Department of Defense
Fiscal Year (FY) 2020 Budget Estimates

March 2019

Navy

Justification Book Volume 4 of 5

Research, Development, Test & Evaluation, Navy

Budget Activity 6

The estimated cost of this report for the Department of the Navy (DON) is $5,804.

The estimated total cost for supporting the DON budget justification material is approximately $1,803,116 for the 2019 fiscal year. This includes $81,351 in supplies and $1,721,765 in labor.

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Research, Development, Test and Evaluation, Navy

For expenses necessary for basic and applied scientific research, development, test and evaluation, including maintenance, rehabilitation, lease, and operation of facilities and equipment, $20,434,909,000 to remain available for obligation until September 30, 2021.

FY 2020 Overseas Contingency Operations funding can be separated into the following categories:

OCO for Direct War Costs ($37,000,000): OCO for Direct War costs are those combat or direct combat support costs that will not continue to be expended once combat operations end at major contingency locations.

OCO for Enduring Requirements ($127,410,000): OCO for Enduring Requirements are enduring in-theater and in-CONUS costs that will likely remain after combat operations cease, and have previously been funded in OCO.

OCO for Base Requirements ($0): OCO for Base Requirements is OCO funding for base budget requirements in support of the National Defense Strategy. The Budget requests these funds in OCO to comply with the base budget defense caps included in the Budget Control Act of 2011.

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

Appropriation	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
Research, Development, Test & Eval, Navy	18,465,332	18,490,002	167,812	18,657,814
Total Research, Development, Test & Evaluation	18,465,332	18,490,002	167,812	18,657,814

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

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, Navy	20,270,499		164,410	164,410	20,434,909
Total Research, Development, Test & Evaluation	20,270,499		164,410	164,410	20,434,909

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

Summary Recap of Budget Activities	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
Basic Research	604,634	679,772		679,772
Applied Research	975,419	1,018,795		1,018,795
Advanced Technology Development	900,071	851,710		851,710
Advanced Component Development & Prototypes	4,210,640	4,139,479	33,300	4,172,779
System Development & Demonstration	6,037,909	5,863,466	1,100	5,864,566
Management Support	1,388,936	1,023,070		1,023,070
Operational Systems Development	4,347,723	4,913,710	133,412	5,047,122
Total Research, Development, Test & Evaluation	18,465,332	18,490,002	167,812	18,657,814
Summary Recap of FYDP Programs				
Strategic Forces	192,820	240,310		240,310
General Purpose Forces	1,514,837	1,914,231	16,130	1,930,361
Intelligence and Communications	816,404	608,772		608,772
Research and Development	13,991,927	13,937,905	34,400	13,972,305
Central Supply and Maintenance	40,084	73,844		73,844
Administration and Associated Activities	1,820	1,579		1,579
Space	49,738	42,858		42,858
Classified Programs	1,857,702	1,670,503	117,282	1,787,785
Total Research, Development, Test & Evaluation	18,465,332	18,490,002	167,812	18,657,814

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

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)
Basic Research	605,978				605,978
Applied Research	936,453				936,453
Advanced Technology Development	742,210				742,210
Advanced Component Development & Prototypes	5,559,062		40,006	40,006	5,599,068
System Development & Demonstration	6,332,033		1,122	1,122	6,333,155
Management Support	990,464				990,464
Operational Systems Development	5,104,299		123,282	123,282	5,227,581
Total Research, Development, Test & Evaluation	20,270,499		164,410	164,410	20,434,909
Summary Recap of FYDP Programs					
Strategic Forces	239,019				239,019
General Purpose Forces	1,835,959		15,000	15,000	1,850,959
Intelligence and Communications	692,089				692,089
Research and Development	15,828,006		41,128	41,128	15,869,134
Central Supply and Maintenance	44,961				44,961
Administration and Associated Activities	1,460				1,460
Space	15,868				15,868
Classified Programs	1,613,137		108,282	108,282	1,721,419
Total Research, Development, Test & Evaluation	20,270,499		164,410	164,410	20,434,909

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

Summary Recap of Budget Activities	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted
Basic Research	604,634	679,772		679,772
Applied Research	975,419	1,018,795		1,018,795
Advanced Technology Development	900,071	851,710		851,710
Advanced Component Development & Prototypes	4,210,640	4,139,479	33,300	4,172,779
System Development & Demonstration	6,037,909	5,863,466	1,100	5,864,566
Management Support	1,388,936	1,023,070		1,023,070
Operational Systems Development	4,347,723	4,913,710	133,412	5,047,122
Total Research, Development, Test & Evaluation	18,465,332	18,490,002	167,812	18,657,814

Summary Recap of FYDP Programs				
Strategic Forces	192,820	240,310		240,310
General Purpose Forces	1,514,837	1,914,231	16,130	1,930,361
Intelligence and Communications	816,404	608,772		608,772
Research and Development	13,991,927	13,937,905	34,400	13,972,305
Central Supply and Maintenance	40,084	73,844		73,844
Administration and Associated Activities	1,820	1,579		1,579
Space	49,738	42,858		42,858
Classified Programs	1,857,702	1,670,503	117,282	1,787,785
Total Research, Development, Test & Evaluation	18,465,332	18,490,002	167,812	18,657,814

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

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)
Basic Research	605,978				605,978
Applied Research	936,453				936,453
Advanced Technology Development	742,210				742,210
Advanced Component Development & Prototypes	5,559,062		40,006	40,006	5,599,068
System Development & Demonstration	6,332,033		1,122	1,122	6,333,155
Management Support	990,464				990,464
Operational Systems Development	5,104,299		123,282	123,282	5,227,581
Total Research, Development, Test & Evaluation	20,270,499		164,410	164,410	20,434,909
Summary Recap of FYDP Programs					
Strategic Forces	239,019				239,019
General Purpose Forces	1,835,959		15,000	15,000	1,850,959
Intelligence and Communications	692,089				692,089
Research and Development	15,828,006		41,128	41,128	15,869,134
Central Supply and Maintenance	44,961				44,961
Administration and Associated Activities	1,460				1,460
Space	15,868				15,868
Classified Programs	1,613,137		108,282	108,282	1,721,419
Total Research, Development, Test & Evaluation	20,270,499		164,410	164,410	20,434,909

Department of the Navy
FY 2020 President's Budget
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Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
1	0601103N	University Research Initiatives	01	137,515	161,433		161,433	U
2	0601152N	In-House Laboratory Independent Research	01	19,035	19,237		19,237	U
3	0601153N	Defense Research Sciences	01	448,084	499,102		499,102	U
	Basic	Research		604,634	679,772		679,772	
4	0602114N	Power Projection Applied Research	02	23,028	27,643		27,643	U
5	0602123N	Force Protection Applied Research	02	182,614	180,549		180,549	U
6	0602131M	Marine Corps Landing Force Technology	02	54,526	63,212		63,212	U
7	0602235N	Common Picture Applied Research	02	35,846	36,348		36,348	U
8	0602236N	Warfighter Sustainment Applied Research	02	48,606	65,782		65,782	U
9	0602271N	Electromagnetic Systems Applied Research	02	83,640	76,497		76,497	U
10	0602435N	Ocean Warfighting Environment Applied Research	02	72,530	89,998		89,998	U
11	0602651M	Joint Non-Lethal Weapons Applied Research	02	6,230	6,299		6,299	U
12	0602747N	Undersea Warfare Applied Research	02	59,644	78,049		78,049	U
13	0602750N	Future Naval Capabilities Applied Research	02	147,219	137,701		137,701	U
14	0602782N	Mine and Expeditionary Warfare Applied Research	02	35,430	38,214		38,214	U
15	0602792N	Innovative Naval Prototypes (INP) Applied Research	02	160,884	154,085		154,085	U

Department of the Navy
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Appropriation: 1319N Research, Development, Test & Eval, Navy

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
1	0601103N	University Research Initiatives	01	116,850				116,850	U
2	0601152N	In-House Laboratory Independent Research	01	19,121				19,121	U
3	0601153N	Defense Research Sciences	01	470,007				470,007	U
	Basic	Research		605,978				605,978	
4	0602114N	Power Projection Applied Research	02	18,546				18,546	U
5	0602123N	Force Protection Applied Research	02	119,517				119,517	U
6	0602131M	Marine Corps Landing Force Technology	02	56,604				56,604	U
7	0602235N	Common Picture Applied Research	02	49,297				49,297	U
8	0602236N	Warfighter Sustainment Applied Research	02	63,825				63,825	U
9	0602271N	Electromagnetic Systems Applied Research	02	83,497				83,497	U
10	0602435N	Ocean Warfighting Environment Applied Research	02	63,894				63,894	U
11	0602651M	Joint Non-Lethal Weapons Applied Research	02	6,346				6,346	U
12	0602747N	Undersea Warfare Applied Research	02	57,075				57,075	U
13	0602750N	Future Naval Capabilities Applied Research	02	154,755				154,755	U
14	0602782N	Mine and Expeditionary Warfare Applied Research	02	36,074				36,074	U
15	0602792N	Innovative Naval Prototypes (INP) Applied Research	02	153,062				153,062	U

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Appropriation: 1319N Research, Development, Test & Eval, Navy

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
16	0602861N	Science and Technology Management - ONR Field Acitivities	02	65,222	64,418		64,418	U
		Applied Research		975,419	1,018,795		1,018,795	
17	0603123N	Force Protection Advanced Technology	03	52,785	32,615		32,615	U
18	0603271N	Electromagnetic Systems Advanced Technology	03	9,231	8,804		8,804	U
19	0603640M	USMC Advanced Technology Demonstration (ATD)	03	164,992	174,809		174,809	U
20	0603651M	Joint Non-Lethal Weapons Technology Development	03	13,090	13,313		13,313	U
21	0603673N	Future Naval Capabilities Advanced Technology Development	03	215,946	214,184		214,184	U
22	0603680N	Manufacturing Technology Program	03	66,173	58,657		58,657	U
23	0603729N	Warfighter Protection Advanced Technology	03	42,895	41,377		41,377	U
24	0603747N	Undersea Warfare Advanced Technology	03	9,657				U
25	0603758N	Navy Warfighting Experiments and Demonstrations	03	63,867	65,885		65,885	U
26	0603782N	Mine and Expeditionary Warfare Advanced Technology	03	14,826	39,672		39,672	U
27	0603801N	Innovative Naval Prototypes (INP) Advanced Technology Development	03	246,609	202,394		202,394	U
		Advanced Technology Development		900,071	851,710		851,710	
28	0603207N	Air/Ocean Tactical Applications	04	47,422	29,747		29,747	U
29	0603216N	Aviation Survivability	04	5,450	7,050		7,050	U

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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

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
16	0602861N	Science and Technology Management - ONR Field Acitivities	02	73,961				73,961	U
		Applied Research		936,453				936,453	
17	0603123N	Force Protection Advanced Technology	03	35,286				35,286	U
18	0603271N	Electromagnetic Systems Advanced Technology	03	9,499				9,499	U
19	0603640M	USMC Advanced Technology Demonstration (ATD)	03	172,847				172,847	U
20	0603651M	Joint Non-Lethal Weapons Technology Development	03	13,307				13,307	U
21	0603673N	Future Naval Capabilities Advanced Technology Development	03	231,907				231,907	U
22	0603680N	Manufacturing Technology Program	03	60,138				60,138	U
23	0603729N	Warfighter Protection Advanced Technology	03	4,849				4,849	U
24	0603747N	Undersea Warfare Advanced Technology	03						U
25	0603758N	Navy Warfighting Experiments and Demonstrations	03	67,739				67,739	U
26	0603782N	Mine and Expeditionary Warfare Advanced Technology	03	13,335				13,335	U
27	0603801N	Innovative Naval Prototypes (INP) Advanced Technology Development	03	133,303				133,303	U
		Advanced Technology Development		742,210				742,210	
28	0603207N	Air/Ocean Tactical Applications	04	32,643		2,400	2,400	35,043	U
29	0603216N	Aviation Survivability	04	11,919				11,919	U

Department of the Navy
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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
30	0603251N	Aircraft Systems	04	693	793		793	U
31	0603254N	ASW Systems Development	04	7,466	7,044		7,044	U
32	0603261N	Tactical Airborne Reconnaissance	04	3,692	3,540		3,540	U
33	0603382N	Advanced Combat Systems Technology	04	4,450	39,240		39,240	U
34	0603502N	Surface and Shallow Water Mine Countermeasures	04	69,906	120,348		120,348	U
35	0603506N	Surface Ship Torpedo Defense	04	24,174	7,100		7,100	U
36	0603512N	Carrier Systems Development	04	9,184	5,440		5,440	U
37	0603525N	PILOT FISH	04	111,278	136,533		136,533	U
38	0603527N	RETRACT LARCH	04	32,608	11,745	18,000	29,745	U
39	0603536N	RETRACT JUNIPER	04	126,210	113,679		113,679	U
40	0603542N	Radiological Control	04	716	740		740	U
41	0603553N	Surface ASW	04	1,092	1,122		1,122	U
42	0603561N	Advanced Submarine System Development	04	91,927	105,809		105,809	U
43	0603562N	Submarine Tactical Warfare Systems	04	13,597	12,374		12,374	U
44	0603563N	Ship Concept Advanced Design	04	23,856	74,603		74,603	U
45	0603564N	Ship Preliminary Design & Feasibility Studies	04	18,369	13,348		13,348	U
46	0603570N	Advanced Nuclear Power Systems	04	329,500	256,137		256,137	U
47	0603573N	Advanced Surface Machinery Systems	04	22,406	27,109		27,109	U
48	0603576N	CHALK EAGLE	04	188,927	29,353		29,353	U

Department of the Navy
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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

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
30	0603251N	Aircraft Systems	04	1,473				1,473	U
31	0603254N	ASW Systems Development	04	7,172				7,172	U
32	0603261N	Tactical Airborne Reconnaissance	04	3,419				3,419	U
33	0603382N	Advanced Combat Systems Technology	04	64,694				64,694	U
34	0603502N	Surface and Shallow Water Mine Countermeasures	04	507,000				507,000	U
35	0603506N	Surface Ship Torpedo Defense	04	15,800				15,800	U
36	0603512N	Carrier Systems Development	04	4,997				4,997	U
37	0603525N	PILOT FISH	04	291,148				291,148	U
38	0603527N	RETRACT LARCH	04	11,980		22,000	22,000	33,980	U
39	0603536N	RETRACT JUNIPER	04	129,163				129,163	U
40	0603542N	Radiological Control	04	689				689	U
41	0603553N	Surface ASW	04	1,137				1,137	U
42	0603561N	Advanced Submarine System Development	04	148,756				148,756	U
43	0603562N	Submarine Tactical Warfare Systems	04	11,192				11,192	U
44	0603563N	Ship Concept Advanced Design	04	81,846				81,846	U
45	0603564N	Ship Preliminary Design & Feasibility Studies	04	69,084				69,084	U
46	0603570N	Advanced Nuclear Power Systems	04	181,652				181,652	U
47	0603573N	Advanced Surface Machinery Systems	04	25,408				25,408	U
48	0603576N	CHALK EAGLE	04	64,877				64,877	U

Department of the Navy
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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
49	0603581N	Littoral Combat Ship (LCS)	04	49,308	37,997		37,997	U
50	0603582N	Combat System Integration	04	15,471	16,351		16,351	U
51	0603595N	Ohio Replacement	04	775,624	542,846		542,846	U
52	0603596N	LCS Mission Modules	04	100,470	103,559		103,559	U
53	0603597N	Automated Test and Analysis	04	24,145	37,931		37,931	U
54	0603599N	Frigate Development	04	137,655	132,775		132,775	U
55	0603609N	Conventional Munitions	04	13,699	9,307		9,307	U
56	0603635M	Marine Corps Ground Combat/Support System	04	771				U
57	0603654N	Joint Service Explosive Ordnance Development	04	77,409	47,857	13,900	61,757	U
58	0603713N	Ocean Engineering Technology Development	04	8,853	5,915		5,915	U
59	0603721N	Environmental Protection	04	23,237	19,811		19,811	U
60	0603724N	Navy Energy Program	04	42,425	32,656		32,656	U
61	0603725N	Facilities Improvement	04	2,794	5,301		5,301	U
62	0603734N	CHALK CORAL	04	237,402	267,477		267,477	U
63	0603739N	Navy Logistic Productivity	04	2,882	2,913		2,913	U
64	0603746N	RETRACT MAPLE	04	287,865	318,878		318,878	U
65	0603748N	LINK PLUMERIA	04	375,595	381,268		381,268	U
66	0603751N	RETRACT ELM	04	52,080	58,192		58,192	U
67	0603764N	LINK EVERGREEN	04	47,115				U

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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

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
49	0603581N	Littoral Combat Ship (LCS)	04	9,934				9,934	U
50	0603582N	Combat System Integration	04	17,251				17,251	U
51	0603595N	Ohio Replacement	04	419,051				419,051	U
52	0603596N	LCS Mission Modules	04	108,505				108,505	U
53	0603597N	Automated Test and Analysis	04	7,653				7,653	U
54	0603599N	Frigate Development	04	59,007				59,007	U
55	0603609N	Conventional Munitions	04	9,988				9,988	U
56	0603635M	Marine Corps Ground Combat/Support System	04	86,464				86,464	U
57	0603654N	Joint Service Explosive Ordnance Development	04	33,478		14,178	14,178	47,656	U
58	0603713N	Ocean Engineering Technology Development	04	5,619				5,619	U
59	0603721N	Environmental Protection	04	20,564				20,564	U
60	0603724N	Navy Energy Program	04	26,514				26,514	U
61	0603725N	Facilities Improvement	04	3,440				3,440	U
62	0603734N	CHALK CORAL	04	346,800				346,800	U
63	0603739N	Navy Logistic Productivity	04	3,857				3,857	U
64	0603746N	RETRACT MAPLE	04	258,519				258,519	U
65	0603748N	LINK PLUMERIA	04	403,909				403,909	U
66	0603751N	RETRACT ELM	04	63,434				63,434	U
67	0603764N	LINK EVERGREEN	04	184,110				184,110	U

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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
68	0603790N	NATO Research and Development	04	8,752	9,652		9,652	U
69	0603795N	Land Attack Technology	04	16,684	5,700	1,400	7,100	U
70	0603851M	Joint Non-Lethal Weapons Testing	04	23,934	27,581		27,581	U
71	0603860N	Joint Precision Approach and Landing Systems - Dem/Val	04	103,984	101,566		101,566	U
72	0603925N	Directed Energy and Electric Weapon Systems	04	92,856	142,814		142,814	U
73	0604014N	F/A -18 Infrared Search and Track (IRST)	04		108,689		108,689	U
74	0604027N	Digital Warfare Office	04	14,476	20,000		20,000	U
75	0604028N	Small and Medium Unmanned Undersea Vehicles	04		16,717		16,717	U
76	0604029N	Unmanned Undersea Vehicle Core Technologies	04		27,483		27,483	U
77	0604030N	Rapid Prototyping, Experimentation and Demonstration.	04	25,225	28,596		28,596	U
78	0604031N	Large Unmanned Undersea Vehicles	04	23,886	60,304		60,304	U
79	0604112N	Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80)	04	82,549	83,121		83,121	U
80	0604126N	Littoral Airborne MCM	04	11,314	14,625		14,625	U
81	0604127N	Surface Mine Countermeasures	04	12,525	15,527		15,527	U
82	0604272N	Tactical Air Directional Infrared Countermeasures (TADIRCM)	04	51,311	47,278		47,278	U
83	0604286M	Marine Corps Additive Manufacturing Technology Development	04	6,168				U

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68	0603790N	NATO Research and Development	04	7,697				7,697	U
69	0603795N	Land Attack Technology	04	9,086		1,428	1,428	10,514	U
70	0603851M	Joint Non-Lethal Weapons Testing	04	28,466				28,466	U
71	0603860N	Joint Precision Approach and Landing Systems - Dem/Val	04	51,341				51,341	U
72	0603925N	Directed Energy and Electric Weapon Systems	04	118,169				118,169	U
73	0604014N	F/A -18 Infrared Search and Track (IRST)	04	113,456				113,456	U
74	0604027N	Digital Warfare Office	04	50,120				50,120	U
75	0604028N	Small and Medium Unmanned Undersea Vehicles	04	32,527				32,527	U
76	0604029N	Unmanned Undersea Vehicle Core Technologies	04	54,376				54,376	U
77	0604030N	Rapid Prototyping, Experimentation and Demonstration.	04	36,197				36,197	U
78	0604031N	Large Unmanned Undersea Vehicles	04	68,310				68,310	U
79	0604112N	Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80)	04	121,310				121,310	U
80	0604126N	Littoral Airborne MCM	04	17,248				17,248	U
81	0604127N	Surface Mine Countermeasures	04	18,735				18,735	U
82	0604272N	Tactical Air Directional Infrared Countermeasures (TADIRCM)	04	68,346				68,346	U
83	0604286M	Marine Corps Additive Manufacturing Technology Development	04						U

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84	0604289M	Next Generation Logistics	04		6,073		6,073	U
85	0604320M	Rapid Technology Capability Prototype	04	16,443	7,107		7,107	U
86	0604454N	LX (R)	04	9,431	5,549		5,549	U
87	0604536N	Advanced Undersea Prototyping	04	64,038	112,669		112,669	U
88	0604636N	Counter Unmanned Aircraft Systems (C-UAS)	04					U
89	0604659N	Precision Strike Weapons Development Program	04	20,279	91,833		91,833	U
90	0604707N	Space and Electronic Warfare (SEW) Architecture/Engineering Support	04	41,214	7,230		7,230	U
91	0604786N	Offensive Anti-Surface Warfare Weapon Development	04	163,843	139,261		139,261	U
92	0303354N	ASW Systems Development - MIP	04	8,278	8,889		8,889	U
93	0304240M	Advanced Tactical Unmanned Aircraft System	04	5,200	17,561		17,561	U
94	0304240N	Advanced Tactical Unmanned Aircraft System	04		9,300		9,300	U
95	0304270N	Electronic Warfare Development - MIP	04	527	466		466	U
		Advanced Component Development & Prototypes		4,210,640	4,139,479	33,300	4,172,779	
96	0603208N	Training System Aircraft	05	16,343	12,798		12,798	U
97	0604212N	Other Helo Development	05	26,423	23,579		23,579	U
98	0604214M	AV-8B Aircraft - Eng Dev	05		46,363		46,363	U
99	0604214N	AV-8B Aircraft - Eng Dev	05	41,261				U

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84	0604289M	Next Generation Logistics	04	4,420				4,420	U
85	0604320M	Rapid Technology Capability Prototype	04	4,558				4,558	U
86	0604454N	LX (R)	04	12,500				12,500	U
87	0604536N	Advanced Undersea Prototyping	04	181,967				181,967	U
88	0604636N	Counter Unmanned Aircraft Systems (C-UAS)	04	5,500				5,500	U
89	0604659N	Precision Strike Weapons Development Program	04	718,148				718,148	U
90	0604707N	Space and Electronic Warfare (SEW) Architecture/Engineering Support	04	5,263				5,263	U
91	0604786N	Offensive Anti-Surface Warfare Weapon Development	04	65,419				65,419	U
92	0303354N	ASW Systems Development - MIP	04	9,991				9,991	U
93	0304240M	Advanced Tactical Unmanned Aircraft System	04	21,157				21,157	U
94	0304240N	Advanced Tactical Unmanned Aircraft System	04						U
95	0304270N	Electronic Warfare Development - MIP	04	609				609	U
		Advanced Component Development & Prototypes		5,559,062		40,006	40,006	5,599,068	
96	0603208N	Training System Aircraft	05	15,514				15,514	U
97	0604212N	Other Helo Development	05	28,835				28,835	U
98	0604214M	AV-8B Aircraft - Eng Dev	05	27,441				27,441	U
99	0604214N	AV-8B Aircraft - Eng Dev	05						U

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100	0604215N	Standards Development	05	2,711	3,771		3,771	U
101	0604216N	Multi-Mission Helicopter Upgrade Development	05	5,313	16,611		16,611	U
102	0604218N	Air/Ocean Equipment Engineering	05	5,583	15,582		15,582	U
103	0604221N	P-3 Modernization Program	05	1,331	2,134		2,134	U
104	0604230N	Warfare Support System	05	19,004	9,729		9,729	U
105	0604231N	Tactical Command System	05	37,609	54,300		54,300	U
106	0604234N	Advanced Hawkeye	05	283,497	210,565		210,565	U
107	0604245M	H-1 Upgrades	05		54,320		54,320	U
108	0604245N	H-1 Upgrades	05	59,806				U
109	0604261N	Acoustic Search Sensors	05	36,310	42,485		42,485	U
110	0604262N	V-22A	05	176,804	135,504		135,504	U
111	0604264N	Air Crew Systems Development	05	7,174	30,980		30,980	U
112	0604269N	EA-18	05	137,029	242,719		242,719	U
113	0604270N	Electronic Warfare Development	05	50,613	83,624		83,624	U
114	0604273M	Executive Helo Development	05		245,064		245,064	U
115	0604273N	Executive Helo Development	05	430,647				U
116	0604274N	Next Generation Jammer (NGJ)	05	584,538	449,429		449,429	U
117	0604280N	Joint Tactical Radio System - Navy (JTRS-Navy)	05	5,172	3,272		3,272	U
118	0604282N	Next Generation Jammer (NGJ) Increment II	05	55,194	93,482		93,482	U

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100	0604215N	Standards Development	05	3,642				3,642	U
101	0604216N	Multi-Mission Helicopter Upgrade Development	05	19,196				19,196	U
102	0604218N	Air/Ocean Equipment Engineering	05						U
103	0604221N	P-3 Modernization Program	05						U
104	0604230N	Warfare Support System	05	8,601				8,601	U
105	0604231N	Tactical Command System	05	77,232				77,232	U
106	0604234N	Advanced Hawkeye	05	232,752				232,752	U
107	0604245M	H-1 Upgrades	05	65,359				65,359	U
108	0604245N	H-1 Upgrades	05						U
109	0604261N	Acoustic Search Sensors	05	47,013				47,013	U
110	0604262N	V-22A	05	185,105				185,105	U
111	0604264N	Air Crew Systems Development	05	21,172				21,172	U
112	0604269N	EA-18	05	143,585				143,585	U
113	0604270N	Electronic Warfare Development	05	116,811				116,811	U
114	0604273M	Executive Helo Development	05	187,436				187,436	U
115	0604273N	Executive Helo Development	05						U
116	0604274N	Next Generation Jammer (NGJ)	05	524,261				524,261	U
117	0604280N	Joint Tactical Radio System - Navy (JTRS-Navy)	05	192,345				192,345	U
118	0604282N	Next Generation Jammer (NGJ) Increment II	05	111,068				111,068	U

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119	0604307N	Surface Combatant Combat System Engineering	05	340,760	379,116		379,116	U
120	0604311N	LPD-17 Class Systems Integration	05	665	939		939	U
121	0604329N	Small Diameter Bomb (SDB)	05	99,286	96,980		96,980	U
122	0604366N	Standard Missile Improvements	05	114,802	190,881		190,881	U
123	0604373N	Airborne MCM	05	15,203	8,351		8,351	U
124	0604378N	Naval Integrated Fire Control - Counter Air Systems Engineering	05	24,801	33,429		33,429	U
125	0604501N	Advanced Above Water Sensors	05	84,507	33,884		33,884	U
126	0604503N	SSN-688 and Trident Modernization	05	142,167	126,932		126,932	U
127	0604504N	Air Control	05	68,012	61,498		61,498	U
128	0604512N	Shipboard Aviation Systems	05	174,034	13,710		13,710	U
129	0604518N	Combat Information Center Conversion	05	4,294	19,263		19,263	U
130	0604522N	Air and Missile Defense Radar (AMDR) System	05	49,643	27,008		27,008	U
131	0604530N	Advanced Arresting Gear (AAG)	05		172,173		172,173	U
132	0604558N	New Design SSN	05	117,887	180,233		180,233	U
133	0604562N	Submarine Tactical Warfare System	05	44,703	80,324		80,324	U
134	0604567N	Ship Contract Design/ Live Fire T&E	05	65,857	71,062		71,062	U
135	0604574N	Navy Tactical Computer Resources	05	4,745	4,642		4,642	U
136	0604580N	Virginia Payload Module (VPM)	05	70,579				U
137	0604601N	Mine Development	05	24,640	21,747		21,747	U

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119	0604307N	Surface Combatant Combat System Engineering	05	415,625				415,625	U
120	0604311N	LPD-17 Class Systems Integration	05	640				640	U
121	0604329N	Small Diameter Bomb (SDB)	05	50,096				50,096	U
122	0604366N	Standard Missile Improvements	05	232,391				232,391	U
123	0604373N	Airborne MCM	05	10,916				10,916	U
124	0604378N	Naval Integrated Fire Control - Counter Air Systems Engineering	05	33,379				33,379	U
125	0604501N	Advanced Above Water Sensors	05	34,554				34,554	U
126	0604503N	SSN-688 and Trident Modernization	05	84,663				84,663	U
127	0604504N	Air Control	05	44,923				44,923	U
128	0604512N	Shipboard Aviation Systems	05	10,632				10,632	U
129	0604518N	Combat Information Center Conversion	05	16,094				16,094	U
130	0604522N	Air and Missile Defense Radar (AMDR) System	05	55,349				55,349	U
131	0604530N	Advanced Arresting Gear (AAG)	05	123,490				123,490	U
132	0604558N	New Design SSN	05	121,010				121,010	U
133	0604562N	Submarine Tactical Warfare System	05	62,426				62,426	U
134	0604567N	Ship Contract Design/ Live Fire T&E	05	46,809				46,809	U
135	0604574N	Navy Tactical Computer Resources	05	3,692				3,692	U
136	0604580N	Virginia Payload Module (VPM)	05						U
137	0604601N	Mine Development	05	28,964				28,964	U

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138	0604610N	Lightweight Torpedo Development	05	21,057	63,147		63,147	U
139	0604654N	Joint Service Explosive Ordnance Development	05	7,449	7,107		7,107	U
140	0604657M	USMC Ground Combat/Supporting Arms Systems - Eng Dev	05					U
141	0604703N	Personnel, Training, Simulation, and Human Factors	05	24,229	6,539		6,539	U
142	0604727N	Joint Standoff Weapon Systems	05	418	441		441	U
143	0604755N	Ship Self Defense (Detect & Control)	05	160,475	180,391	1,100	181,491	U
144	0604756N	Ship Self Defense (Engage: Hard Kill)	05	214,132	193,244		193,244	U
145	0604757N	Ship Self Defense (Engage: Soft Kill/EW)	05	126,037	120,210		120,210	U
146	0604761N	Intelligence Engineering	05	44,855	25,965		25,965	U
147	0604771N	Medical Development	05	36,392	38,095		38,095	U
148	0604777N	Navigation/ID System	05	74,984	126,026		126,026	U
149	0604800M	Joint Strike Fighter (JSF) - EMD	05	157,162	66,566		66,566	U
150	0604800N	Joint Strike Fighter (JSF) - EMD	05	105,648	65,494		65,494	U
151	0604810M	Joint Strike Fighter Follow On Modernization (FoM) - Marine Corps	05	139,369				U
152	0604810N	Joint Strike Fighter Follow On Modernization (FoM) - Navy	05	138,308				U
153	0605013M	Information Technology Development	05	14,497	11,030		11,030	U
154	0605013N	Information Technology Development	05	120,387	242,110		242,110	U

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138	0604610N	Lightweight Torpedo Development	05	148,349				148,349	U
139	0604654N	Joint Service Explosive Ordnance Development	05	8,237				8,237	U
140	0604657M	USMC Ground Combat/Supporting Arms Systems - Eng Dev	05	22,000				22,000	U
141	0604703N	Personnel, Training, Simulation, and Human Factors	05	5,500				5,500	U
142	0604727N	Joint Standoff Weapon Systems	05	18,725				18,725	U
143	0604755N	Ship Self Defense (Detect & Control)	05	192,603		1,122	1,122	193,725	U
144	0604756N	Ship Self Defense (Engage: Hard Kill)	05	137,268				137,268	U
145	0604757N	Ship Self Defense (Engage: Soft Kill/EW)	05	97,363				97,363	U
146	0604761N	Intelligence Engineering	05	26,710				26,710	U
147	0604771N	Medical Development	05	8,181				8,181	U
148	0604777N	Navigation/ID System	05	40,755				40,755	U
149	0604800M	Joint Strike Fighter (JSF) - EMD	05	1,710				1,710	U
150	0604800N	Joint Strike Fighter (JSF) - EMD	05	1,490				1,490	U
151	0604810M	Joint Strike Fighter Follow On Modernization (FoM) - Marine Corps	05						U
152	0604810N	Joint Strike Fighter Follow On Modernization (FoM) - Navy	05						U
153	0605013M	Information Technology Development	05	1,494				1,494	U
154	0605013N	Information Technology Development	05	384,162				384,162	U

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155	0605024N	Anti-Tamper Technology Support	05	3,900	5,618		5,618	U
156	0605212M	CH-53K RDTE	05		336,945		336,945	U
157	0605212N	CH-53K RDTE	05	329,367				U
158	0605215N	Mission Planning	05	36,108	32,714		32,714	U
159	0605217N	Common Avionics	05	47,338	51,486		51,486	U
160	0605220N	Ship to Shore Connector (SSC)	05	31,583	1,444		1,444	U
161	0605327N	T-AO 205 Class	05	1,895	1,298		1,298	U
162	0605414N	Unmanned Carrier Aviation (UCA)	05	194,176	518,942		518,942	U
163	0605450M	Joint Air-to-Ground Missile (JAGM)	05		16,559		16,559	U
164	0605450N	Joint Air-to-Ground Missile (JAGM)	05	14,457				U
165	0605500N	Multi-mission Maritime Aircraft (MMA)	05	11,422	34,196		34,196	U
166	0605504N	Multi-Mission Maritime (MMA) Increment III	05	123,752	163,809		163,809	U
167	0605611M	Marine Corps Assault Vehicles System Development & Demonstration	05	150,381	66,137		66,137	U
168	0605813M	Joint Light Tactical Vehicle (JLTV) System Development & Demonstration	05	19,467				U
169	0204202N	DDG-1000	05	134,664	140,264		140,264	U
170	0303267N	Auctioned Spectrum Relocation Fund***	05	97,558				U
171	0303467N	SENSR Spectrum Pipeline SRF***	05	1,773				U
172	0304785N	Tactical Cryptologic Systems	05	22,762	42,398		42,398	U

***Funding in this Program Element was transferred during the year of execution from the Spectrum Relocation Fund (SRF) in support of the Advanced Wireless Services 3 (AWS-3) auction and is associated with the reallocation or sharing of the 1755-1780 MHz and 1695-1710 MHz bands. The SRF is administered by the Office of Management and Budget (OMB), which approves SRF transfers to federal agencies on an annual basis in consultation with the National Telecommunications and Information Administration (NTIA).

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155	0605024N	Anti-Tamper Technology Support	05	4,882				4,882	U
156	0605212M	CH-53K RDTE	05	516,955				516,955	U
157	0605212N	CH-53K RDTE	05						U
158	0605215N	Mission Planning	05	75,886				75,886	U
159	0605217N	Common Avionics	05	43,187				43,187	U
160	0605220N	Ship to Shore Connector (SSC)	05	4,909				4,909	U
161	0605327N	T-AO 205 Class	05	1,682				1,682	U
162	0605414N	Unmanned Carrier Aviation (UCA)	05	671,258				671,258	U
163	0605450M	Joint Air-to-Ground Missile (JAGM)	05	18,393				18,393	U
164	0605450N	Joint Air-to-Ground Missile (JAGM)	05						U
165	0605500N	Multi-mission Maritime Aircraft (MMA)	05	21,472				21,472	U
166	0605504N	Multi-Mission Maritime (MMA) Increment III	05	177,234				177,234	U
167	0605611M	Marine Corps Assault Vehicles System Development & Demonstration	05	77,322				77,322	U
168	0605813M	Joint Light Tactical Vehicle (JLTV) System Development & Demonstration	05	2,105				2,105	U
169	0204202N	DDG-1000	05	111,435				111,435	U
170	0303267N	Auctioned Spectrum Relocation Fund***	05						U
171	0303467N	SENSR Spectrum Pipeline SRF***	05						U
172	0304785N	Tactical Cryptologic Systems	05	101,339				101,339	U

***Funding in this Program Element was transferred during the year of execution from the Spectrum Relocation Fund (SRF) in support of the Advanced Wireless Services 3 (AWS-3) auction and is associated with the reallocation or sharing of the 1755-1780 MHz and 1695-1710 MHz bands. The SRF is administered by the Office of Management and Budget (OMB), which approves SRF transfers to federal agencies on an annual basis in consultation with the National Telecommunications and Information Administration (NTIA).

