, AL	0.000	0.000		0.634	Nov 2018	2.056	Nov 2019	-		2.056	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Transition to Ops (PRIME)	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		2.573	Nov 2018	4.223	Nov 2019	-		4.223	Continuing	Continuing	Continuing
Space Sensor Layer (SSL) - Ground Segment	TBD	Jacobs : CO	0.000	3.798	Apr 2018	0.000		0.000		-		0.000	0.000	3.798	3.800
Space Sensor Layer (SSL) - Space Prototype Concept Activity	MIPR	SMC SpEC OTA : Various	0.000	7.207	Mar 2018	0.000		0.000		-		0.000	0.000	7.207	0.400
		Subtotal	0.000	25.919		14.454		24.085		-		24.085	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Spacebased Kill Assessment - Contract Support Services (CSS)	C/Various	Various : CO, VA	0.000	0.355	Nov 2017	0.193	Nov 2018	0.499	Nov 2019	-		0.499	Continuing	Continuing	Continuing
Spacebased Kill Assessment - FFRDC	FFRDC	Various : CO, AL, MD, VA, CA	0.000	0.786	Nov 2017	0.791	Nov 2018	0.739	Nov 2019	-		0.739	Continuing	Continuing	Continuing
Spacebased Kill Assessment - IT User Services	C/CPAF	Northrop Grumman : AK, CA, CO, HI, NM, VA	0.000	0.046	Nov 2017	0.053	Nov 2018	0.054	Nov 2019	-		0.054	Continuing	Continuing	Continuing
Spacebased Kill Assessment - MDA Civilian	Allot	MDA : VA	0.000	0.222	Oct 2017	0.217	Oct 2018	0.217	Oct 2019	-		0.217	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Program Mission Support	C/Various	Various : CO, AL, MD, VA	0.000	0.082	Nov 2017	0.037	Oct 2018	0.419	Oct 2019	-		0.419	Continuing	Continuing	Continuing
Space Sensor Layer (SSL) - Contract Support Services (CSS)	C/CPFF	Various : CO, AL, VA	0.000	4.805	Feb 2018	0.000		0.000		-		0.000	0.000	4.805	3.600
Space Sensor Layer (SSL) - FFRDC	MIPR	Various : CA, CO, NM, VA	0.000	6.766	Mar 2018	0.000		0.000		-		0.000	0.000	6.766	3.500
Space Sensor Layer (SSL) - MDA Civilian	Allot	MDA : CO, AL, VA	0.000	0.744	Feb 2018	0.000		0.000		-		0.000	0.000	0.744	1.150
Space Sensor Layer (SSL) - Program Mission Support	C/Various	Various : CO, AL, VA	0.000	0.978	Feb 2018	0.000		0.000		-		0.000	0.000	0.978	0.500
Space Sensor Layer (SSL) - UARC	C/CPFF	Various : UT, MD	0.000	3.202	Feb 2018	0.000		0.000		-		0.000	0.000	3.202	1.050
		Subtotal	0.000	17.986		1.291		1.928		-		1.928	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	43.905		15.745		26.013		-		26.013	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD33 / *MD Space Exp Center (MDSEC)*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
SKA Experimentation - 1Q2018-4Q2018	✦	✦	✦	✦																								
SKA Launch Campaign		✦	✦	✦																								
Future System Prototype Design Activity		✦	✦	✦																								
SKA On-Orbit Check-out		✧	✧	✧	✧	✧																						
JFTM-05 E1 (JAPAN, DT Intercept Flight Test)				▲																								
JFTM-05 E2 (JAPAN, DT Intercept Flight Test)				▲																								
SKA Experimentation - 1Q2019-4Q2019					✧	✧	✧	✧																				
SKA Experimentation - 1Q2020-4Q2020									✧	✧	✧	✧																
BMDS Integration									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)										△																		
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)												△																
FTO-03 (OTA, OT Intercept Flight Test)												△																
SKA Experimentation - 1Q2021-4Q2021													✧	✧	✧	✧												
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)														△														
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)														△														
FTT-21 (TH, DT Intercept Flight Test)														△														
FTX-26 (OT) (SN, OT Target Only Flight Test)															△													
SKA Experimentation - 1Q2022-4Q2022																	✧	✧	✧	✧								
GM CTV-03+ (GM, DT Interceptor Only Flight Test)																		△										
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																				△								
FTG-17 (GM, DT Intercept Flight Test)																					△							
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)																					△							
SKA Experimentation - 1Q2023-4Q2023																					✧	✧	✧	✧				
FTG-18 (GM, DT/OT Intercept Flight Test)																									△			