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173	0306250M	Cyber Operations Technology Development	05	2,960	6,808		6,808	U
		System Development & Demonstration		6,037,909	5,863,466	1,100	5,864,566	
174	0604256N	Threat Simulator Development	06	89,491	94,576		94,576	U
175	0604258N	Target Systems Development	06	18,737	10,981		10,981	U
176	0604759N	Major T&E Investment	06	68,977	90,514		90,514	U
177	0605126N	Joint Theater Air and Missile Defense Organization	06	140	48		48	U
178	0605152N	Studies and Analysis Support - Navy	06	4,438	3,942		3,942	U
179	0605154N	Center for Naval Analyses	06	44,302	42,693		42,693	U
180	0605285N	Next Generation Fighter	06		5,000		5,000	U
181	0605502N	Small Business Innovative Research	06	407,133				U
182	0605804N	Technical Information Services	06	1,280	1,029		1,029	U
183	0605853N	Management, Technical & International Support	06	135,102	86,932		86,932	U
184	0605856N	Strategic Technical Support	06	3,909	4,231		4,231	U
185	0605861N	RDT&E Science and Technology Management	06	1,104	1,072		1,072	U
186	0605863N	RDT&E Ship and Aircraft Support	06	105,019	97,471		97,471	U
187	0605864N	Test and Evaluation Support	06	369,056	373,834		373,834	U
188	0605865N	Operational Test and Evaluation Capability	06	20,298	21,554		21,554	U

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173	0306250M	Cyber Operations Technology Development	05	26,406				26,406	U
		System Development & Demonstration		6,332,033		1,122	1,122	6,333,155	
174	0604256N	Threat Simulator Development	06	66,678				66,678	U
175	0604258N	Target Systems Development	06	12,027				12,027	U
176	0604759N	Major T&E Investment	06	85,348				85,348	U
177	0605126N	Joint Theater Air and Missile Defense Organization	06						U
178	0605152N	Studies and Analysis Support - Navy	06	3,908				3,908	U
179	0605154N	Center for Naval Analyses	06	47,669				47,669	U
180	0605285N	Next Generation Fighter	06	20,698				20,698	U
181	0605502N	Small Business Innovative Research	06						U
182	0605804N	Technical Information Services	06	988				988	U
183	0605853N	Management, Technical & International Support	06	102,401				102,401	U
184	0605856N	Strategic Technical Support	06	3,742				3,742	U
185	0605861N	RDT&E Science and Technology Management	06						U
186	0605863N	RDT&E Ship and Aircraft Support	06	93,872				93,872	U
187	0605864N	Test and Evaluation Support	06	394,020				394,020	U
188	0605865N	Operational Test and Evaluation Capability	06	25,145				25,145	U

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Line No	Program Element Number	Item	Act	FY 2018 (Base + OCO)	FY 2019 Base Enacted	FY 2019 OCO Enacted	FY 2019 Total Enacted	Sec
189	0605866N	Navy Space and Electronic Warfare (SEW) Support	06	16,274	16,227		16,227	U
190	0605867N	SEW Surveillance/Reconnaissance Support	06					U
191	0605873M	Marine Corps Program Wide Support	06	21,423	21,538		21,538	U
192	0605898N	Management HQ - R&D	06	43,266	41,765		41,765	U
193	0606355N	Warfare Innovation Management	06	27,759	41,918		41,918	U
194	0606942M	Assessments and Evaluations Cyber Vulnerabilities	06		7,000		7,000	U
195	0606942N	Assessments and Evaluations Cyber Vulnerabilities	06		48,800		48,800	U
196	0305327N	Insider Threat	06		1,682		1,682	U
197	0902498N	Management Headquarters (Departmental Support Activities)	06	1,749	1,579		1,579	U
198	0909999N	Financing for Cancelled Account Adjustments	06	71				U
199	1206867N	SEW Surveillance/Reconnaissance Support	06	9,408	8,684		8,684	U
		Management Support		1,388,936	1,023,070		1,023,070	
201	0604014N	F/A -18 Infrared Search and Track (IRST)	07	68,087				U
202	0604227N	HARPOON Modifications	07		5,197		5,197	U
203	0604840M	F-35 C2D2	07		234,107		234,107	U
204	0604840N	F-35 C2D2	07		227,998		227,998	U

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189	0605866N	Navy Space and Electronic Warfare (SEW) Support	06	15,773				15,773	U
190	0605867N	SEW Surveillance/Reconnaissance Support	06	8,402				8,402	U
191	0605873M	Marine Corps Program Wide Support	06	37,265				37,265	U
192	0605898N	Management HQ - R&D	06	39,673				39,673	U
193	0606355N	Warfare Innovation Management	06	28,750				28,750	U
194	0606942M	Assessments and Evaluations Cyber Vulnerabilities	06						U
195	0606942N	Assessments and Evaluations Cyber Vulnerabilities	06						U
196	0305327N	Insider Threat	06	2,645				2,645	U
197	0902498N	Management Headquarters (Departmental Support Activities)	06	1,460				1,460	U
198	0909999N	Financing for Cancelled Account Adjustments	06						U
199	1206867N	SEW Surveillance/Reconnaissance Support	06						U
		Management Support		990,464				990,464	
201	0604014N	F/A -18 Infrared Search and Track (IRST)	07						U
202	0604227N	HARPOON Modifications	07	2,302				2,302	U
203	0604840M	F-35 C2D2	07	422,881				422,881	U
204	0604840N	F-35 C2D2	07	383,741				383,741	U

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205	0607658N	Cooperative Engagement Capability (CEC)	07	88,088	128,815		128,815	U
206	0607700N	Deployable Joint Command and Control	07	3,093	3,127		3,127	U
207	0101221N	Strategic Sub & Weapons System Support	07	130,652	148,379		148,379	U
208	0101224N	SSBN Security Technology Program	07	35,105	41,959		41,959	U
209	0101226N	Submarine Acoustic Warfare Development	07	9,439	11,311		11,311	U
210	0101402N	Navy Strategic Communications	07	17,624	38,661		38,661	U
211	0204136N	F/A-18 Squadrons	07	133,544	204,886		204,886	U
212	0204163N	Fleet Telecommunications (Tactical)	07	8,465	1,344		1,344	U
213	0204228N	Surface Support	07	20,587	9,708		9,708	U
214	0204229N	Tomahawk and Tomahawk Mission Planning Center (TMPC)	07	100,011	252,395		252,395	U
215	0204311N	Integrated Surveillance System	07	55,164	71,959		71,959	U
216	0204313N	Ship-Towed Array Surveillance Systems	07		15,454		15,454	U
217	0204413N	Amphibious Tactical Support Units (Displacement Craft)	07	2,346	6,073		6,073	U
218	0204460M	Ground/Air Task Oriented Radar (G/ ATOR)	07	53,605	44,579		44,579	U
219	0204571N	Consolidated Training Systems Development	07	64,585	104,903		104,903	U
220	0204574N	Cryptologic Direct Support	07	2,355	4,544		4,544	U

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205	0607658N	Cooperative Engagement Capability (CEC)	07	127,924				127,924	U
206	0607700N	Deployable Joint Command and Control	07						U
207	0101221N	Strategic Sub & Weapons System Support	07	157,676				157,676	U
208	0101224N	SSBN Security Technology Program	07	43,354				43,354	U
209	0101226N	Submarine Acoustic Warfare Development	07	6,815				6,815	U
210	0101402N	Navy Strategic Communications	07	31,174				31,174	U
211	0204136N	F/A-18 Squadrons	07	213,715				213,715	U
212	0204163N	Fleet Telecommunications (Tactical)	07						U
213	0204228N	Surface Support	07	36,389				36,389	U
214	0204229N	Tomahawk and Tomahawk Mission Planning Center (TMPC)	07	320,134				320,134	U
215	0204311N	Integrated Surveillance System	07	88,382				88,382	U
216	0204313N	Ship-Towed Array Surveillance Systems	07	14,449				14,449	U
217	0204413N	Amphibious Tactical Support Units (Displacement Craft)	07	6,931				6,931	U
218	0204460M	Ground/Air Task Oriented Radar (G/ATOR)	07	23,891				23,891	U
219	0204571N	Consolidated Training Systems Development	07	129,873				129,873	U
220	0204574N	Cryptologic Direct Support	07						U

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221	0204575N	Electronic Warfare (EW) Readiness Support	07	49,094	66,889		66,889	U
222	0205601N	HARM Improvement	07	70,415	120,762		120,762	U
223	0205604N	Tactical Data Links	07	75,523	88,979		88,979	U
224	0205620N	Surface ASW Combat System Integration	07	28,410	26,321		26,321	U
225	0205632N	MK-48 ADCAP	07	48,740	68,255		68,255	U
226	0205633N	Aviation Improvements	07	120,940	134,823		134,823	U
227	0205675N	Operational Nuclear Power Systems	07	127,445	117,028		117,028	U
228	0206313M	Marine Corps Communications Systems	07	170,529	172,683	16,130	188,813	U
229	0206335M	Common Aviation Command and Control System (CAC2S)	07	6,976	4,760		4,760	U
230	0206623M	Marine Corps Ground Combat/ Supporting Arms Systems	07	68,941	100,850		100,850	U
231	0206624M	Marine Corps Combat Services Support	07	24,915	29,905		29,905	U
232	0206625M	USMC Intelligence/Electronic Warfare Systems (MIP)	07	30,630	37,821		37,821	U
233	0206629M	Amphibious Assault Vehicle	07	53,404	20,690		20,690	U
234	0207161N	Tactical AIM Missiles	07	34,063	40,121		40,121	U
235	0207163N	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	29,486	28,235		28,235	U
239	0303109N	Satellite Communications (SPACE)	07					U
240	0303138N	Consolidated Afloat Network Enterprise Services (CANES)	07	24,197	23,697		23,697	U

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221	0204575N	Electronic Warfare (EW) Readiness Support	07	82,325				82,325	U
222	0205601N	HARM Improvement	07	138,431				138,431	U
223	0205604N	Tactical Data Links	07						U
224	0205620N	Surface ASW Combat System Integration	07	29,572				29,572	U
225	0205632N	MK-48 ADCAP	07	85,973				85,973	U
226	0205633N	Aviation Improvements	07	125,461				125,461	U
227	0205675N	Operational Nuclear Power Systems	07	106,192				106,192	U
228	0206313M	Marine Corps Communications Systems	07	143,317		15,000	15,000	158,317	U
229	0206335M	Common Aviation Command and Control System (CAC2S)	07	4,489				4,489	U
230	0206623M	Marine Corps Ground Combat/ Supporting Arms Systems	07	51,788				51,788	U
231	0206624M	Marine Corps Combat Services Support	07	37,761				37,761	U
232	0206625M	USMC Intelligence/Electronic Warfare Systems (MIP)	07	21,458				21,458	U
233	0206629M	Amphibious Assault Vehicle	07	5,476				5,476	U
234	0207161N	Tactical AIM Missiles	07	19,488				19,488	U
235	0207163N	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	39,029				39,029	U
239	0303109N	Satellite Communications (SPACE)	07	34,344				34,344	U
240	0303138N	Consolidated Afloat Network Enterprise Services (CANES)	07	22,873				22,873	U

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241	0303140N	Information Systems Security Program	07	49,310	44,228		44,228	U
243	0305192N	Military Intelligence Program (MIP) Activities	07	6,934	6,081		6,081	U
244	0305204N	Tactical Unmanned Aerial Vehicles	07	7,770	8,529		8,529	U
245	0305205N	UAS Integration and Interoperability	07	20,848	24,663		24,663	U
246	0305208M	Distributed Common Ground/Surface Systems	07	13,338	7,610		7,610	U
247	0305208N	Distributed Common Ground/Surface Systems	07	40,150	42,846		42,846	U
248	0305220N	MQ-4C Triton	07	94,115	14,395		14,395	U
249	0305231N	MQ-8 UAV	07	62,656	24,143		24,143	U
250	0305232M	RQ-11 UAV	07	2,002	524		524	U
251	0305234N	Small (Level 0) Tactical UAS (STUASL0)	07	4,827	5,265		5,265	U
252	0305239M	RQ-21A	07	10,500	6,000		6,000	U
253	0305241N	Multi-Intelligence Sensor Development	07	93,020	81,231		81,231	U
254	0305242M	Unmanned Aerial Systems (UAS) Payloads (MIP)	07	18,392	5,956		5,956	U
255	0305421N	RQ-4 Modernization	07	224,249	219,403		219,403	U
256	0308601N	Modeling and Simulation Support	07	5,038	7,097		7,097	U
257	0702207N	Depot Maintenance (Non-IF)	07	35,463	46,560		46,560	U
258	0708730N	Maritime Technology (MARITECH)	07	4,621	27,284		27,284	U

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241	0303140N	Information Systems Security Program	07	41,853				41,853	U
243	0305192N	Military Intelligence Program (MIP) Activities	07	8,913				8,913	U
244	0305204N	Tactical Unmanned Aerial Vehicles	07	9,451				9,451	U
245	0305205N	UAS Integration and Interoperability	07	42,315				42,315	U
246	0305208M	Distributed Common Ground/Surface Systems	07	22,042				22,042	U
247	0305208N	Distributed Common Ground/Surface Systems	07						U
248	0305220N	MQ-4C Triton	07	11,784				11,784	U
249	0305231N	MQ-8 UAV	07	29,618				29,618	U
250	0305232M	RQ-11 UAV	07	509				509	U
251	0305234N	Small (Level 0) Tactical UAS (STUASL0)	07	11,545				11,545	U
252	0305239M	RQ-21A	07	10,914				10,914	U
253	0305241N	Multi-Intelligence Sensor Development	07	70,612				70,612	U
254	0305242M	Unmanned Aerial Systems (UAS) Payloads (MIP)	07	3,704				3,704	U
255	0305421N	RQ-4 Modernization	07	202,346				202,346	U
256	0308601N	Modeling and Simulation Support	07	7,119				7,119	U
257	0702207N	Depot Maintenance (Non-IF)	07	38,182				38,182	U
258	0708730N	Maritime Technology (MARITECH)	07	6,779				6,779	U

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259	1203109N	Satellite Communications (SPACE)	07	40,330	34,174		34,174	U
9999	9999999999	Classified Programs		1,857,702	1,670,503	117,282	1,787,785	U
		Operational Systems Development		4,347,723	4,913,710	133,412	5,047,122	
Total Research, Development, Test & Eval, Navy				18,465,332	18,490,002	167,812	18,657,814	

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259	1203109N	Satellite Communications (SPACE)	07	15,868				15,868	U
9999	9999999999	Classified Programs		1,613,137		108,282	108,282	1,721,419	U
		Operational Systems Development		5,104,299		123,282	123,282	5,227,581	
Total Research, Development, Test & Eval, Navy				20,270,499		164,410	164,410	20,434,909	

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14	02	0602782N	Mine & Exp Warfare Applied Res	Volume 1 - 225
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21	03	0603673N	(U)Future Naval Capabilities Advanced Tech Dev	Volume 1 - 309
22	03	0603680N	(U)Manufacturing Technology Program	Volume 1 - 325
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JT Precision Approach & Ldg Sys	0603860N	71	04	Volume 2 - 991
JT Service EOD	0604654N	139	05	Volume 3 - 1159
JT Service Explosive Ordn Dev	0603654N	57	04	Volume 2 - 735
JT Strike Fighter (JSF) - EMD	0604800N	150	05	Volume 3 - 1459
JT Tact Radio Sys (JTRS)	0604280N	117	05	Volume 3 - 533
Joint Air-to-ground Missile (JAGM)	0605450M	163	05	Volume 3 - 1867
Joint Air-to-ground Missile (JAGM)	0605450N	164	05	Volume 3 - 1883
Joint Non-Lethal Weapons Testing	0603851M	70	04	Volume 2 - 979
Joint Standoff Weapon Systems	0604727N	142	05	Volume 3 - 1191
LPD-17 Class Systems Integration	0604311N	120	05	Volume 3 - 683
Land Attack Tech	0603795N	69	04	Volume 2 - 955
Lightweight Torpedo Development	0604610N	138	05	Volume 3 - 1133
MC Advanced Technology Demo	0603640M	19	03	Volume 1 - 273
MC Ground Cmbt Spt Arms Sys	0206623M	230	07	Volume 5 - 809
MK-48 ADCAP	0205632N	225	07	Volume 5 - 539
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Marine Corps Comms Systems	0206313M	228	07	Volume 5 - 619
Marine Corps Grnd Cmbt/Supt Sys	0603635M	56	04	Volume 2 - 709
Marine Corps IT Dev/Mod	0605013M	153	05	Volume 3 - 1515
Marine Corps Lndg Force Tech	0602131M	6	02	Volume 1 - 105
Marine Corps Program Wide Supt	0605873M	191	06	Volume 4 - 239
Maritime Tech (MARITECH)	0708730N	258	07	Volume 5 - 1377
Medical Development	0604771N	147	05	Volume 3 - 1365
Mine & Exp Warfare Applied Res	0602782N	14	02	Volume 1 - 225
Mine Development	0604601N	137	05	Volume 3 - 1115
Mine and Expeditionary Warfare Advanced Technology	0603782N	26	03	Volume 1 - 353
Modeling & Simulation Support	0308601N	256	07	Volume 5 - 1331
Multi-Mssn Helicopter Upgrade Dev	0604216N	101	05	Volume 3 - 85
Multi-mssn Maritime Aircraft (MMA) (P-8A)	0605500N	165	05	Volume 3 - 1893
NATO Research and Deve	0603790N	68	04	Volume 2 - 945
Nav Integrated Fire Control-Counter Air Sys Eng	0604378N	124	05	Volume 3 - 771
Navigation/Id System	0604777N	148	05	Volume 3 - 1381

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Navy Space & Electr Warfare Supt	0605866N	189	06	Volume 4 - 221
Navy Strategic Comms	0101402N	210	07	Volume 5 - 145
Navy Tactical Computer Resources	0604574N	135	05	Volume 3 - 1095
Navy Warfighting Exp & Demo	0603758N	25	03	Volume 1 - 345
New Design SSN	0604558N	132	05	Volume 3 - 991
Next Generation Jammer (NGJ)	0604274N	116	05	Volume 3 - 519
Ocean Engineering Tech Dev	0603713N	58	04	Volume 2 - 781
Ocean Wrfghtg Env Applied Res	0602435N	10	02	Volume 1 - 173
Operational Test & Eval Capability	0605865N	188	06	Volume 4 - 215
Other Helicopter Development	0604212N	97	05	Volume 3 - 25
P-3 Modernization Program	0604221N	103	05	Volume 3 - 125
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Power Proj Applied Research	0602114N	4	02	Volume 1 - 73
RDT&E Science & Tech Mgmt	0605861N	185	06	Volume 4 - 167
RDT&E Ship & Aircraft Support	0605863N	186	06	Volume 4 - 171
RQ-11 UAV	0305232M	250	07	Volume 5 - 1245
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Ship Contract Design/ Live Fire T&E	0604567N	134	05	Volume 3 - 1045
Ship Prel Design & Feasibility Studies	0603564N	45	04	Volume 2 - 483
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Shipboard Aviation Systems	0604512N	128	05	Volume 3 - 929
Small Business Innovative Research	0605502N	181	06	Volume 4 - 65
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Surface ASW	0603553N	41	04	Volume 2 - 329
Surface ASW Cmbt Sys Integr	0205620N	224	07	Volume 5 - 525
Surface Combatant Cmbt Sys Eng	0604307N	119	05	Volume 3 - 633
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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604256N *I Threat Simulator 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	0.000	89.491	94.576	66.678	-	66.678	29.986	29.109	29.238	29.843	Continuing	Continuing
0602: *Eletronics W/F Env Simulation (ECHO)*	0.000	74.630	80.936	54.241	-	54.241	14.430	13.901	14.339	14.626	Continuing	Continuing
0672: *Effect Nav E/W (ENEWS)*	0.000	14.861	13.640	12.437	-	12.437	15.556	15.208	14.899	15.217	Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a continuing program that consolidates the design, fabrication and integration of Naval Electronic Warfare (EW) threat simulators for increased managerial emphasis and coordination. These simulator development efforts provide realistic Developmental and Operational Test and Evaluation environments to test EW systems and defensive tactics. These projects develop threat Anti-Air and Anti-Ship weapon system simulators in accordance with the Services' requirements.

The 0602 Project, Electronic Warfare Environment Simulation, directly supports the Test and Evaluation resource requirements for all Naval Air EW development programs to include multi-spectral situational awareness and countermeasures. Programs in development and future programs include: Joint Strike Fighter, EA-18G, Low Band Transmitter, Next Generation Jammer, Advanced Anti-Radiation Guided Missile (AARGM), Long Range Anti-Ship Missile (LRASM), and Triton.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	91.819	94.576	69.602	-	69.602
Current President's Budget	89.491	94.576	66.678	-	66.678
Total Adjustments	-2.328	0.000	-2.924	-	-2.924
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.328	0.000			
• Program Adjustments	0.000	0.000	-2.924	-	-2.924
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604256N *I Threat Simulator Development*

Change Summary Explanation

The funding decrease from FY 2019 to FY 2020 due to the completion of the beam measurement system in FY 2019 for NAWCAD and NAWCWD. Additionally, it reflects the purchase of the final L-Band radar signal emulators occurs in FY 2019 with the purchase of spare parts and logistical equipment in FY 2020 for NAWCWD.

The FY 2020 request was reduced by $1.924 million to reflect the availability of prior year execution balances.

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604256N / *Threat Simulator Development*	Project (Number/Name) 0602 / *Eletronics W/F Env Simulation (ECHO)*	

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
0602: *Eletronics W/F Env Simulation (ECHO)*	0.000	74.630	80.936	54.241	-	54.241	14.430	13.901	14.339	14.626	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The objective of this project is development of necessary simulation facilities and approaches to allow determination of the effectiveness of Electronic Warfare (EW) in real world engagement situations and to support the introduction of modern, effective systems into Naval Aviation. The heavy use of test resources by all Services demonstrates the importance of these assets.

The Electronic Warfare Environment Simulation project is unique because it is the only program within the Department of Defense which develops and provides Naval anti-air warfare threat assets for Test and Evaluation (T&E).

This project directly supports the T&E resource requirements for all Naval Air EW development programs, to include multi-spectral situational awareness and countermeasures. Programs in development and future programs include: Joint Strike Fighter, EA-18G, Low Band Transmitter, Next Generation Jammer, Advanced Anti-Radiation Guided Missile (AARGM), Long Range Anti-Ship Missile (LRASM), and Triton.

This project provides for the development of an Integrated Air Defense T&E capability to be fielded at each of the three sites comprising the Navy's Tri-Center complex: Naval Air Warfare Center Weapons Division, China Lake and Point Mugu in CA, and Naval Air Warfare Center Aircraft Division, Patuxent River, MD.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: REQUIREMENTS AND VALIDATION	0.775	0.590	0.590	0.000	0.590
Articles:	-	-	-	-	-
Description: Validate and track intel updates of the threat systems necessary for the operation and continuous improvement of Navy laboratories and ranges which provide engineering support, testing and analysis to the developers, integrators, testers and users of systems and technologies that counter or penetrate air defenses.					
FY 2019 Plans: - Continue to provide program management, systems engineering, and requirements identification for the development of simulators and foreign material acquisition. - Continue to validate simulators and stimulators at the Navy tri-lab centers.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0602 / *Eletronics W/F Env Simulation (ECHO)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue to provide program management, systems engineering, and requirements identification for the development of simulators and foreign material acquisition. - Continue to validate simulators and stimulators at the Navy tri-lab centers. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no change from FY 2019 to FY 2020.					
Title: ACQUISITION AND MEASUREMENT CAPABILITIES	63.806	71.491	41.221	0.000	41.221
Articles:	-	-	-	-	-
Description: Provide the test community with modern threat target acquisition systems and effective measurement systems necessary for Test and Evaluation of airborne early warning, situational awareness, detection and targeting systems and airborne response systems. Project investments in FY 2018, FY 2019 and FY 2020 support procurement of advanced, threat representative electronic warfare (EW) target acquisition radars to establish a frequency diverse, dense and geographically dispersed threat integrated air defense system to support operationally realistic testing of F-35, Next Generation Jammer, EA-18G and Triton in a threat representative multi-axis anti-access area denial environment that does not currently exist on any Department of Defense open air range. ***FY 2019 Plans:*** - Complete development of an open air radio frequency beam measurement capability. - Continue upgrades to the Naval Air Warfare Center ranges to support OT of the JSF by preparing sites for L-Band radar signal emulators, passive radar systems, early warning radar systems and signal detection and location systems. - Continue the site preparation and integration of radar signal emulators at the Electronic Combat Range. - Continue the development of two threat signal augmentation simulators for NAWCWD. - Continue the procurement of three L-Band radar signal emulators for NAWCWD by procuring the second system. - Continue the procurement of three passive radar systems for NAWCWD by procuring the second and third systems. - Continue the procurement of three early warning radar systems for NAWCWD by procuring the first system.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0602 / *Eletronics W/F Env Simulation (ECHO)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate the procurement of three signal detection and location systems for NAWCWD by procuring the first two systems. ***FY 2020 Base Plans:*** - Complete the site preparation and integration of radar signal emulators at the Electronic Combat Range. - Complete the procurement of three L-Band radar signal emulators for NAWCWD by procuring spares and logistic items. - Complete the procurement of two passive radar systems for NAWCWD by procuring the second system. - Complete the procurement of three early warning radar systems for NAWCWD by procuring the second and third systems. - Complete the procurement of three signal detection and location systems for NAWCWD by procuring the third system. - Continue upgrades to the Naval Air Warfare Center ranges to support OT of the JSF by preparing sites for L-Band radar signal emulators, passive radar systems, early warning radar systems and signal detection and location systems. - Continue the development of two threat signal augmentation simulators for NAWCWD. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding decrease from FY 2019 to FY 2020 due to the completion of the beam measurement system in FY 2019 for NAWCAD and NAWCWD. Additionally, the purchase of the final L-Band radar signal emulators occurs in FY 2019 with the purchase of spare parts and logistical equipment in FY 2020 for NAWCWD.					
Title: ENGAGEMENT CAPABILITIES	10.049	8.855	12.430	0.000	12.430
Articles:	-	-	-	-	-
Description: Provide the test community with the modern threat engagement systems necessary for Test and Evaluation of airborne alert, Situation Awareness, targeting systems and airborne response systems. ***FY 2019 Plans:*** - Complete the development of a closed-loop threat surface to air missile system simulator. - Complete the integration of a threat engagement system at ECR. - Continue the upgrade and integration of missile simulation models. - Continue the conversion of a threat system.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0602 / *Eletronics W/F Env Simulation (ECHO)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue the minor upgrades to open air and laboratory threat systems. - Continue the development of a naval based threat radar closed-loop simulator for installation in laboratories at Naval Air Warfare Center Weapons Division and Naval Air Warfare Center Aircraft Division and designed for open air range implementation. ***FY 2020 Base Plans:*** - Continue the upgrade and integration of missile simulation models. - Continue the conversion of a threat system. - Continue the minor upgrades to open air and laboratory threat systems. - Continue the development of a naval based threat radar closed-loop simulator for installation in laboratories at Naval Air Warfare Center Weapons Division and Naval Air Warfare Center Aircraft Division and designed for open air range implementation. The project will move from performing trade studies to design and material purchases. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 supports the final material purchases and integration on the threat system conversion project. The naval based threat radar closed-loop simulator has been developing requirements and performing design trade studies since its inception; material purchases for the developmental laboratory systems will begin in FY 2020.					
Accomplishments/Planned Programs Subtotals	74.630	80.936	54.241	0.000	54.241

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not Applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0602 / *Eletronics W/F Env Simulation (ECHO)*

E. Performance Metrics

Successfully achieve Initial Operational Capability of Navy Threat Simulation projects within 60 days of approved schedule and have test capabilities scheduled in support of Navy test programs within 180 days.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604256N / *Threat Simulator Development*	Project (Number/Name) 0672 / *Effect Nav E/W (ENEWS)*	

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
0672: *Effect Nav E/W (ENEWS)*	0.000	14.861	13.640	12.437	-	12.437	15.556	15.208	14.899	15.217	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The objective of the Effectiveness of Naval Electronic Warfare (EW) Systems (ENEWS) Project is the development and application of necessary simulation assets to determine the effectiveness of Electronic Warfare for Navy ships in simulated real-world engagement situations. The project primarily supports the introduction of modern, effective shipboard and off-board Electronic Warfare systems, and tactics for the Surface Navy. The heavy use of ENEWS resources by Naval Sea Systems Command, Operational Test and Evaluation (OT&E) Force, Special Operations, and other Electronic Warfare Research, Development, Test and Evaluation (T&E) agencies speaks to the overall importance of this project. The project provides support for Electronic Warfare system design, Engineering Test (ET), Development Test (DT), Operational Test (OT), and the development of utilization tactics. In the past ENEWS quick reaction capabilities have had great impact on crisis situations such as the Libyan crises, Iran threat, Persian Gulf crisis, and Operation Desert Shield/Storm. Simulation Display (SIMDIS) is an ENEWS modeling tool that was developed to support Testing and Evaluation. Simulation Display has been adopted by most Department of Defense (DoD) Testing and Evaluation and training ranges to provide visualization of Testing and Evaluation and training scenarios. One of the primary threats to surface ships is Anti-Ship Capable Missile systems. The Effectiveness of ENEWS Project is unique in that it is the only project within the Department of Defense dedicated to developing and providing realistic Anti-Ship Capable Missile assets to test and evaluate the effectiveness of shipboard Electronic Warfare systems and tactics against these type threats. The Effectiveness of ENEWS Project is a critical part of the Office of the Secretary of Defense Test Resource Master Plan. This plan employs many of the Effectiveness of ENEWS assets for planning, analysis, testing, and verification of shipboard and off-board Electronic Warfare systems techniques and tactics. As part of its normal activities, ENEWS provides Development Test and Evaluation (DT&E), Operational Test and Evaluation (OT&E), and Follow-on Operational Test and Evaluation (FOT&E) support to the surface Navy for all ship classes. Development Test, Operational Test and Follow-on Operational Test and Evaluation support includes AN/SLQ-32 Surface Electronic Warfare Improvement Program (SEWIP), Nulka, Rapid Anti-ship Integrated Defense System, all MK245 Giant tests, advanced InfraRed (IR) decoys, decoy placement, ship InfraRed signature and radar cross section measurement of DDG-51, LPD-17, DD-21 and Patrol Craft class ships, High Power Microwave program, and other ship self-defense initiatives, including Test and Evaluation of Future Naval Capability process. In addition, ENEWS assets are regularly employed to test the effectiveness of North Atlantic Treaty Organization (NATO) ships' Electronic Warfare systems in joint allied exercises. ENEWS assets also support Joint Electronic Warfare exercises that are conducted with Rim of the Pacific (RIMPAC) nations.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: CLASSIFIED PROGRAM	8.200	7.139	8.000	0.000	8.000
Articles:	-	-	-	-	-
Description: Details about this program are classified.					
Details about this program and any changes are classified.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0672 / *Effect Nav E/W (ENEWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: - Details are of a higher classification. ***FY 2020 Base Plans:*** - Details are of a higher classification. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** - Details are of a higher classification.					
Title: HARDWARE SIMULATION SYSTEMS	3.564	3.538	2.700	0.000	2.700
Articles:	-	-	-	-	-
Description: Maintain and perform Hardware and Software Upgrades to the inventory of Effectiveness of Naval Electronic Warfare Systems (ENEWS) flyable and shore based Anti-Ship Capable Missile (ASCM) Electro-Optic/ Infrared (EO/IR), Visible and Radio Frequency (RF) Simulators. Perform characterization of Infrared and Radio Frequency simulators as part of the periodic evaluation of simulation performance and collect performance data for comparison with previously recorded data. Also includes development and maintenance of all simulator control panels. ***FY 2019 Plans:*** - Continue hardware upgrades to the SUMMIT Simulator. - Continue software upgrades to the VICTOR Standard Instrumentation Pod (SIP). - Continue hardware upgrades to the FOXTROT 3 TOWSIM(IOTA). - Continue hardware upgrades for VICTOR 1 SIP and Anti-Ship Imaging Missile (AIMS) simulators - Continue software upgrade for FOXTROT 1 Sim 1 simulator - Continue to maintain and perform hardware and software upgrades to the inventory of Effectiveness of Naval Electronic Warfare Systems (ENEWS) flyable and shore based Anti-Ship Capable Missile (ASCM) Electro-Optic/ Infrared (EO/IR), Visible and Radio Frequency (RF) Simulators and simulator control panels. - Complete hardware upgrades for the EPSILON, FOXTROT 1 (ground based) and FOXTROT 1 SIP simulators - Complete software upgrades for the FOXTROT 1 (ground based) and FOXTROT 1 SIP simulators - Initiate hardware upgrades for the NU (towed configuration) and VICTOR 1 SIP simulators - Introduce and initiate flight certification of one new simulator into the ENEWS inventor					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0672 / *Effect Nav E/W (ENEWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate software upgrades for the IOTA (towed configuration), VICTOR 1 SIP simulators - Maintain and upgrade 22 hardware simulators, 5 programmable simulators and the Antenna Test Rig to support the SEWIP Block 3 and AOEW effectiveness evaluations. ***FY 2020 Base Plans:*** - Continue all efforts of FY 2019 less those noted as completed above. - Continue to maintain and perform hardware and software upgrades to the inventory of ENEWS flyable and shore based Anti-Ship Capable Missile (ASCM) Electro-Optic/Infrared (EO/IR), Visible and Radio Frequency (RF) simulators and simulator control panels. Introduce a new simulator into the ENEWS inventory and prepare simulator for flight and field testing - Initiate software upgrades for one EO/IR simulator - Maintain and upgrade 23 hardware simulators, 5 programmable simulators and the Antenna Test Rig to support the SEWIP Block 3 and AOEW effectiveness evaluations. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 reflects delays to the deployment of a new hardware threat simulator and a reduction in hardware and software updates to existing ENEWS inventory of Radio Frequency (RF), Electro-Optic (EO) and Infra-Red (IR) simulators.					
Title: SIMULATION CHARACTERIZATION, VERIFICATION AND REQUIREMENTS	0.691	0.632	0.300	0.000	0.300
Articles:	-	-	-	-	-
Description: Provides for the documentation of Anti-Ship Capable Missile (ASMC) threat simulators. Develops reports that contain detailed descriptions and parametric data of the Anti-Ship Capable Missile threat simulators and compares the simulator's parametric data to the actual threat's parametric data. Provide technical management functions in support of the Effectiveness of Naval Electronic Warfare Systems (ENEWS) project; engineering and technical support requirements for the Anti-Ship Capable Missile simulators and upgrades to meet DT/ OT testing requirements, development of detailed test resource requirements and provides an interface between OPNAV N2/N6, Office of Naval Research, and ENEWS oversight activities. ***FY 2019 Plans:*** - Continue to develop reports that compare the parametric data of the ASCM threat simulators					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0672 / *Effect Nav E/W (ENEWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
to the parametric data of the actual threat and provide technical management functions in support of the ENEWS project. - Initiate and complete the FY 2019 ENEWS Program Management Plan. - Initiate and complete FY 2019 status reviews, monthly reports, performance based management and analysis, financial execution reporting and assessment. - Complete characterization and hardware simulator documentation report for the upgraded OMEGA simulator. ***FY 2020 Base Plans:*** - Continue to develop reports that compare the parametric data of the Anti-Ship Capable Missile (ASCM) threat simulators to the parametric data of the actual threat and provide technical management functions in support of the Effectiveness of Naval Electronic Warfare Systems (ENEWS) project. - Initiate and complete the FY 2020 ENEWS Program Management Plan. - Coordinate and conduct FY 2020 status reviews - Draft and submit monthly reports, performance based management and analysis, financial execution reports and assessments. - Initiate characterization and hardware simulator documentation report for an RF simulator. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 reflects a reduction in program management support and deferral of verification and characterization of an RF hardware simulator until FY 2021.					
Title: SUPPORT AND COMPUTERS SIMULATION SYSTEMS	2.406	2.331	1.437	0.000	1.437
Articles:	-	-	-	-	-
Description: Perform maintenance and intelligence upgrades to Electro-Optic/Infrared, Digital, and Radio Frequency Laboratory Simulation Testing facilities and flight support equipment based on existing and emerging complex threat systems. Development of Testing & Evaluation scenarios and environmental modeling to support Electronic Support (ES) and Electronic Attack (EA) testing; modify Anti-Ship Cruise Missile (ASCM) threat simulators based on the latest intelligence data obtained from threat databases. ***FY 2019 Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0672 / *Effect Nav E/W (ENEWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue to perform maintenance and intelligence upgrades to Electro-Optic/Infrared, Digital, and Radio Frequency Laboratory Simulation testing facilities and flight support equipment and provide ES and EA test support. - Continue target models to support Surface Electronic Warfare Improvement Program Block 3 and Advanced Offboard Electronic Warfare (AOEW) effectiveness assessments. - Continue update to the Scenario and Environmental Model used to support open and closed loop simulations. - Continue maintenance and upgrades to shore-based test facilities and mobile test vans as required to conduct testing in support of Surface Electronic Warfare Improvement Program, Nulka and multi-function Electronic Warfare programs. - Continue to transition environmental, threat and platform simulations from Subversion to Mercurial Distributed Version Control System. - Continue upgrades to configuration control software library as new releases became available. - Continue to develop new digital models of Anti-Ship Cruise Missile (ASCM) threats as they became available. - Continue upgrades and maintenance of flight support systems as necessary to support the infrared / radio frequency Effectiveness of Naval Electronic Warfare Systems (ENEWS) simulators. - Continue upgrades and user friendly enhancements to the Simulation Display (SIMDIS) toolset - Continue development of LIMA III and LIMA IV digital models - Continue digital model upgrades to support Surface Electronic Warfare Improvement Program (SEWIP) Block 3 test and evaluation. - Continue simulator upgrades to support SEWIP Block 3 test and evaluation. - Continue to perform maintenance and intelligence upgrades to Electro-Optic/Infrared, Digital, and Radio Frequency Laboratory Simulation testing facilities and flight support equipment and provide Electronic Support (ES) and Electronic Attack (EA) test support. - Update and install new ship models into database and evaluate performance. - Initiate Hardware-In-the-Loop (HWIL) capability update.					
FY 2020 Base Plans: - Continue all efforts of FY 2019 less those noted as completed above. - Continue to perform maintenance and intelligence upgrades to Electro-Optic/Infrared, Digital, and Radio Frequency Laboratory Simulation testing facilities and flight support equipment and provide ES and EA test support. - Update and install new ship models into database to support Navy studies, Development Test (DT)/Operational Test (OT) events; ENEWS digital models will be updated to allow modeling and simulation (M&S) based EW					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604256N / *Threat Simulator Development*	**Project (Number/Name)** 0672 / *Effect Nav E/W (ENEWS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
testing for SEWIP Block 3, Advanced Offboard Electronic Warfare (AOEW) and Navy Enterprise Testbed programs. - Complete HWIL millimeter wave capability update. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 reflects a deferral of updates to the Simulation Display (SIMDIS) visualization and display tool until FY 2021 and a reduction in updates to missile and target models for modeling and simulation based evaluations.					
Accomplishments/Planned Programs Subtotals	14.861	13.640	12.437	0.000	12.437

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Performance metrics are discussed within each project (R2a).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0604258N / *Target Systems 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	0.000	18.737	10.981	12.027	-	12.027	8.569	8.791	8.993	9.173	Continuing	Continuing
0609: *Aerial Target System Dev*	0.000	6.201	9.658	7.874	-	7.874	7.184	7.377	7.551	7.702	Continuing	Continuing
0610: *Wpn Sys T&E Trng Dev/ Proc*	0.000	11.248	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	11.248
0612: *Surface Targets Development*	0.000	1.288	1.323	1.353	-	1.353	1.385	1.414	1.442	1.471	Continuing	Continuing
2159: *ASW TARGET*	0.000	0.000	0.000	2.800	-	2.800	0.000	0.000	0.000	0.000	0.000	2.800

A. Mission Description and Budget Item Justification

This program element funds the development of Aerial Target Systems, Unmanned Aerial Vehicle targets, Sea Surface Target Systems, Target Control systems, and associated Target Mission Support Systems, Target Threat Simulation Program and Target Augmentation and Auxiliary Systems required to simulate real world threats. These capabilities are required to execute developmental/operational test and evaluation of naval combat weapon systems and to satisfy advanced fleet training requirements while ensuring the Navy continues to develop threat simulations of emerging threat requirements.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST AND EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	23.053	10.981	9.227	-	9.227
Current President's Budget	18.737	10.981	12.027	-	12.027
Total Adjustments	-4.316	0.000	2.800	-	2.800
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-4.000	0.000			
• SBIR/STTR Transfer	-0.316	0.000			
• Program Adjustments	0.000	0.000	2.800	-	2.800
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*

Change Summary Explanation

The FY20 Program Element Budget increased by $2.8M in support of Project 2159 ASW Targets.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604258N / *Target Systems Development*	Project (Number/Name) 0609 / *Aerial Target System Dev*	

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
0609: *Aerial Target System Dev*	0.000	6.201	9.658	7.874	-	7.874	7.184	7.377	7.551	7.702	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The mission of the Aerial Target Systems Development program is the design and development of threat representative subsonic and supersonic aerial targets that simulate threat weapon systems, threat aircraft or threat Unmanned Aerial Vehicles. In addition to representative air vehicles, this includes development of Target Control (TC) systems, and associated Target Augmentation and Auxiliary Systems (TA/AS) which are used to replicate specific threats. Targets and auxiliary payloads are developed to support test and evaluation of combat systems required to defend fleet surface and air units in a hostile environment. As to specific hardware development, this project includes:

- Supersonic Targets: Portfolio includes GQM-163A Supersonic Sea-Skimming Target (SSST), GQM-173A Multi-Stage Supersonic Target (MSST), AQM-37, and Fleet Supersonic Training Target programs. Supersonic targets represent supersonic anti-ship cruise missile threats. The design and development of GQM-163A capabilities provide threat representative targets that are used in direct support of Developmental Test and Evaluation, Operational Test and Evaluation, and Live Fire Test and Evaluation of major combat weapons programs and to a lesser degree, support fleet training. Critical live-fire Test and Evaluation events are supported for AEGIS, DDG-1000, LHA-6, CVN-78, LCS, and LSD-41/49 (SM-6, SM-2, RAM, SSDS, and ESSM). The GQM-163A is a non-recoverable supersonic sea skimming aerial target, capable of speeds in excess of Mach 2.5 and cruise altitudes from 13.0 to 66 ft. The GQM-163A has also demonstrated higher altitude diving threat profiles. MSST was a supersonic development effort that was terminated on September 25, 2015. Once the contract termination costs have been determined by DCMA, funds may be required to cover settlement costs. However, the requirement still exists to provide a multi-stage vehicle presentation. New supersonic target development efforts include the Fleet Supersonic Training Target and a replacement target for AQM-37.

- Subsonic Targets: Portfolio includes BQM-177A, and BQM-34 & BQM-74 subsonic target programs. The BQM-177A SSAT development primarily represents subsonic anti-ship cruise missile threats, replacing legacy BQM-74E targets with a modernized subsonic target with increased capabilities. The BQM-177A SSAT provides threat representation for developmental and operational test & evaluation events of major combat weapons systems programs and in support of fleet training events. Specifically, the BQM-177A SSAT provides critical live-fire test and evaluation events for AEGIS, SM-6, SM-2, RAM, and ESSM. BQM-74s are undergoing product improvement program efforts to increase their current performance envelope to meet evolving Fleet requirements and increase operational readiness needs and other subsonic targets, such as the BQM-34, are being considered for similar efforts.

- Target Threat Simulation Program (TTSP), Target Mission Support Systems (TMSS), and Target Control and Target Augmentation and Auxiliary Systems (TC/TA/AS) development: the TTSP portfolio provides the payload equipment required to electronically enhance aerial targets to provide threat representative radio frequency signatures, specifically the electronic attack and threat radar emissions (active emitters). Development of threat representative simulation components is on-going and required to keep pace with evolving threats and ensure that the Navy's threat simulation capabilities maintain warfighter readiness in the current environment. TC provides command and control of targets to enable the execution of threat-representative mission profiles. The mission also includes the design, development and qualification of various TMSS projects including but not limited to: Target RF datalink hardware, ground control hardware and software, scorer transponders, scoring

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*	**Project (Number/Name)** 0609 / *Aerial Target System Dev*

ground stations, telemetry antennas, radar and locator beacons, identification, friend or foe transponders, and associated test sets. TA/AS enables each target to be uniquely configured for specific mission profiles and provide for high fidelity simulation of foreign threats. TA/AS-configured targets are used for radar acquisition test, electronic countermeasures (jamming) evaluation, infrared measurement and testing, radar cross section evaluation, decoy-effectiveness testing, maneuver analysis, electronic warfare evaluation, warhead-effectiveness testing and evaluation of fleet tactics. TA/AS scoring capabilities include both surface and airborne scalar and vector scoring systems.

In addition to the design and development of target hardware and software, funding supports studies performed by a University Affiliated Research Center (UARC) to specify and verify needed target performance for future target development. For the design and validation of targets under development, the UARC will provide engineering studies in areas such as structures, controls, guidance, and propulsion. For those hardware and software items presently under development by commercial vendors, the UARC will provide oversight and validation of vendor design and development approach.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Supersonic Targets - Development & Upgrades of Supersonic targets	0.629	0.229	0.237	0.000	0.237
Articles:	-	-	-	-	-
Description: Provides funding for the development of GQM-163A upgrades/evolutionary development to keep pace with evolving threat characteristics. Efforts include continued development of performance envelope characteristics to include flight termination performance, enhanced speed and distance capabilities, and multiple target launch capability. Funding will also support the development of other unique supersonic targets as required, and the close out of the GQM-173 development effort.					
FY 2019 Plans: Continue the GQM-163A Supersonic Sea Skimming Targets improvement and increased capability efforts including deployable chaff, EW payloads, enhanced flight performance and Orbital Front End System space allocation studies and redesign for SSST. Complete Radome and Radar Altimeter design and development efforts, integration of JTIM and M&S. Commence the development for required improvements in the current infrastructure of the launch capability to accommodate the increased number of targets to as many as six. Continue to support the development and test of other unique supersonic targets as required.					
FY 2020 Base Plans: Complete the Orbital Front End System Space Allocation study. Continue the development of GQM-163A Supersonic Sea Skimming Targets (SSST) improvements and increased capability efforts including deployable chaff, EW payloads, enhanced flight performance. Continue SSST redesign and development efforts as required for improvements and infrastructure upgrades to include those required to accommodate increased					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*	**Project (Number/Name)** 0609 / *Aerial Target System Dev*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
simultaneous launches. Continue to support the development and test of other unique supersonic targets as required. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of 0.008 from FY 2019 to FY 2020 to account for potential future supersonic developments and inflation.					
Title: Subsonic Targets - Development & Upgrades of subsonic aerial targets with increased capabilities	1.128	1.000	1.020	0.000	1.020
Articles:	-	-	-	-	-
Description: A Subsonic Aerial Target (SSAT) replacement air vehicle, for the currently fielded BQM-74E target no longer in production, is required. The BQM-177A is a modernized subsonic target with increased capabilities providing realistic threat representation in support of critical live-fire Test and Evaluation events for major weapons systems and Fleet combat training. The target features increased capabilities to include higher speed, longer range, lower cruise altitudes and greater maneuverability. Other subsonic target alternatives are being explored, including the BQM-74G. ***FY 2019 Plans:*** BQM-177A schedule delays were experienced in FY18 due to technical issues which resulted in design modifications being incorporated to address the technical challenges. Subsequently, the entire schedule shifted to the right (FY19) to include but not limited to qualification tests, payload integrations tests, and shipboard suitability tests. Continue to prepare for a Full Rate Production (FRP) contract award and obtain support of a FRP decision. Continue the Weapon System Explosive Safety Review Board (WSESRB) approval of shipboard operations. Continue engineering, manufacturing, training, logistics and test efforts of the BQM-177A SSAT for transition to FRP including shipboard qualification and operations. Incorporate Engineering Change Proposals and modernizations in the baseline design configuration as mission and threats evolve. Continue studies & development efforts on other subsonic target alternatives, including the BQM-74G. ***FY 2020 Base Plans:*** Complete WSESRB approval of shipboard operations. Complete required shipboard suitability testing in preparation of FOC. Continue engineering, manufacturing, training, logistics and test efforts of the BQM-177A SSAT towards FOC including shipboard qualification and operations. Incorporate Engineering Change Proposals					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*	**Project (Number/Name)** 0609 / *Aerial Target System Dev*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
and modernizations in the baseline design configuration as mission and threats evolve. Continue studies & development efforts on other subsonic target alternatives, including the BQM-74G. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of 0.02 from FY 2019 to FY 2020 to account for potential future subsonic developments and inflation.					
Title: Target Threat Simulation Program (TTSP), Target Mission Support Systems (TMSS), Target Control (TC) and Target Augmentation and Auxiliary Systems (TA/AS)	4.444	8.429	6.617	0.000	6.617
Articles:	-	-	-	-	-
Description: Provides funding for the development of Target Control (TC) systems and Target Augmentation and Auxiliary Systems (TA/AS) capable of supporting Test and Evaluation (T&E) and fleet training activities to ensure emerging threat simulation requirements are met. Target Control Systems (TCS) involve the improved command and control systems capable of controlling multiple targets simultaneously while delivering adequate fidelity of T&E telemetry data. The TMSS program portfolio provides target control, scoring, location, and navigation of air, land and seaborne targets for fleet training and weapons systems test and evaluation. Funding also supports the design, development and qualification of TMSS including but not limited to the current and next generation TC systems, scalar scorers, scoring ground station, telemetry antennas, radar and locator beacons, identification friend or foe and associated test sets. Augmentation and auxiliary systems must be capable of augmenting targets in support of radar acquisition test, electronic countermeasures (jamming) evaluation, infrared measurement/test, radar cross section evaluation, decoy effectiveness, maneuver analysis, electronic warfare, warhead effectiveness and evaluation of fleet tactics, readiness, and training. The Target Threat Simulation Program (TTSP) provides the payload equipment required to electronically enhance aerial/surface targets to provide threat representative Radio Frequency signatures, specifically the Electronic Attack and Threat Radar Emissions (Active Emitters). The TTSP accomplishes this by providing a collection of modules which are integrated into individual targets in various configurations to provide the ability to simulate the RF environment. TTSP equipment in various configurations is certified for carriage in aerial/surface targets. Funding supports the continued development of the TTSP portfolio so that the Navy can keep pace with emerging enemy threats. ***FY 2019 Plans:*** Continue development, prototyping and integration of threat electronic attack& active emitter simulators to ensure the Fleet meets emerging threat requirements. Gather and exploit threat intelligence. Begin fielding of					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*	**Project (Number/Name)** 0609 / *Aerial Target System Dev*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
the TCS Radio Frequency Subsystem (SNTC BLK 3) upgrade hardware which is a two to three year process. Continue development and qualification of the SNTC BLK 4 Ground Control Station with associated hardware and software upgrades. Commence fielding the DSQ-50A Scalar Scorer and its associated Ground Telemetry Station which is a two to three year process. Begin development AN/DPN-88 Identify, Friend or Foe (IFF) replacement for fielding in FY 2020. Begin acquisition planning for a replacement TDU-32 Tow Banner in support of Fleet Aerial Gunner Training. ***FY 2020 Base Plans:*** Continue development, prototyping and integration of threat electronic attack& active emitter simulators to ensure the Fleet meets emerging threat requirements. Gather and exploit threat intelligence. Continue development and qualification of the SNTC BLK 4 Ground Control Station with associated hardware and software upgrades. Commence development of the DSQ-50B Vector Scorer. Begin fielding the replacement AN/DPN-90 Radar Beacon and the AN/DPN-88 IFF replacement. Continue fielding the DSQ-50A Scalar Scorer and its associated Ground Telemetry Station and the TCS Radio Frequency Subsystem (SNTC BLK 3) upgrade hardware, both two to three year processes. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of $1.812M from FY 2019 to FY 2020 due to Payload and Mission Support System Development contracts being delayed to further in the FYDP.					
Accomplishments/Planned Programs Subtotals	6.201	9.658	7.874	0.000	7.874

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
• WPN 2280: *Aerial Targets*	122.173	133.937	145.880	6.500	152.380	181.653	180.067	186.010	185.481	Continuing	Continuing

Remarks

D. Acquisition Strategy

Supersonics: The GQM-163A Supersonic Sea-Skimming Target (SSST) is an Acquisition Category II program. The acquisition strategy includes the continued development of Quad Launch, design efforts for integration of new Radome and Radar Altimeter, Electronic Warfare (EW) systems and other Engineering Change Proposals as required to emulate emerging threat systems. These development efforts will continue to be rolled into the production baseline. Production efforts are

expected to continue at higher quantities in order to meet projected MDAP T&E requirements. Additionally, development of alternative supersonic targets is being explored.

Congress was notified on September 25, 2015 that the Department of the Navy made the decision to terminate the Multi-Stage Supersonic Target (MSST) development program. Termination settlement efforts are ongoing with DCMA.

Subsonics: The Subsonic Aerial Target (SSAT) program is an ACAT-IV program. The EMD contract is ongoing and a follow-on Low Rate Initial Production (LRIP) 3 contract will be awarded in 3rd Quarter of FY19 with Full Rate Production (FRP) Contracts to follow. Engineering Change Proposals will be contracted as required via IDIQ contract vehicles to keep pace with emerging threat systems and changes rolled into the production baseline. Development efforts for other subsonic targets will be resourced via other contracting efforts as required.

Target Threat Simulation Program (TTSP), Target Mission Support Systems (TMSS), Target Control, and Target Augmentation and Auxiliary Systems: The acquisition strategy for these components vary, depending on industry responses to government issued Requests for Information, but most are acquired via Firm Fixed Price IDIQ contracts.

E. Performance Metrics

EFFORT	PERFORMANCE REQUIREMENT	OBJECTIVE	THRESHOLD	TEST RESULT
BQM-177 EMD	Maximum Speed at Low Altitude [Mach(M) at feet (ft) above wave crest at WMO Sea State conditions]	0.95 M @ 6.6 ft @ Sea State 5	0.90 M @ 10.0 ft @ Sea State 3	TBD

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604258N / *Target Systems Development*	Project (Number/Name) 0610 / *Wpn Sys T&E Trng Dev/Proc*	

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
0610: *Wpn Sys T&E Trng Dev/ Proc*	0.000	11.248	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	11.248
Quantity of RDT&E Articles		5	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the development and procurement of aerial targets and associated systems. These systems are used exclusively for test and evaluation of naval weapons systems, which closely represent current and projected threats to fleet units in the joint strike and the littoral warfare environments. These threat representations must include characteristics in relation to size, performance envelope, and electromagnetic and infrared signatures. As threats evolve, changes must be made to keep the targets threat representative in response to increased complexity in the test requirements from the developers of naval weapons systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: QF-16 Full-Scale Aerial Target (FSAT)	11.248	0.000	0.000	0.000	0.000
Articles:	5	-	-	-	-
Description: The QF-16 FSAT has been developed as a 4th generation, full scale, threat representative target providing a replacement for the FSAT/QF-4 and are maintained and operated by the Air Force. The QF-16 FSAT is a converted F-16 aircraft that provides a supersonic, high altitude, remote-controlled aerial target. This target will have full command and control capability through normal flight envelopes. The QF-16 FSAT target presentations will support aircraft and weapons systems testing and development, including that of the Joint Strike Fighter, AIM-9X Sidewinder missile, AIM-120 Advanced Medium Range Air-to-Air Missile, and Standard Missile-6.					
FY 2019 Plans: FY 2019 funds were reprogrammed to the Weapons Procurement, Navy (WPN) appropriation (BLI 2280).					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	11.248	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*	**Project (Number/Name)** 0610 / *Wpn Sys T&E Trng Dev/Proc*

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
• WPN 2280: *Aerial Targets*	122.173	143.637	152.380	-	152.380	181.653	180.067	186.010	185.481	Continuing	Continuing

Remarks

D. Acquisition Strategy

A Memorandum of Agreement (MOA) for Lots 6-8 is being developed between the United States Navy (USN) and the United States Air Force (USAF) for the QF-16 Full-Scale Aerial Target Program (FSAT). Milestone C was achieved in 1st Quarter FY14 and Initial Operating Capability was achieved 4th Quarter FY 2016. FOC is planned for FY 2018. Commencing in FY 2019, the QF-16 program will be reprogrammed to a WPN program.

E. Performance Metrics

EFFORT	PERFORMANCE REQUIREMENT	OBJECTIVE	THRESHOLD	TEST RESULT
QF-16	Drone Mission Performance	Achieve requirement	Threshold=objective	TBD
FSAT	Payload Integration	Achieve requirement	Threshold=objective	TBD
Superiority	carry, operation & monitoring TEMS,			
Target	ALE-47, AIM-9, ALQ-188, ALQ-167 ALE-56 & 300 Gallon Fuel Tank			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604258N / *Target Systems Development*	Project (Number/Name) 0612 / *Surface Targets 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
0612: *Surface Targets Development*	0.000	1.288	1.323	1.353	-	1.353	1.385	1.414	1.442	1.471	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops seaborne targets and their related target augmentation systems in support of air-to-surface and surface-to-surface weapons test and evaluation and fleet training.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Surface Targets Development	1.288	1.323	1.353	0.000	1.353
Articles:	-	-	-	-	-

FY 2019 Plans:

Develop specifications and initiate design concepts for Mobile Ship Target Replacement - MST(X). Analyze and develop control concepts for MST(X). Research improved system for over-the-horizon command and control for Seaborne Targets including satellite links. Integrate Ship Deployable Seaborne Target (SDST) with formation algorithms in Portable Command and Control Unit (PCCU). Perform testing on new platform for High Speed Maneuvering Surface Target - Streamlined Variant (HSMST-s). Measure radar cross section of HSMST-s. Develop advanced radar and infrared signature enhancement for towed Seaborne Targets. Develop configurations of Low Cost Modular Target (LCMT) to support test and evaluation of new weapon systems. Review emerging threats and developing weapon systems and analyze requirements for new targets or improvements/alterations to existing targets.

FY 2020 Base Plans:

Develop new hardware for Portable Command and Control Unit (PCCU) with reduced footprint to enhance portability. Develop post-exercise analysis system for target swarm exercises. Develop chaff countermeasure launch controller for seaborne targets. Research large-scale electronic scoring systems for application to seaborne target exercises. Develop improvements to SeaCAN data bus and signal processing. Develop encryption method for SeaCAN data. Develop improvements to SeaCAN system to reduce potential for Electro-Magnetic Interference (EMI) and perform testing on new system components. Research and develop station-keeping capability for towed target platforms.

FY 2020 OCO Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*	**Project (Number/Name)** 0612 / *Surface Targets Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Number and complexity of RDT&E projects has increased due to increased weapon system Test and Evaluation and Fleet training requirements.					
Accomplishments/Planned Programs Subtotals	1.288	1.323	1.353	0.000	1.353

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
• OPN/5429: *ASW SE*	10.571	7.753	10.790	-	10.790	13.581	12.214	11.675	11.909	0.000	115.405

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Review capability of inventory with respect to threat, weapons test schedules and fleet training requirements. OBJECTIVE: Available inventory of seaborne targets meets fleet requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604258N / *Target Systems Development*	Project (Number/Name) 2159 / *ASW TARGET*	

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
2159: *ASW TARGET*	0.000	0.000	0.000	2.800	-	2.800	0.000	0.000	0.000	0.000	0.000	2.800
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This project is a new start in FY2020.

A. Mission Description and Budget Item Justification

RDT&E,N Budget provides funding for Small Business Innovation Research (SBIR) Phase 2.5 for sprint speed and frequency expansion to improve performance capability for the Mk39 Mod 3 Expendable Mobile ASW Training Target (EMATT). This effort supports the transition of the Sprint Speed and Low Frequency Improvement Phase 2.5 efforts into MK 39 Mod 3 EMATT production and starts to investigate Continuous Active Sonar (CAS) capability to provide better detection performance and provide operators with a continuous track. Sprint Speed and Frequency Expansion upgrade allows EMATT to more closely represent submarine tactics for evasion and will make it compatible with new ASW sensors like the LCS ASW mission package.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: New Accomplishment/Planned Program Entry	0.000	0.000	2.800	0.000	2.800
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: RDT&E,N funding in FY20 will be used to continue to address performance shortfalls in the current fleet of MK39 Mod 3 EMATTs to add Sprint Speed and Frequency Expansion upgrades to be more compatible with New ASW Sensors.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The FY20 Program Element Budget increased by $2.8M to provide for SBIR Phase 2.5 for sprint speed and frequency expansion to improve performance capability for the Mk39 Mod 3 Expendable Mobile ASW Training Target (EMATT).					
Accomplishments/Planned Programs Subtotals	0.000	0.000	2.800	0.000	2.800

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604258N / *Target Systems Development*	**Project (Number/Name)** 2159 / *ASW TARGET*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Frequent IPT meetings with contract and government technical program personnel.
- Rigorous acoustic, environmental and in-water dynamic test program.
- Award SBIR Phase 2.5 Sprint Speed and Frequency Expansion Contractor efforts

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0604759N / *Major T&E Investment*							
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	68.977	90.514	85.348	-	85.348	83.560	71.548	61.514	62.744	Continuing	Continuing
2195: *T & E Investment*	0.000	52.560	77.014	85.348	-	85.348	83.560	71.548	61.514	62.744	Continuing	Continuing
9999: *Congressional Adds*	0.000	16.417	13.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	29.917

A. Mission Description and Budget Item Justification

This project corrects major deficiencies, improves Test & Evaluation (T&E) capabilities, and increases T&E support effectiveness at Navy Major Range and Test Facility Base. The T&E Investment project provides improved test capabilities at the following test facilities: the Naval Undersea Warfare Center Division Newport Atlantic Undersea Test and Evaluation Center, Andros Island, Bahamas; the Nanoose and Dabob ranges of the Naval Undersea Warfare Center Division Keyport, Keyport, WA; the Sea Range, Land Ranges, Targets, Ordnance T&E Facility, Test Wing Pacific located at the Naval Air Warfare Center Weapons Division, Point Mugu, CA and China Lake, CA; and the Atlantic Test Range, Air Combat Environment T&E Facility, Electromagnetic Environmental Effects, Air Vehicle Modification and Instrumentation facility, Test Wing Atlantic, Targets, and the Propulsion Systems Evaluation Facility located at the Naval Air Warfare Center Aircraft Division, Patuxent River, MD and the test and evaluation capabilities located at the Pacific Missile Range Facility, Kauai, HI.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	52.634	77.014	85.348	-	85.348
Current President's Budget	68.977	90.514	85.348	-	85.348
Total Adjustments	16.343	13.500	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	13.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.657	0.000			
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Congressional Add Adjustments	17.000	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759N *I Major T&E Investment*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Congressional Add: *Program Increase*	3.863	0.000
Congressional Add: *Navy UFR for Critical Infrastructure Investments- Major Range & Test Facilities*	12.554	0.000
Congressional Add: *Fifth Generation Radar Ground Test Upgrades*	0.000	4.000
Congressional Add: *Complex Electronic Warfare Test Equipment*	0.000	3.500
Congressional Add: *Ground Based Sense-and-Avoid*	0.000	6.000
Congressional Add Subtotals for Project: 9999	16.417	13.500
Congressional Add Totals for all Projects	16.417	13.500

Change Summary Explanation

There are no changes from PB19 to PB20 for FY20

Funding increase from FY 2019 to FY2020 supports the design of a framework to enable interaction between disparate models, developing a methodology to maintain configuration control and distribution of the common modeling tools, integrating electronic warfare effects into visualization models, as well as, for the purchase of a free standing chamber wall, the purchase of a global positioning simulator, and for the purchase of x-ray equipment.

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604759N / *Major T&E Investment*	Project (Number/Name) 2195 / *T & E Investment*	

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
2195: *T & E Investment*	0.000	52.560	77.014	85.348	-	85.348	83.560	71.548	61.514	62.744	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project corrects major deficiencies, improves Test & Evaluation (T&E) capabilities, and increases T&E support effectiveness at Navy Major Range and Test Facility Base. The T&E Investment project provides improved test capabilities at the following test facilities: the Naval Undersea Warfare Center Division Newport Atlantic Undersea Test and Evaluation Center (AUTEC), Andros Island, Bahamas; the Nanoose and Dabob ranges of the Naval Undersea Warfare Center Division Keyport, Keyport, WA; the Sea Range, Land Ranges, Targets, Ordnance T&E Facility, Test Wing Pacific located at the Naval Air Warfare Center Weapons Division, Point Mugu, CA and China Lake, CA; and the Atlantic Test Range, Air Combat Environment T&E Facility, Electromagnetic Environmental Effects, Air Vehicle Modification and Instrumentation facility, Test Wing Atlantic, Targets, and the Propulsion Systems Evaluation Facility located at the Naval Air Warfare Center Aircraft Division, Patuxent River, MD and the test and evaluation capabilities located at the Pacific Missile Range Facility, Kauai, HI.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: UNDERSEA RANGE INVESTMENTS	8.624	6.611	6.281	0.000	6.281
Articles:	-	-	-	-	-
Description: This effort funds the modernization, upgrades, and new test and evaluation capabilities required at the Navy's Major Range Test Facility Base undersea ranges, to include AUTEC, Andros Island, Bahamas and the Nanoose and Dabob ranges of the Naval Undersea Warfare Center Division Keyport, Keyport, WA.					
FY 2019 Plans: - Continue the minor upgrade and modernization of test capabilities at AUTEC, Nanoose and Dabob. - Continue tracking system modernization at Nanoose and Dabob. - Complete replacement of in-water sensors at AUTEC. - Complete replace of range tracking radar at AUTEC. - Complete range radar obsolescence project at Nanoose and Dabob. - Continue recovery system improvement at Nanoose and Dabob. - Complete operating system upgrade at Nanoose and Dabob. - Initiate torpedo control panel modernization at Nanoose and Dabob.					
FY 2020 Base Plans: - Continue the minor upgrade and modernization of test capabilities at AUTEC, Nanoose and Dabob. - Continue tracking system modernization at Nanoose and Dabob. - Continue torpedo control panel modernization at Nanoose and Dabob.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 2195 / *T & E Investment*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Complete recovery system improvement at Nanoose and Dabob. -Initiate range telemetry and communications upgrade at Nanoose and Dabob. -Initiate procurement of small range craft for unmanned underwater vehicle (UUV) work at Nanoose and Dabob. -Initiate modernization of range data management system at Nanoose and Dabob. -Initiate cyber security upgrades at Nanoose and Dabob. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding decrease from FY 2019 to FY 2020 due to the completion of the range tracking radar at AUTEC, and the range radar obsolescence project at Nanoose and Dabob and the completion of all material purchases for the modification to the recovery system at Nanoose and Dabob.					
Title: OPEN AIR RANGE INVESTMENTS	38.536	40.167	34.901	0.000	34.901
Articles:	-	-	-	-	-
Description: This effort funds the modernization and upgrades of existing capabilities and the development of new T&E capabilities required at the Navy's Major Range Test Facility Base open air ranges at the Naval Air Warfare Center Aircraft Division (NAWCAD), Patuxent River, MD, Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu, CA and China Lake, CA and Pacific Missile Range Facility (PMRF), Kauai, HI. ***FY 2019 Plans:*** - Continue the minor upgrade and modernization of test capabilities at NAWCAD, NAWCWD and PMRF. - Continue procurement of Range Support Aircraft. - Continue the modernization of the telemetry antenna controllers and data processors at PMRF. - Continue the modernization of the imaging radar at PMRF. - Complete the modernization of the InfraRed measurement capability at NAWCAD. - Continue the upgrade of the avionic data processing and display system at NAWCAD. - Continue modernization of the imaging radar mechanical assemblies at PMRF. - Continue the development of Environmental Impact Statements at NAWCAD and NAWCWD. - Complete the acquisition of tactical data link capability at NAWCAD. - Complete the acquisition of new Infrared and Ultraviolet measurement capability at NAWCAD. - Continue the replacement of the FOCUS cable at NAWCWD. - Continue the development and integration of Telemetry and optics equipment on the Range Support Aircraft. - Complete the site preparation and integration of radars and emitters at NAWCWD.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 2195 / *T & E Investment*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate and complete modernization of air traffic control radar at NAWCWD. - Initiate upgrade for ground based testing against a 5th generation aerial threat. This effort will upgrade an existing track test facility at NAWC WD with the ability to suspend a 5th generation aircraft for use in testing sensors. ***FY 2020 Base Plans:*** - Continue the minor upgrade and modernization of test capabilities at NAWCAD, NAWCWD and PMRF. - Continue procurement of Range Support Aircraft. - Continue the development of Environmental Impact Statements at NAWCAD and NAWCWD. - Continue the development and integration of Telemetry and optics equipment on the Range Support Aircraft. - Complete the modernization of the telemetry antenna controllers and data processors at PMRF. - Complete the modernization of the imaging radar at PMRF. - Complete the upgrade of the avionic data processing and display system at NAWCAD. - Complete modernization of the imaging radar mechanical assemblies at PMRF. - Complete the replacement of the FOCUS cable at NAWCWD. - Complete the upgrade for ground based testing against a 5th generation aerial threat. This effort will upgrade an existing track test facility at NAWCWD with the ability to suspend a 5th generation aircraft for use in testing sensors. -Initiate the imaging radar transmitter modernization at PMRF. -Initiate cyber security upgrades at NAWCWD. -Initiate and complete the modernization of the down range network at NAWCAD. -Initiate and complete the modernization of the surface surveillance radars at NAWCAD. -Initiate and complete the modernization of the HD video distribution capability at NAWCWD. -Initiate and complete the modernization of the command and control transmitter at NAWCWD. -Initiate and complete the laser designator modernization at NAWCWD. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding decrease from FY 2019 to FY 2020 due to the completion of a number of projects including the tactical data link terminal purchase, the infrared and ultraviolet measurement equipment purchase for the imaging radar mechanical modernization.					
Title: TEST FACILITIES INVESTMENTS	5.400	30.236	44.166	0.000	44.166
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 2195 / *T & E Investment*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: This effort funds the modernization and upgrades of existing capabilities and the development of new Test & Evaluation capabilities required at the Navy's Major Range Test Facility Base ground test facilities at NAWCAD, Patuxent River, MD, and NAWCWD, Point Mugu, CA and China Lake, CA. ***FY 2019 Plans:*** -Initiate the test cell performance improvement at NAWCAD. This effort will upgrade Propulsion Systems Evaluation Facility turbine engine test cell to provide uniform temperature and pressure intake airflow and improve dynamometer performance. FY 2019 work includes establishing requirements, analyzing solution alternatives, and preliminary and critical design reviews. - Initiate the modernization of the data acquisition and processing system at NAWCAD. This effort will modernize the Electro Magnetic Pulse (EMP) instrumentation by replacing analog fiber links and obsolete oscilloscopes and control triggers with modern supportable equipment. In FY 2019, the prototype instrumentation package will be developed. - Initiate the procurement of the direct drive electromagnetic test system at NAWCAD. This effort will evaluate potential amplifier solutions to replace amplifiers at the Electromagnetic/Environmental/Effects (E3)facility that are no longer supported by the manufacturer. The replacement amplifiers will provide less distortion/better representation responses and be maintainable. - Initiate the modernization of the insensitive munitions test arena at NAWCWD. Tasks include developing requirements for modernizing the control room, test pads and cable paths to the test arena and developing a contract package to implement the modernization of the Ordnance test facility. Modeling and Simulation: - Initiate and complete a study to evaluate past and current modeling and simulation environments in government and industry. Effort will confirm requirements of advanced modeling and simulation detailed requirements, analyze solution alternatives, and conduct design reviews for technical products. -Initiate multi-site and multi-domain modeling and simulation test bed design. Develop virtualized representations of high-priority Navy systems to integrate into complex digital battle space and into National Cyber Range. Innovate and standardize virtualization and integration process for use in DON Modeling & Simulation/Live					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 2195 / *T & E Investment*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Virtual Constructive (LVC) Environment. Evaluate architecture of major modeling and simulation environments and integrate major multi-domain test beds using best practices, open interfaces and ensure standing persistent connectability. Task will promulgate Enterprise models across Air, Surface, Subsurface and Cyber domains. Collaborate on improvements required for multi-Domain modeling and complex security environments to facilitate "Capability" Analysis/RDT&E/Training and fund enabling technologies. -Initiate common modeling and simulation tool design effort. Enhance Model Based Systems Engineering tools and integrate tools with T&E capabilities, allowing improved planning for agile software testing and cyber evaluations. Develop state-of-the-art data analysis and mining tools to integrate and present cohesive results in complex LVC environments. Develop architecture to integrate emerging Threat Intelligence products for both classified software, virtual and low-cost hardware representations. Improve and integrate Integrated Threat Analysis Simulation Environment to meet Navy requirements. Update immersive visualization model suite to add complex Electronic Warfare (EW) effects and improve ability to evaluate and understand complex interactions tied to warfighting outcomes. Continue to integrate and transition best-of-breed innovations coming from research centers, DIUX and the gaming industry into use at RDT&E facilities for program and prototyping support. Incorporate improved EW effects/interactions into constructive modeling and integrate with virtual/ hardware in the loop labs/ranges to create a coherent LVC EW/Electromagnetic Spectrum Maneuver Warfare evaluation environment. Analyze future state and develop plan to assess new capabilities for fusion and predictive systems. Integrate ONR modeling tools into test beds to allow assessment of human performance when assisted by improved machine-learning technologies. Focus on integration with Next Generation Threat System as core enterprise simulation and allow assessment in both test/training environments. Design, develop and integrate reference Interoperability emulators, low fidelity capability assessment tools and battlespace suite design to allow platforms to assess performance early in system development - Continue the minor upgrade and modernization of test capabilities at NAWCAD and NAWCWD and the upgrade to general instrumentation and equipment. - Complete the modernization of the helicopter propulsion data acquisition system - Complete the procurement of time precision RF signal generation and distribution equipment.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 2195 / *T & E Investment*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Initiate upgrade for model and simulation testing against a 5th generation aerial threat. This effort will develop the capability to synchronize radio frequency output of different electronic warfare environment generators for a coherent presentation."					
FY 2020 Base Plans: - Continue the minor upgrade and modernization of test capabilities at NAWCAD and NAWCWD and the upgrade to general instrumentation and equipment. -Continue the test cell performance improvement at NAWCAD. This effort will upgrade Propulsion Systems Evaluation Facility turbine engine test cell to provide uniform temperature and pressure intake airflow and improve dynamometer performance. FY 2020 work includes completing the design work, ordering materials and beginning the assembly of the equipment. - Continue the modernization of the insensitive munitions test arena at NAWCWD. Tasks include developing requirements for modernizing the control room, test pads and cable paths to the test arena and developing a contract package to implement the modernization of the Ordnance test facility. -Complete the upgrade for model and simulation testing against a 5th generation aerial threat. This effort will develop the capability to synchronize radio frequency output of different electronic warfare environment generators for a coherent presentation." - Complete the modernization of the data acquisition and processing system at NAWCAD. This effort will modernize the Electro Magnetic Pulse (EMP) instrumentation by replacing analog fiber links and obsolete oscilloscopes and control triggers with modern supportable equipment. In FY 2019, the prototype instrumentation package will be developed. - Complete the procurement of the direct drive electromagnetic test system at NAWCAD. This effort will evaluate potential amplifier solutions to replace amplifiers at the Electromagnetic/Environmental/Effects (E3) facility that are no longer supported by the manufacturer. The replacement amplifiers will provide less distortion/better representation responses and be maintainable. -Initiate the purchase of materials that will enable the establishment of free standing chamber walls at NAWCAD. This will allow an increased through put of testing by allowing limited anechoic testing in spaces that were not designed to be anechoic. -Initiate and complete the purchase of a global positioning simulator at NAWCAD. -Initiate and complete the purchase of x-ray equipment designed to examine munitions and ordnance at NAWCWD.					
Modeling and Simulation:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 2195 / *T & E Investment*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue multi-site and multi-domain modeling and simulation test bed design. Develop virtualized representations of high-priority Navy systems to integrate into complex digital battle space and into National Cyber Range. Innovate and standardize virtualization and integration process for use in DON Modeling & Simulation/Live Virtual Constructive (LVC) Environment. Evaluate architecture of major modeling and simulation environments and integrate major multi-domain test beds using best practices, open interfaces and ensure standing persistent connectability. Task will promulgate Enterprise models across Air, Surface, Subsurface and Cyber domains. Collaborate on improvements required for multi-Domain modeling and complex security environments to facilitate "Capability" Analysis/RDT&E/Training and fund enabling technologies. FY 2020 work includes decomposing major modeling architecture frameworks and designing a common compatible framework and developing a configuration methodology for promulgating enterprise models across multiple domains. - Continue common modeling and simulation tool design effort. Enhance Model Based Systems Engineering tools and integrate tools with T&E capabilities, allowing improved planning for agile software testing and cyber evaluations. Develop state-of-the-art data analysis and mining tools to integrate and present cohesive results in complex LVC environments. Develop architecture to integrate emerging Threat Intelligence products for both classified software, virtual and low cost hardware representations. Improve and integrate Integrated Threat Analysis Simulation Environment to meet Navy requirements. Update immersive visualization model suite to add complex Electronic Warfare (EW) effects and improve ability to evaluate and understand complex interactions tied to warfighting outcomes. Continue to integrate and transition best-of-breed innovations coming from research centers, DIUX and the gaming industry into use at RDT&E facilities for program and prototyping support. Incorporate improved EW effects/interactions into constructive modeling and integrate with virtual/ hardware in the loop labs/ranges to create a coherent LVC EW/Electromagnetic Spectrum Maneuver Warfare evaluation environment. Analyze future state and develop plan to assess new capabilities for fusion and predictive systems. Integrate ONR modeling tools into test beds to allow assessment of human performance when assisted by improved machine-learning technologies. Focus on integration with Next Generation Threat System as core enterprise simulation and allow assessment in both test/training environments. Design, develop and integrate reference Interoperability emulators, low fidelity capability assessment tools and battlespace suite design to allow platforms to assess performance early in system development. FY 2020 work includes adding EW effects to immersive visualization model suites and adding EW effects into constructive models and integrating them with virtual and hardware in the loop labs and ranges. -Initiate advanced immersive visualization of battlespace and red/blue interactions. Task will update immersive visualization model suite to add complex EW effects and improve ability to evaluate and understand complex interactions tied to warfighting outcomes. -Initiate update of Naval model and simulation environment to implement improved electronic warfare modeling effect and interactions. Task will incorporate improved Electronic Warfare (EW) effects and interactions into					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 2195 / *T & E Investment*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
constructive modeling and integrate with virtual and hardware-in-the-loop labs and ranges to create a coherent Live Virtual Constructive (LVC) EW evaluation environment. -Initiate update to Family Of Simulation models to account for offensive and defensive cyber effects in the battlespace. Task will update constructive models used for analysis and RDT&E to incorporate modeling of red/ blue cyber effects -Improvement to support assessment of machine-assisted learning and automated intelligence (AI). Integrate AI tools with Next Generation Threat System as core enterprise simulation and allow assessment in both test/ training environments. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding increase from FY 2019 to FY 2020 supports the design of a framework to enable interaction between disparate models, developing a methodology to maintain configuration control and distribution of the common modeling tools, integrating electronic warfare effects into visualization models, and for the purchase of a free standing chamber wall, the purchase of a global positioning simulator and for the purchase of x-ray equipment.					
Accomplishments/Planned Programs Subtotals	52.560	77.014	85.348	0.000	85.348

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not Applicable.