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)																									△			
SKA Experimentation - 1Q2024-4Q2024																									✧	✧	✧	✧
FTG-19 (GM, DT/OT Intercept Flight Test)																												

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SKA Experimentation - 1Q2018-4Q2018	1	2018	4	2018
SKA Launch Campaign	2	2018	4	2018
Future System Prototype Design Activity	2	2018	4	2018
SKA On-Orbit Check-out	2	2018	2	2019
JFTM-05 E1 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
JFTM-05 E2 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
SKA Experimentation - 1Q2019-4Q2019	1	2019	4	2019
SKA Experimentation - 1Q2020-4Q2020	1	2020	4	2020
BMDS Integration	1	2020	4	2023
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	2	2020	2	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020
SKA Experimentation - 1Q2021-4Q2021	1	2021	4	2021
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
SKA Experimentation - 1Q2022-4Q2022	1	2022	4	2022
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	4	2022	4	2022
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)	1	2023	1	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SKA Experimentation - 1Q2023-4Q2023	1	2023	4	2023
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)	1	2024	1	2024
SKA Experimentation - 1Q2024-4Q2024	1	2024	4	2024
FTG-19 (GM, DT/OT Intercept Flight Test)	1	2025	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD37 / *Space Sensor Layer*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD37: *Space Sensor Layer*	-	0.000	73.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	73.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019, this program element received a $73.000 million congressional plus up for development of the Space Sensor Layer (SSL), formerly named Missile Defense Tracking System.

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. Beginning in FY20, funds for continuing SSL efforts are in the SDA and DARPA budget.

A. Mission Description and Budget Item Justification

The Space Sensor Layers (SSL) priority is to maintain the pace of the development schedule to meet the urgent warfighter need to address rapidly developing threats. To meet this priority, SSL must use high technology readiness level components, take advantage of existing government capabilities to minimize development, use a management culture that does not slow down the pace of development and use Other Transaction Agreements (OTA) to minimize contracting cycle times. OTAs allow the Government to work with traditional, non-traditional, and New Space businesses to identify innovative solutions.

The SSL requirements are derived from Unites States Strategic Command (USSTRATCOM) Prioritized Capabilities List (PCL), the National Defense Authorization Act for Fiscal Year 2019, and DoD requirements from the Joint Requirements Oversight Council (JROC).

The current SSL objectives are as follows:
-Complete multiple, competing Preliminary Concept Reviews (PCR) for prototype constellations at Low-Earth Orbit altitude
-Estimate the costs and schedules for developing the competing prototype systems
-Complete risk reduction activities that will enable the MDA to initiate development of the SSL prototype, if authorized and appropriated.

The primary technical activity in this phase is developing the target signal-to-clutter algorithms. These algorithms will be evaluated in a Signal Chain Processing (SCP) demonstration in which prototype data processing subsystems will process, and distribute the mission data. This activity also includes development of prototype infrared sensor payloads and provides insight into the constellation architecture, communications approach, and preliminary command and control design aspects.

MDA is working concurrently and collaboratively with the Defense Advanced Research Projects Agency (DARPA), the U.S. Air Force, and the Space Development Agency (SDA). DARPA's and SMC's research focuses on spacecraft design, constellation management, and improving industrial production capacity. MDA's research focuses on developing payloads and signal chain processing to detect and track missile targets of interest.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

Like other MDA space sensors, SSL is planned to integrate with the existing Joint OPIR Ground (JOG) architecture for mission tasking and data distribution. This OPIR enterprise architecture will be integrated with the terrestrial Ballistic Missile Defense System (BMDS) sensors to improve missile defense architecture capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Space Sensor Layer	0.000	73.000	0.000
Articles:	-	-	-
Description: Space Sensor Layer (SSL) is a future space-based missile tracking sensor/system concept to address warfighter requirements. The goal of this effort is to develop prototype space sensor concepts to: -Detect and track traditional and emerging threats -Support Missile Warning (MW)/Missile Defense (MD) mission -Leverage inherent multi-domain capabilities to provide as capable support to the Overhead Persistent Infrared (OPIR) Enterprise Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -Complete the concept design and systems engineering for a space-based network of Infrared (IR) sensors capable of detecting and tracking traditional and emerging targets of interest. -Develop prototype payload concepts and conduct a signal-chain processing demonstration to reduce risk -Implement an extensible and modular prototype concept that supports technology insertion capabilities ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. Beginning in FY20, funds for continuing SSL efforts are included in the SDA and DARPA budget.			
Accomplishments/Planned Programs Subtotals	0.000	73.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 1206893C: *Space Tracking and Surveillance System (STSS)*	35.008	36.955	35.849	-	35.849	35.623	36.334	37.235	37.966	Continuing	Continuing