E. Performance Metrics

Successfully achieve Initial Operational Capability of 8-15 Improvement and Modernization projects per year and have 90% of test capabilities scheduled in support of Navy acquisition test programs within 180 days.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0604759N / *Major T&E Investment*	Project (Number/Name) 9999 / *Congressional Adds*	

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
9999: *Congressional Adds*	0.000	16.417	13.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	29.917
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Add

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Congressional Add: Program Increase ***FY 2018 Accomplishments:*** Funding supports Range Support Aircraft flight termination system communication, and avionics upgrades. ***FY 2019 Plans:*** N/A	3.863	0.000
Congressional Add: Navy UFR for Critical Infrastructure Investments- Major Range & Test Facilities ***FY 2018 Accomplishments:*** -Initiate and complete installation of the fiber optic connection across the Chesapeake Bay to complete the connection for the Atlantic Test Range to the Wallops Island facilities at NAWC AD. -Initiate and complete the purchase and integration of modern control radar for R2508 at NAWC WD. -Initiate and complete antenna pedestal modernizations and improvements at NAWC AD. -Initiate and complete cyber security upgrades to multiple systems at NAWC WD. ***FY 2019 Plans:*** N/A	12.554	0.000
Congressional Add: Fifth Generation Radar Ground Test Upgrades ***FY 2018 Accomplishments:*** N/A ***FY 2019 Plans:*** To initiate and complete the development of advanced radar target generators for modern radar test support at NAWCAD.	0.000	4.000
Congressional Add: Complex Electronic Warfare Test Equipment ***FY 2018 Accomplishments:*** N/A ***FY 2019 Plans:*** To initiate and complete upgrades to Air Combat Environment Test & Evaluation Facility (ACETEF) EW stimulation capability in support Mission testing at NAWCAD.	0.000	3.500
Congressional Add: Ground Based Sense-and-Avoid	0.000	6.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0604759N / *Major T&E Investment*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
FY 2018 Accomplishments: N/A ***FY 2019 Plans:*** To initiate and complete the enhancement of Atlantic Test Range (ATR) air and ground surveillance capability in support of Unmanned Aircraft Systems (UAS) operations at Naval Air Warfare Center Aircraft Division (NAWCAD).		
Congressional Adds Subtotals	16.417	13.500

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not required for Congressional Adds

E. Performance Metrics

Not required for Congressional Adds

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605126N *I (U)Joint Theater Air and Missile Defense Org*

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	0.140	0.048	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.188
3307: *Maritime Integrated Air and Missile Defense (IAMD) Processing Sys (MIPS)*	0.000	0.140	0.048	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.188

A. Mission Description and Budget Item Justification

Maritime Integrated Air and Missile Defense (IAMD) Planning System (MIPS) is an automated air and missile defense planning tool that supports the Joint Force Maritime Component Commander at the Operational Level of War (OLW) by automatically and optimally allocating and stationing ships in support of Ballistic Missile Defense (BMD) and Anti-Air Warfare (AAW). MIPS contains United States Army Patriot and Terminal High Altitude Air Defense (THAAD) models to ensure synergistic allocation and positioning of maritime units in relation to other joint units, providing optimized mutual defense for selected defended assets against selected BMD and AAW threats. MIPS completed developing significantly improved inorganic Ballistic Missile Defense planning capabilities through the incorporation of Long Range Surveillance and Training, Cued Engagement, and Launch on Tactical Digital Information Links (TADIL) planning functionality. In FY2015, MIPS began development to deliver an automated planning capability for Naval Integrated Fire Control-Counter Air (NIFC-CA) operations, incorporating the Naval Positioning Assessment Tool (NPAT) to assist in aviation asset placement, bottom contours will be added to refine the areas of ship positioning during the planning process, and adding the Cooperative Engagement Capability (CEC) stationing planning capability.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	0.141	0.048	0.000	-	0.000
Current President's Budget	0.140	0.048	0.000	-	0.000
Total Adjustments	-0.001	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.001	0.000			
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Change Summary Explanation

FY18 reflects -$0.001M due to SBIR realignment.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605126N / *(U)Joint Theater Air and Missile Defense Org*	Project (Number/Name) 3307 / *Maritime Integrated Air and Missile Defense (IAMD) Processing Sys (MIPS)*	

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
3307: *Maritime Integrated Air and Missile Defense (IAMD) Processing Sys (MIPS)*	0.000	0.140	0.048	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.188
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Maritime Integrated Air and Missile Defense (IAMD) Planning System (MIPS) is an automated air and missile defense planning tool that supports the Joint Force Maritime Component Commander at the Operational Level of War (OLW) by automatically and optimally allocating and stationing ships in support of Ballistic Missile Defense (BMD) and Anti-Air Warfare (AAW). MIPS contains United States Army Patriot and Terminal High Altitude Air Defense (THAAD) models to ensure synergistic allocation and positioning of maritime units in relation to other joint units, providing optimized mutual defense for selected defended assets against selected BMD and AAW threats. MIPS completed developing significantly improved inorganic Ballistic Missile Defense planning capabilities through the incorporation of Long Range Surveillance and Training, Cued Engagement, and Launch on Tactical Digital Information Links (TADIL) planning functionality. In FY2015, MIPS began development to deliver an automated planning capability for Naval Integrated Fire Control-Counter Air (NIFC-CA) operations, incorporating the Naval Positioning Assessment Tool (NPAT) to assist in aviation asset placement, bottom contours will be added to refine the areas of ship positioning during the planning process, and adding the Cooperative Engagement Capability (CEC) stationing planning capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Systems Engineering	0.140	0.048	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: - Complete test analysis and resolve test performance issues.					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: Research and Development effort complete in FY 2019. No requirement is needed for FY 2020.					
Accomplishments/Planned Programs Subtotals	0.140	0.048	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605126N / *(U)Joint Theater Air and Missile Defense Org*	**Project (Number/Name)** 3307 / *Maritime Integrated Air and Missile Defense (IAMD) Processing Sys (MIPS)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

ACAT III designation granted February 2011.
The MIPS Capabilities Development Document (CDD) signed and approved 4QTRFY2016.

Contracts:
MIPS RDT&E FY15-FY17

E. Performance Metrics

FY18:
- Performed independent government testing.

FY19:
- Complete test analysis and resolve test performance issues.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605152N *I Studies & Analysis Supt - Navy*

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	4.438	3.942	3.908	-	3.908	3.922	4.010	4.087	4.171	Continuing	Continuing
2092: *Naval Warfare Studies*	0.000	0.768	0.777	0.785	-	0.785	0.790	0.808	0.823	0.840	Continuing	Continuing
2097: *Manpower Personnel & Training*	0.000	0.472	0.549	0.531	-	0.531	0.501	0.512	0.522	0.533	Continuing	Continuing
3310: *Naval Aviation Developmental Planning*	0.000	3.198	2.616	2.592	-	2.592	2.631	2.690	2.742	2.798	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program provides analytical support to the Secretary of the Navy and the Chief of Naval Operations as a basis for major policy, planning and acquisition program execution decisions. It supports research and development strategy development and planning. It supports studies in the areas of manpower, personnel, training, and aviation. It also develops analytical tools for evaluating effectiveness of U.S. weapons against potential foreign threat ships and submarines.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	3.917	3.942	3.959	-	3.959
Current President's Budget	4.438	3.942	3.908	-	3.908
Total Adjustments	0.521	0.000	-0.051	-	-0.051
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.560	0.000			
• SBIR/STTR Transfer	-0.039	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.051	-	-0.051

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605152N / *Studies & Analysis Supt - Navy*	Project (Number/Name) 2092 / *Naval Warfare Studies*	

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
2092: *Naval Warfare Studies*	0.000	0.768	0.777	0.785	-	0.785	0.790	0.808	0.823	0.840	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports detailed mission, capability, and technical analysis of future naval warfighting requirements. This work provides the analytical basis for integration and prioritization of overall military capability requirements and acquisition programs in support of executing the Naval Capability Development Process and development/delivery of Mission Capability Packages, Naval Capability Packages, and Integrated Strategic Capability Plans for Chief of Naval Operations. The Resource Allocation Model (RAM) is an analytic decision support tool to aid Navy leadership with both investment and divestment programming decisions. This methodology provides an assessment process that fosters informed, understandable, repeatable investment decisions with consistent, pedigreed, and retrievable information. The focus of this work adds fidelity to the system through the inclusion of Mission Technical Baselines and Integrated Capabilities Technical Baselines data to identify program of record integration and interoperability dependencies to inform investment/divestment decisions. It provides leadership and resource sponsors with a starting point for their offset decision process as well as an issue ranking capability. RAM will include linkage of programs to strategic imperatives, programs mapped to warfare areas, program interdependencies annotated, and balance factors that can be adjusted to reflect Navy Leadership Priorities. This effort captures and maps issues/funding adjustments, and providing a system capable of identifying fiscal interdependencies and consideration to risk in order to increase accuracy in calculating programmatic risk.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Resource Allocation Model (RAM)	0.768	0.777	0.785	0.000	0.785
Articles:	-	-	-	-	-
FY 2019 Plans: Continue establishing the Resource Allocation Model to provide an analytic portfolio management methodology to aid Navy leadership with investment decision support. Provide an assessment process that fosters informed, understandable, repeatable investment decisions with consistent, pedigreed, and retrievable information. Assess programs of record and their proposed modifications on their capability to contribute to future warfighting requirements. Develop techniques that optimize the usage of the Warfare Capability Baseline Kill Chain data and enable capability trade-offs based on sound algorithmic or mathematical analysis.					
FY 2020 Base Plans: Continue establishing the Resource Allocation Model to provide an analytic portfolio management methodology to aid Navy leadership with investment decision support. Provide an assessment process that fosters informed, understandable, repeatable investment decisions with consistent, pedigreed, and retrievable information.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605152N / *Studies & Analysis Supt - Navy*	**Project (Number/Name)** 2092 / *Naval Warfare Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Assess programs of record and their proposed modifications on their capability to contribute to future warfighting requirements. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 and FY 2020.					
Accomplishments/Planned Programs Subtotals	0.768	0.777	0.785	0.000	0.785

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

The RAM methodology and analysis will be used to assist with the prioritization, planning, and programming of Naval warfare program budgets to achieve interoperable warfighting capability solutions. Identification of capability gaps and seams will be used to inform budgetary decision-making with current fiscal budgetary constraints.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605152N / *Studies & Analysis Supt - Navy*	Project (Number/Name) 2097 / *Manpower Personnel & Training*	

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
2097: *Manpower Personnel & Training*	0.000	0.472	0.549	0.531	-	0.531	0.501	0.512	0.522	0.533	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Chief of Naval Personnel has a continuing need for studies and analysis of Manpower and Personnel (M&P) policies and programs and critical M&P issues that have Navy-wide implications. This project provides an essential management tool to: (a) assess the effectiveness of existing M&P policies and programs; (b) identify needs for new policies and programs; (c) determine the required manpower and training mix relative to changing demographic, societal and legislative/regulatory actions, and to evolving strategic and geopolitical factors; (d) study the impact of M&P programs on Navy accession, attrition, retention, and performance; and, (e) to develop, validate and/or refine a broad range of M&P forecasting models. The program permits Navy to more effectively utilize Research and Development expertise to respond to emergent M&P issues on a continuing basis. This program is funded under RDT&E operational systems development because it encompasses engineering and development of new end-items prior to production approval decision.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Manpower Personnel & Training	0.472	0.549	0.531	0.000	0.531
Articles:	5	5	5	-	5
Description: The Chief of Naval Personnel has a continuing need for studies and analysis of Manpower and Personnel (M&P) policies and programs and critical M&P issues that have Navy-wide implications. This project provides an essential management tool to: (a) assess the effectiveness of existing M&P policies and programs; (b) identify needs for new policies and programs; (c) determine the required manpower and training mix relative to changing demographic, societal and legislative/regulatory actions, and to evolving strategic and geopolitical factors; (d) study the impact of M&P programs on Navy accession, attrition, retention, and performance; and, (e) to develop, validate and/or refine a broad range of M&P forecasting models. The program permits Navy to more effectively utilize Research and Development expertise to respond to emergent M&P issues on a continuing basis. This program is funded under RDT&E operational systems development because it encompasses engineering and development of new end-items prior to production approval decision. Analytical support to the Secretary of the Navy and the Chief of Naval Personnel as a basis for major policy, planning, and acquisition program execution decisions. It supports the maturation and implementation of strategy and planning via studies in the areas of manpower, personnel, training, and education.					
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605152N / *Studies & Analysis Supt - Navy*	**Project (Number/Name)** 2097 / *Manpower Personnel & Training*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue assessing Special and Incentive Pay policies. - Continue assessing Econometric Modeling System and updating elasticity - Continue assessing and evaluating retention, accession and training trade-offs. - Continue assessing economic factors and relationships to MPTE business lines ISO forecasting and responses. - Continue assessing factors, thresholds and mitigation strategies to avoid a Hollow Force. ***FY 2020 Base Plans:*** - Continue assessing Special and Incentive Pay policies. - Continue assessing Econometric Modeling System and updating elasticity - Continue assessing and evaluating retention, accession and training trade-offs. - Continue assessing economic factors and relationships to MPTE business lines ISO forecasting and responses. - Continue assessing factors, thresholds and mitigation strategies to avoid a Hollow Force. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 reflects fewer studies being conducted in FY 2020.					
Accomplishments/Planned Programs Subtotals	0.472	0.549	0.531	0.000	0.531

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This PE provides funding to support continuing need for studies and analysis of issues critical to decisions required by the Chief of Naval Personnel and his staff regarding manpower, personnel, training and education policies, and programs that have far-reaching implications to service members and the Navy budget. This PE supports research of both Naval Postgraduate School faculty and students, and in FY10 began the formulation of focused economic research, to include behavioral economics. This focus will provide continuing analysis and research to facilitate the data gathering and synthesis to provide consistent and timely update to economic

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605152N / *Studies & Analysis Supt - Navy*	**Project (Number/Name)** 2097 / *Manpower Personnel & Training*

indicators to use in the numerous models that support management decisions within the MPTE arena that have significant impact on the efficient use of the nearly $27B Manpower & Personnel, Navy budget. The economic research will consolidate the data necessary to perform elasticity estimations and maintain this data for subsequent estimations. To gather the data necessary to perform such estimations, would conservatively cost more than $300K on each such occasion. The MPTE enterprise uses dozens of models, most of which require elasticity updates. Consolidating the data repository to support this analysis will result in a cost avoidance of more than $1M and this does not include any of the actual model revisions.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605152N / *Studies & Analysis Supt - Navy*	Project (Number/Name) 3310 / *Naval Aviation Developmental Planning*	

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
3310: *Naval Aviation Developmental Planning*	0.000	3.198	2.616	2.592	-	2.592	2.631	2.690	2.742	2.798	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding supports Naval aviation pre-Milestone B developmental activities to include the conduct and integration of systems engineering activities. This project unit provides information, automated tools, and decision aids necessary to perform acquisition planning in support of warfighter capability requirements. This project unit also supports research, development, and analysis efforts to include various studies, joint requirements analysis, and cost analysis requirements in support of systems engineering activities, analyses of alternatives, and development of the 30-Year Aviation Plan, a Congressionally mandated product. Due to high turnover and end of service life of several Naval aircraft set against increasing threat capabilities, DOD 5000 series mandates documentation of capability requirements and mechanisms to obtain these capabilities. This project unit allows Naval aviation the means to properly identify capability gaps and potential solutions required to maintain maximum warfighting capability realizing (or achieving) reductions to technical risks and overall program costs.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Naval Aviation Developmental Planning	3.198	2.616	2.592	0.000	2.592
Articles:	-	-	-	-	-
FY 2019 Plans: Continue various studies for training aircraft, FA-18E/F/G, P-8A, MH-60R, MH-60S, and Joint Strike Fighter with integrated engineering, logistics, and manpower requirements. Meet emergent engineering requirements documentation within the air warfare portfolio. Update decision support toolset to facilitate internal air warfare and program office total life-cycle trades, and reduce long-term costs of data repositories, manpower, and computer programs. Fund total life-cycle analysis modeling environment required for multiple anticipated analyses of alternatives on fighter, adversary, and rotary-wing aircraft to reduce total cost of studies. Analyses are required to meet pre-Milestone B, DOD 5000 series mandated activities, as well as timelines mandated by the Congressional requirements for an Aviation Investment Plan.					
FY 2020 Base Plans: Continue various studies for training aircraft, FA-18E/F/G, P-8A, MH-60R, MH-60S, and Joint Strike Fighter with integrated engineering, logistics, and manpower requirements. Meet emergent engineering requirements documentation within the air warfare portfolio. Update decision support toolset to facilitate internal air warfare and program office total life-cycle trades, and reduce long-term costs of data repositories, manpower, and computer programs. Fund total life-cycle analysis modeling environment required for multiple anticipated					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605152N / *Studies & Analysis Supt - Navy*	**Project (Number/Name)** 3310 / *Naval Aviation Developmental Planning*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
analyses of alternatives on fighter, adversary, and rotary-wing aircraft to reduce total cost of studies. Analyses are required to meet pre-Milestone B, DOD 5000 series mandated activities, as well as timelines mandated by the Congressional requirements for an Aviation Investment Plan. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	3.198	2.616	2.592	0.000	2.592

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Produce and deliver 30-Year Aviation Plan (Congressionally mandated product). Studies performed will be used to identify known warfighter capability gaps and support acquisition planning requirements associated with potential solutions. Studies provide coherent and integrated cost and capability data to support long-term planning for Naval Aviation consistent with DOD 5000 series instructions.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605154N *I Center For Naval Analyses*							
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	44.302	42.693	47.669	-	47.669	47.372	48.916	50.002	51.058	Continuing	Continuing
0031: *MCOAG*	0.000	5.487	4.489	6.421	-	6.421	6.566	6.701	6.839	6.976	Continuing	Continuing
0148: *Center For Naval Analyses (CNA)*	0.000	38.815	38.204	41.248	-	41.248	40.806	42.215	43.163	44.082	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Center for Naval Analyses (CNA) is the Department of the Navy's (DoN) only Federally Funded Research and Development Center (FFRDC). CNA provides independent, objective, and expert analyses based on its unique access to sensitive data and hands-on exposure to fleet operations gained through its world-wide field program. CNA's research program is centrally funded by this program element and is primarily concentrated along one Marine Corps category and thirteen Navy categories of study called product areas. These product areas are structured to enhance CNA's focus of research and analysis upon the major present and future needs and issues of the Navy and the Marine Corps. Because of rapid advances in technology, changes in the fleet, the increasing complexity of weapon systems, and reductions in manpower, force structure, budgets, the current security environment, and Department of Defense (DoD) transformation, the Navy and Marine Corps have a greater need for analyses that are sophisticated, relevant, and timely. CNA conducts research and analysis at all security classification levels, to include Sensitive Compartmented Information (SCI) and Special Access Programs (SAP).

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

B. Program Change Summary ($ in Millions)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	50.432	48.797	50.578	-	50.578
Current President's Budget	44.302	42.693	47.669	-	47.669
Total Adjustments	-6.130	-6.104	-2.909	-	-2.909
• Congressional General Reductions	-	-6.104			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.756	0.000			
• Rate/Misc Adjustments	0.000	0.000	-2.909	-	-2.909
• Congressional General Reductions Adjustments	-4.374	-	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605154N *I Center For Naval Analyses*

Change Summary Explanation

The funding increase from FY 2019 to FY 2020 reflects increased support in critical subject areas in support of research efforts for the Navy/Marine Corps.

Technical: N/A

Schedule: N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605154N / *Center For Naval Analyses*	Project (Number/Name) 0031 / *MCOAG*	

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
0031: *MCOAG*	0.000	5.487	4.489	6.421	-	6.421	6.566	6.701	6.839	6.976	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports the Marine Corps portion of the Department of Navy, CNA, Center for Naval Analysis Research Program, and is managed as an element of the Marine Corps Studies System. This program provides the Marine Corps with independent and objective research and analysis of specific issues/topics appropriately performed by a Federally Funded Research and Development Center (FFRDC). Marine Corps Division analysts work at CNA headquarters and, through CNA's Field representative Program serve at commands worldwide, including: Marine Forces Command, Marine Forces Pacific, Marine Special Operations Command, the three Marine Expeditionary Forces, Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), and in Iraq, providing on-site analysis to deployed Marine forces there. CNA also assigns analysts to support the Deputy Commandants and their staffs as well as other Marine Corps organizations such as the Marine Corps Warfighting Lab, Marine Corps Systems Command, and the Commander, Marine Forces Reserve.

The program areas are linked to the Marine Corps Advocacy (prepotency), which are: (1) Logistics and Infrastructure; (2) Manpower and Training; (3) Research, Development and Acquisition; (4) Operations and Plans; (5) Programs and Resources; (6) Aviation; (7) Combat Development and Integration; and (8) Intelligence, Surveillance and Reconnaissance. Scientific Analyst support provides six scientific analysts for the following six focus areas: Deputy Commandant (DC), Plans, Policies and Operations; DC Aviation; DC Installation and Logistics; DC Programs and Resources; DC Manpower Reserve Affairs; and Director, Manpower Plans (MP) - Manpower and Reserve Affairs (M&RA). The program continues analytical support for field exercises, Ad Hoc and Quick Response study requirements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MARINE CORPS OPERATIONS AND ANALYSIS GROUP	5.487	4.489	6.421	0.000	6.421
Articles:	-	-	-	-	-
FY 2019 Plans: Conduct new studies in support of the FY 2019 Marine Corps Studies System Master Plan (MCSSMP) including the following priority areas: applying USMC capabilities today, balancing current demands against future readiness, innovating to enhance Marine Corps warfighting advantages, ways and means for USMC strategy and policy, and operating the Marine Corps more effectively and efficiently. Continue the FY 2018 analytic focus in support of CMC priorities. Enhanced support and increased capacity to address CMC priorities such as: - The relative threats posed by our major adversaries (e.g., Russian resurgence and PRC capabilities and activities) - Prosecuting global campaigns - Enabling and supporting distributed operations					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605154N / *Center For Naval Analyses*	**Project (Number/Name)** 0031 / *MCOAG*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Integrating information operations into the MAGTF construct both organizationally and to maximize effects on the battlefield - Leveraging autonomy and artificial intelligence to establish and maintain dominance over existing and emerging threats - Using big data/data science/predictive analysis to gain comparative advantage - Improving the use of gaming in Navy learning and research - Leveraging our analytic efforts for the Navy to support USMC priorities. ***FY 2020 Base Plans:*** Initiate new studies in support of the FY 2020 Marine Corps Studies System Master Plan (MCSSMP) including the following priority areas: applying USMC capabilities today, balancing current demands against future readiness, innovating to enhance Marine Corps warfighting advantages, ways and means for USMC strategy and policy, and operating the Marine Corps more effectively and efficiently. Continue the FY 2019 analytic focus in support of CMC priorities. Enhanced support and increased capacity to address CMC priorities. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase FY 2019 to FY 2020 reflects program demands for increased support and analyses directed by the Commanding General Combat Development and Integration (CD&I) in the areas of Combat Strategies; Force Protection; Protective Equipment (A0A); Troop Training and Planning and Wargaming.					
Accomplishments/Planned Programs Subtotals	5.487	4.489	6.421	0.000	6.421

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This project supports the Marine Corps portion of the Department of Navy, CNA Center for Naval Analysis Research Program, and is managed as an element of the Marine Corps Studies System. This program provides the Marine Corps with independent and objective research and analysis of specific issues/topics appropriately performed by a Federally Funded Research and Development Center (FFRDC). Marine Corps Division analysts work at CNA headquarters and, through CNA's Field

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605154N / *Center For Naval Analyses*	**Project (Number/Name)** 0031 / *MCOAG*

representative Program, serve at commands worldwide, including: Marine Forces Command, Marine Forces Pacific, Marine Special Operations Command, the three Marine Expeditionary Forces, Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), and in Iraq, providing on-site analysis to deployed Marine forces there. CNA also assigns analysts to support the Deputy Commandants and their staffs as well as other Marine Corps organizations such as the Marine Corps Warfighting Lab, Marine Corps Systems Command, and the Commander, Marine Forces Reserve.

The program areas are linked to the Marine Corps Advocacy (prepotency), which are: (1) Logistics and Infrastructure; (2) Manpower and Training; (3) Research, Development and Acquisition; (4) Operations and Plans; (5) Programs and Resources; (6) Aviation; (7) Combat Development and Integration; and (8) Intelligence, Surveillance and Reconnaissance. Scientific Analyst support provides six scientific analysts for the following six focus areas: Deputy Commandant (DC), Plans, Policies and Operations; DC Aviation; DC Installation and Logistics; DC Programs and Resources; DC Manpower Reserve Affairs; and Director, Manpower Plans (MP) - Manpower and Reserve Affairs (M&RA).

The Marine Corps' portion of the CNA program is executed via the Marine Corps Studies System (MCSS) Annual Plan which is reviewed and updated on a quarterly basis. The MCSS maintains a comprehensive listing of all CNA studies performed for the Marine Corps. The MCSS ensures there are no duplicate analytical efforts within the Marine Corps. Additionally, the Operations Analysis Division of Combat Integration Division (CD&I, MCCDC) provides analytical review of all CNA products for the Marine Corps and integrates the results and recommendations into a quarterly newsletter for research and analysis.

Other evaluation processes are as follows:
A) Contract Status Meetings: The Marine Corps participates in contract status meetings. The Contracting Officer chairs monthly meetings with the Marine Corps, and members of the CNA Business Support Group to provide guidance regarding contract management to include reviewing the Defense Technical Information Center (DTIC) database requirements to emphasize the contractual requirement that all ongoing research be submitted to DTIC to ensure against duplication to reviewing CNA's cost effectiveness and efficiency.

B) Marine Corps Three-Star Flag Officer Review: The Commanding General, CD&I, MCCDC and the Director, Operations Analysis Division (OAD) frequently to review the current research program and provide guidance to CNA regarding future research requirements. Meetings are essential to provide CNA to ensure that research conducted is of the greatest value to the Marine Corps. The meetings serve as a roadmap for future projects. The Marine Corps' research plan is consolidated with the DoN's Annual Plan that is submitted to the Deputy Chief of Naval Operations for Integration of Capabilities and Resources (N8) for final review and acceptance.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605154N / *Center For Naval Analyses*	Project (Number/Name) 0148 / *Center For Naval Analyses (CNA)*	

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
0148: *Center For Naval Analyses (CNA)*	0.000	38.815	38.204	41.248	-	41.248	40.806	42.215	43.163	44.082	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program supports the Navy's portion of the CNA Research Program, which is primarily concentrated along thirteen Navy categories of study called product areas. These product areas include the following: (1) Manpower/Personnel, Medical and Training; (2) Intelligence, Information and Networks; (3) Plans, Policy, and Operations; (4) Infrastructure and Readiness; (5) Resources, Programs, and Assessments; (6) Capability Integration; (7) Research, Development and Acquisition; (8) Navy Field Program; (9) Navy Field Exercise Program; (10) Scientific Analyst Program; (11) Navy Quick Response Projects; (12) Navy General Concept Development and (13) CNA Initiated Projects. This program provides the Navy with independent and objective research and analysis of specific issues/topics appropriately performed by a FFRDC and includes studies support (to include quick response studies support), field support to fleet commanders, scientific analyst support to Deputy Chiefs of Naval Operations (DCNOs) and their staffs, exercise support, and ad hoc support. CNA's analyses have resulted in substantial improvements in force structure, fleet effectiveness, and significant cost avoidance

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: CENTER FOR NAVAL ANALYSES, NAVY	38.815	38.204	41.248	0.000	41.248
Articles:	-	-	-	-	-
Description: Funding in this project supports integrated research for the Department of Navy (DoN) and other DoD components across a broad range of issues including the development and evaluation of tactics, operations testing of new systems, assessment of current capabilities, logistics and readiness, work-force management, space and space-related activities, cyber operations, cost and operational program analysis, assessment of advanced technology, force planning, and strategies implications of political-military developments.					
FY 2019 Plans: Continue all efforts in support of CNO priorities, to include, maintaining maritime superiority for the future, applying maritime power today, Navy strategy and policy, strategic workforce planning and management, operating the Navy more efficiently and effectively, balancing current and future readiness, understanding great power and dynamics. Conduct new studies in the following priority areas: - Applying maritime power today - Maintaining maritime superiority for the future - Innovating to compete and win					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605154N / *Center For Naval Analyses*	**Project (Number/Name)** 0148 / *Center For Naval Analyses (CNA)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Balancing current and future readiness - Understanding great power dynamics - Aligning ends, ways and means for Navy strategy and policy - Operating the Navy more efficiently and effectively - Strategic workforce planning - Enhanced support and increased capacity to address emerging CNO priorities including Russia's resurgence and implications for the Navy and its partners - Aligning the programming and budgeting process with Navy strategy - Enabling distributed networked operations - Leveraging autonomy and artificial intelligence to establish and maintain dominance over emerging threats - Using big data/data science/predictive analytics to gain competitive advantage; and integrating gaming into Navy learning and research ***FY 2020 Base Plans:*** CNA conducts individual analytic efforts for a wide range of DoN and DoD sponsors including: OPNAV and HQMC, the Navy Secretariat, Type Commanders, the numbered Fleets and Navy/Marine Corps component commanders, Combatant Commands, operational test and evaluation (OT&E) activities including OPTEVFOR and DOT&E, SYSCOMs, Office of the Secretary of Defense, Defense agencies and the Defense Intelligence Community. In FY 2020 CNA will provide study and analysis support on critical Navy corporate priorities. This analysis will review strategic efforts, including engagement with peer competitors and disruptive actions globally. In addition, CNA will help Navy address internal processes from logistics to personnel policies. As the only Navy funded FFRDC, CNA will be integral in the development of future initiatives; including big data and machine learning. CNA will also continue to provide analytical support to selected wargames and exercises; providing detailed analysis of each event to identify areas of improvement for Navy Operational procedures. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase from FY 2019 to FY 2020 reflects increased support from CNA in critical subject areas in support of Navy/Marine Corps research efforts.					
Accomplishments/Planned Programs Subtotals	38.815	38.204	41.248	0.000	41.248

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605154N / *Center For Naval Analyses*	**Project (Number/Name)** 0148 / *Center For Naval Analyses (CNA)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

CNA is reviewed throughout the research year on several different levels to ensure that research produced is not duplicated elsewhere. The primary (and most effective) method of review for duplication is the Contracting Officer's Technical Representative (COTR) review and approval of each and every project proposal submitted by CNA. This method is highly effective in providing the necessary oversight to ensure that duplication of effort does not occur. The Marine Corps Studies System (MCSS) maintains a comprehensive listing of all CNA studies performed for the USMC. The MCSS ensures that there are no duplicate analytical efforts within the USMC. Additionally, the Studies and Analysis Division of the Marine Corps Combat Development Command (MCCDC) provides analytical review of all CNA products for the USMC and integrates the results and recommendations into a quarterly newsletter and an annual plan for research and analysis.
Other evaluation processes:

A) DoN Contract Status Meetings: As part of the CNA oversight process, the Office of Naval Research Contracting Officer chairs a monthly meeting with the COTR, the USMC, and the CNA's Chief Financial Office to provide guidance regarding contract management.

B) Two-Star Flag Officers and VCNO Corporate Board Meetings: DoN Two-Star and their equivalent civilian counterparts meet several times a year to review the current fiscal year's research and provide guidance to CNA regarding their future research for DoN. These high level meetings are essential to provide CNA with DoN's guidance to ensure that the research conducted is of the greatest value to DoN. The meetings also serve as the catalyst for the formation of the CNA Annual Plan, CNA's roadmap for research during the upcoming fiscal year. The CNA Annual Plan is then submitted to VCNO/N8 for final review and acceptance.

C) CNA Comprehensive Review: Prior to contract renewal, CNA, as an Federally Funded Research and Development Center (FFRDC), must be evaluated to ensure that the DoN wants to renew CNA's contract for an additional five year period. DoN completes an exhaustive review of sponsors' technical needs and mission requirements; DoN's consideration of other sources; CNA's efficiency and effectiveness; CNA's management and cost effectiveness; as well as the FFRDC establishment criteria and sponsorship agreement. The CNA Comprehensive Review is approved by ASN (RDA) and accepted by OSD (AT&L).

D) Navy-CNA Integration Board. DON 3-stars and CNA leadership meet quarterly to review the annual research program, discuss priorities and related implications for current and future work, and address issues impacting CNA's ability to execute its mission as an FFRDC. CNA research highlights are also briefed and discussed. The board meetings are chaired by the Director, Navy Staff.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605285N *I (U)Next Generation Fighter*

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	0.000	5.000	20.698	-	20.698	55.051	111.263	255.592	371.897	Continuing	Continuing
2937: *Next Generation Fighter*	0.000	0.000	5.000	20.698	-	20.698	55.051	111.263	255.592	371.897	Continuing	Continuing

A. Mission Description and Budget Item Justification

Next Generation Air Dominance (NGAD) is the Family-of-System (FoS) required to deliver future aircraft carrier based TACAIR capabilities. The FoS will include both the recapitalization of current capabilities of the existing air wing and development of new capabilities for 2035 mission success across multiple domains. This program provides analytical support to the Secretary of the Navy and the Chief of Naval Operations as a basis for major policy, planning and acquisition program execution decisions and provides the initial airframe, avionics, and power/propulsion efforts to develop and field the FoS necessary to replace the United States Navy's F/A-18E/F Super Hornet. It supports research and development strategy development and planning and supports studies in the areas of manpower, personnel, training, and aviation. It also develops and delivers Technology Maturation and Risk Reduction Acquisition Plans and all supporting documents and security classification guides/program protection plans.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

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	5.000	5.100	-	5.100
Current President's Budget	0.000	5.000	20.698	-	20.698
Total Adjustments	0.000	0.000	15.598	-	15.598
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	-0.020	-	-0.020
• Rate/Misc Adjustments	0.000	0.000	15.618	-	15.618

Change Summary Explanation

Technical: Not applicable.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605285N / *(U)Next Generation Fighter*				Project (Number/Name) 2937 / *Next Generation Fighter*			
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**
2937: *Next Generation Fighter*	0.000	0.000	5.000	20.698	-	20.698	55.051	111.263	255.592	371.897	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports the analysis of the advanced air dominance family of systems to replace capabilities lost with the end of service life of the F/A-18E/F and EA-18G.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Next Generation Air Dominance Analysis	0.000	5.000	5.082	0.000	5.082
Articles:	-	-	-	-	-
FY 2019 Plans: Conduct systems engineering and mission effectiveness analysis to sufficiently review capabilities of the proposed family-of-system alternatives. Conduct cost estimates and affordability analysis with sufficient fidelity across the total life-cycle of the alternative courses of action to identify a preferred system concept. This includes analysis and support of AoA execution and Advanced Development Program Office planning. Products include data sets, automated tools, and decision aids necessary to provide OPNAV and OSD the information to perform acquisition planning in support of warfighter capability requirements. Conduct briefing support as required by excursions at the direction of the AoA executive steering group.					
FY 2020 Base Plans: Conduct systems engineering and mission effectiveness analysis to sufficiently review capabilities of the proposed family-of-system alternatives. This includes analysis and support of Advanced Development Program Office planning. Products include data sets, automated tools, and decision aids necessary to provide OPNAV and OSD the information to perform acquisition planning in support of warfighter capability requirements. Conduct briefing support as required by excursions at the direction of the AoA executive steering group					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: No significant change between FY19 and FY20					
Title: NG Advanced Engines	0.000	0.000	15.616	0.000	15.616
Articles:	-	-	-	-	-
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605285N / *(U)Next Generation Fighter*	**Project (Number/Name)** 2937 / *Next Generation Fighter*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2020 Base Plans:*** Support Technology Maturation and Risk Reduction (TMRR) acquisition planning and execution. Define TMRR propulsion and power system requirements, security construct and execution plan. Conduct in-house performance analysis and requirements refinement. Initiate TMRR development efforts to include engine, power and thermal systems design, refined cycle definitions and performance analysis. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase between FY19 and FY20 due to Next Generation Advanced Engine effort beginning in FY20					
Accomplishments/Planned Programs Subtotals	0.000	5.000	20.698	0.000	20.698

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Produce and deliver FA-XX (Next Generation Air Dominance) Analysis of Alternatives and Initial Capabilities Document development in accordance with Office of the Secretary of Defense Cost Assessment and Program Evaluation guidance. Analysis performed will be used to identify known warfighter capability gaps and support acquisition planning requirements associated with potential solutions. Analysis provides coherent and integrated cost, risk, and effectiveness data to support long-term planning for Naval Aviation consistent with DOD 5000 series instructions.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605502N *I Small Business Innovative 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	0.000	407.133	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	407.133
1812: *NAVAIR SBIR Program*	0.000	119.476	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	119.476
1813: *SPAWAR SBIR Program*	0.000	8.391	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.391
1814: *NAVSEA SBIR Program*	0.000	83.792	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	83.792
1824: *USMC SBIR Program*	0.000	14.722	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.722
1862: *SSPO SBIR Program*	0.000	7.262	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.262
1863: *NAVSUP SBIR Program*	0.000	2.200	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.200
1864: *ONR SBIR Program*	0.000	92.116	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	92.116
1865: *SBIR ADMIN - ONR*	0.000	5.726	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.726
2016: *NAVFAC SBIR Program*	0.000	1.600	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.600
2204: *Small Business Tech Transfer Program*	0.000	30.547	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	30.547
2240: *SBIR ADMIN - USMC*	0.000	0.717	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.717
2241: *SBIR ADMIN - SPAWAR*	0.000	0.423	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.423
2242: *SBIR ADMIN - NAVSEA*	0.000	6.006	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.006
2243: *SBIR ADMIN - NAVAIR*	0.000	5.899	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.899
2244: *SBIR ADMIN - NAVFAC*	0.000	0.075	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.075
2245: *SBIR ADMIN - NAVSUP*	0.000	0.082	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.082
2248: *SBIR ADMIN - SSPO*	0.000	0.373	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.373
3201: *SBIR CRP - NAVAIR*	0.000	1.223	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.223
3202: *SBIR CRP - SPAWAR*	0.000	0.088	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.088
3203: *SBIR CRP - NAVSEA*	0.000	0.858	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.858
3204: *SBIR CRP - USMC*	0.000	0.149	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.149
3205: *SBIR CRP - ONR*	0.000	1.083	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.083
3213: *NAVAIR STTR Program*	0.000	17.196	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	17.196
3233: *SPAWAR STTR Program*	0.000	0.070	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.070

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy													Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605502N *I Small Business Innovative Research*								
3344: *SBIR Trial Admin Program*	0.000	7.059	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.059

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in
federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

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	407.133	0.000	0.000	-	0.000
Total Adjustments	407.133	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	407.133	0.000			
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1812 / *NAVAIR SBIR 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
1812: *NAVAIR SBIR Program*	0.000	119.476	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	119.476
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in
federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVAIR SBIR Program	119.476	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	119.476	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1813 / *SPAWAR SBIR 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
1813: *SPAWAR SBIR Program*	0.000	8.391	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.391
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in
federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SPAWAR SBIR PROGRAM	8.391	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	8.391	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1814 / *NAVSEA SBIR 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
1814: *NAVSEA SBIR Program*	0.000	83.792	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	83.792
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVSEA SBIR Program	83.792	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	83.792	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1824 / *USMC SBIR 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
1824: *USMC SBIR Program*	0.000	14.722	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.722
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: USMC SBIR Program	14.722	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	14.722	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1862 / *SSPO SBIR 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
1862: *SSPO SBIR Program*	0.000	7.262	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.262
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SSPO SBIR Program	7.262	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	7.262	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1863 / *NAVSUP SBIR 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
1863: *NAVSUP SBIR Program*	0.000	2.200	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.200
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVSUP SBIR Program	2.200	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	2.200	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1864 / *ONR SBIR 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
1864: *ONR SBIR Program*	0.000	92.116	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	92.116
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in
federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: ONR SBIR Program	92.116	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	92.116	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