Remarks

D. Acquisition Strategy

The SSL acquisition approach delivers a warfighting capability in stages called spirals. Each spiral is of limited duration, capability focused, and allows the first SSL spiral to maintain schedule and allows future spirals to add new technology and capabilities when ready.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Sensor Layer - Space Prototype Concept Activity	MIPR	SMC SpEC OTA : Various	0.000	0.000		60.160	Jun 2019	0.000		-		0.000	0.000	60.160	60.160
		Subtotal	0.000	0.000		60.160		0.000		-		0.000	0.000	60.160	N/A

Remarks

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. Beginning in FY20, funds for continuing SSL efforts are included in the SDA and DARPA budget

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Sensor Layer - Contract Support Services (CSS)	C/Various	Various : CO, AL	0.000	0.000		2.640	Jun 2019	0.000		-		0.000	0.000	2.640	2.640
Space Sensor Layer - FFRDC	MIPR	Various : CO, CA, NM	0.000	0.000		4.472	Jun 2019	0.000		-		0.000	0.000	4.472	4.472
Space Sensor Layer - MDA Civilian	Allot	MDA : CO	0.000	0.000		1.376	Nov 2018	0.000		-		0.000	0.000	1.376	1.376
Space Sensor Layer - Program Mission Support	Various	Various : CO	0.000	0.000		0.289	Dec 2018	0.000		-		0.000	0.000	0.289	0.289
Space Sensor Layer - Threat Modeling	C/TBD	TBD : CO, AL	0.000	0.000		3.000	Mar 2019	0.000		-		0.000	0.000	3.000	3.000
Space Sensor Layer - UARC	C/CPFF	Space Dynamics Lab : CO, UT	0.000	0.000		1.063	Jun 2019	0.000		-		0.000	0.000	1.063	1.063
		Subtotal	0.000	0.000		12.840		0.000		-		0.000	0.000	12.840	N/A

Remarks

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. Beginning in FY20, funds for continuing SSL efforts are included in the SDA and DARPA budget

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD37 / *Space Sensor Layer*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		73.000		0.000		-		0.000	0.000	73.000	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. Beginning in FY20, funds for continuing SSL efforts are included in the SDA and DARPA budget

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
Prototype Concept Development					✧	✧	✧	✧	✧	✧	✧																	
Other Transaction Award							△																					
Signal Chain Processing Demonstration											△																	
Preliminary Concept Review											△																	

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Prototype Concept Development	1	2019	3	2020
Other Transaction Award	3	2019	3	2019
Signal Chain Processing Demonstration	3	2020	3	2020
Preliminary Concept Review	3	2020	3	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MC33 / *MD Space Exp Center (MDSEC)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC33: *MD Space Exp Center (MDSEC)*	-	0.469	5.000	0.380	-	0.380	0.390	0.400	0.410	0.420	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2019 to FY 2020 reflects completion of cyber security projects and executing steady-state support to meet cyber security requirements

A. Mission Description and Budget Item Justification

Ballistic Missile Defense System (BMDS) Space Programs Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for BMDS Space Program mission systems. Activities in this Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Network/System Certification and Accreditation (C&A)	0.469	5.000	0.380
Articles:	-	-	-

Description: This activity maintains the Assessment and Authorization (A&A) and C&A data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&Ms on all MDA information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) /Certification Authority and the DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems. Recurring accomplishments include the following: - Monitor and track cybersecurity and mitigations detailed in Information Technology security POA&Ms - Conduct cybersecurity design, engineering, and architecture planning for information technology systems - Plan and test the cybersecurity controls for space systems - Conduct SCA testing continuous monitoring of mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities Specific and/or unique accomplishments to each FY are as follows:

FY 2019 Plans:

In addition to the above activities, the FY 2019 Congressional Plus-Up will also provide the following activities
-Further strengthening of BMDS Space systems Risk Management Framework posture
-Study and design of cloud-based cyber solutions
-Improving compliance with DoD Cyber Scorecard

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
-Expanding PKI implementation ***FY 2020 Plans:*** See above ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects completion of cyber security projects and executing steady-state support to meet cyber security requirements.			
Accomplishments/Planned Programs Subtotals	0.469	5.000	0.380

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network/System Certification and Accreditation (C&A) - CORE Upgrade	C/CPFF	Northrop Grumman : Schriever AFB, CO	0.000	0.000		0.900	Jan 2019	0.000		-		0.000	0.000	0.900	0.000
Network/System Certification and Accreditation (C&A) - Contractor Support Services (CSS)	C/Various	Various : AL, CO, MD	0.000	0.469	Apr 2018	0.808	Dec 2018	0.380	Nov 2019	-		0.380	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - MDSEA Solutions	C/CPFF	Jacobs : Schriever AFB, CO	0.000	0.000		1.751	Feb 2019	0.000		-		0.000	0.000	1.751	0.000
Network/System Certification and Accreditation (C&A) - Network/Comm Assurance	Various	Various : Various	0.000	0.000		0.796	Apr 2019	0.000		-		0.000	0.000	0.796	0.000
Network/System Certification and Accreditation (C&A) - SKA Communications	C/CPFF	JHU/APL : MD	0.000	0.000		0.745	Feb 2019	0.000		-		0.000	0.000	0.745	0.000
		Subtotal	0.000	0.469		5.000		0.380		-		0.380	Continuing	Continuing	N/A

Remarks

MC33 budget project added to account for emerging Cyber requirements

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.469		5.000		0.380		-		0.380	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

Significant Event Complete ▲ | Significant Event Planned △ | Milestone Decision Complete ★ | Milestone Decision Planned ☆ | Element Test Complete ◆ | Element Test Planned ◇ | System Level Test Complete ● | System Level Test Planned ○ | Complete Activity ✦ | Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MC33 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC33 Cyber Operations	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	0.749	0.739	1.172	-	1.172	0.995	0.952	1.029	1.051	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Program Wide Support	0.749	0.739	1.172
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (SRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	0.749	0.739	1.172

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	C/CPAF	Various Multi: AL, CA, : CO, VA	0.000	0.050	Dec 2017	0.011	Jul 2019	0.018	Jul 2020	-		0.018	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various; Multi AL, CO, : VA	0.000	0.699	Dec 2017	0.728	Apr 2019	1.154	Jul 2020	-		1.154	Continuing	Continuing	Continuing
		Subtotal	0.000	0.749		0.739		1.172		-		1.172	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.749		0.739		1.172		-		1.172	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2018	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502C / *Small Business Innovation Research - MDA*

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	115.278	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	115.278
MD45: *Small Business Innovation Research*	-	115.278	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	115.278

Program MDAP/MAIS Code: 362

Note

Funds are transferred into this PE in the execution year.

A. Mission Description and Budget Item Justification

Small Business Innovation Research (SBIR) explores innovative concepts pursuant to Public Law 106-554 (Small Business Reauthorization Act of 2000) and Public Law 107-50 (Small Business Technology Transfer Program Reauthorization Act of 2001), which mandates a two-phase competition for small businesses with innovative technology that can be commercialized. SBIR and Small Business Technology Transfer (STTR) programs will develop new dual-use technology for future Missile Defense Agency (MDA) Ballistic Missile Defense Systems (BMDS) needs. Dual-use means that the technology will be judged on the potential for future private sector investment both as a vehicle for reducing development time and cost, unit costs of new BMDS technology, and as a route to national economic growth through new commercial products. MDA will conduct the competition, award, and manage the contracts.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	115.278	0.000	0.000	-	0.000
Total Adjustments	115.278	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	115.278	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

FY 2018 funds were transferred to SBIR/STTR from other Program Elements in accordance with the SBIR/STTR Reauthorization Act of 2011

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502C / *Small Business Innovation Research - MDA*	Project (Number/Name) MD45 / *Small Business Innovation Research*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD45: *Small Business Innovation Research*	-	115.278	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	115.278
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds are transferred into this PE in the execution year.