None

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 1865 / *SBIR ADMIN - ONR*	

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
1865: *SBIR ADMIN - ONR*	0.000	5.726	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.726
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small Business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SBIR Administration	5.726	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Small Business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts elated to SBIR. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	5.726	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

NONE

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2016 / *NAVFAC SBIR 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
2016: *NAVFAC SBIR Program*	0.000	1.600	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.600
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in
federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVFAC SBIR PROGRAM	1.600	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	1.600	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2204 / *Small Business Tech Transfer 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
2204: *Small Business Tech Transfer Program*	0.000	30.547	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	30.547
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Technology Transfer (STTR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $1,000,000,000 to set aside 0.45% for STTR in FY 2018. This funds cooperative R&D between small businesses and research institutions. The program goals are to create vehicles
from moving ideas from research institutions to market; enable researchers to pursue commercial application of technologies; and bridge funding gap between basic research and commercial product.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Small Business Tech Transfer Program	30.547	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	30.547	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605502N / *Small Business Innovative Research*	**Project (Number/Name)** 2204 / *Small Business Tech Transfer Program*

E. Performance Metrics

NONE

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2240 / *SBIR ADMIN - USMC*	

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
2240: *SBIR ADMIN - USMC*	0.000	0.717	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.717
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: USMC SBIR Administration	0.717	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.717	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2241 / *SBIR ADMIN - SPAWAR*	

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
2241: *SBIR ADMIN - SPAWAR*	0.000	0.423	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.423
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SBIR ADMIN SPAWAR	0.423	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.423	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2242 / *SBIR ADMIN - NAVSEA*	

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
2242: *SBIR ADMIN - NAVSEA*	0.000	6.006	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.006
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVSEA SBIR Administration	6.006	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	6.006	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2243 / *SBIR ADMIN - NAVAIR*	

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
2243: *SBIR ADMIN - NAVAIR*	0.000	5.899	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.899
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small Business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVAIR SBIR Administration	5.899	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	5.899	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2244 / *SBIR ADMIN - NAVFAC*	

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
2244: *SBIR ADMIN - NAVFAC*	0.000	0.075	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.075
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SBIR ADMIN NAVFAC	0.075	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.075	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*				Project (Number/Name) 2245 / *SBIR ADMIN - NAVSUP*			
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**
2245: *SBIR ADMIN - NAVSUP*	0.000	0.082	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.082
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SBIR ADMIN NAVSUP	0.082	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.082	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 2248 / *SBIR ADMIN - SSPO*	

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
2248: *SBIR ADMIN - SSPO*	0.000	0.373	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.373
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Small business Innovative Research (SBIR) Administration. Manage the program, technical efforts and award contracts related to SBIR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SSPO SBIR Administration	0.373	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.373	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 3201 / *SBIR CRP - NAVAIR*	

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
3201: *SBIR CRP - NAVAIR*	0.000	1.223	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.223
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Section 252 of the 2006 NDAA Public law No. 109-163 allowed up to 1% of the SBIR to be used to fund the administrative costs of the Commercialization Pilot Program (CPP). The pilot program transitioned to the Commercialization Readiness Program (CRP). CRP is part of the SBIR and STTR Reauthorization Act of 2012 (P. L. 112-81, Section 5001).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Commercialization Readiness Program (CRP) - NAVAIR	1.223	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	1.223	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*				Project (Number/Name) 3202 / *SBIR CRP - SPAWAR*			
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**
3202: *SBIR CRP - SPAWAR*	0.000	0.088	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.088
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Section 252 of the 2006 NDAA Public law No. 109-163 allowed up to 1% of the SBIR to be used to fund the administrative costs of the Commercialization Pilot Program (CPP). The pilot program transitioned to the Commercialization Readiness Program (CRP). CRP is part of the SBIR and STTR Reauthorization Act of 2012 (P. L. 112-81, Section 5001).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Commercialization Readiness Program (CRP)	0.088	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.088	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 3203 / *SBIR CRP - NAVSEA*	

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
3203: *SBIR CRP - NAVSEA*	0.000	0.858	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.858
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Section 252 of the 2006 NDAA Public law No. 109-163 allowed up to 1% of the SBIR to be used to fund the administrative costs of the Commercialization Pilot Program (CPP). The pilot program transitioned to the Commercialization Readiness Program (CRP). CRP is part of the SBIR and STTR Reauthorization Act of 2012 (P. L. 112-81, Section 5001).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SBIR Commercialization Readiness Program (CRP) NAVSEA	0.858	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.858	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*				Project (Number/Name) 3204 / *SBIR CRP - USMC*			
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**
3204: *SBIR CRP - USMC*	0.000	0.149	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.149
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Section 252 of the 2006 NDAA Public law No. 109-163 allowed up to 1% of the SBIR to be used to fund the administrative costs of the Commercialization Pilot Program (CPP). The pilot program transitioned to the Commercialization Readiness Program (CRP). CRP is part of the SBIR and STTR Reauthorization Act of 2012 (P. L. 112-81, Section 5001).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SBIR Commercialization Readiness Program (CRP) USMC	0.149	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.149	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 3205 / *SBIR CRP - ONR*	

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
3205: *SBIR CRP - ONR*	0.000	1.083	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.083
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Section 252 of the 2006 NDAA Public law No. 109-163 allowed up to 1% of the SBIR to be used to fund the administrative costs of the Commercialization Pilot Program (CPP). The pilot program transitioned to the Commercialization Readiness Program (CRP). CRP is part of the SBIR and STTR Reauthorization Act of 2012 (P. L. 112-81, Section 5001).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SBIR Commercialization Readiness Program (CRP) ONR	1.083	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	1.083	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

NONE

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*				Project (Number/Name) 3213 / *NAVAIR STTR 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**
3213: *NAVAIR STTR Program*	0.000	17.196	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	17.196
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Technology Transfer (STTR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $1,000,000,000 to set aside 0.45% for STTR in FY 2018. This funds cooperative R&D between small businesses and research institutions. The program goals are to create vehicles
from moving ideas from research institutions to market; enable researchers to pursue commercial application of technologies; and bridge funding gap between basic research and commercial product.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVAIR STTR Program	17.196	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	17.196	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605502N / *Small Business Innovative Research*	**Project (Number/Name)** 3213 / *NAVAIR STTR Program*

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 3233 / *SPAWAR STTR 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
3233: *SPAWAR STTR Program*	0.000	0.070	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.070
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Technology Transfer (STTR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $1,000,000,000 to set aside 0.45% for STTR in FY 2018. This funds cooperative R&D between small businesses and research institutions. The program goals are to create vehicles
from moving ideas from research institutions to market; enable researchers to pursue commercial application of technologies; and bridge funding gap between basic research and commercial product.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SPAWAR STTR PROGRAM	0.070	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.070	0.000	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-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605502N / *Small Business Innovative Research*	Project (Number/Name) 3344 / *SBIR Trial Admin 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
3344: *SBIR Trial Admin Program*	0.000	7.059	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.059
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovation Research (SBIR) program requires each Federal agency that has an extramural budget for Research and Development (R&D) in excess of $100,000,000 to set aside 3.2% for SBIR in FY 2018. This funds R&D at small businesses. The program goals are to stimulate technological innovation; increase small business participation in federally funded R&D; foster participation by minority and disadvantaged firms in technological innovation; and increase private sector commercialization of federal R&D.

This project provides funding for the pilot administrative program authorized by the FY 2012 National Defense Authorization Act (SEC. 5141. PILOT TO ALLOW FUNDING FOR ADMINISTRATIVE, OVERSIGHT, AND CONTRACT PROCESSING COSTS.)

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: New Accomplishment/Planned Program Entry	7.059	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	7.059	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605502N / *Small Business Innovative Research*	**Project (Number/Name)** 3344 / *SBIR Trial Admin Program*

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605804N / *Technical Information Services*							
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	1.280	1.029	0.988	-	0.988	0.930	0.944	0.963	0.983	Continuing	Continuing
0835: *Tech Info System*	0.000	0.766	1.029	0.988	-	0.988	0.930	0.944	0.963	0.983	Continuing	Continuing
2296: *Federal Lab Consortium*	0.000	0.514	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.514

A. Mission Description and Budget Item Justification

The Technical Information Services program provides support to achieve affordability in the development of Navy systems by reducing life-cycle costs through the facilitation of advanced technology associations between U.S. industry and the Navy. Warfighting effectiveness is enhanced through strategic relationships with industry to commercialize the science and technology developed by the Naval Research Enterprise and to gain strategic understanding of industry Research and Development Programs and plans; access concepts and technologies; and access to business practices within the civil sector.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	0.782	1.029	1.009	-	1.009
Current President's Budget	1.280	1.029	0.988	-	0.988
Total Adjustments	0.498	0.000	-0.021	-	-0.021
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	0.498	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.021	-	-0.021

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605804N / *Technical Information Services*	Project (Number/Name) 0835 / *Tech Info 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
0835: *Tech Info System*	0.000	0.766	1.029	0.988	-	0.988	0.930	0.944	0.963	0.983	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The goal for this project is to enhance warfighter effectiveness by: leveraging industry independent Research and Development science and technology base; developing strategic partnerships with industry to transition private sector technology; and transferring appropriate Navy-developed innovative concepts and inventions to the private sector for purposes of commercialization. (Public Law 96-480, Federal Technology Transfer Act of 1986.)

This project also provides the Department of the Navy (DON) interface to the Office of the Assistant Secretary of Defense for Rapid Fielding, and to the Assistant Secretary of Commerce for Technology Policy for matters relating to policy and reporting requirements for technology transfer.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: TECHNICAL INFORMATION SERVICES	0.766	1.029	0.988	0.000	0.988
Articles:	-	-	-	-	-
Description: Technical Information Services supports the spin-in and spin-out of research and development performed by Navy laboratories and industry. This program develops the tools and provides management oversight of the Department of Navy (DON) Domestic Technology Transfer (T2) Program. The Navy plans on initiating two new pilot programs per year with the objective of increasing the visibility and transfer of the Navy developed technologies.					
FY 2019 Plans: Conduct the following efforts in FY 2019: Revise and update Technology Transfer mechanisms (e.g., Cooperative Research and Development Agreements (CRADAs), PIAs templates, Navy Defense Technology Transfer Information System (NDTTIS) database, online training) and continue updates to the T2 Handbook and T2 Policy Guidance. Execute two new pilot programs to support Technology Transfer (T2) efforts at Navy Office of Research and Technology Application (ORTA) activities across Navy laboratories. T2 innovation efforts are selected during 1st quarter of the year of appropriation and executed during the same. These efforts lead to innovations to T2 process within the sponsored Navy laboratory and are shared across the Department of the Navy (DoN) and Defense Wide.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605804N / *Technical Information Services*	**Project (Number/Name)** 0835 / *Tech Info System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
To enhance transactional efficiency between the Navy laboratories and industry and academic collaborators, the Navy Technology Transfer (T2) Office will revise and update Technology Transfer mechanisms (e.g., Cooperative Research and Development Agreements (CRADAs), PIAs templates, Navy Defense Technology Transfer Information System (NDTTIS) database, online training), Technology Transfer Handbook, Licensing Handbook and Policy Guidance. It will also execute at least two new pilot programs to embolden innovative T2 efforts at Navy Office of Research and Technology Application (ORTA) activities across laboratories and commercialize Navy laboratory-developed technologies. Additionally, the T2 Program Office will raise the visibility of Navy technologies through publications, videos, website/social media, marketing and outreach to capitalize on the Navy laboratory developed innovations and systematically drive economic growth in the industrial base, create new services and products and amplify an inclusive technology based economic development. In order to deliver solutions and capabilities to the acquisition workforce in support of the warfighter, the Navy T2 Program Office will enhance the NDTTIS database to leverage the value/impact of CRADAs. The Navy-wide T2 Innovation Discovery/Intellectual Property Mining Program will be expanded to identify, license and transition more patentable inventions that provide solutions to acquisition and commercial industry technological challenges that can benefit the warfighter and society. The Program Office will also lead and participate in national and regional technology transfer industry and academia engagement events to optimize the marketing and outreach of Navy developed inventions and expand on collaboration opportunities with industry and engage with underserved communities and non-traditional partners to advance commercialization. The Navy T2 Program Office will institute a customer relationship and transaction management system that harmonizes and streamlines the T2 mechanism collaboration process, consolidates the Navy's intellection capital into a single structure through a centrally managed portfolio that will include a marketing analysis component, provide for external and internal stakeholder engagement, licensing and ecosystem landscape analysis to discover and forge opportunities for mutually beneficial T2 commercialization collaborations with academia, economic development agencies and start-up businesses. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605804N / *Technical Information Services*	**Project (Number/Name)** 0835 / *Tech Info System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	0.766	1.029	0.988	0.000	0.988

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Demonstrate support for technological transitions from the Naval Research Enterprise into industrial and commercial enterprises supporting Navy programs of record and warfighter needs, by being responsive to Offices of Research and Technology Applications focal points for technology transfer in their development of Cooperative Research and Development Agreements (CRADA), and reducing transaction/information exchange timeframes to enable invention commercialization and utilization of government funded facilities, equipment and innovations.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605804N / *Technical Information Services*	Project (Number/Name) 2296 / *Federal Lab Consortium*	

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
2296: *Federal Lab Consortium*	0.000	0.514	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.514
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Federal Laboratory Consortium for Technology Transfer (FLC) was established by Congress under the Federal Technology Transfer Act of 1986 (P.L. 99-502, 20 October 1986, as amended). The FLC, in cooperation with federal laboratories and the private sector, provides services to enhance the transfer of federally-developed technology to include activities such as: developing and administering technology transfer training courses and materials; assisting Federal agencies and laboratories in their technology transfer programs; and providing a clearinghouse for technology transfer requests.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: FEDERAL LAB CONSORTIUM	0.514	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: The Federal Laboratory Consortium for Technology Transfer (FLC) was established by Congress under the Federal Technology Transfer Act of 1986 (P.L. 99-502, 20 October 1986, as amended). The FLC, in cooperation with federal laboratories and the private sector, provides services to enhance the transfer of federally-developed technology to include activities such as: developing and administering technology transfer training courses and materials; assisting Federal agencies and laboratories in their technology transfer programs; and providing a clearinghouse for technology transfer					
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.514	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605804N / *Technical Information Services*	**Project (Number/Name)** 2296 / *Federal Lab Consortium*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

In accordance with the Federal Technology Transfer Act of 1986 (P.L. 99-502, 20 October 1986, as amended), disseminated funding judiciously.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605853N *I Management, Technical & Intl Supt*							
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	135.102	86.932	102.401	-	102.401	100.981	101.029	101.346	103.306	Continuing	Continuing
0149: *International Coop RDT&E*	0.000	2.886	3.575	3.658	-	3.658	3.513	3.549	3.623	3.696	Continuing	Continuing
1767: *Naval War Col Strategic Studies Supt*	0.000	4.434	5.263	5.658	-	5.658	5.769	5.879	5.991	6.111	Continuing	Continuing
2098: *Navy Postgraduate School (NPS) Studies Support*	0.000	12.335	11.588	10.840	-	10.840	11.220	11.345	11.582	11.816	Continuing	Continuing
2221: *JT Mission Assessment Studies*	0.000	23.998	25.134	25.799	-	25.799	25.866	26.399	26.894	27.454	Continuing	Continuing
2801: *Anti-Tamper*	0.000	1.385	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.385
3017: *Enterprise Information Systems*	0.000	0.000	0.000	0.932	-	0.932	0.952	0.970	0.991	1.011	Continuing	Continuing
3027: *Defense Critical Infrastructure Program*	0.000	6.186	5.862	7.743	-	7.743	6.927	7.073	7.217	7.361	Continuing	Continuing
3312: *MTMD-Maritime Theater Missile Defense Forum*	0.000	7.692	7.045	14.158	-	14.158	16.251	15.043	14.342	14.523	Continuing	Continuing
3330: *Naval Research Laboratory (NRL) Facilities Modernization*	0.000	18.210	15.438	19.026	-	19.026	16.351	16.741	16.361	16.681	Continuing	Continuing
3363: *PACOM Initiative*	0.000	14.520	13.027	14.587	-	14.587	14.132	14.030	14.345	14.653	Continuing	Continuing
9999: *Congressional Adds*	0.000	43.456	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	43.456

A. Mission Description and Budget Item Justification

International Cooperative RDT&E: provide program management, execution, and support to implement a broad range of cooperative Naval Research and Development, Test and Evaluation initiatives to improve coalition interoperability, harmonize US Navy requirements with allied and friendly nations, and identify cooperative international opportunities, and improve coalition interoperability. In addition, it develops coherent approaches, coordinating with partner nations, to sea-based missile defense, command, control, communications, computers and intelligence (C4I), and cooperative acquisition programs while also identifying technology to support the Global Maritime Partnership initiative.

Naval War College Strategic Studies Support:

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605853N *I Management, Technical & Intl Supt*

Provides research, analysis and gaming activities which serve as a focal point, stimulus, and major source of strategic and operational thought within the Navy, joint and interagency communities. These efforts generate strategic and operational alternatives, quantitative analysis, war gaming and political military assessments, and provide recommendations regarding the formulation and execution of maritime options . The War Gaming Department plans, designs, executes, analyzes and reports on the Navy's Title 10 war games. These war games provide analytical input to the Navy's Strategic Plan, assessments of future concepts, and recommendations to the Navy's Quadrennial Defense Review, force design, and strategy process. The War Gaming Department also designs, executes and analyzes war games for theater security cooperation plans and operational war fighting issues.

Assessment Program:

The Navy Assessment Program provides capability-based planning assessment for Joint Capabilities Integration and Development System (JCIDS), conducts analysis to affect war fighting capability trades and enterprise resources, identifies needs, gaps, and overlaps, and assesses alternative solutions to Joint needs. The program supports both the development and use of modeling, simulation and analytically-based warfare and provides business analyses and analytic tools that provide the basis for decision making with respect to concepts of operations (CONOPS), Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Systems (Information Dominance); warfare systems (Sea Strike, Sea Shield, and Sea Basing) and analytical underpinnings/basis for programmatic decisions of the Navy's top leadership regarding their architectures, force structure, and the Navy's core "organize, train, and equip mission" (the warfare and provider Enterprises). The program provides overarching Planning, Programming, Budgeting and Execution System (PPBES) analyses and guidance for PPBES which provides gap analysis and investment strategy and total obligation authority allocation. It provides independent capability analysis and assists in structuring follow-on Navy analyses. The program coordinates Navy's position for the enhanced planning process and conducts net assessments. It serves as the lead campaign analysis to approve Navy warfare and support requirements. The program supports "A Cooperative Strategy for 21st Century Seapower 21" as modified by the Maritime Strategy which charts a course for the Navy, Coast Guard and Marine Corps to work collectively with each other and international partners to prevent crises from occurring or reacting quickly should one occur to avoid negative impact to the United States. It serves as an independent assessor providing a broad-view perspective across the Navy staff apart from resource sponsors, with an integrated look at both war fighting and war fighting support programs. The program supports the world class modeling efforts to attain a level of Modeling and Simulation (M&S) capability that is world class and establishes the Navy as a leader in the Department of Defense (DoD) M&S community. It provides Navy alternatives in assessing the implications embedded within resource decisions in a quantified context of costs versus capability versus risk. The program provides independent analytic support to Navy leadership in conjunction with various executive level decision forums. It develops tools and analytical methodologies that assist in evaluating Navy programs and provides technical leadership for the analysis functional area of Naval Modeling and Simulation.

Operations Integration Group: Classified

Naval Research Laboratory (NRL)Facilities Modernization: This program has been established to provide a systematic and planned approach to improve vital in-house science and technology (S&T) laboratory facilities which are reaching or have reached critical stages of deterioration. The program includes restoration and modernization (R&M) initiatives for about 350,000 net square feet, where the average age of the buildings is 67 years old.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605853N *I Management, Technical & Intl Supt*

The Joint Information Environment (JIE) initiative provides the supporting IT capability framework comprised of shared information technology infrastructure, enterprise services, interoperability with coalition partners and a single security architecture that enables mission commanders to execute mission partnered operations. JIE provides the U.S. configuration controls necessary for enterprise capabilities. By utilizing a U.S enterprise-wide secure Identity and Access Management system, JIE ensures that authorized users at the right classification level gain access to only the data and services they are entitled. The continued development and refinement of a Joint Information Environment will provide for a significant improvement in data sharing within, and between, coalition maritime elements.

MTMD - Maritime Theater Missile Defense Forum:

This project funds participation in Maritime Integrated Air and Missile Defense projects with other nations through the Maritime Missile Defense Projects Framework Memorandum of Understanding of 2004 (as amended 2009, 2015, and 2016).Known as the Maritime Theater Missile Defense (MTMD)Forum, it promotes interoperability with the Navies of eleven participating nations (Australia, Canada, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, United Kingdom and the United States). This project funds participation in multiple Projects and includes a maritime contribution to
the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) project, now known as NATO Ballistic Missile Defense (BMD). Engineering analysis and recommendations from MTMD activities are provided to European, Pacific and
Central Combatant Commands to influence present day operations. Specifically, the MTMD Forum is addressing challenges with "Maritime Allied Air Defense in Support of Ballistic Missile Defense Operations" that face the Combatant Commanders during present day operations. The MTMD Forum is leveraging At-Sea Demonstration (ASD) test events and operational Fleet Exercises to integrate technology with concepts of operations developed within MTMD Forum working groups.

The MTMD Forum develops systems and techniques that enhance protection and defense against the proliferation of short, medium and long-range Ballistic Missile (BM) and Advanced Anti-Ship Cruise Missile (ASCM) threats through the development of interoperable sea-based Integrated Air and Missile Defense (IAMD) capability among coalition nations. This includes protection across the full spectrum of these threats through the enhanced utilization of existing sea-based systems to protect against current threats while progressively improving and developing systems and system-of- systems to effectively counter evolving threats.

This project supports USN participation in several Maritime IAMD related Project Arrangements and Working Groups including:

(1) Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) to define and develop architectures as well as to perform engineering to address coalition capability gaps.
(2) Modeling & Simulation (M&S) to establish and maintain a maritime coalition M&S testbed and to perform legacy and future systems simulation testing.
(3) Coalition Distributed Engineering Plant (CDEP) to establish and maintain a maritime coalition Hardware-in-the-Loop Testbed and to conduct CDEP testing.
(4) Open Architecture (OA) to develop Interface Standards and Data Models.
(5) Test Planning and Execution (TPEX) to develop Test Plans, oversee exercise participation and conduct post event data analysis and reporting.
(6) Operational Requirements (OR) to develop a Coalition Maritime Missile Defense Operational Concept Document and to identify operational constraints and tactical constructs surrounding coalition maritime missile defense activities.
(7) Reciprocal Use of Test Facilities agreements with other nations to support Maritime IAMD and MTMD related demonstrations.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605853N *I Management, Technical & Intl Supt*

(8) Tactical Advancement for Next Generation (TANG) to work with our Allies and International Partners using human-centered design methodologies to identify solutions to technology and sailor performance issues that have been cited during previously conducted experiments, exercises, and demonstrations. This process will seek to leverage R&D investments and risk reduction research commercial companies are making today that can provide potential "dual use" technology and process solutions to complex problems.

Anti-Tamper (AT): The AT program performs as the Navy Technical Process Owner for the Anti-Tamper systems engineering activity that is intended to prevent and/or delay the exploitation of critical technologies in U.S. systems; manages the research, design, development, implementation, and testing of AT measures and coordinates with Department of Defense AT Executive Agent. Starting in FY19, funding for AT is realigned to PE 0605024N Anti-Tamper Technology Support.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	94.562	87.565	97.717	-	97.717
Current President's Budget	135.102	86.932	102.401	-	102.401
Total Adjustments	40.540	-0.633	4.684	-	4.684
• Congressional General Reductions	-	-0.633			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.718	0.000			
• Program Adjustments	0.000	0.000	5.203	-	5.203
• Rate/Misc Adjustments	0.001	0.000	-0.519	-	-0.519
• Congressional General Reductions Adjustments	-0.743	-	-	-	-
• Congressional Add Adjustments	45.000	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		
Congressional Add: *Navy Research Lab Infrastructure Upgrades*	28.971	0.000
Congressional Add: *Printed Circuit Board Executive Agent*	14.485	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605853N *I Management, Technical & Intl Supt*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Congressional Add Subtotals for Project: 9999	43.456	0.000
Congressional Add Totals for all Projects	43.456	0.000

Change Summary Explanation

PRJ 0149 International Coop RDT&E:
- The increase FY2019 to FY2020 is to support requests for additional ESEP Participation from Partner and Allied Nations. In addition, this increase continues to support the establishment of the Maritime Theater Anti-Submarine Warfare (M-TASW) effort, providing focus on TASW efforts in the Indo-Pacific region with Japan and Australia.

PRJ 1767 Naval War Col Strategic Studies Supt:
- Naval War Gaming Support - Increased funding from FY 2019 to FY 2020 continues resourcing of the Naval War College's expansion to execute high security war gaming and research.

PRJ 2098 - Navy Postgraduate School (NPS) Studies Support:
- Faculty and Student Studies, Analysis and Research - The decrease from FY 2019 to FY 2020 reflects fewer studies being conducted in FY 2020.

PRJ 2221 JT Mission Assessment Studies:
- Navy Studies & Analysis - FY 2019 to FY 2020 increase reflects inflation and need for concept studies to inform Fleet architecture and future force structure, continued development of a new model to improve the Navy's capabilities in Anti-Submarine Warfare (ASW) mission-level analysis and increased need for modeling and simulation support for Campaign analysis and ongoing OPNAV missile defense analysis requirements.

PRJ 3017 Enterprise Information Systems:
- Increase in FY 2020 reflects transfer of NGEN corporate funding from 0605861N RDT&E Science and Technology Management.

PRJ 3027 Defense Critical Infrastructure Program:
- Mission Assurance Assessments Support - The funding increase from FY 2019 to FY 2020 supports assessments concerned with strategic missions that will require follow on mitigation analysis and solution refinement, with potential for persistent cyber network evaluation at multiple sites. Funding addresses the planned assessment support of 32 sites or installations with 10 being OCONUS. Additionally, this tasking covers unplanned events like hurricanes, tornadoes and earthquakes that threaten DoD installations and supporting infrastructure, as well as 2-3 planned COCOM exercise events (Vigilant Shield, Ardent Sentry, and PANAMAX).
- Cyber Mission Assurance - The funding increase from FY 2019 to FY 2020 reflects increased research on network mission assurance of defense missions and operations and enhancements of Red Team assessment capabilities. These capabilities increase the amount of time and labor required to maintain awareness of network vulnerabilities during and post-assessment to enhance the mitigations and solutions for cyber security of critical Navy and DoD networks. This persistence increases the costs associated with conducting these evaluations. The increased cost reflects the additional red team members necessary to conduct 2-3 cyber mission assurance assessments per year across DoD and NAVSEA enterprises.

Defense Critical Electric Infrastructure - The funding increase from FY 2019 to FY 2020 reflects the increased focus on electric grid dependencies and vulnerabilities that Energy Security analysis has revealed and the efforts to increase DoD and Interagency resilience from the natural or manmade effects. 79 installations will need analysis of their critical electric power paths supported by 47 utility providers, entities needed for implementation and execution that require

constant attention to ensure reliable data and analytical rigor is applied. Multiple interagency entities will be involved with both exercise (Liberty Eclipse, NERC Grid Ex, and follow on) and potential real world issues involving complex policy and technical guidance, increasing costs to the program to maintain the data from multiple industry databases.
- Mission Assurance Program Management - The funding increase from FY 2019 to FY 2020 reflects the increased oversight from management efforts and utilization of centralized management tool (Innoslate) to better track programmatic requirements and subsequent related tasks, costs, and contracts.
- Defense Critical Infrastructure - The funding increase from FY 2019 to FY 2020 supports infrastructure specific asset analysis to particular DoD assets and missions, the Defense Industrial Base, and the supporting infrastructure. To provide a more overarching view of mission analysis, the increase reflects the prototype and use of models based system engineering methods and tools to enhance deliverables being asked for by senior leadership. Congressional legislative pilot studies from NDAA 1647 and 1650 related to cybersecurity of weapons platforms and critical infrastructure are due in 2020 and will need follow on analysis for the multiple weapons platforms and critical infrastructure on at least 2 prioritized sites.
- Defense Critical Mission - The funding increase from FY 2019 to FY 2020 reflect a larger number of DCMs being assessed during the period of performance. This includes 2-3 sites / installations every other month, necessitating an increase in assessment team members and analytical tools.

PRJ 3312 MTMD - Maritime Theater Missile Defense Forum:
- FY 2020 increase due to ramped up requirements for At-SEA demonstration for Ballistic Missile targeting.
PRJ 3330 - Naval Research Laboratory (NRL) Facilities Modernization:
- NRL Facilities Modernization - The increase in FY 2020 is planned for projects to replace critical equipment in the upgraded and relocated labs across NRL.
PRJ 3363 - PACON Initiative:
- PACOM Initiative - Increased funding will support more advanced, critical research projects that address China Strategic Initiative Derivation knowledge gaps; further enhancement and refinement of the Critical Factors Analysis suite of analytical tools and products; dramatic increase in both the quality and quantity Emulations at the strategic and operational levels as well as expanded development for the modeling and simulation technologies that support those events; increased scope and support for the INDOPACOM Media Project that will expand to cover all Combatant Commands with added line of effort to cover unique analysis of Chinese media censorship.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 0149 / *International Coop RDT&E*	

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
0149: *International Coop RDT&E*	0.000	2.886	3.575	3.658	-	3.658	3.513	3.549	3.623	3.696	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Provides funding for program management, execution, and support activities to implement a broad range of cooperative naval Research and Development, Test and Evaluation (RDT&E) initiatives to improve coalition interoperability, harmonize US Navy requirements with allied and friendly nations,and identify cooperative international opportunities. The funding is used to develop approaches to international cooperation consistent with combatant commanders (COCOMs), CNO, and SECNAV priorities in the maritime domain.

Various cooperative RDT&E programs, projects and exchanges are pursued to identify cooperative acquisition programs, enhance OCO efforts and MDA development, fill capability gaps, improve US/coalition interoperability, and standardize defense capabilities with international partners. Such efforts have resulted in:
1. Negotiating and developing approximately 57 international RDT&E Agreements annually with allied and friendly nations;
2. Executing approximately 300 Information Exchange Annexes (IEAs) with foreign partners;
3. Improving IEA information dissemination with allied and friendly countries and within Department of the Navy (DoN);
4. Coordinating Navy inputs to the Office of the Under Secretary of Defense (OUSD) Acquisition, Technology, and Logistics (AT&L) Foreign Comparative Test (FCT) Program, and Coalition Warfare Program (CWP) as well as the DoN Technology Transfer Security Assistance Review Boards (TTSARB).
5. Represent the US Navy in Office of the Secretary of Defense (OSD) directed Armaments Cooperation Forums, including the Conference of NATO Armaments Directors' groups {NATO Naval Armaments Group (NNAG)}, and Senior National Representative (SNR);
6. Funding of various international RDT&E support databases including Technical Project Officer (TPO), International Agreement Generators, Information/Data Exchange Agreements, and Project Agreements/Memorandums of Understanding;
7. Funding for Engineering and Scientist Exchange Program (ESEP).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: International Coop RDT&E	2.886	3.575	3.658	0.000	3.658
Articles:	-	-	-	-	-
FY 2019 Plans: -Continue all efforts from prior FY's -Identify potential from an International Theater ASW Forum with foreign partners, similar in structure to the existing MTMD Forum. -Continue to support Maritime Missile Defense (MTMD) Forum system engineering and BMD interoperability activities, including Forum staff support, and ongoing PA activities for Battle Management C4I, Coalition					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 0149 / *International Coop RDT&E*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Distributed Engineering Plant, Modeling and Simulation, Force Level Open Architecture Standards, and At-Sea Demonstration -Continue execution of approximately 150 Information Exchange Agreements/Data Exchange Agreements (IEA/DEA) with more than 30 countries -Continue execution and support in placement of U.S. Navy and partner nation engineers and scientists under OSD's Engineer and Scientist Exchange Program (ESEP) -Continue to coordinate U.S. Navy participation in OUSD (AT&L) Coalition Warfare Program (CWP) selection processes to meet emerging military capability requirements -Support U.S.-India Defense Technology and Trade Initiative Working Groups, including the Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC), the Jet Engine Technology Joint Working Group (JETJWG), and the Joint Working Group on Naval Systems (JWGNS). -Support U.S.-India Defense Technology and Trade Initiative Information Exchange and Terms of Reference (TOR) exchanges to promote cooperative opportunity development. -Navy International Agreement Database maintenance and support -Execution of Above Water Working Group (AWWG) -Continue to support NATO Naval Armaments Group (NNAG) and Five Power Groups on cooperative programs					
FY 2020 Base Plans: -Continue all efforts from prior FYs -Continue and increase support for an international Theater ASW Forum with foreign partners, including expansion of international participation in technical discussions. -Continue execution and support in placement of U.S. Navy and partner nation engineers and scientists under OSD's Engineer and Scientist Exchange Program (ESEP), with a focused increase (~4-5 additional/year) on ESEP placements in Five Eye's nations, such as Australia and the United Kingdom. -Continue execution of approximately 150 Information Exchange Agreements/Data Exchange Agreements (IEA/DEA) with more than 30 countries -Continue to coordinate U.S. Navy participation in OUSD (AT&L) Coalition Warfare Program (CWP) selection processes to meet emerging military capability requirements -Support U.S.-India Defense Technology and Trade Initiative Working Groups, including the Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC), the Jet Engine Technology Joint Working Group (JETJWG), and the Joint Working Group on Naval Systems (JWGNS).					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 0149 / *International Coop RDT&E*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Support U.S.-India Defense Technology and Trade Initiative Information Exchange and Terms of Reference (TOR) exchanges to promote cooperative opportunity development. -Execution of Above Water Working Group (AWWG) -Continue to support NATO Naval Armaments Group (NNAG) and Five Power Groups on cooperative programs -Contract support for Senior National Representative (SNR) and Navy International Programs Office for international outreach, development, and administrative activities -Travel support for SNR participation in Senior Naval National Representative (SNNR) meetings with key foreign partners, and for select NATO meetings in support of CNO priorities ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase FY2019 to FY2020 is to support requests for additional ESEP Participation from Partner and Allied Nations. In addition, this increase continues to support the establishment of the Maritime Theater Anti-Submarine Warfare (M-TASW) effort, providing focus on TASW efforts in the Indo-Pacific region with Japan and Australia. In future years this effort will expand to include the United Kingdom and others in support of coordinated global ASW strategy initiatives.					
Accomplishments/Planned Programs Subtotals	2.886	3.575	3.658	0.000	3.658

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The Navy International Cooperative RDT&E project supports the implementation of many international cooperative program activities throughout the Department of the Navy (DoN) RDT&E communities. The project funds DoN participation in NATO and OSD lead Armaments Cooperation as well as DoN lead international cooperation that promotes coalition interoperability and set standards with international partners. The focused activities under this project maximize the DoN's efforts by leveraging international technologies and funding to fill capabilities gaps, gain access to foreign research and testing data, and avoid duplication of research and development efforts. The performance goals and metrics are, in cooperation with Maritime Partner nations, to set and harmonize requirements, utilize respective technologies, encourage financial contributions and facilities use, and support forums and work that reduce DoN funding requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 1767 / *Naval War Col Strategic Studies Supt*	

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
1767: *Naval War Col Strategic Studies Supt*	0.000	4.434	5.263	5.658	-	5.658	5.769	5.879	5.991	6.111	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Naval War College (NWC) research, analysis and gaming activities serve as a focal point, stimulus, and major source of strategic and operational thought within the Navy, Joint and Interagency communities. These efforts generate strategic and operational alternatives, tactical imperatives, quantitative analysis, war gaming, political-military assessments, and provide recommendations to the Chief of Naval Operations (CNO), Fleet Commanders and numbered Fleet Commanders regarding the formulation and execution of maritime options for the President of the United States.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Strategic Studies	0.512	0.522	0.532	0.000	0.532
Articles:	-	-	-	-	-
Description: Naval War College (NWC) conducts research in strategic studies in response to tasking from the Secretary of the Navy (SECNAV), Chief of Naval Operation (CNO), Fleet Commanders, numbered Fleet Commanders, and Combatant Commanders. NWC research includes strategic documents produced by its Chinese Maritime Studies Institute (CMSI), Russia Maritime Studies Institute (RMSI), Center for Cyber Conflict Studies (C3S), and Institute for Future Warfare Studies (IFWS).					
FY 2019 Plans: Conduct research and analysis projects and provide supporting events for OPNAV, the numbered Fleets, Navy Component Commanders, and Combatant Commanders. - Continue to support OPNAV Staff on tasked research projects. - Conduct research into Chinese, Russian, and Future maritime capabilities and affairs in order to enhance understanding of global developments and provide studies and advice for CNO and Fleet. - Continue research on cyber capabilities, focusing on deterrence. - Continue Mahan Program research on deterrence capabilities with increased focus on Navy contribution to national nuclear deterrence missions and future Navy capabilities.					
FY 2020 Base Plans: - Conduct research and analysis projects and provide supporting events for OPNAV, the numbered Fleets, Navy Component Commanders, and Combatant Commanders.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 1767 / *Naval War Col Strategic Studies Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue to support OPNAV Staff on tasked research projects. - Conduct research into Chinese, Russian, and Future maritime capabilities and affairs in order to enhance understanding of global developments and provide studies and advice for CNO and Fleet. - Continue research on cyber capabilities, focusing on deterrence. - Continue Mahan Program research on deterrence capabilities with increased focus on Navy contribution to national nuclear deterrence missions and future Navy capabilities. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: Naval War Gaming Support	3.350	4.157	4.530	0.000	4.530
Articles:	-	-	-	-	-
Description: Naval War College (NWC) conducts strategic and operational war gaming and research for Office of the Chief of Naval Operations (OPNAV), the numbered Fleets, Fleet Commanders, and the Combatant Commanders. Each year, 45-60 major war games and associated events provide support to efforts that explore and analyze military, political,informational and economic aspects of differing strategic and operational scenarios and tactical imperatives. NWC continues to expand its capability and capacity to execute war games of increased scope, magnitude and complexity. ***FY 2019 Plans:*** - Conduct 55-60 major war games and related events in support of OPNAV, the numbered Fleets, and the Combatant Commands. - Conduct 8 Executive Committee submitted and CNO approved war games and Navy Title X war games, directed research, and analysis. - Continue to foster cooperative relationships with international partners through use of war gaming, research, analysis and education. - Refine capstone war gaming exercises that support the International Maritime Staff Operators Course. - Execute Fleet Synchronization Conferences.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 1767 / *Naval War Col Strategic Studies Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Execute capstone war game exercise for the Joint Force Maritime Component Commander (JFMCC) Course. - Resource and provision life cycle maintenance requirements for networks, communications, and modeling and simulation capacity. - Resource and provision required manpower and equipment for the High Security Research and Wargaming Facility. ***FY 2020 Base Plans:*** - Conduct 55-60 major war games and related events in support of OPNAV, the numbered Fleets, and the Combatant Commands. - Conduct 8 Executive Committee submitted and CNO approved war games and Navy Title X war games, directed research, and analysis. - Continue to foster cooperative relationships with international partners through use of war gaming, research, analysis and education. - Refine capstone war gaming exercises that support the International Maritime Staff Operators Course. - Execute Fleet Synchronization Conferences. - Execute capstone war game exercise for the Joint Force Maritime Component Commander (JFMCC) Course. - Resource and provision life cycle maintenance requirements for networks, communications, and modeling and simulation capacity. - Resource and provision required manpower and equipment for the High Security Research and Wargaming Facility. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increased funding from FY 2019 to FY 2020 continues resourcing of the Naval War College's expansion to execute high security war gaming and research.					
Title: Warfare Analysis and Research	0.533	0.544	0.555	0.000	0.555
Articles:	-	-	-	-	-
Description: Naval War College (NWC) supports senior decision-makers from the Department of Defense, Department of the Navy, the numbered Fleets, Fleet Commanders and Combatant Commanders in reaching well-informed, objective decisions on strategic, operational and programmatic issues through collaborative research which integrates traditional research and analysis with advanced decision support tools.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 1767 / *Naval War Col Strategic Studies Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: - Continue conducting major decision events in support of OPNAV, the numbered Fleets, Fleet Commanders, and the Combatant Commanders. - Continue warfighting analysis requirements for numbered Fleet commanders. - Continue analytical research on key strategic and operational challenges such as maritime ballistic missile defense, proliferation security initiative, global maritime security, maritime situational awareness, maritime operations headquarters, interconnectivity, and multi-service force deployment. - Continue evaluation of concepts and decision events in conjunction with war gaming center. - Continue research targeted at the strategic and policy level decision making within China and Russia. - Continue providing direct support to NWC student research groups and war gaming. - Execute approximately 20 - 22 major decision events in support of these efforts. ***FY 2020 Base Plans:*** - Continue conducting major decision events in support of OPNAV, the numbered Fleets, Fleet Commanders, and the Combatant Commanders. - Continue warfighting analysis requirements for numbered Fleet commanders. - Continue analytical research on key strategic and operational challenges such as maritime ballistic missile defense, proliferation security initiative, global maritime security, maritime situational awareness, maritime operations headquarters, interconnectivity, and multi-service force deployment. - Continue evaluation of concepts and decision events in conjunction with war gaming center. - Continue research targeted at the strategic and policy level decision making within China and Russia. - Continue providing direct support to NWC student research groups and war gaming. - Execute approximately 20 - 22 major decision events in support of these efforts. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: NWC Student Research Projects	0.039	0.040	0.041	0.000	0.041
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 1767 / *Naval War Col Strategic Studies Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: Selected top performing Naval War College (NWC) students to conduct focused research and analysis of current and future strategic and operational challenges and tactical imperatives. These students are organized under the supervision of the Mahan Scholars Program and the Halsey Group Program. ***FY 2019 Plans:*** - Conduct focused research, analysis and war gaming of current and future strategic/operational challenges and tactical imperatives by the Halsey Groups and Mahan Scholars programs. - Research groups continue to conduct focused research, analysis and free-play war gaming of current and future operational challenges and tactical imperatives arising from regional threats, homeland defense and access denial efforts at the high end of the conflict spectrum in the Pacific, European Command (EUCOM), Central Command (CENTCOM) and Northern Command (NORTHCOM) area of responsibility (AOR). Research and analysis efforts continue in those areas above, and will be expanded to include a detailed focus on counter-targeting, operational deception, and countering information denial and missile defense at the theater joint operational level. ***FY 2020 Base Plans:*** - Conduct focused research, analysis and war gaming of current and future strategic/operational challenges and tactical imperatives by the Halsey Groups and Mahan Scholars programs. - Research groups continue to conduct focused research, analysis and free-play war gaming of current and future operational challenges and tactical imperatives arising from regional threats, homeland defense and access denial efforts at the high end of the conflict spectrum in the Pacific, European Command (EUCOM), Central Command (CENTCOM) and Northern Command (NORTHCOM) area of responsibility (AOR). Research and analysis efforts continue in those areas above, and will be expanded to include a detailed focus on counter-targeting, operational deception, and countering information denial and missile defense at the theater joint operational level. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	4.434	5.263	5.658	0.000	5.658

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 1767 / *Naval War Col Strategic Studies Supt*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This project provides research, analysis and war gaming to meet the needs of the Secretary of the Navy, the Chief of Naval Operations, and Fleet Commanders. Performance is measured in terms of both the quantity and quality of war games, analysis and the extent to which demand for war games and research products can be accommodated within funding levels. Results of research products and war games are evaluated through customer feedback and the extent to which findings are incorporated into follow-on research and practical applications such as Navy doctrine, operational tactics, and programming decisions made during the Planning, Programming, Budgeting & Execution (PPBE) process.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 2098 / *Navy Postgraduate School (NPS) Studies 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
2098: *Navy Postgraduate School (NPS) Studies Support*	0.000	12.335	11.588	10.840	-	10.840	11.220	11.345	11.582	11.816	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Navy Postgraduate School (NPS) research and analysis activities serve as a focal point, stimulus, and major source of strategic, tactical and operational thought within the Navy communities. These efforts generate strategic and operational alternatives, tactical imperatives, quantitative analyses, technical developments and assessments, and political-military assessments. Also, provide recommendations to the Chief of Naval Operations (CNO), Fleet Commanders and numbered Fleet Commanders regarding the formulation and execution of maritime options for the President of the United States. Research will be conducted that will enhance graduate education for Naval Officers and potentially provide students with areas of studies for theses and faculty projects. These research activities also serve as a means for OPNAV Resource Sponsors and Major Commands to have analysis and decision support research conducted in the uses of the applied, soft, and hard sciences in solving diverse and complex resource allocation and strategic issues facing the Navy today and envisioned in the future.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Faculty and Student Studies, Analysis and Research	12.335	11.588	10.840	0.000	10.840
Articles:	-	-	-	-	-
Description: Navy Postgraduate School (NPS) research and analysis activities serve as a focal point, stimulus, and major source of strategic, tactical and operational alternatives, tactical imperatives, quantitative analyses, technical developments and assessments, and political-military assessments. Also, provide recommendations to the Chief of Naval Operations (CNO), Fleet Commanders and numbered Fleet Commanders regarding the formulation and execution of maritime options for the President of the United States. Research will be conducted to support graduate students theses determination and completion as part of Faculty projects. These research activities also serve as a means for OPNAV Resource Sponsors and Major Commands to have analysis and decision support research conducted in the uses of the applied, soft, and hard sciences in solving diverse and complex resource allocation and strategic issues facing the Navy today and envisioned in the future.					
FY 2019 Plans: Continue Studies planned in the following areas: - 1 in the area of Applied Mathematics - 15 in the area of Executive Education					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2098 / *Navy Postgraduate School (NPS) Studies Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- 24 in the area of Computer Science - 107 in the area of Defense Analysis - 7 in the area of Electrical and Computer Engineering - 14 in the area of Energy Academic Group - 81 in the area of Business & Public Policy - 112 in the area of Information Sciences - 31 in the area of Information Sciences and Modeling, Virtual Environments and Simulation (MOVES) - 25 in the area of Mechanical and Aerospace Engineering - 10 in the area of Meteorology - 20 in the area of National Security Affairs - 12 in the area of Oceanography - 282 in the area of Operations Research - 32 in the area of Physics - 3 in the area of Space Systems - 144 in the area of Systems Engineering					
FY 2020 Base Plans: Continue Studies planned in the following areas: - 1 in the area of Applied Mathematics - 15 in the area of Executive Education - 24 in the area of Computer Science - 97 in the area of Defense Analysis - 7 in the area of Electrical and Computer Engineering - 14 in the area of Energy Academic Group - 76 in the area of Business & Public Policy - 112 in the area of Information Sciences - 31 in the area of Information Sciences and Modeling, Virtual Environments and Simulation (MOVES) - 25 in the area of Mechanical and Aerospace Engineering - 10 in the area of Meteorology - 20 in the area of National Security Affairs - 12 in the area of Oceanography - 275 in the area of Operations Research					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2098 / *Navy Postgraduate School (NPS) Studies Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- 32 in the area of Physics - 3 in the area of Space Systems - 135 in the area of Systems Engineering ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 reflects fewer studies being conducted in FY 2020 within the areas of Defense Analysis, Business and Public Policy, Operations Research and Systems Engineering.					
Accomplishments/Planned Programs Subtotals	12.335	11.588	10.840	0.000	10.840

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This Project provides funding to support continuing need for studies and analysis to meet the needs of the Secretary of the Navy, the Chief of Naval Operations, Resource Sponsors, Major Commands and Fleet Commanders. Performance is measured in terms of both the quantity and quality of the studies, research and analysis products that can be accommodated within funding levels. Results of research products are evaluated through customer feedback and the extent to which findings are incorporated into follow-on research and practical applications such as Navy doctrine, operational tactics, and programming decisions made during the Planning, Programming, Budgeting & Execution (PPBE) process. This project supports research of both Naval Postgraduate School faculty and students.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 2221 / *JT Mission Assessment Studies*	

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
2221: *JT Mission Assessment Studies*	0.000	23.998	25.134	25.799	-	25.799	25.866	26.399	26.894	27.454	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This exhibit has been updated to reflect the establishment of the Navy Analytic Office (NAO) which is responsible for the executive oversight of Navy studies and analysis. The NAO was stood up to better align the annual Analytic Agenda to CNO's strategic priorities while also providing for study of the more tactical requirements of the Fleet and Navy writ large. The outcome will be synchronized modeling, simulation, assessments, wargames, experiments and exercises providing rich, shared data to support and refine warfighting concepts and to inform budget decisions.

The Navy Assessment Program supports the Analytic Agenda by providing both the development and use of modeling, simulation and analytically-based warfare, business analyses and analytic tools that provide the basis for decision making with respect to concepts of operations (CONOPS), Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Systems; warfare systems, and analytical underpinnings/basis for programmatic decisions of the Navy's top leadership regarding their architectures, force structure, and the Navy's core "organize, train, and equip mission" (the warfare and provider Enterprises). The program provides capability-based planning assessment for Joint Capabilities Integration and Development System (JCIDS), conducts analysis to affect warfighting capability trades and enterprise resources, identifies needs, gaps and overlaps, and assesses alternative solutions to Joint needs. The program provides overarching Planning, Programming, Budgeting and Execution System (PPBES) analyses and guidance for PPBES which provides gap analysis and investment strategy and total obligation authority allocation. It provides independent capability analysis and assists in structuring follow-on Navy analyses. The program coordinates Navy's position for the enhanced planning process and conducts net assessments. It serves as the lead campaign analysis to approve Navy warfare and support requirements. The program supports the Maritime Strategy which charts a course for the Navy, Coast Guard and Marine Corps to work collectively with each other and international partners to prevent crises from occurring, or reacting quickly should one occur to avoid negative impact to the United States. The Assessment Program provides a broad-view perspective across the Fleet and Navy staff, with an integrated look at both warfighting and warfighting-support programs. It provides Navy alternatives in assessing the implications embedded within resource decisions in a quantified context of costs versus capability versus risk. The program provides independent analytic support to Navy leadership in conjunction with various executive level decision forums.

This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship and associated platform force structure along with development of the tools to accomplish these efforts. Advanced platform concept studies and systems technology assessments will be conducted as will the development and upgrade of concept design and engineering tools, methods, and criteria. Concept Formulation (CONFORM)/Concept Development and Experimentation (CDE) for ships, boats and unmanned maritime vehicles must be continuously exercised to remain viable. It takes years to train competent practitioners, and knowledge currency is quickly lost without practice. Evolving threats and technologies drive concepts (and the tools, processes, and skills needed to produce them) towards obsolescence without constant attention. Capability Based Assessments and Analysis of Alternatives (AoA) timelines are insufficient for establishing potential material solution cost versus capability relationships without significant concept formulation work beforehand. Active collaboration between the Office of the Chief of Naval Operations requirement sponsors, Program Offices, and the various System Commands (Naval Sea Systems Command, Naval Air

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

Systems Command and Space and Naval Warfare Systems Command) engineers is critical for fully exploring the trade space by conducting analysis for affordability, effectiveness and risk. The majority of Total Ownership Cost (TOC) is locked into a design before it is even a program. In the later stages of a program it becomes much more costly to make changes that will significantly impact TOC. Investment up front in concept design can have a high payoff in TOC reduction over the life of a platform class. Outputs include concept costing and performance parameterization for comparative assessment against capability objectives and synthesis to quantify overall (Fleet) capabilities. These products (expressions of cost vs. capability) will serve as the basis of requirements and Joint Capabilities Integration and Development System analysis, define the trade space for AoA efforts, and underpin discussion of force architecture/structure during Quadrennial Defense Review, Long Range Shipbuilding Strategy builds, and Joint Requirements Oversight Council reviews.

Capabilities-Based Assessment (CBA) is the Joint Capabilities Integration and Development System (JCIDS) analysis process that includes three phases: Functional Area Analysis (FAA), Functional Needs Analysis (FNA), and Functional Solution Analysis (FSA). The results of the CBA are used to develop a joint capabilities document (based on the FAA and FNA) or initial capabilities document (based on the full analysis). CBA funding provides the resource sponsors the means to develop the analytic underpinning required by Chairman of the Joint Chiefs of Staff Instruction 3170.01G to support the determination of Naval warfighting capabilities and force structure needed to support the Joint Requirements Oversight Council (JROC)/JCIDS requirements validation process and to inform Program Objective Memorandum programming decisions. This analysis includes evaluation of integration and interoperability gaps of both current and future Navy platforms and systems capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Navy Studies & Analysis	19.287	20.617	21.404	0.000	21.404
Articles:	-	-	-	-	-
FY 2019 Plans: -Continue to develop alternative scenarios in support of Defense Review guidance, Joint studies, and Navy resource analyses. -Continue to develop, update and maintain analytic baselines for the MCO based on DPG. -Continue to develop details required to execute analysis of designated Defense Planning Scenarios and their respective Multi-Service Force Deployment Plans. -Continue to develop and maintain a framework and common set of processes to ensure that essential elements of warfare analyses, including scenarios, operational concepts, tactics, capabilities of platforms and systems (for Navy, Joint, coalition and threat forces), key assumptions and input data are defined and traceable to government approved/provided source material. -Continue to develop scenarios and operational concepts based on government inputs that are sufficiently detailed for use in naval and joint campaign analyses. -Continue to develop MOPs and MOEs and recommend appropriate modeling/methodology to support analyses. -At the mission level, continue to script OPSITS or TACSITS for use in effectiveness analyses in specific warfare mission areas. -Continue to provide analytically-based decision recommendations to CNO for both warfighting and support areas.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Continue to develop CNO investment strategy recommendations and assessments for Program Review and Program Objective Memorandum. -Continue to conduct Verification, Validation & Accreditation of warfare, performance, and pricing models. -Continue to perform rigorous, time critical naval and joint campaign and mission-level analyses, usually based on modeling and simulation that illuminated complex warfare issues which support decision-making in the PPBE process. -Continue to perform analyses including joint campaign analysis that examines the ability to counter a range of coordinated threat capabilities, high level tradeoffs between service capabilities, or impact of large-scale architecture, mission-level effectiveness analyses that determines system capabilities; conduct analyses of alternative force structures that determine the ability to meet peacetime deployment or steady-state requirements and respond to transition to war and contingency operations. -Continue to conduct cost-effectiveness analyses and analyses of new technologies in support of Sponsor Program Proposal, Navy Program Objective Memorandum or Warfare Capability Plan. -Continue to develop innovative analysis techniques that evaluate the effectiveness of operations on the Long War focus on Irregular Warfare and Sea Shaping (influence) activities such as Theater Security Cooperation. -Continue to provide rigorous business case assessments of complex issues relating to the warfighting support processes, manpower and personnel, training and education, infrastructure, both afloat and ashore readiness, Naval Medical Program and provider enterprise operations. -Continue to perform analyses for accreditation of models, use estimated cost and performance of performance-based modeled programs such as the Flying Hour Program, ship operations, ship and aircraft maintenance, spares, facilities, and base operation support, aircraft maintenance, spares, facilities, and base operation support. -Continue to conduct weapons safety and sea basing capability assessments. -Continue to conduct ISR and METOC assessments to determine the optimal mix of Naval ISR and METOC sensors, platforms, and processing, analysis and fusion disposition to support MCOs, the OCO, and intelligence preparation of the environment for both MCOs and OCO. -Continue to develop and maintain common baselines from which campaign excursions and mission-level analyses are executed. -Continue to identify, develop and improve data and modeling, and broker agreements upon assumptions, CONOPS, scenarios, and data. -Continue to lead campaign analysis for OPNAV and lead Navy's participation in OSD/Joint Staff analytic agenda, baseline development, and collection of data.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Continue to conduct modeling and simulation support for ongoing OPNAV missile defense analysis requirements. -Continue to provide analytically-based decision recommendations to OPNAV for joint warfighting and support areas. -Continue to conduct net assessments and provide independent analytic support to Navy leadership in conjunction with various executive level decision forums. -Continue to participate in OSD and JS analysis assessments and provide structure for coordination across the Navy. -Continue to develop new analytic models and techniques for informing resource allocation decisions; conduct all campaign and warfare mission-level analyses and develop investment strategies. -Continue to develop and improve the Navy's analysis capabilities which support Joint and Navy analytic agendas and resource-allocation decision making by refining the linkages between cost and performance in performance-modeled programs in support of OPNAV analysis and assessment. Areas of tool development and improvement included mission- and campaign-level warfighting models, active and reserve manpower, afloat and ashore readiness, and medical capabilities. -Continue to focus on integrated analysis capabilities that cut across business and program accounts. Specific efforts address cyber warfare and security, optimizing the training pipeline, integrating ship maintenance and operations price performance models, and improving mission- and campaign-level C5ISR models and representations. -Continue to develop medical analysis that links to campaign analysis including movement of injured between care facilities, life-saving treatment of injured and recuperation support of injured to support Navy Medical Program decisions. -Continue to update the high-level readiness model that fully integrates all aspects of warfighting support (operational utilization, training cycles, training centers, depots, etc.) and personnel (recruitment, training, development, deployment, retention, etc.) across the Navy's warfighting platforms (aircraft, ships, submarines, etc.), facilities and personnel development centers. -Continue to conduct ship, boat, and unmanned marine vehicle concept studies in preparation for Capabilities Based Assessments (CBAs) and Analysis of Alternatives (AoAs). Studies will be performed in a continuous manner to support future recapitalization of Surface Combatants, Amphibious Ships, Carriers, Auxiliary Ships and other emerging program requirements. -Continue to collaborate with Warfare Systems design experts to perform continuous Warfare Systems analysis at the ship and fleet level. Warfare Systems effectiveness assessment tools are being continually developed and enhanced as required to address future concepts and to incorporate improvements in information					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
technology systems. Additionally, collaborate with aircraft, C4ISR, and networks by continuing dialog and collaboration between NAVSEA, NAVAIR, and SPAWAR systems commands which refines fleet level requirements. -Continue to refine platform concept stage cost analysis tools to predict costs better in areas where weight-based algorithms may not be appropriate. Continually enhance tools to estimate total ownership costs more accurately at the ship and weapons system concept development stage. Continue to conduct cost estimates in support of future concept design exploration, CBA, and AoA efforts. Further develop Cost Estimating Relationships (CERs) and continue to develop cost estimating tools to accommodate emerging technologies incorporated in future platforms. -Continue to conduct future force structure concept formulation. Fleet synthesis and analysis will be conducted, which includes capabilities requirements, platform design and cost and quantitative tracking of the long-term evolution of the fleet as new platforms are introduced and old ones are retired. Areas to be examined include interoperability concepts, force architecture impact studies, and operational employment concept studies.					
FY 2020 Base Plans: -Continue to develop, update and maintain detailed level Navy Standard scenarios based on DPG. -Continue to develop alternative scenarios in support of Defense Review guidance, Joint studies, and Navy resource analyses. -Continue to develop, update and maintain analytic baselines for the MCO based on DPG. -Continue to develop details required to execute analysis of designated Defense Planning Scenarios and their respective Multi-Service Force Deployment Plans. -Continue to develop and maintain a framework and common set of processes to ensure that essential elements of warfare analyses, including scenarios, operational concepts, tactics, capabilities of platforms and systems (for Navy, Joint, coalition and threat forces), key assumptions and input data are defined and traceable to government approved/provided source material. -Continue to develop scenarios and operational concepts based on government inputs that are sufficiently detailed for use in naval and joint campaign analyses. -Continue to develop MOPs and MOEs and recommend appropriate modeling/methodology to support analyses. -At the mission level, continue to script Operational Situations (OPSITS) or Tactical Situations (TACSITS) for use in effectiveness analyses in specific warfare mission areas. -Continue to provide analytically-based decision recommendations to CNO for both warfighting and support areas.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Continue to develop CNO investment strategy recommendations and assessments for Program Review and Program Objective Memorandum. -Continue to conduct Verification, Validation & Accreditation of warfare, performance, and pricing models. -Continue to perform rigorous, time critical naval and joint campaign and mission-level analyses, usually based on modeling and simulation that illuminated complex warfare issues which support decision-making in the PPBE process. -Continue to perform analyses including joint campaign analysis that examines the ability to counter a range of coordinated threat capabilities, high level tradeoffs between service capabilities, or impact of large-scale architecture, mission-level effectiveness analyses that determines system capabilities; conduct analyses of alternative force structures that determine the ability to meet peacetime deployment or steady-state requirements and respond to transition to war and contingency operations. -Continue to conduct cost-effectiveness analyses and analyses of new technologies in support of Sponsor Program Proposal, Navy Program Objective Memorandum or Warfare Capability Plan. -Continue to develop innovative analysis techniques that evaluate the effectiveness of operations on the Long War focus on Irregular Warfare and Sea Shaping (influence) activities such as Theater Security Cooperation. -Continue to provide rigorous business case assessments of complex issues relating to the warfighting support processes, manpower and personnel, training and education, infrastructure, both afloat and ashore readiness, Naval Medical Program and provider enterprise operations. -Continue to perform analyses for accreditation of models, use estimated cost and performance of performance-based modeled programs such as the Flying Hour Program, ship operations, ship and aircraft maintenance, spares, facilities, and base operation support, aircraft maintenance, spares, facilities, and base operation support. -Continue to conduct weapons safety and sea basing capability assessments. -Continue to conduct ISR and METOC assessments to determine the optimal mix of Naval ISR and METOC sensors, platforms, and processing, analysis and fusion disposition to support MCOs, the OCO, and intelligence preparation of the environment for both MCOs and OCO. -Continue to develop and maintain common baselines from which campaign excursions and mission-level analyses are executed. -Continue to identify, develop and improve data and modeling, and broker agreements upon assumptions, CONOPS, scenarios, and data. -Continue to lead campaign analysis for OPNAV and lead Navy's participation in OSD/Joint Staff analytic agenda, baseline development, and collection of data.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Continue to conduct modeling and simulation support for ongoing OPNAV missile defense analysis requirements. -Continue to provide analytically-based decision recommendations to OPNAV for joint warfighting and support areas. -Continue to conduct net assessments and provide independent analytic support to Navy leadership in conjunction with various executive level decision forums. -Continue to participate in OSD and JS analysis assessments and provide structure for coordination across the Navy. -Continue to develop new analytic models and techniques for informing resource allocation decisions; conduct all campaign and warfare mission-level analyses and develop investment strategies. -Continue to develop and improve the Navy's analysis capabilities which support Joint and Navy analytic agendas and resource-allocation decision making by refining the linkages between cost and performance in performance-modeled programs in support of OPNAV analysis and assessment. Areas of tool development and improvement included mission- and campaign-level warfighting models, active and reserve manpower, afloat and ashore readiness, and medical capabilities. -Continue to focus on integrated analysis capabilities that cut across business and program accounts. Specific efforts address cyber warfare and security, optimizing the training pipeline, integrating ship maintenance and operations price performance models, and improving mission- and campaign-level C5ISR models and representations. -Continue to develop and improve the Navy's analysis capabilities which support Joint and Navy analytic agendas and resource-allocation decision making by refining the linkages between cost and performance in performance-modeled programs in support of OPNAV analysis and assessment. Areas of tool development and improvement included mission- and campaign-level warfighting models, active and reserve manpower, afloat and ashore readiness, and medical capabilities. -Continue to focus on integrated analysis capabilities that cut across business and program accounts. Specific efforts address cyber warfare and security, optimizing the training pipeline, integrating ship maintenance and operations price performance models, and improving mission- and campaign-level C5ISR models and representations. -Continue to develop medical analysis that links to campaign analysis including movement of injured between care facilities, life-saving treatment of injured and recuperation support of injured to support Navy Medical Program decisions. -Continue to update the high-level readiness model that fully integrates all aspects of warfighting support (operational utilization, training cycles, training centers, depots, etc.) and personnel (recruitment, training,					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
development, deployment, retention, etc.) across the Navy's warfighting platforms (aircraft, ships, submarines, etc.), facilities and personnel development centers. -Continue to conduct ship, boat, and unmanned marine vehicle concept studies in preparation for Capabilities Based Assessments (CBAs) and Analysis of Alternatives (AoAs). Studies will be performed in a continuous manner to support future recapitalization of Surface Combatants, Amphibious Ships, Carriers, Auxiliary Ships and other emerging program requirements. -Continue to collaborate with Warfare Systems design experts to perform continuous Warfare Systems analysis at the ship and fleet level. Warfare Systems effectiveness assessment tools are being continually developed and enhanced as required to address future concepts and to incorporate improvements in information technology systems. Additionally, collaborate with aircraft, C4ISR, and networks by continuing dialog and collaboration between NAVSEA, NAVAIR, and SPAWAR systems commands which refines fleet level requirements. -Continue to refine platform concept stage cost analysis tools to predict costs better in areas where weight-based algorithms may not be appropriate. Continually enhance tools to estimate total ownership costs more accurately at the ship and weapons system concept development stage. Continue to conduct cost estimates in support of future concept design exploration, CBA, and AoA efforts. Further develop Cost Estimating Relationships (CERs) and continue to develop cost estimating tools to accommodate emerging technologies incorporated in future platforms. -Continue to conduct future force structure concept formulation. Fleet synthesis and analysis will be conducted, which includes capabilities requirements, platform design and cost and quantitative tracking of the long-term evolution of the fleet as new platforms are introduced and old ones are retired. Areas to be examined include interoperability concepts, force architecture impact studies, and operational employment concept studies. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2019 to FY 2020 increase reflects the need for concept studies to inform Fleet architecture and future force structure, continued development of a new model to improve the Navy's capabilities in Anti-Submarine Warfare (ASW) mission-level analysis and increased need for modeling and simulation support for Campaign analysis and ongoing OPNAV missile defense analysis requirements.					
Title: Joint Mission Assessment Studies	4.711	4.517	4.395	0.000	4.395
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: CBA - The CBA is the JCIDS analysis process that includes three phases: the Functional Area Analysis (FAA), the Functional Needs Analysis (FNA), and the Functional Solution Analysis (FSA). The results of the CBA are used to develop a joint capabilities document (based on the FAA and FNA) or initial capabilities document (based on the full analysis). CBA funding provides the resource sponsors the means to develop the analytic underpinning required by Chairman of the Joint Chiefs of Staff Instruction 3170.01G to support the determination of Naval war fighting capabilities and force structure needed to support the JROC/JCIDS requirements validation process and to inform Program Objective Memorandum programming decisions. ***FY 2019 Plans:*** Continue Capabilities-Based Assessments (CBA) such as advanced Naval surface fires and Naval aviation training to identify future capability requirements. Develop metrics to describe the effectiveness of solutions, and evaluate current and programmed systems ability to meet capability requirements to determine capability gaps. Expand warfighting gap assessments addressing interaction of mission area kill chain platforms, sensors, and weapons in a system-of-system construct. ***FY 2020 Base Plans:*** Continue Capabilities-Based Assessments (CBA) such as advanced Naval surface fires and Naval aviation training to identify future capability requirements. Develop metrics to describe the effectiveness of solutions, and evaluate current and programmed systems ability to meet capability requirements to determine capability gaps. Expand warfighting gap assessments addressing interaction of mission area kill chain platforms, sensors, and weapons in a system-of-system construct. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020					
Accomplishments/Planned Programs Subtotals	23.998	25.134	25.799	0.000	25.799

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2221 / *JT Mission Assessment Studies*

D. Acquisition Strategy

N/A.

E. Performance Metrics

The overall goal is to conduct analysis to support Navy decisions needed to turn strategy and guidance into the Fleet capabilities required within acceptable risk.
METRICS:

- Risks are balanced to deliver the right capabilities within the resources available to Navy.
- Identify shortfalls and redundancies in existing or planned capabilities. Determine the impact of variations in warfare systems and architectures in threat, U.S. and combined forces and strategies.
- Develop analysis plans; determine proposed alternatives for analysis; and research performance data on current and future threats, coalition and own force systems; perform technology investigations and forecasts; develop or obtain cost data for current or planned systems; develop and use Cost Estimating Relationships to determine cost for conceptual or future systems for which no cost data is available; identify analysis assumptions, limitations and uncertainties; use established models or develop new models or methodologies to perform analyses; and interpret and analyze results.
- Develop Measures of Performance and Measures of Effectiveness and recommend appropriate modeling/methodology to support analysis. Models/methodology used reflect study objects, level of fidelity required and time constraints.
- A combination of model design statements, model study reports, system specifications, updated model reports, model/database documents, model verification and validation plans, code, and Plan of Action and Milestones reports, and technical reports.
- Provide engineering and analytic support for the assessment and transition of technology for use in the Investment Strategy.

The May 2007 revision of the Joint Chiefs of Staff's Joint Capabilities Integration and Development System (JCIDS) instruction (CJCSI 3170.01F) requires a CBA to assess new requirements. A CBA instruction has been developed by the Chief Navy Office's warfare integration office that prescribes a procedure and structure to this warfighting requirements generation process (JCIDS). A CBA is required to address and validate capability shortfalls or gaps as defined by combatant commanders. It is an analytical process that includes three phases: the Functional Area Analysis, the Functional Needs Analysis, and the Functional Solution Analysis. This process is designed to address future warfighting requirements and analysis needs and improve the quality of Analysis of Alternatives. CBA supports Navy programming decisions and provides the means to develop the analytic underpinning to support the determination of Naval capabilities and force structure recapitalization investments required to fulfill the Maritime Strategy.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 2801 / *Anti-Tamper*	

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
2801: *Anti-Tamper*	0.000	1.385	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.385
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Starting in FY 2019, funding for Project 2801 Anti-Tamper (AT) is realigned to 0605024N Anti-Tamper Technology Support.

A. Mission Description and Budget Item Justification

Anti-Tamper Program - performs as the Navy Technical Process Owner for the Anti Tamper systems engineering activity that is intended to prevent and/or delay the exploitation of critical technologies in U.S. systems; manages the research, design, development, implementation, and testing of Anti Tamper measures and coordinates with Department of Defense Anti Tamper Executive Agent.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Anti-Tamper (AT)	1.385	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: .					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	1.385	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 2801 / *Anti-Tamper*

E. Performance Metrics

Manage the research, design, development, implementation and testing of Anti-Tamper measures for the Department of the Navy. Manage Information Security for all navy programs throughout their lifecycles.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 3017 / *Enterprise Information 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
3017: *Enterprise Information Systems*	0.000	0.000	0.000	0.932	-	0.932	0.952	0.970	0.991	1.011	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Funding realigned from PE 0605861N RDT&E Science and Technology Management project 0135 to better align with activities supported. This project is not a new start.

A. Mission Description and Budget Item Justification

This project funds Office of Naval Research (ONR) corporate expenses including Information Technology (IT), specifically Next Generation Enterprise Network (NGEN) corporate costs.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Next Generation Enterprise Network (NGEN)	0.000	0.000	0.932	0.000	0.932
Articles:	-	-	-	-	-
Description: This program funds Office of Naval Research (ONR) corporate expenses including Information Technology (IT), specifically Next Generation Enterprise Network (NGEN) corporate costs. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** This project funds Next Generation Enterprise Network (NGEN) Corporate requirements ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase in FY 2020 reflects the realignment of NGEN corporate funding from 0605861N RDT&E Science and Technology Management.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.932	0.000	0.932

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3017 / *Enterprise Information Systems*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This project funds operating costs for ONR's mission. Program performance is measured by attaining financial benchmarks for planned obligations vs. actual obligations and planned expenditures vs. actual expenditures