A. Mission Description and Budget Item Justification

Small Business Innovation Research (SBIR) explores innovative concepts pursuant to Public Law 106-554 (Small Business Reauthorization Act of 2000) and Public Law 107-50 (Small Business Technology Transfer Program Reauthorization Act of 2001), which mandates a two-phase competition for small businesses with innovative technology that can be commercialized. SBIR and Small Business Technology Transfer (STTR) programs will develop new dual-use technology for future Missile Defense Agency (MDA) Ballistic Missile Defense Systems (BMDS) needs. Dual-use means that the technology will be judged on the potential for future private sector investment both as a vehicle for reducing development time and cost, unit costs of new BMDS technology, and as a route to national economic growth through new commercial products. MDA will conduct the competition, award, and manage the contracts.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Small Business Innovation Research	115.278	0.000	0.000
Articles:	-	-	-
Description: The MDA's SBIR/STTR investments are divided into 16 Research Areas for the following key components: -Aegis Ballistic Missile Defense (BMD): Develops Naval BMD Capability -Command, Control, Communication, Computer Intelligence Surveillance and Reconnaissance (C4ISR): Defines, develops and deploys an integrated Sensor and Command and Control (C2) capability for the Ballistic Missile Defense System -Program and Integration: Supervises the non-Aegis portfolio including Targets, Terminal High Altitude Area Defense (THAAD), Ground-based Midcourse Defense, and the Israeli programs -Test: Characterizes ballistic missile defense capability and supports fielding of an integrated and effective capability to the Warfighter -Advanced Technology: Develops technology to counter future threats			
FY 2019 Plans: N/A			
FY 2020 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502C / *Small Business Innovation Research - MDA*	**Project (Number/Name)** MD45 / *Small Business Innovation Research*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	115.278	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency												Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0606942C *I Assessments and Evaluations of Cyber Vulnerabilities*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	3.400	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400
MC39: *Assessment and Evaluation of Cyber Vulnerabilities*	-	0.000	3.400	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400
Program MDAP/MAIS Code: 362												

Note

This program element (PE) reflects OSD addition in FY 2019. All prior and subsequent FYs are funded in PE 0603914C MC04. This is a continuation of efforts funded within the Management and Support Office of the Secretary of Defense (OSD) PE 0604942DZ Assessments & Evaluation.

Pursuant to section 1647 of Public Law 114-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides $84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements. Missile Defense Agency received $3.4 million in FY 2019 for Cyber Vulnerability Assessment and Mitigation.

A. Mission Description and Budget Item Justification

This program element (PE) provides funds for cyber vulnerability assessments of critical elements of the Ballistic Missile Defense System (BMD) that Missile Defense Agency (MDA) is responsible for conducting, as directed by Sec. 16470 of the Fiscal Year 2017 National Defense Authorization Act.

Resources will be used for assessments and non-recurring engineering for mitigations for elements of the BMD system that MDA is responsible for conducting.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	0.000	3.400	0.000	-	0.000
Current President's Budget	0.000	3.400	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency					Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*		R-1 Program Element (Number/Name) PE 0606942C *I Assessments and Evaluations of Cyber Vulnerabilities*			
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0606942C / *Assessments and Evaluations of Cyber Vulnerabilities*	Project (Number/Name) MC39 / *Assessment and Evaluation of Cyber Vulnerabilities*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC39: *Assessment and Evaluation of Cyber Vulnerabilities*	-	0.000	3.400	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Pursuant to section 1647 of Public Law 114-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides $84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements. Missile Defense Agency (MDA) received $3.4 million in FY 2019 for Cyber Vulnerability Assessment and Mitigation.

A. Mission Description and Budget Item Justification

N/A

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: Cyber Vulnerabilities Testing	0.000	3.400	0.000
Articles:	-	-	-
Description: Pursuant to section 1647 of Public Law 114-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides $84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements. Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-328, *1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments. ***FY 2019 Plans:*** - Implement Cyber Vulnerability Assessment and Mitigation pursuant to Section 1647 of Public Law 114-92, the NDAA for FY 2016. - Plan, coordinate, and execute cyber activities in developmental and operational test environments as identified in the Integrated Master Test Plan for cyber activities.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0606942C / *Assessments and Evaluations of Cyber Vulnerabilities*	**Project (Number/Name)** MC39 / *Assessment and Evaluation of Cyber Vulnerabilities*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
- Continue to incorporate cybersecurity testing requirements into BMDS flight and ground test events; to include cyber planning requirements for GTD-07b (NORTHCOM/PACOM). - Develop efficiencies from lessons learned documented from prior cyber vulnerability assessments. ***FY 2020 Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.000	3.400	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0901598C / *Management HQ - MDA*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	197.372	29.947	28.626	27.065	-	27.065	27.446	28.164	28.698	29.271	Continuing	Continuing
MD38: *Management Headquarters*	197.372	29.947	28.626	27.065	-	27.065	27.446	28.164	28.698	29.271	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