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 3027 / *Defense Critical Infrastructure 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
3027: *Defense Critical Infrastructure Program*	0.000	6.186	5.862	7.743	-	7.743	6.927	7.073	7.217	7.361	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funds received pursuant to the transfer of budget authority from OUSD Policy (OUSD (P)) Homeland Defense Mission Assurance Directorate will be used for infrastructure analysis, assessment, and research required to support execution of the Defense Critical Infrastructure and Mission Assurance Program (DCIP / MA). Additionally, the transferred budget authority will be used to provide in-depth/cross-cutting analysis to the Mission Assurance (MA)/DCIP programs at the Office of the Secretary of Defense (OSD), Joint Staff, Military Departments/Services, Defense Agencies, and Combatant Commands. NSWCDD-A40 will also perform cyber mission assurance research and provide expertise in infrastructure mitigation techniques and solutions.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Mission Assurance Risk Management System (MARMS) Technical Support	1.665	1.679	1.680	0.000	1.680
Articles:	-	-	-	-	-
Description: Provide capabilities to meet the technical requirements in support of the developmental efforts for the current and future common operating picture for Mission Assurance supporting Joint Staff MARMS development team, program office and A40 mission assurance database organization. The OSD (P) Mission Assurance Directorate and the Joint Staff provide oversight for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OSD (P). ***FY 2019 Plans:*** 1 MARMS TWG guidance & requirements traceability tracking and enforcement upon anticipated FY 2018 contract award 2 MARMS programmatic acquisition support to DoD CIO based on milestone decision authority phase entry and system engineering support 3 MARMS Architecture (DoDAF) tracking and incorporating data registry scheme between existing Joint Staff portals and MARMS developed user interface					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
4 Database mapping and analysis for MARMS and update of data from emerging analysis and assessment data for initial operational capability for MARMS use and implementation ***FY 2020 Base Plans:*** 1 MARMS TWG guidance & requirements traceability tracking and enforcement upon anticipated FY 2019 contract award 2 MARMS programmatic acquisition support to Joint Staff and DTRA Program Office based on milestone decision authority phase entry and anticipated system engineering support 3 MARMS Architecture (DoDAF) tracking and incorporating data registry scheme between existing Joint Staff portals and MARMS developed user interface (EPRM) 4 Database mapping and analysis for MARMS and update of data from emerging analysis and assessment data for initial operational capability for MARMS use and implementation ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change between FY 2019 and FY 2020.					
Title: Mission Assurance Assessments Support	0.965	0.882	1.365	0.000	1.365
Articles:	-	-	-	-	-
Description: Provide analysis and characterization of Defense Critical Infrastructure through research and study of existing assessment data and incoming assessment data to analyze trends, provide feedback, and significant impacts to defense missions and assets during events, exercises, and planning efforts. The OSD (P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OSD (P). ***FY 2019 Plans:*** 1 Mission Assurance Trends Analysis Methodology finalization and continue refinement of data inputs from latest assessment results 2 Annual trends analysis on MAA reports conduct to ensure common vulnerabilities are identified, tracked, and enterprise solutions offered to enhance efficient use of limited budgets and funding for risk mitigations					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
3 Review of Joint Staff quantitative processes in Mission Assurance Assessments to ensure viable and verified risk estimates are defendable within the budget process and gain attention for immediate resolution from cyber and physical threats ***FY 2020 Base Plans:*** 1 Mission Assurance Trends Analysis Methodology continue refinement of data inputs from latest assessment results 2 Annual trends analysis on MAA reports conducted to ensure common vulnerabilities are identified, tracked, and enterprise solutions offered to enhance efficient use of limited budgets and funding for risk mitigations 3 Review of Joint Staff quantitative processes in Mission Assurance Assessments to ensure viable and verified risk estimates are defendable within the budget process and gain attention for immediate resolution from cyber and physical threats 4 Incorporate NAVSEA 00I assessment needs into existing Mission Assurance methods and execute two Mission Assurance / Cyber Network Assurance combined assessments at NAVSEA laboratory as pilot and shipyard as initial rollout. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 supports assessments concerned with strategic missions that will require follow on mitigation analysis and solution refinement, with potential for persistent cyber network evaluation at multiple sites. Funding addresses the planned assessment support of 32 sites or installations with 10 being OCONUS. Additionally, this tasking covers unplanned events like hurricanes, tornadoes and earthquakes that threaten DoD installations and supporting infrastructure, as well as 2-3 planned COCOM exercise events (Vigilant Shield, Ardent Sentry, and PANAMAX).					
Title: Cyber Mission Assurance	1.000	0.925	1.498	0.000	1.498
Articles:	-	-	-	-	-
Description: Analysts will investigate cyber impacts to missions and infrastructure associated with DoD assets. This information will be conveyed in assessments, memorandums, and white papers to inform senior leaders and teams about the significance of cyber infrastructure and the interdependencies with physical infrastructure.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The OSD (P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OSD (P). ***FY 2019 Plans:*** 1 Best Practices report for risk reduction to PIT-CS will be expanded to encompass weapons platform IT constructs and other critical infrastructure platforms on which DoD has dependencies 2 Annual ICS update to Best Practices Report will be conducted to identify enhanced methods and metrics to monitor progress and accomplishment towards categorizing entire inventory of critical DoD control systems and their known vulnerabilities 3 Research and develop cyber-specific infrastructure assessment methods to complement assessment teams and data incoming from ongoing assessments across DoD and Services 4 Technical Liaison Support to Cyber MA Enterprise will continue to identify paths for engaging MA partners on a collaborative tool that identifies cyber mission risks from assets identified as part of ongoing assessment efforts across multiple missions and cyber domains ***FY 2020 Base Plans:*** 1 Best Practices report for risk reduction to PIT-CS will be edited to encompass weapons platform IT constructs and other critical infrastructure platforms on which DoD has dependencies 2 Annual ICS update to Best Practices Report will be conducted to identify enhanced methods and metrics to monitor progress and accomplishment towards categorizing entire inventory of critical DoD control systems and their known vulnerabilities 3 Research and develop cyber-specific infrastructure assessment methods to complement assessment teams and data incoming from ongoing assessments across DoD and Services, with particular focus on NAVSEA Red Team enhancement 4 Technical Liaison Support to Cyber MA Enterprise will continue to identify paths for engaging MA partners on a collaborative tool that identifies cyber mission risks from assets identified as part of ongoing assessment efforts across multiple missions and cyber domains ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The funding increase from FY 2019 to FY 2020 reflects increased research on network mission assurance of defense missions and operations and enhancements of Red Team assessment capabilities. These capabilities increase the amount of time and labor required to maintain awareness of network vulnerabilities during and post-assessment to enhance the mitigations and solutions for cyber security of critical Navy and DoD networks. This persistence increases the costs associated with conducting these evaluations. The increased cost reflects the additional red team members necessary to conduct 2-3 cyber mission assurance assessments per year across DoD and NAVSEA enterprises.					
Title: Defense Critical Electric Infrastructure (DCEI)	0.715	0.644	0.850	0.000	0.850
Articles:	-	-	-	-	-
Description: Provide electric power analysis and characterization of defense installations at the request of senior leaders engaged with energy security and resilience efforts for national security with interagency representatives from industry utilities, DHS, and DoE. The OSD (P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OSD (P). ***FY 2019 Plans:*** 1 Provide briefing outlining DCEI analysis findings to interagency partners across US in support of DHS and DOE initiatives related to power grid resiliency 2 Update DCEI analysis as requested per ongoing interagency collaborations in DoD cluster areas 3 Writing documentation recommending COAs for how other entities can replicate A40 analysis of the grid to enhance relationships with local utility and power providers 4 Provide recommendations on what DoD processes may be appropriate to use to engage with utilities to discuss analysis findings 5 Engage with other federal and private industry agencies to deepen understanding of utility operations and grid operations (FERC, NERC, NRECA, etc.) ***FY 2020 Base Plans:*** 1 Update installation peak power methodology and primary EP infrastructure pathways in support of interagency FAST act collaboration 2 Update DCEI analysis as requested per ongoing interagency collaborations in DoD cluster areas					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
3 Analyzing post table top exercise feedback (Constrained Eagle) to enhance leadership understanding of commercial electric power grid dependencies for DoD Missions 4 Provide recommendations on what DoD processes may be appropriate to use to engage with utilities to discuss analysis findings 5 Engage with other federal and private industry agencies to deepen understanding of utility operations and grid operations (FERC, NERC, NRECA, etc.) ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects the increased focus on electric grid dependencies and vulnerabilities that Energy Security analysis has revealed and the efforts to increase DoD and Interagency resilience from the natural or manmade effects. 79 installations will need analysis of their critical electric power paths supported by 47 utility providers, entities needed for implementation and execution that require constant attention to ensure reliable data and analytical rigor is applied. Multiple interagency entities will be involved with both exercise (Liberty Eclipse, NERC Grid Ex, and follow on) and potential real world issues involving complex policy and technical guidance, increasing costs to the program to maintain the data from multiple industry databases.					
Title: Mission Assurance Program Management	0.465	0.396	0.450	0.000	0.450
Articles:	-	-	-	-	-
Description: Monitor, track and report on all budget related inquiries and task planning and execution for the Mission Assurance / DCIP programs including data calls, weekly budget reports, and deliverables. The OSD (P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OSD (P). ***FY 2019 Plans:*** 1 Enhance program management support to OSD to include financial tracking and updates to support reclama notices or budget execution data calls 2 Offer options for enhanced information sharing to MA community and related entities, potentially in support of COCOM exercises or real world events that showcases A40 expertise					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
3 Continue to discover ways to save funding via IT footprint consolidation and efficient use of network resources and database files ***FY 2020 Base Plans:*** 1 Enhance program management support to OSD and NAVSEA to include financial tracking and updates to support reclama notices or budget execution data calls 2 Offer options for enhanced information sharing to MA community and related entities, potentially in support of COCOM exercises or real world events that showcases A40 expertise 3 Continue to discover ways to save funding via IT footprint consolidation and efficient use of network resources and database files ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects the increased oversight from management efforts and utilization of centralized management tool (Innoslate) to better track programmatic requirements and subsequent related tasks, costs, and contracts.					
Title: Defense Critical Infrastructure	0.431	0.347	0.600	0.000	0.600
Articles:	-	-	-	-	-
Description: Provide mission assurance assessment and support for characterization of defense critical infrastructure and supporting links to commercial industry and equipment. Analysis and research will provide details on critical links to defense missions and assets and support risk management decision planning for installations, services, and COCOMS. The OSD (P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OSD (P). ***FY 2019 Plans:*** 1 Maintain GMAP portal documentation requirements and help build out database solution and provide best practices / option in support and coordination with MARMS effort 2 DCI criticality assessments and nominations will continue to flow in and be reviewed / analyzed for completeness and prioritized for review					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
3 Mission Mitigation and Risk Reduction Plan coordination and review of new or existing nominated assets and need for budget prioritization of vulnerability solutions 4 Risk Management Plan draft summaries will be coordinated, edited, and reviewed for correctness, completeness and identified appropriate vulnerabilities and threats to justify risk management plan efforts cover the issues 5 Nomination package preparation for biannual update and finalization of critical defense assets and infrastructure 6 Revalidation packages for DCAs will be reviewed and nominated based on previous mission plan inputs and current Joint Staff and OSD defense planning guidance updates 7 Development of Supporting Eagle Table Top Exercise and assessment pilot to enhance Defense Industrial Base policy and assessment capabilities of supporting infrastructure to DIB missions at DoD installations					
FY 2020 Base Plans: 1 Maintain GMAP portal documentation requirements and continue development of database solution and provide best practices / option in support and coordination with MARMS effort 2 DCI criticality assessments and nominations will continue to flow in and be reviewed / analyzed for completeness and prioritized for review 3 Mission Mitigation and Risk Reduction Plan coordination and review of new or existing nominated assets and need for budget prioritization of vulnerability solutions 4 Risk Management Plan draft summaries will be coordinated, edited, and reviewed for correctness, completeness and identified appropriate vulnerabilities and threats to justify risk management plan efforts cover the issues 5 Continue nomination package preparation for biannual update and finalization of critical defense assets and infrastructure 6 Revalidation packages for DCAs will be reviewed and nominated based on previous mission plan inputs and current Joint Staff and OSD defense planning guidance updates 7 Development and support of Defense Industrial Base pilot assessment "Supporting Eagle" will be executed and feedback gained from exercise execution to implement in future policy documents					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The funding increase from FY 2019 to FY 2020 supports infrastructure specific asset analysis to particular DoD assets and missions, the Defense Industrial Base, and the supporting infrastructure. To provide a more overarching view of mission analysis, the increase reflects the prototype and use of models based system engineering methods and tools to enhance deliverables being asked for by senior leadership. Congressional legislative pilot studies from NDAA 1647 and 1650 related to cybersecurity of weapons platforms and critical infrastructure are due in 2020 and will need follow on analysis for the multiple weapons platforms and critical infrastructure on at least 2 prioritized sites.					
Title: Defense Critical Mission	0.945	0.989	1.300	0.000	1.300
Articles:	-	-	-	-	-
Description: Conduct research and provide expertise on the defense critical missions nominated by the Joint Staff and Mission Assurance community for development of mitigations and solutions to vulnerabilities discovered as part of mission assurance assessment processes. Analysts will provide expertise and knowledge in multiple areas of engineering and infrastructure to provide robust and resilient plans and projects to enhance installation infrastructure and planning to increase successful support of critical missions. The OSD (P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OSD (P). ***FY 2019 Plans:*** 1 Continuous update of Mission Maps to maintain awareness of existing and new DCMs and the assets supporting multiple AORs and across mission owners (and de-conflict) 2 Provide DCM process briefings to MA community to enhance awareness of critical mission assets and their importance on executing in multiple mission domains 3 Support DPG response briefings and papers to Joint Staff led initiatives incorporating the concept into doctrine or best practices 4 Update Defense Critical Mission Methodology Brief to include Plan of Action and Milestones and execute tasks to provide a more holistic concept of mission assurance and protection of assets in support of multiple missions ***FY 2020 Base Plans:*** 1 Continue update of Mission Maps to maintain awareness of existing and new DCMs and the assets supporting multiple AORs and across mission owners (and de-conflict)					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3027 / *Defense Critical Infrastructure Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
2 Provide DCM process briefings to MA community to enhance awareness of critical mission assets and their common vulnerabilities within domains and across operational areas to enhance enterprise solutions and identify funding dollars to fix vulnerabilities 3 Support MA SSG and ESG briefings and papers to Joint Staff led initiatives incorporating the DCM concept into doctrine or best practices 4 Continued update of Defense Critical Mission Methodology Brief to include Plan of Action and Milestones and execute tasks to provide a more holistic concept of mission assurance and protection of assets in support of multiple missions ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflect a larger number of DCMs being assessed during the period of performance. This includes 2-3 sites / installations every other month, necessitating an increase in assessment team members and analytical tools.					
Accomplishments/Planned Programs Subtotals	6.186	5.862	7.743	0.000	7.743

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Program cost, schedule, and performance are measured using a systematic approach with approved program management methods. The results are presented in a monthly financial execution status report. Reports are to be submitted to the Director, MA and the Policy Resource Management Office in OSD Policy by the 15th of each succeeding month. The reports will reflect the progress made on each of the project tasks by deliverable and a separate accumulated cost report. Actual versus planned costs will be reflected in the reports at the request of the sponsor.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 3312 / *MTMD-Maritime Theater Missile Defense Forum*	

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
3312: *MTMD-Maritime Theater Missile Defense Forum*	0.000	7.692	7.045	14.158	-	14.158	16.251	15.043	14.342	14.523	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds participation in Maritime Integrated Air and Missile Defense projects with other nations through the Maritime Missile Defense Projects Framework Memorandum of Understanding of 2004 (as amended 2009, 2015, and 2016). Known as the Maritime Theater Missile Defense (MTMD) Forum, it promotes interoperability with the Navies of eleven participating nations (Australia, Canada, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, United Kingdom and the United States). This project funds participation in multiple Projects and includes a maritime contribution to the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) project, now known as NATO Ballistic Missile Defense (BMD). Engineering analysis and recommendations from MTMD activities are provided to European, Pacific and Central Combatant Commands to influence present day operations. Specifically, the MTMD Forum is addressing challenges with "Maritime Allied Air Defense in Support of Ballistic Missile Defense Operations" that face the Combatant Commanders during present day operations. The MTMD Forum is leveraging At-Sea Demonstration (ASD) test events and operational Fleet Exercises to integrate technology with concepts of operations developed within MTMD Forum working groups.

The MTMD Forum develops systems and techniques that enhance protection and defense against the proliferation of short, medium and long-range Ballistic Missile (BM) and Advanced Anti-Ship Cruise Missile (ASCM) threats through the development of interoperable sea-based Integrated Air and Missile Defense (IAMD) capability among coalition nations. This includes protection across the full spectrum of these threats through the enhanced utilization of existing sea-based systems to protect against current threats while progressively improving and developing systems and system-of- systems to effectively counter evolving threats.

This project supports USN participation in several Maritime IAMD related Project Arrangements and Working Groups including:

(1) Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) to define and develop architectures as well as to perform engineering to address coalition capability gaps.
(2) Modeling & Simulation (M&S) to establish and maintain a maritime coalition M&S testbed and to perform legacy and future systems simulation testing.
(3) Coalition Distributed Engineering Plant (CDEP) to establish and maintain a maritime coalition Hardware-in-the-Loop Testbed and to conduct CDEP testing.
(4) Open Architecture (OA) to develop Interface Standards and Data Models.
(5) Test Planning and Execution (TPEX) to develop Test Plans, oversee exercise participation and conduct post event data analysis and reporting.
(6) Operational Requirements (OR) to develop a Coalition Maritime Missile Defense Operational Concept Document and to identify operational constraints and tactical constructs surrounding coalition maritime missile defense activities.
(7) Reciprocal Use of Test Facilities agreements with other nations to support Maritime IAMD and MTMD related demonstrations.
(8) Tactical Advancement for Next Generation (TANG) to work with our Allies and International Partners using human-centered design methodologies to identify solutions to technology and sailor performance issues that have been cited during previously conducted experiments, exercises, and demonstrations. This process will

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3312 / *MTMD-Maritime Theater Missile Defense Forum*

seek to leverage R&D investments and risk reduction research commercial companies are making today that can provide potential "dual use" technology and process solutions to complex problems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MTMD-Martime Theater Missile Defense Forum	7.692	7.045	14.158	0.000	14.158
Articles:	-	-	-	-	-

FY 2019 Plans:

(1) BMC4I will continue engineering analysis and multi-national interoperability gap assessment for the Target Architecture based on test results and complete development of the Target Architecture based on requests for information input from member nations. BMC4I will evaluate new Possible Point Solutions and provide recommendations for the implementation in correcting coalition interoperability gaps. BMC4I will update information exchange requirements in preparation for at-sea demonstrations. BMC4I will develop updates to MTMD Coalition Capabilities and Interoperability (CCI), as appropriate.

(2) M&S will continue analysis of Target Architectures and conduct further assessments in support of providing recommendations to improve information exchange requirements identified by BMC4I and the Systems Engineering Team (SET). M&S will model future Target Architectures and provide analysis in support of future at-sea demonstrations. The M&S team will continue development of the test bed and add additional computing power to the test environment to provide faster and more powerful analytical capability to the Forum System Engineering Team. The M&S Working Group will continue development of the Mission Models in support of capability development to illustrate operational impact of proposed solutions to complex Integrated Air and Missile Defense (IAMD) problems.

(3) CDEP will integrate joint air and land assets for the first time in Annual Test Event (ATE) 2019. CDEP will work with BMC4I and OR working groups to update the Coalition Capabilities and Interoperability (CCI) gaps document and develop test plans to assess capabilities suitable for land-based testing. CDEP will also characterize risks of future at-sea demonstrations such as At-Sea Demonstration (ASD) 2020. CDEP will prepare for and conduct hardware-in-the-loop tests with allied partners, and will provide assessments and recommendations to improve information exchanges required to conduct at-sea demonstrations or to evaluate performance as an effective and efficient alternative to costly at-sea demonstrations. CDEP will continue to support fulfillment of stated objectives within the MTMD Forum Capability Roadmap.

(4) The Open Architecture Working Group (OAWG) will finalize the Force Data Model for Threat Evaluation (TE) and begin extending the data model to incorporate other Force Level Functions (FLFs). This will be

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
accomplished by reusing data for existing data models such as Open Architecture Radar Interface Standard (OARIS) and Combat Resource Allocation System (CORALS). A prototype interface will be developed for insertion in a Force Threat Evaluation and Weapons Assignment (FTEWA) implementation that will be exercised in an M&S environment. Additional Force Level Function (FLF) component interfaces will be modeled and developed as the Force Level Data Model is finalized. The OAWG will collaborate with BMC4I, OR, and CDEP to ensure these interfaces align with the Target and Reference Architectures as well as selected Possible Point Solutions (PPSs) in developing the Force Level Open Architecture Technical Standard (FLOATS). The OAWG will collaborate with the FTEWA Workshops and Subject Matter Experts (SMEs) to ensure the FLF component interfaces align with FTEWA requirements. (5) TPEX will continue preparations for MTMD participation as part of ongoing at-sea test event continuums. Exercise Formidable Shield 19 (FS-19) execution will commence in Q3 of FY 2019. Eight of the MTMD Forum nations will be providing ships for FS-19 events and six MTMD Forum nations will be firing weapons. These at-sea demonstrations will include live IAMD tracking events and a combination of live and IAMD simulated engagements with a fleet exercise and interoperability focus. Planning for At-Sea Demonstrations (ASD) and follow-on at-sea testing will continue into future years and include air & ballistic target procurement. Future planning in FY19 will include ASD 2020 and ASD 2021. (6) Operational Requirements Working Group will continue to provide fleet perspective while also providing operational subject matter expertise and oversight for test and evaluation events. The Operational Concept Document and tactics, techniques, and procedures will be updated for distribution to MTMD Forum nations as well as the North Atlantic Treaty Organization (NATO) through Executive Committee action.					
FY 2020 Base Plans: (1) BMC4I will continue engineering analysis and multi-national interoperability gap assessment for the Target Architecture based on test results and complete development of the Target Architecture based on additional requests for information input from member nations. BMC4I will evaluate any additional Possible Point Solutions and provide recommendations for the implementation in correcting coalition interoperability gaps. BMC4I will update information exchange requirements in preparation for at-sea demonstrations. BMC4I will develop updates to MTMD Coalition Capabilities and Interoperability (CCI), as appropriate. (2) M&S will continue analysis of Target Architectures and conduct further assessments in support of providing recommendations to improve information exchange requirements identified by BMC4I and the SET. M&S will					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
model future Target Architectures and provide analysis in support of future at-sea demonstrations. The M&S team will continue development of the test bed and add additional computing power to the test environment to provide faster and more powerful analytical capability to the Forum System Engineering Team. The M&S Working Group will continue development of the Mission Models in support of capability development to illustrate operational impact of proposed solutions to complex Integrated Air and Missile Defense (IAMD) problems. (3) CDEP will continue to assess interoperability of joint air and land assets in Annual Test Event (ATE) 2020. CDEP will also characterize risks of future at-sea events such as at-sea demo (ASD) 2020 and ASD 2021. CDEP will work with BMC4I and OR working groups to update the Coalition Capabilities and Interoperability (CCI) gaps document and develop test plans to assess capabilities suitable for land-based testing. CDEP will prepare for and conduct hardware-in-the-loop tests with allied partners, and will provide assessments and recommendations to improve information exchanges required to conduct at-sea demos or to evaluate performance as an effective and efficient alternative to costly at-sea events. CDEP will continue to align with the stated objectives within the MTMD Forum Capability Roadmap. CDEP will continue to improve a hardware-in-the-loop (HWIL) suite that can supplement live testing and facilitate a robust engineering evaluation of integrated air and missile defense performance for coalition interoperability. (4) The Open Architecture Working Group (OAWG) will model and develop the component interfaces for the Force Level Functions (FLFs). The Force Data Model will be updated as required. Force Level Open Architecture Technical Standard (FLOATS) interfaces will be exercised within the M&S and CDEP environment via Force Threat Evaluation and Weapons Assignment (FTEWA) implementations that incorporate FLOATS interfaces. These exercises will demonstrate various operational methodologies for distributing data within the Force as well as identifying performance parameters for the FLOATS standard. The OAWG will continue to collaborate with BMC4I, OR, CDEP and the System Experts Meeting (SEM) to ensure these interfaces align with the Target and Reference Architectures as well as selected Possible Point Solutions (PPSs) in developing the Force Level Open Architecture Technical Standard (FLOATS). The OAWG will collaborate with the FTEWA Workshops and Subject Matter Experts (SMEs) to ensure the FLF component interfaces align with FTEWA and operational requirements. (5) TPEX will continue preparations for MTMD participation as part of ongoing at-sea test event continuums. ASD 2020 will execute in Q4 of FY 2020. Three live-fire Integrated Air and Missile Defense (IAMD) events are planned to be conducted. These at-sea demonstrations will include live tracking events and a combination of live and simulated engagements with a fleet exercise and interoperability focus. Planning for At-Sea					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Demonstrations and follow-on at-sea testing will continue into future years and include air & ballistic target procurement. Future planning in FY20 will include ASD 2021, PD 22, and FS-23 which will be risk reduction for future ASDs. (6) Operational Requirements Working Group will continue to provide operator's perspective and recommendations to the engineering and test activity conducted in the other working groups. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increased funds will be utilized to support conduct of At-Sea Demonstration 2020 (ASD 20) and Exercise Formidable Shield 2021 (FS 21) that are planned for 4th quarter FY 2020 and FY 2021, respectively. These demonstrations will involve simultaneous presentation of targets representing ballistic and cruise missile threats to create scenarios that represent the Integrated Air and Missile Defense (IAMD) threat environment maritime forces now face when deployed. Specifically, these funds will be used to procure sounding rockets that represent the ballistic missile threat, and long lead material items: Oriole solid fuel rocket motors, thrust vane controllers (for guidance accuracy function), and system integration for all up round (AUR) buildup. The sounding rockets will be used during conduct of ASD 20 and the completed AURs are planned to be launched in FS 21. This demonstration enables maritime forces to demonstrate IAMD capability and new concepts for increased mission effectiveness, while enabling assessment of IAMD interoperability with our allies in this complex and challenging mission area. Major elements of these efforts include: ballistic target shipping and buildup, test planning and analysis, and combat system integration within the Tactical Data Link architecture that supports and enables the exercises. At the completion of each ASD event, thorough data analysis will be performed to identify interoperability issues and opportunities for the next event. Additionally, identification of systems integration, technology development and Fleet training needs, along with lessons learned, will be brought forward and implemented prior to the next ASD event. The plan is to execute an underway fleet-led event or demonstration with maritime forces at an average rate of one per year in order to increase our interoperability in the IAMD arena with our International Partners and Allies.					
Accomplishments/Planned Programs Subtotals	7.692	7.045	14.158	0.000	14.158

C. Other Program Funding Summary ($ in Millions)

N/A

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C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Program Reviews and Baseline Assessments

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 3330 / *Naval Research Laboratory (NRL) Facilities Modernization*	

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
3330: *Naval Research Laboratory (NRL) Facilities Modernization*	0.000	18.210	15.438	19.026	-	19.026	16.351	16.741	16.361	16.681	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program has been established to provide a systematic and planned approach to improve vital in-house science and technology (S&T) laboratory facilities at the Naval Research Laboratory (NRL) which are reaching or have reached critical stages of deterioration. The program includes restoration and modernization (R&M) initiatives for about 350,000 net square feet, where the average age of the buildings is 67 years old.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NRL Facilities Modernization	18.210	15.438	19.026	0.000	19.026
Articles:	-	-	-	-	-
Description: Critical Science and Technology research cannot be sustained or succeed in deteriorated facilities. World class research can only be accomplished in facilities that are at a minimum "adequate", but preferably "state-of-the-art." Due to their advanced age and deterioration, funds are planned to restore/modernize various laboratory facilities at the Naval Research Laboratory.					
FY 2019 Plans: Conduct modernization of laboratories to ensure they can meet future technological threats. Conduct specific studies, evaluations, and the special handling of highly critical and sensitive laboratories that are being relocated into refurbished buildings. Continue planning, consolidating and relocating of over 100 laboratories into less than 80 laboratories; careful disassembly of one-of-a-kind facilities and equipment by in-house scientists and experts and contractor support with specialized skills to devise unique plans to disassemble, transport, and reassemble the facilities; and the recalibration and specialized reassembly of the highly specialized equipment (e.g., solid-state electronic devises, lasers, vacuum tubes, electrical connections, reactors, gas sensors and chambers, and chemical connectors and distribution systems).					
FY 2020 Base Plans: Continue to address planned and emergent studies, evaluations, and modernization projects of laboratory facilities and infrastructure modernization of laboratories to meet future technological threats. Execute planned Corporate Facility Investment Plan (CFIP) actions which include continuing laboratory consolidation efforts					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3330 / *Naval Research Laboratory (NRL) Facilities Modernization*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
and relocation of highly sensitive, highly specialized equipment into refurbished buildings. Projects planned for FY 2020 include but are not limited to the replacement of existing duct work and control systems for multiple air handlers that support materials science research into the synthesis, processing, characterization, and implementation of advanced materials; the renovation of additional laboratory space to support research of electronic materials including semiconductors, heterostructures, and superconductors as well as materials characterization and properties; and the replacement of 50 year old chilled water lines that service multiple facilities, laboratories, and critical equipment located within these laboratories. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase in FY 2020 is planned for additional costs associated with the replacement of critical chilled water lines in multiple facilities across the laboratory.					
Accomplishments/Planned Programs Subtotals	18.210	15.438	19.026	0.000	19.026

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

None

E. Performance Metrics

Restoration and modernization of the laboratory facilities will begin in a phased approach until completion.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 3363 / *PACOM 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
3363: *PACOM Initiative*	0.000	14.520	13.027	14.587	-	14.587	14.132	14.030	14.345	14.653	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

China Strategic Initiative (CSI) (LI 0605853N). The CSI became a DoD RDTE program in FY 2014. The CSI program is USPACOM's first Asia Rebalance initiative and provides critical support to operational planning efforts. The CSI program is a command-directed program that provides the Commander, USPACOM and his staff critical support at all levels of planning and decision-making for military operations within the PACOM Area Of Responsibility (AOR). The CSI program provides: Effects Emulations, PACOM Media Project, Operational Modeling and Simulation and a Critical Factors Analysis Tool.
This funding is for a classified effort.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: PACOM Initiative	14.520	13.027	14.587	0.000	14.587
Articles:	-	-	-	-	-
Description: The China Strategic Initiative (CSI) program is the Department of Defense's (DoD's) first Asia Rebalance initiative and provides critical support to strategic and operational policy-making and planning efforts. On behalf of DoD, CDR, USPACOM directs CSI to research and develop highly sophisticated analytic tools to supplement command decision cycles across the Joint Force and the interagency.					
FY 2019 Plans: Continue development and refinement of: analysis of Chinese war theory and planning, critical vulnerabilities assessments and methodology, effects testing, and expansion of China media analysis to all Combatant Commands. Integration with routine policy and planning processes will mature, alongside efforts to consolidate knowledge management of high-output data yields.					
FY 2020 Base Plans: Enhanced development and refinement of: deeper analysis of Chinese war theory and planning, increase in the overall number of critical vulnerabilities assessments and methodology, increase in the number of effects testing events, and continued expansion of China media analysis to all Combatant Commands. Integration with routine policy and planning processes will mature, alongside efforts to consolidate knowledge management of high-output data yields.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3363 / *PACOM Initiative*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increased funding will support more advanced, critical research projects that address China Strategic Initiative Derivation knowledge gaps; further enhancement and refinement of the Critical Factors Analysis suite of analytical tools and products; dramatic increase in both the quality and quantity Emulations at the strategic and operational levels as well as expanded development for the modeling and simulation technologies that support those events; increased scope and support for the INDOPACOM Media Project that will expand to cover all Combatant Commands with added line of effort to cover unique analysis of Chinese media censorship.					
Accomplishments/Planned Programs Subtotals	14.520	13.027	14.587	0.000	14.587

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Operational Emulation (OE) is meeting or exceeding program milestones, and is pacing ahead of expected developmental timeline. As the OE program continues to mature, it is also expanding as required to meet the overall mandate of supporting extensive studies and analyses for the operational and intelligence contingency planning required by the China Strategic Initiative. In FY 2017, OE conducted a beta intelligence forum and its first "live" intelligence forum, and is on pace to conduct an intelligence forum every two months in FY18. Currently for each two-month cycle, OE conducts an operational forum, intelligence forum, and extensive modeling and simulation using a variety of analytic tools. The first operationally-focused forum was conducted in June 2018, and the program is on track to conduct one every two months for the rest of FY 2018.

OE provides operational planners and intelligence subject matter experts (SMEs) with highly structured and repeatable processes with which to develop, test, and refine concepts. OE now includes separate, but interrelated, operational and intelligence-focused events utilizing highly-qualified SMEs to provide qualitative analysis, and robust modeling and simulation for quantitative analysis. The OE program is maturing through extensive participation by operational planners and intelligence SMEs, and continues to yield significant insights that fundamentally influence the development of operational plans.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 3363 / *PACOM Initiative*

Operational Decision Analysis (ODA). Successfully achieve Initial Operating Capability on ODA sub Line of Effort support effort with at least 80% of initial objectives being achieved by 3QTR FY 2018.

ODA provides funding to support continuing requirement for studies and analysis of issues critical to operational and intelligence contingency planning required by the China Strategic Roundtable (whose members include all Combatant Commanders, Service Chiefs, Deputy Secretary of Defense, Policy leadership, the Director of Defense Intelligence Agency, and Director of the National Security Agency). The PE directly support CSIs Strategic Emulation LOE and will provide critical technical inputs and strategic insights that complement the programs OE output database, which is still under development. ODA outputs will significantly enhance Combatant Component Command staffs with their operational and intelligence planning and global synchronization across multiple domains amongst all geographic and functional combatant commands.

Decision Support Elements to Operational Emulation Modeling and Simulation (DSEOMS). Successfully achieve Initial Operating Capability on this major LOE with at least 80% of initial objectives being met by 3QTR FY 2019.

DSEOMS provides funding to support all four major LOEs for the CSI program and all its sub-LOEs. This effort will provide a comprehensive and campaign-quality decision support toolset to decision makers across the entire CSI enterprise: OSD, Joint Staff, Combatant Commands, Intelligence Community, and the Whole of US Government (Interagency). This PE will create a set of enhanced automated and doctrinal decision- making tools to assist key policy- and strategic leaders on a full spectrum of contingencies related to competitor nations. DSEOMS will provide analytic modeling and simulation tools that take inputs from all major CSI program LOEs; the goal being to present decision- and policy-makers and their planning staffs with a rich dataset of information that is relevant, timely, and substantive for their respective problem sets. The current scope and focus across all LOEs is to support emerging near-term and longer-term planning to both significantly enhance war planning orientation and force posture considerations but also to significantly enhance more informed strategic choices regarding future joint/service capability investments and joint/service operational concepts across all strategic domains. Ultimately, fully integrated program deliverables will guide a deliberative process for identifying efficiencies in major service platform decisions to ensure they are optimized for the full-spectrum of projected adversary capabilities in the future.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / *Management, Technical & Intl Supt*	Project (Number/Name) 9999 / *Congressional Adds*	

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
9999: *Congressional Adds*	0.000	43.456	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	43.456
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Congressional Add: Navy Research Lab Infrastructure Upgrades	28.971	0.000
FY 2018 Accomplishments: The Naval Research Laboratory continues to address emergent and planned facilities sustainment and modernization projects. These efforts will ensure the laboratory can conduct a broadly based multidisciplinary program of scientific research and advanced technological development to meet current and future threats to naval forces. The funding provided in FY 2018 via this Congressional Add allowed the command to accelerate the submission of crucial projects whose delay due to availability of resources would have negatively impacted ongoing and planned research efforts focused on increasing naval warfighting technological advantage over near-peer competitors. Anticipated awards in FY 2018 include but are not limited to replacement of electrical panels that support materials science and technology research which requires steady state electrical power to operate multi-million dollar additive manufacturing equipment used to develop next generation metallic and ceramic complex structural materials; replacement of transformers that provide power to the Nike Laser Facility used to conduct research in plasma physics and potential directed energy weapons development; and replacement of transformers and switching gear that supports multiple departments responsible for research and engineering related to naval space technology efforts in the areas of component design, mechanical systems development, electronic systems development, control systems development, and design test and processing of materials and systems ensuring reliable and robust use of this critical environment in support of naval operations.		
FY 2019 Plans: N/A		
Congressional Add: Printed Circuit Board Executive Agent	14.485	0.000
FY 2018 Accomplishments: Program Management: - Leading bi-weekly TAG-UP calls and monthly Charter Leads meeting. - Conducting Weekly EA PM Meetings. Trust Assurance:		

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
- The PrCB EA, along with support from SAIC and their Merrillville, IN lab, continues to investigate a microvia reliability issue. - Supporting status and update meetings and telecons with OSD R&E/SE, OSD L&MR/MPP, DLA, OSD MIBP. - Continuing EA trusted accreditation process development for printed circuit board design, fabrication & assembly. - Overseeing DOTC Counterfeit Detection Project. Technology Development: - Continue to develop processes and product refinement for the newly acquired and installed Optomec printer and LED imager. - Ongoing initiatives for DoD Organic supply chain: board design & assembly, interconnect technology related challenges, and EA outreach for technology transition purposes to academia and industry. - Investigating novel materials and hybrid additive manufacturing technologies for printable and flexible electronic interconnect and PCB assembly. Supply Chain Risk Management: - Continuing to review and utilize data and results from the PrCB Industrial Base survey conducted by the Department of Commerce for incorporation into the 2017 Technology Roadmap and other initiatives. - Continued engagement for a Supply Chain Risk Management project executed by GTSI. - Continued development of PrCB Reliability guidance documents. - Overseeing DOTC Supply Chain Risk Mgmt. - Ongoing work to address military requirement gaps for IPC J-STD-001 by developing an Aerospace and Defense Addendum as well as a User's Guide. - Ongoing work on Standards Development and Coordination of industry standard membership and participation, including leadership roles on the IPC-1071 rewrite and a printed electronics Standard. - Continued NSWC Crane Printed Circuit Board Mfg Facility Assessment, including Process review and development and equipment setup & maintenance. ***FY 2019 Plans:*** N/A		
Congressional Adds Subtotals	43.456	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605853N / *Management, Technical & Intl Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Interest Items not included in other Projects.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605856N / *Strategic Technical 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	0.000	3.909	4.231	3.742	-	3.742	3.815	3.906	3.997	4.087	Continuing	Continuing
0128: *Mgmt/Tech Supt Strategic*	0.000	1.111	1.210	1.226	-	1.226	1.252	1.278	1.305	1.331	Continuing	Continuing
1038: *Acoustic & Non-Acoustic Analysis Supt*	0.000	2.798	3.021	2.516	-	2.516	2.563	2.628	2.692	2.756	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element supports technical studies and analyses as directed by the Director for Submarine Warfare to support major policy and procurement decisions. This program is divided into two elements to support decision making in the areas of submarine and antisubmarine warfare and undersea surveillance.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	4.313	4.231	4.242	-	4.242
Current President's Budget	3.909	4.231	3.742	-	3.742
Total Adjustments	-0.404	0.000	-0.500	-	-0.500
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.138	0.000			
• Program Adjustments	0.000	0.000	-0.500	-	-0.500
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions Adjustments	-0.266	-	-	-	-

Change Summary Explanation

PRJ 0128 - Increase $16K from FY 2019 to FY 2020 supports the development of a 30-Year Unmanned Undersea Vehicle (UUV) and Core Technology Evolution Plan to support fleet operational planning.

PRJ 1038 - Decrease $500K from FY 2019 to FY 2020 is a result of transition of Action Proponent from Undersea Capability Warfare to Deputy Chief Naval Officer (DCNO) Fleet Readiness and Logistics. Funds transferred to BA 01, Warfare Tactics (1C4C) properly align environmental compliance support actions related to SURTASS Low Frequency Active (LFA) sonar systems.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605856N *I Strategic Technical Support*

Technical: N/A

Schedule: N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605856N / *Strategic Technical Support*	Project (Number/Name) 0128 / *Mgmt/Tech Supt Strategic*	

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
0128: *Mgmt/Tech Supt Strategic*	0.000	1.111	1.210	1.226	-	1.226	1.252	1.278	1.305	1.331	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The project provides analytical support to the Director, Undersea Warfare Division as a basis for major policy, planning and acquisition program decisions. It supports the development of the Submarine Force strategic vision to guide research and development investment strategy and future planning. Additionally, this line supports studies in the area of submarine and undersea surveillance missions, force structure, payloads and sensors and force employment.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MANAGEMENT AND TECHNICAL SUPPORT, STRATEGIC	1.111	1.210	1.226	0.000	1.226
Articles:	-	-	-	-	-
FY 2019 Plans: - Conduct analysis to identify and weigh options for addressing problems/challenges and assessing the impact across the strategic and conventional military spectrum with use of modeling and simulation including projects such as Tactical Submarine Evolution Plan, UUV inventory modeling and Integrated Mast and Antenna Plan. - Develop supporting strategic guidance in the undersea domain with regard to force structure, capabilities and budgetary decisions with analysis. Anticipate emerging and future Undersea Warfare (USW) challenges, and lead effective assessment efforts to proactively address those challenges.					
FY 2020 Base Plans: - Conduct analysis to identify and weigh options for addressing problems/challenges and assessing the impact across the strategic and conventional military spectrum. - Anticipate emerging and future Undersea Warfare (USW) challenges, and lead effective assessment efforts to proactively address those challenges. -Develop a 30-Year Unmanned Undersea Vehicle (UUV) and Core Technology Evolution Plan to support fleet operational planning.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: Increase $16K from FY 2019 to FY 2020 supports the development of a 30-Year Unmanned Undersea Vehicle (UUV) and Core Technology Evolution Plan to support fleet operational planning.					
Accomplishments/Planned Programs Subtotals	1.111	1.210	1.226	0.000	1.226

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605856N / *Strategic Technical Support*	**Project (Number/Name)** 0128 / *Mgmt/Tech Supt Strategic*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This project supports studies in the area of undersea surveillance missions, sensor system, payloads, force employment, communications, acoustic performance prediction systems, environmental and medical effects of acoustics systems including installations/removals, operational security and future threat analysis. Project success is measured through analytical results and constant interaction with the contractors that enable the Director for Submarine Warfare to make decisions effectively.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605856N / *Strategic Technical Support*	Project (Number/Name) 1038 / *Acoustic & Non-Acoustic Analysis Supt*	

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
1038: *Acoustic & Non-Acoustic Analysis Supt*	0.000	2.798	3.021	2.516	-	2.516	2.563	2.628	2.692	2.756	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides analytical support to the Director, Intelligence, Surveillance, and Reconnaissance (ISR) Division, the Battlespace Awareness Division of Deputy, Chief Naval Operations (DCNO) Information Warfare, and the Integrated Undersea Surveillance System (IUSS) Branch as a basis for major policy, planning, and acquisition program decisions. It supports studies in the area of undersea surveillance missions, sensor system communications, and acoustic performance prediction systems, environmental and medical effects of acoustic systems, operational security, and future threat analysis. Supports synthetic mission lay down simulations for IUSS strategic planning and resource allocation. Supports continued development and documentation of architecture for future undersea surveillance capabilities and systems. Supports studies to determine long-term impact of IUSS active sensors on marine animals and development of Surveillance Towed Array Sensor system (SURTASS) Low Frequency Active (LFA), Compact LFA (CLFA)and the Supplemental Environmental Impact Statement (SEIS).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: ACOUSTIC AND NON-ACOUSTIC ANALYSIS SUPPORT	2.798	3.021	2.516	0.000	2.516
Articles:	-	-	-	-	-
FY 2019 Plans: -Continue to execute the Surveillance Engineering Measurements Program (SEMP) providing critical analytic insight into engineering and operational performance components of the IUSS shore based and mobile systems. Working with fixed and mobile surveillance projects; emphasizing the feedback to all stackholders. -Continue comprehensive case analyses to establish a basis for understanding what impact, both positive and negative, our legacy tactical sonar systems and new Advanced Surveillance Build (ASB) capability deliveries have on fleet operations. Operator Workload Reductions (OWR) is a thrust of this effort for the IUSS community. -Continue Data Set identification and production as the sole source for real-world data to enable these advanced development initiatives which span Defense Advanced Research Projects Agency (DARPA), Office of Naval Research					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605856N / *Strategic Technical Support*	**Project (Number/Name)** 1038 / *Acoustic & Non-Acoustic Analysis Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
(ONR), Integrated Warfare Systems (IWS), Space & Naval Warfare Systems Command (SPAWAR), Naval Research Laboratory (NRL), and others to bring critically needed new capabilities and capability improvements to the IUSS community. -Continue to provide environmental compliance documentation development, generation, revision, adjudication, and submission of Draft Supplemental Environmental Impact Statements (SEIS) enabling continuing fleet operations of SURTASS Low Frequency Active systems. -Continue to provide analytic and Subject Matter Expert (SME) support to facilitate Naval Litigation Office (NLO) and Department of Justice (DoJ) efforts in litigation from environmental NGOs in order to ensure no gap in SURTASS LFA sonar vessel operations. -Provide passive acoustic monitoring, which must occur whenever the SURTASS LFA sonar is operational, to support continued fleet Low Frequency Active operations worldwide. -Continue oversight and data/document management control during the 5-year development of the 2022 EIS. -Develop Draft and Final Scientific Research Plan for field research using SURTASS LFA sonar system in oceanic environment to support development of the 2022 SURTASS LFA sonar new EIS; transition to OPNAV N45 and Fleet as the action proponent. -Continue development of the 2022 EIS, which is essentially a full EIS rewrite, no carrying forward of previous conclusions/information/data as has been done with the four supplemental EISs between 2007 and 2017, and which will include the input from the public scoping meetings. -Provide daily SITREPs during field research to pertinent Navy personnel; and upon completion provide Hot Wash brief; and within three months of conclusion of the field research, provide Quicklook report and brief. -With support from the SWG, initiate the updating of information on the following elements of the new 2022 EIS: 1) nonacoustic alternatives to LFA sonar; 2) effects of LFA sonar on human divers; 3) efficacy of LFA sonar					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605856N / *Strategic Technical Support*	**Project (Number/Name)** 1038 / *Acoustic & Non-Acoustic Analysis Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
mitigation measures; 4) potential effects of exposure to LFA sonar on marine mammals, sea turtles, and fish; and 5) effects on recreational marine activities, such as diving. -On direction, plan for public hearings in at least five locations. -Close out any remaining actions regarding the oversight and execution of the IUSS Marine Mammal Monitoring (M3) Program prior to the transfer of this work. Support the transition of action proponent to the Fleet as well as support to transition the LFA workload to the Navy's leading environmental compliance, OPNAV N45. Plans transition F24 Action Proponent by the end of FY19 to Commander Pacific Fleet and OPNAV N45. -Provide support for requirements development for the Integrated Undersea Surveillance Systems family of systems provided by fixed, mobile, deployable sensors, integrated common processor, and the advanced surveillance builds. - Provide support on TAGOS(X) in the gate and JCIDS process, as well as other IUSS systems including support to the analysis of alternatives for IUSS deployable family of systems. - Provide analyses in support for IUSS Future Plan. ***FY 2020 Base Plans:*** -Continue to execute the Surveillance Engineering Measurements Program (SEMP) providing critical analytic insight into engineering and operational performance components of the IUSS shore based and mobile systems. Working to incorporated both fixed and mobile surveillance case studies and support transitions of analysis to program office. Emphasizing the feedback to all stakeholders. -Continue comprehensive case analyses to establish a basis for understanding what impact, both positive and negative, our legacy tactical sonar systems and new Advanced Surveillance Build (ASB) capability deliveries have on fleet operations. Operator Workload Reductions (OWR) is a thrust of this effort for the IUSS community. -Continue Data Set identification and production as the sole source for real-world data to enable these advanced development initiatives which span Defense Advanced Research Projects Agency (DARPA), Office of Naval Research (ONR), Integrated Warfare Systems (IWS), Space & Naval Warfare Systems Command (SPAWAR), Naval Research					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605856N / *Strategic Technical Support*	**Project (Number/Name)** 1038 / *Acoustic & Non-Acoustic Analysis Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Laboratory (NRL), and others to bring critically needed new capabilities and capability improvements to the IUSS community. -Provide support for requirements development for the Integrated Undersea Surveillance Systems family of systems provided by fixed, mobile, deployable sensors, integrated common processor, and the advanced surveillance builds. - Provide support on TAGOS(X) in the gate and JCIDS process, as well as other IUSS systems including IUSS Deployable family of systems. -Provide analyses in support of IUSS Future Plan. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease $500K/yr from FY 2019 to FY 2020 is a result of transition of Action Proponent from OPNAV Undersea Capability Warfare to Deputy Chief Naval Officer (DCNO) Fleet Readiness and Logistics.					
Accomplishments/Planned Programs Subtotals	2.798	3.021	2.516	0.000	2.516

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This project supports studies in the area of undersea surveillance missions, sensor systems, and acoustic performance prediction systems, environmental and medical effects of acoustic systems, and future threat analysis. In addition, it provides research and reports necessary to support SURTASS LFA and Compact Low Frequency Active (CLFA) sonar compliance
with Federal, State and Local environmental laws required for continued SURTASS LFA and CLFA operations, analysis of undersea technology for application to future undersea surveillance capabilities, and assessment of current and future IUSS warfare areas and potential allied Navy contributions. To this end, research is conducted by prominent educational

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605856N / *Strategic Technical Support*	**Project (Number/Name)** 1038 / *Acoustic & Non-Acoustic Analysis Supt*

and research institutions recognized for their expertise in the area, and by marine mammal biologists with extensive background in specific areas of underwater acoustics. This approach is deemed the most cost effective and efficient course of action for the Navy.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605861N / *RDT&E Science & Tech Mgmt*							
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	1.104	1.072	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.176
0135: *ONR Science & Technology Mgmt*	0.000	1.104	1.072	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.176

A. Mission Description and Budget Item Justification

This program element (PE) covers Office of Naval Research (ONR) corporate expenses including salaries, Information Technology (IT), Financial Improvement Plan (FIP) efforts and some of the day-to-day logistical costs. The vast majority of these items represent fixed costs associated with Scientists and Engineers supporting the Navy's Science and Technology (S&T) Programs.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	1.104	1.072	1.082	-	1.082
Current President's Budget	1.104	1.072	0.000	-	0.000
Total Adjustments	0.000	0.000	-1.082	-	-1.082
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	-1.082	-	-1.082

Change Summary Explanation

The funding decrease from FY 2019 to FY 2020 reflects the transfer of Financial Improvement and Audit Readiness (FIAR) Civilian Salary (1 Full Time Equivalent (FTE)) to Program Element (PE) 0605898N Management of Headquarters Activity to better align with other existing Civilian Salary FIAR positions. Next Generation Enterprise Networks (NGEN) corporate requirements were also transferred to PE 0605853N Management, Technical and International Support, Project 3017 Enterprise Information Systems.