The Management Headquarters Activity (MHA) Program Element (PE) 0901598C includes decreases in accordance with Department of Defense (DoD) reform efforts to maintain major headquarter activities' civilian staffing at reduced levels. DoD efforts to establish a common MHA framework resulted in a net funding decrease due to the transfer of civilian manpower performing functions MDA considered MHA in prior years. Funding and civilian manpower performing these non-MHA functions were appropriately transferred to Program Wide Support. Implementation of prior year efficiencies continues through FY 2020.

A. Mission Description and Budget Item Justification

As prescribed by DoD Instruction 5100.73 Major Headquarters Activities, MDA's Management Headquarters PE supports the operation of MDA's management headquarters activities. This program element funds government civilian salaries and benefits, travel, contract support services, and operations of non-fielded activities.

Management Headquarters Activities provide executive leadership planning, develop centralized agency policy, prepare and defend annual budget submissions, respond to external inquiries, and implement SECDEF and Presidential priorities. As a DoD research, development and acquisition agency, the Headquarters Activities provide cost efficient oversight, direction, and control of initiatives and processes that assure best value, high quality, on-time, and successful performance of MDA acquisition programs. This is accomplished by ensuring acquisition and procurement program management emphasizes systems engineering; incorporates life cycle management objectives; implements risk management; and assesses cost, schedule or performance trade-offs.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	29.947	28.626	27.276	-	27.276
Current President's Budget	29.947	28.626	27.065	-	27.065
Total Adjustments	0.000	0.000	-0.211	-	-0.211
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Missile Defense Agency				Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*		**R-1 Program Element (Number/Name)** PE 0901598C *I Management HQ - MDA*			
• Other Adjustment	0.000	0.000	-0.211	-	-0.211

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0901598C / *Management HQ - MDA*	Project (Number/Name) MD38 / *Management Headquarters*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD38: *Management Headquarters*	197.372	29.947	28.626	27.065	-	27.065	27.446	28.164	28.698	29.271	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The Management Headquarters Activity (MHA) Program Element (PE) 0901598C includes decreases in accordance with Department of Defense (DoD) reform efforts to maintain major headquarter activities' civilian staffing at reduced levels. DoD efforts to establish a common MHA framework resulted in a net funding decrease due to the transfer of civilian manpower performing functions MDA considered MHA in prior years. Implementation of prior year efficiencies continues through FY 2020.

A. Mission Description and Budget Item Justification

The MDA Headquarters provides oversight, direction and control over MDA's acquisition programs and fielded systems. The MDA Headquarters staff functions (government salaries, government travel, and contract support services) support the mission and operations of the world-wide MDA mission.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
Title: MHA Civilian Salaries	17.523	17.151	16.720
Articles:	-	-	-
Description: Provide mission support, oversight, and management of: - Acquisition, implementation of international initiatives to increase missile defense coverage to deployed forces and allies, efficiency-oriented administrative services, business operations, financial resources, human capitol, general counsel, internal review, public affairs, and media release. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** -SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: MHA Travel	0.990	0.990	0.925
Articles:	-	-	-
Description: Provide mission essential government travel.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0901598C / *Management HQ - MDA*	**Project (Number/Name)** MD38 / *Management Headquarters*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A			
Title: MHA Contract Services	11.434	10.485	9.420
Articles:	-	-	-
Description: Provide contract support services to mission activities for acquisition, business operations, internal review, general counsel, administrative support and public affairs. Specific and/or unique accomplishments to each FY are as follows: ***FY 2019 Plans:*** - SEE ABOVE. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY 2019 to FY 2020 reflects the reduction in contracted services required to support Management Headquarters activities.			
Accomplishments/Planned Programs Subtotals	29.947	28.626	27.065

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A