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605861N / *RDT&E Science & Tech Mgmt*	Project (Number/Name) 0135 / *ONR Science & Technology Mgmt*	

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
0135: *ONR Science & Technology Mgmt*	0.000	1.104	1.072	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.176
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports ONR leadership, management and direction for the Naval S&T program. This project funds ONR HQ Non-Management Headquarters Activities (Non-MHA) salaries, communications, and other fixed costs. In FY16 and out, the Mid-Range Financial Improvement Plan effort will be transferred into this project from PE 0605853N Project 3025 to support ONR's goal of attaining a clean and auditable financial statement. ONR sponsors scientific advances, which lead to Future Naval Capabilities (FNCs), supporting the Fleet's ability to operate from a position of technological superiority. Functions performed include (1) scientific and technical direction of the nationwide 6.1 basic research program with colleges, universities, non-profit organizations and Naval Laboratories and Warfare Centers; (2) scientific and technical direction of the 6.2 applied research program through the Naval R&D laboratories and Warfare Centers and industry; (3) scientific and technical direction of the Naval 6.3 advanced technology development program through the Navy's R&D laboratories, Warfare Centers and industry; (4) management, resource formulation, program assessment, and contract negotiation/administration of the Navy basic research, applied research and advanced technology development program; and (5) coordination of the Navy's Technology Base program within the context of total DoD/Government (e.g., National Science Foundation, National Academy of Sciences) R&D initiatives in order to maximize scientific advances. This project also supports ONR Non-MHA management and direction for the following Navy-wide programs: Small Business Innovation Research, Naval Research Advisory Committee, Navy Patent Program, Historically Black Colleges and Universities/Minority Institutions Program, Navy Manufacturing Technology Program and the Ballistic Missile Submarine Nuclear (SSBN) Security Technology Program.

Additionally, this project funds ONR field salaries, communications, and other fixed costs. Functions performed support ONR's Navy-wide responsibilities in the negotiation and establishment of indirect cost rates for DoD-assigned universities and performance of contract administration for all DoD contracts/grants at all colleges and universities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: S&T MANAGEMENT SUPPORT	1.104	1.072	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Provides for the salary associated with 1 Financial Improvement and Audit Readiness (FIAR) Full Time Equivalent (FTE) assigned to ONR Headquarters to support Financial Improvement Plan (FIP) efforts. Funding also supports information technology costs associated with the operations of the Next Generation Enterprise Networks (NGEN) efforts.					
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605861N / *RDT&E Science & Tech Mgmt*	**Project (Number/Name)** 0135 / *ONR Science & Technology Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
This PE project funds NGEN Corporate requirements and FIAR Civilian Salary (1 FTE) ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 reflects the transfer of Financial Improvement and Audit Readiness (FIAR) Civilian Salary (1 Full Time Equivalent (FTE)) to Program Element (PE) 0605898N Management of Headquarters Activity to better align with other existing Civilian Salary FIAR positions. Next Generation Enterprise Networks (NGEN) corporate requirements were also transferred to PE 0605853N Management, Technical and International Support, Project 3017 Enterprise Information Systems.					
Accomplishments/Planned Programs Subtotals	1.104	1.072	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This PE funds operating costs for ONR's mission. Program performance is measured by attaining financial benchmarks for planned obligations vs. actual obligations and planned expenditures vs. actual expenditures.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605863N *I RDT&E Ship & Aircraft 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	0.000	105.019	97.471	93.872	-	93.872	104.982	101.888	101.298	107.357	Continuing	Continuing
0568: *RDT&E Acft Flt Hours*	0.000	33.655	34.026	33.543	-	33.543	37.705	34.651	33.480	38.183	Continuing	Continuing
0569: *RDT&E Acft Supt*	0.000	34.134	40.206	33.232	-	33.232	39.147	39.727	40.313	41.119	Continuing	Continuing
2924: *SDTS*	0.000	11.365	10.524	13.386	-	13.386	12.607	12.400	12.409	12.657	Continuing	Continuing
3206: *T&E Enterprise*	0.000	25.865	12.715	13.511	-	13.511	15.323	14.910	14.896	15.198	Continuing	Continuing
3238: *Threat Engineering*	0.000	0.000	0.000	0.200	-	0.200	0.200	0.200	0.200	0.200	Continuing	Continuing

A. Mission Description and Budget Item Justification

This continuing program provides support for ships and aircraft required to accommodate Research, Development, Test and Evaluation (RDT&E) of new systems. The RDT&E ship and aircraft inventory is required to adequately test new and improved weapon systems, stay current with threats, and increase warfighting capability of the fleet. The program provides integrated logistics support for aircraft at selected field activities; provides depot-level rework of aircraft, engines, and components for the Navy inventory of RDT&E aircraft; and provides support for ships and aircraft bailed to contractors for Navy RDT&E projects. Costs covered under this element include aircrew training and proficiency, fuel, supplies, equipment, repair, Aviation Depot Level Repairables, overhaul of ships and aircraft, as well as organizational, intermediate, and depot maintenance of ships and aircraft in the Navy RDT&E inventory.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	105.666	97.471	100.567	-	100.567
Current President's Budget	105.019	97.471	93.872	-	93.872
Total Adjustments	-0.647	0.000	-6.695	-	-6.695
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	0.000			
• SBIR/STTR Transfer	-0.646	0.000			
• Program Adjustments	0.000	0.000	-6.711	-	-6.711
• Rate/Misc Adjustments	0.000	0.000	0.016	-	0.016

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605863N *I RDT&E Ship & Aircraft Support*

Change Summary Explanation

Project 2924: The 2017 Board of Inspection and Survey (INSURV) report identified numerous material issues that has resulted in an increase in the required labor and consumable parts to accomplish routine preventive maintenance to prevent recurrence of identified deficiencies and material degradation of ship Hull, Mechanical and Electrical (HM&E) Systems. FY 2020 funding increase of $1.33M from PB 2019 to PB 2020 is to support the accomplishment of this routine maintenance. Without the increase in funding, the Self Defense Test Ship risks being placed in Do Not Operate status, which will negatively impact the Navy's ability to conduct realistic live fire testing in support of CVN 78, Littoral Combat Ship and LSD 52 Class Amphibious Ship Self Defense Systems.

Project 3206 - $1.2M FY 2020 TOA decrease from PB 2019 to PB 2020 is due to Underexecution Issue of $1.0M and realignment of $200k from PU 3206 to PU 3238 Threat Engineering.

Project 0569: The funding decrease of approximately $7.0 million reflects a reduction in planned depot events for NAVAIR RDT&E aircraft - primarily driven by DON decisions to retire legacy FA-18 aircraft, and the grounding of NAVAIR C-130's due to propeller issues, resulting in delay of those depot inductions.

Project 3238: Project was established to support the Acquisition Threat Evaluation Projects (ATEP). Funding was realigned within the PE from project 3206 T&E Enterprise.

The FY 2020 request was reduced by $2.5 million to reflect the availability of prior year execution balances.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605863N / *RDT&E Ship & Aircraft Support*	Project (Number/Name) 0568 / *RDT&E Acft Flt Hours*	

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
0568: *RDT&E Acft Flt Hours*	0.000	33.655	34.026	33.543	-	33.543	37.705	34.651	33.480	38.183	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Research, Development, Test and Evaluation (RDT&E) Aircraft Flight Hours. This non-acquisition project supports direct flight hour costs, including organizational and intermediate level maintenance, as well as associated consumables, including petroleum, oil, and lubricants. These flight hours are used for post-maintenance test flights, aircrew training, and the accomplishment of pilot proficiency requirements (approximately three hours per pilot per month), in support of Research and Development programs at four Naval Air Systems Command/Naval Surface Warfare Center/Office of Naval Research flight activities.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: RDT&E Acft Flt Hours	33.655	34.026	33.543	0.000	33.543
Articles:	-	-	-	-	-
FY 2019 Plans: Continue to provide planned organizational and intermediate-level maintenance, supply and petroleum, oil and lubricants in support of RDT&E aircraft operations.					
FY 2020 Base Plans: Continue to provide planned organizational and intermediate-level maintenance, supply and petroleum, oil and lubricants in support of RDT&E aircraft operations.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The funding decrease reflects a reduction of funded Test and Evaluation pilot proficiency requirements.					
Accomplishments/Planned Programs Subtotals	33.655	34.026	33.543	0.000	33.543

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 0568 / *RDT&E Acft Flt Hours*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Not Applicable

E. Performance Metrics

This Research, Development, Test and Evaluation (RDT&E) Aircraft program supports approximately three hours per pilot per month of post-maintenance test flights, aircrew training and the accomplishment of pilot proficiency requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605863N / *RDT&E Ship & Aircraft Support*	Project (Number/Name) 0569 / *RDT&E Acft Supt*	

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
0569: *RDT&E Acft Supt*	0.000	34.134	40.206	33.232	-	33.232	39.147	39.727	40.313	41.119	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

The FY 2020 funding request was reduced by $.834 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

Research, Development, Test and Evaluation (RDT&E) Aircraft Support. This continuing project funds costs associated with RDT&E fixed and rotary wing aircraft which accommodate test and evaluation of aircraft/weapon systems. Testing aboard these platforms reduces the number of fleet units required to support RDT&E efforts. Included in these costs are Aviation Depot-Level Repairables (AVDLR), which are spare and replacement aircraft parts and components to support overhead maintenance related flight operations, aircrew training, and proficiency flight hours. This project also funds airframe Standard Depot Level Maintenance (SDLM), the Integrated Maintenance Concept (IMC) and Phased Depot Maintenance (PDM), in-service repairs, emergency repairs, and engine repairs, as well as aircraft material condition and field inspections. Additionally, it funds Aircraft Structure Periodic Adjustments (ASPA), Individual Material Readiness List (IMRL) tools and support equipment, Aviation Climate Assessment Survey System (ACASS) and other systems for application to and compatibility with RDT&E requirements.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Aircraft/Engine Maintenance and AVDLR/IMRL Support	33.534	39.606	32.632	0.000	32.632
Articles:	-	-	-	-	-
FY 2019 Plans: Continue planned transition from ASPA/SDLM to the IMC/PDM program for depot maintenance requirements, while sustaining the following programs: AVDLR/IMRL, engine repairs, support of aircraft in the RDT&E inventory. Continue operation and implementation of maintenance and material management programs at Naval Air Warfare Center activities.					
FY 2020 Base Plans: Continue to provide funding to in support of RDT&E depot maintenance requirements, while funding the following sustainment costs: AVDLR/IMRL in support of Pilot Readiness, engine repairs, support of aircraft in the					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 0569 / *RDT&E Acft Supt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
RDT&E inventory. Continue operation and implementation of maintenance and material management programs at Naval Air Warfare Center activities. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding decrease reflects a reduction in planned depot events for NAVAIR RDT&E aircraft - primarily driven by DON decisions to retire legacy FA-18 aircraft, and the grounding of NAVAIR C-130's due to propeller issues, resulting in delay of those depot inductions.					
Title: In-Service Repairs	0.600	0.600	0.600	0.000	0.600
Articles:	-	-	-	-	-
FY 2019 Plans: Continue to provide planned In-Service Repair funds for emergent repair requirements to aircraft performing mission critical test and evaluation projects. ***FY 2020 Base Plans:*** Continue to provide planned In-Service Repair funds for emergent repair requirements to aircraft performing mission critical test and evaluation projects. ***FY 2020 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	34.134	40.206	33.232	0.000	33.232

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 0569 / *RDT&E Acft Supt*

E. Performance Metrics

The RDT&E Aircraft Support program goal is to provide the required funds to meet NAVAIR Aircraft Controlling Custodian aircraft sustainment requirements. These sustainment costs include providing annual support for required Planned Depot Maintenance events, In-service Repairs (P&E, Repairs, Mods), Depot Engine Inductions, IMRL Repairs, along with the funding of management oversight of the aircraft and the AVDLR costs associated with pilot readiness requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605863N / *RDT&E Ship & Aircraft Support*	Project (Number/Name) 2924 / *SDTS*	

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
2924: *SDTS*	0.000	11.365	10.524	13.386	-	13.386	12.607	12.400	12.409	12.657	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the Hull Mechanical and Electrical (HM&E) and remote control system maintenance aboard the Self-Defense Test Ship (SDTS) in support of the Navy RDT&E of ship self-defense systems. Testing aboard this ship provides the capability to safely test self-defense weapon systems within their minimum range and reduces the number of fleet units required to support RDT&E efforts.

Funds are used to purchase expendable supplies, routine equipment maintenance, and repairs and supporting services.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SDTS	11.365	10.524	13.386	0.000	13.386
Articles:	-	-	-	-	-
FY 2019 Plans: NSWC PHD continues to conduct management, operation, maintenance and repair/upgrade of ship HM&E critical items to ensure ongoing safe operation, and performance of the SDTS. Maintain, operate, configure and upgrade the TSRCS and associated infrastructure in support of T&E requirements onboard SDTS to support the AW SSD Enterprise TEMP efforts as well as Navy development test programs.					
FY 2020 Base Plans: NSWC PHD continues to conduct management, operation, maintenance and repair/upgrade of ship HM&E critical items to ensure ongoing safe operation, and performance of the SDTS. Maintain, operate, configure and upgrade the TSRCS and associated infrastructure in support of T&E requirements onboard SDTS to support the AW SSD Enterprise TEMP efforts					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 2924 / *SDTS*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
as well as Navy development test programs. Continue efforts to address issues identified by the INSURV report. Continue to improve the routine maintenance and repair efforts onboard SDTS. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The 2017 Board of Inspection and Survey (INSURV) report identified numerous material issues that has resulted in an increase in the required labor and consumable parts to accomplish routine preventive maintenance to prevent recurrence of identified deficiencies and material degradation of ship Hull, Mechanical and Electrical (HM&E) Systems. Funding increase of $2,862K supports accomplishment of this routine maintenance. Without the increase in funding, the Self Defense Test Ship risks being placed in Do Not Operate status, which will negatively impact the Navy's ability to conduct realistic live fire testing in support of CVN 78, Littoral Combat Ship and LSD 52 Class Amphibious Ship self defense systems.					
Accomplishments/Planned Programs Subtotals	11.365	10.524	13.386	0.000	13.386

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This line of accounting is for recurring HM&E and ship maintenance.

E. Performance Metrics

1. Ability to successfully remain safe and operationally available to support testing and evaluation of systems while in an unmanned, remotely controlled mode.
2. Successful development of applicable operation and maintenance documentation and reporting of installations.
3. Successful and timely delivery of funding status, schedule and technical delays and other issues.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605863N / *RDT&E Ship & Aircraft Support*				Project (Number/Name) 3206 / *T&E Enterprise*			
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**
3206: *T&E Enterprise*	0.000	25.865	12.715	13.511	-	13.511	15.323	14.910	14.896	15.198	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The T&E Enterprise consolidates all Air Warfare (AW) Ship Self Defense (SSD) at-sea testing across multiple class ships, beginning with LHD 8, LSD 52, LHA 6, DDG 1000, CVN 78, and Littoral Combat Ship (LCS). This consolidated AW SSD test and evaluation approach meets the Probability of Raid Annihilation (PRA) (PRA is defined as a required surface ship defense against Anti-Ship Cruise Missiles), Self Defense Test Ship (SDTS) testing requirements as outlined in Air Warfare Ship Self Defense Enterprise TEMP 1714, and lead/operational ship testing requirements for Extended Sea Sparrow Missile (ESSM) TEMP 1471, Rolling Airframe Missile (RAM) Blk 2 TEMP 286-2, DDG 1000 TEMP 1560, CVN 78 TEMP 1610, Cooperative Engagement Capability (CEC) TEMP 1415, SSDS TEMP 1400, LHA 6 TEMP 1697, AN/SPQ-9B TEMP 1463, Surface Electronic Warfare Improvement Program (SEWIP) TEMP 1658 (Block 1A), and LCS TEMP 1695.

Enterprise Cost elements:

a) SDTS Summary includes installation, check-out and stage testing of the major combat systems elements on the SDTS.

b) SDTS Test includes tracking and firing exercises versus single and dual, subsonic and supersonic Anti-Ship Cruise Missile (ASCM) threat surrogates for ship classes in the Enterprise TEMP from the SDTS including: LSD 52, DDG 1000, LCS and CVN 78.

c) Lead Ship Test includes tracking and firing exercises versus single and dual, subsonic and supersonic ASCM threat surrogates for ship classes in the Enterprise TEMP from the Lead Ship including: LSD 50, LCS and CVN 78.

d) Testbed includes all modeling and simulation (M&S) costs required to create OT-quality digital representations of shipboard combat system performance including infrastructure, distributed secure network, common environmental services for Developmental Test (DT) and Operational Test (OT).

e) Enterprise Testing and Planning includes the contractor and government costs to administer the Enterprise, collect and distribute data from live events, maintain Information Assurance (IA) certifications, and financial management.

f) Maintenance of Combat System (CS) includes the costs for the routine preventive maintenance and repairs of the Combat Systems elements on the SDTS.

The T&E Enterprise merges common ship, element, and system requirements into the least number of test events while leveraging planned Combat System Ship Qualification Trials (CSSQTs) to accomplish Developmental Testing (DT) and Operational Testing (OT) requirements. All tests on the SDTS require the sharing of infrastructure, missile range allocations, execution time and underway time to eliminate duplicative testing. T&E Enterprise preserves end-to-end mission Operational Testing in a realistic operational environment, capitalizing on Probability of Raid Annihilation Modeling and Simulation (M&S) data validated with results of that

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 3206 / *T&E Enterprise*

Operational Testing, and ensuring a consistent approach across ship classes. Applicability of all test events is beneficial across multiple ship classes with the same variation under test.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: T&E Enterprise	25.865	12.715	13.511	0.000	13.511
Articles:	-	-	-	-	-
FY 2019 Plans: Continue to conduct test planning in support of CVN 78, LSD 52, LCS and DDG 1000. The Enterprise will continue routine maintenance, IA/Cybersecurity Certification and Accreditation on combat systems elements and the remote control system on the SDTS. Continue to facilitate the integration of systems into the PEO IWS M&S framework.					
FY 2020 Base Plans: Continue to conduct test planning in support of CVN 78, LSD 52, LCS and DDG 1000. The Enterprise will continue routine maintenance, IA/Cybersecurity Certification and Accreditation on combat systems elements and the remote control system on the SDTS. Continue to facilitate the integration of systems into the PEO IWS M&S framework.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The funding increase from FY19 to FY20 supports continued test planning for CVN 78, LSD 52, LCS and DDG 1000. The Enterprise will continue routine maintenance, IA/Cybersecurity Certification and Accreditation on combat systems elements and the remote control system on the SDTS. Continue to facilitate the integration of systems into the PEO IWS M&S framework. Funding in the amount of $200K was realigned within this program element to a new project - 3238 Threat Engineering.					
Accomplishments/Planned Programs Subtotals	25.865	12.715	13.511	0.000	13.511

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 3206 / *T&E Enterprise*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Successfully complete required documentation and reporting for Enterprise installations and required check out and testing of installations. Successfully complete all Enterprise Operational Test Readiness Reviews (OTRR). Successfully complete required Enterprise developmental testing and operational testing, with 0 casualty delays. Successfully collect related test result data and distribute accordingly.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605863N / *RDT&E Ship & Aircraft Support*	Project (Number/Name) 3238 / *Threat Engineering*	

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
3238: *Threat Engineering*	0.000	0.000	0.000	0.200	-	0.200	0.200	0.200	0.200	0.200	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Threat Engineering produces Acquisition Threat Evaluation Products (ATEPs) that are inputs to System of System requirements across Program Executive Office (PEO) Integrated Warfare Systems (IWS) platforms, elements, and DoD systems to deliver scalable fleet level performance capability. This program also produces critical, valid T&E assets that satisfy Commander Operational Test & Evaluation Force (COTF) and Director of Operational Test and Evaluation (DOT&E) requirements as these same tools will be used to support and supplement test and evaluation and training against the assessed threats in both testbed and at-sea configurations, ensuring consistency between the development and T&E acquisition phases.

ATEP is the surface navy cost effective, affordable, single, common threat modeling architecture that supports its Major Defense Acquisition Program (MDAP), (and other subordinate programs) RDT&E activities throughout the acquisition life cycle and extending through operations and sustainment. ATEP satisfies Life Cycle Mission Planning (LCMP) requirements by providing the threat modeling architecture needs to support systems engineering trade-off analysis, T&E (DT and OT) and operations and sustainment (OA) through testbed evaluation activities. ATEP is a critical component in ensuring requirements are achievable, affordable and testable.

ATEP provides the required threat models to ensure fleet operational readiness against the threat. Specifically, ATEP Satisfies Operational Test (OT) and Operational Assessment (OA) requirements including COMOPTEVFOR requirement (COMOPTEVFOR Memo, 3960, SER 00/244 of 29 April 2016). This requirement specifies ATEP is necessary to provide the surface navy validated Anti-Ship Cruise Missile (ASCM) threat models for use in the M&S infrastructure supporting OT&E. Moreover, ATEP satisfies COMOPTEVFOR requirement that threat models must be at a fidelity commensurate with the blue-force system representations and contain intel-derived lethality/vulnerability data, physics-based six degrees-of-freedom models, reactive seekers and guidance, and other engineering data. ATEP is necessary to evaluate mandatory Key Performance Parameters including operational effectiveness, and suitability to include a systems lethality and survivability, and achieving its performance requirements within operation and sustainment costs.

ATEP provides the threat models necessary to ensure the surface navy 1.) Avoids Technological Surprise and 2.) Eliminates Point Solutions. ATEP satisfies necessary Threat model requirements to conduct warfare systems analysis of alternatives including gaps analysis, and threat systems mission and performance analysis and effectiveness studies supporting both material and non-material solutions while supporting the development of Intelligence Community Tasking Threat.

With Threat Engineering efforts and development of ATEPs the Navy and PEO IWS will produce substantiated risk and cost based Fleet Level Engineering decisions producing predictable and timely fleet capability against stressing threats. Scalable warfighting performance will be evaluated against the appropriate threat environment, using sufficient, verified and validated models applied to produce Fleet Level Engineering requirements and gaps analysis.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 3238 / *Threat Engineering*

Without Threat Engineering efforts and ATEPs the Navy and the PEO will incur unsubstantiated risk and cost in developing capability for the fleet. Scalable warfighting performance will not be evaluated against the threat environment, sufficient models will not be developed or applied to produce Fleet Level Engineering requirements and gaps analysis.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Threat Engineering	0.000	0.000	0.200	0.000	0.200
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: -Acquisition Threat Evaluation Projects (ATEP) Products Support and Sustainment, which includes support of the ATEP products, as well as tracking and troubleshooting issues. This could result in the production of an upgraded version and/or a development plan with an updated systems requirements document (dependent upon the magnitude of the changes). -Threat Requirements Development, which includes identifying additional requirements from the program offices and other users to determine what work needs to be accomplished to satisfy those requirements and to develop the appropriate planning to address the requirements based on prioritization from the PEO program offices that will result in the development plan and updated system requirements document.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The funding increase reflects the realignment of funding to support the threat engineering efforts from project 3206 T & E Enterprise, within this program element.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.200	0.000	0.200

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

New start program required integration into an existing applicable PE to consolidate and bring to bear scalable fleet level warfighting capability to the fleet and is not accounted for within this exhibit.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605863N / *RDT&E Ship & Aircraft Support*	**Project (Number/Name)** 3238 / *Threat Engineering*

E. Performance Metrics

Successfully complete Verification & Validation testing of ATEP Products against Validated intelligence and ensure Acceptance of Delivery of ATEP products by community of users and stakeholders. Successfully complete all program acquisition milestones (System Requirements Review (SRR), Preliminary Design Review (PDR), Critical Design Review (CDR), Test Readiness Review (TRR), and Acceptance and Delivery Review (ADR)).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation 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	0.000	369.056	373.834	394.020	-	394.020	400.395	402.683	409.693	418.101	Continuing	Continuing
0541: *AUTEC*	0.000	60.636	53.196	54.507	-	54.507	55.358	56.343	57.479	58.628	Continuing	Continuing
0566: *NAVAIR Environmental Compliance*	0.000	4.373	4.428	4.572	-	4.572	4.663	4.756	4.851	4.948	Continuing	Continuing
0653: *NAWC Weapons Division*	0.000	140.001	143.497	155.097	-	155.097	151.429	157.103	159.224	162.410	Continuing	Continuing
0654: *NAWC Acft Division*	0.000	93.584	97.001	100.281	-	100.281	102.250	104.250	106.313	108.418	Continuing	Continuing
2921: *Pacific Missile Range Facility*	0.000	6.277	5.219	5.394	-	5.394	5.499	5.610	5.722	5.836	Continuing	Continuing
2922: *MRTFB Maint & Repair*	0.000	43.738	45.383	41.382	-	41.382	43.831	44.650	45.543	46.532	Continuing	Continuing
2958: *Cyberspace Activities*	0.000	0.000	0.000	0.433	-	0.433	0.445	0.445	0.445	0.454	Continuing	Continuing
3154: *Nanoose and Dabob Bay Ranges*	0.000	11.556	12.018	12.714	-	12.714	12.964	12.981	13.240	13.661	Continuing	Continuing
3386: *MRTFB Marine Vessels*	0.000	8.891	13.092	19.640	-	19.640	23.956	16.545	16.876	17.214	Continuing	Continuing

A. Mission Description and Budget Item Justification

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

This program provides institutional maintenance and operations support for: the Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center, Andros Island, Bahamas; the Environmental Compliance Program; Naval Air Warfare Center Weapons Division, Point Mugu and China Lake, CA; Naval Air Warfare Center Aircraft Division, Patuxent River, MD; Test and Evaluation related capabilities at the Pacific Missile Range Facility, Barking Sands, HI; Maintenance and Repair at Naval Air Warfare Center Weapons Division, Naval Air Warfare Center Aircraft Division, and Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center; and the Naval Undersea Warfare Center Keyport Nanoose and Dabob Bay Ranges. The program also provides marine vessels overhauls and preventative maintenance in support of the 23 Major Range and Test Facility Base marine vessels located at Naval Air Warfare Center Weapons Division, Point Mugu, CA, Pacific Missile Range Facility, Honolulu, HI, Naval Undersea Warfare Center Keyport Nanoose and Dabob Bay Ranges, Keyport, WA, Naval Air Warfare Center Aircraft Division, Patuxent River, MD, and Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center. The Test and Evaluation activities make up the Navy portion of the Department of Defense's Major Range and Test Facility Base. These activities are chartered to perform Test and Evaluation for the development and acquisition of technology advanced weapons systems. Core Test and Evaluation capabilities and capacity are operated to obtain weapons system performance documentation for acquisition program milestone decisions to provide operational forces with effective weapons systems. This program provides

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605864N *I Test & Evaluation Support*

Navy Acquisition Program Managers required test capabilities; lowers cost of Test and Evaluation; removes cost and scheduling impact of providing their own Test and Evaluation resources; and retains the physical airspace, land space and sea space needed to conduct testing.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	373.667	373.834	395.811	-	395.811
Current President's Budget	369.056	373.834	394.020	-	394.020
Total Adjustments	-4.611	0.000	-1.791	-	-1.791
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.121	0.000			
• Program Adjustments	0.000	0.000	-1.765	-	-1.765
• Rate/Misc Adjustments	0.000	0.000	-0.026	-	-0.026
• Congressional Directed Reductions Adjustments	-3.490	-	-	-	-

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 0541 / *AUTEC*	

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
0541: *AUTEC*	0.000	60.636	53.196	54.507	-	54.507	55.358	56.343	57.479	58.628	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Cyberspace Activities funding realigned to PU2958 to create cyber pure budget line and projects in order to ensure maximum visibility and enhanced oversight.

A. Mission Description and Budget Item Justification

As a detachment of Naval Undersea Warfare Center, Division Newport, the mission of the Atlantic Undersea Test and Evaluation Center is to provide the US Navy an underwater range facility for full-spectrum test and evaluation of Undersea Warfare systems and for Fleet training and readiness assessment. The Atlantic Undersea Test and Evaluation Center Program Office is headquartered at Newport, RI. Atlantic Undersea Test and Evaluation Center's administrative offices are located at West Palm Beach, Florida. Test facilities are located at Andros Island, Sites 1 through 4, and the Berry Islands in the Bahamas. Atlantic Undersea Test and Evaluation Center aircraft make scheduled daily flights between West Palm Beach and Andros Town Airport.

Atlantic Undersea Test and Evaluation Center manages and, under service contract, maintains and operates a 500 square nautical miles deep-water and a 100 square nautical miles shallow-water range; air-target tracking capabilities; sonobuoy simulation systems; electronic warfare threat simulation systems; rotary wing aircraft; aircraft ground support facilities; acoustic targets; torpedo retrieval and flushing capabilities; open-ocean range craft; marine support facilities; and data processing and analysis capabilities.

Major test facilities on Andros Island are located at Site 1. The Command Control Building houses the range tracking displays and replay centers, the computer center, operations support functions, communications center, and the central timing system. The Range Support Facility houses a torpedo post-run workshop, Mark 46 /Mark 50 lightweight torpedo Intermediate Maintenance Activity, a Mark 30 undersea target Intermediate Maintenance Activity, a Mark 48 heavyweight torpedo Research and Development Turnaround facility and related technical facilities. The complex includes electrical and physical calibration labs, a complete electronics maintenance shop, a dive locker, a precision machine shop, and logistics support areas.

Atlantic Undersea Test and Evaluation Center has a 285-foot concrete pier with a controlling depth of 17 feet (5.2 meters) at mean low tide. An adjacent wharf is approximately 240 feet in length (72 meters) with a controlling depth of 15 feet at mean low tide. Power is available at both locations. Facilities at the pier/marine area include fully equipped machine /fabrication and marine overhaul shops. Also at Site 1, six Range User Buildings are maintained for assembling test equipment and equipment check-out during test mobilization or dockside periods. These staging areas are equipped with a variety of power sources, gantry cranes, compressed air and security features. A fully equipped range user hanger for ground maintenance and storage of helicopters is located at the Atlantic Undersea Test and Evaluation Center helicopter airstrip. Sites 2, 3, and 4 are small instrumented areas located south of Site 1 used to extend tracking of sonobuoys, communications, and air target track.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Atlantic Undersea Test and Eval Ctr Facility	48.880	41.440	42.751	0.000	42.751

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0541 / *AUTEC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Articles:	-	-	-	-	-
Description: Atlantic Undersea Test and Evaluation Center is a Test and Evaluation facility for collecting selected underwater, surface and air tracking data on test participants. This project funds the overhead/ institutional costs required to sustain the Major Range and Test Facility capabilities at Atlantic Undersea Test and Evaluation Center in accordance with Department of Defense Directive 3200.11. ***FY 2019 Plans:*** Continue to maintain and operate mission essential/core test support resources, instrumentation systems and marine craft required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain Major Range and Test Facility Base operations. Reimburse the Command for General and Administrative support services. Continue to support resolution of policy compliance issues resulting from a Naval Sea Systems Command Inspector General/Newport Office of Counsel and Contracting review. ***FY 2020 Base Plans:*** Continue to maintain and operate mission essential/core test support resources, instrumentation systems and marine craft required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain Major Range and Test Facility Base operations. Reimburse the Command for General and Administrative support services. Continue to support resolution of policy compliance issues resulting from a Naval Sea Systems Command Inspector General/Newport Office of Counsel and Contracting review. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects inflation and an increase in compliance related charges associated with the follow-on AUTEC Maintenance and Operations contract. The increase in compliance related charges include shipping of personnel and belongings via contractor owned barge; Per diem; and an annual travel stipend as part of workforce compensation for a remote location duty station.					
Title: Bahamian Lease	11.756	11.756	11.756	0.000	11.756
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0541 / *AUTEC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: Rental payments to the Bahamian government for use of land and ocean in the Bahamas. ***FY 2019 Plans:*** Continue to provide rental payments to the Bahamian government for use of land and ocean in the Bahamas. ***FY 2020 Base Plans:*** Continue to provide rental payments to the Bahamian government for use of land and ocean in the Bahamas. ***FY 2020 OCO Plans:*** Not applicable.					
Accomplishments/Planned Programs Subtotals	60.636	53.196	54.507	0.000	54.507

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain Major Range and Test Facility Base infrastructure in a ready state to provide between 2,500-2,900 range hours in support of multiple Navy and Department of Defense acquisition programs and fleet training.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 0566 / *NAVAIR Environmental Compliance*	

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
0566: *NAVAIR Environmental Compliance*	0.000	4.373	4.428	4.572	-	4.572	4.663	4.756	4.851	4.948	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This continuing project supports environmental compliance, conservation and pollution prevention related efforts at the Navy Major Range and Test Facility Base located at Patuxent River, MD, China Lake, CA, Point Mugu, CA, and Atlantic Undersea Test and Evaluation Center, Bahamas. The Navy Major Range and Test Facility Base environmental projects include ongoing efforts to comply with Federal, State, and local environmental requirements.

The Major Range and Test Facility Base are test and evaluation facilities that provide for Department of Defense test and evaluation support missions. These missions include: Weapons system testing, military operational squadron training on new weapon systems, and validation of performance or operational characteristics.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Environmental Compliance	4.373	4.428	4.572	0.000	4.572
Articles:	-	-	-	-	-
Description: Projects supporting level 1 compliance requirements at Naval Air Systems Command Ranges inclusive of hazardous waste disposal, Resource Conservation & Recovery Act, Subtitle C - 40 CFR 260 through 279, and Emergency Planning and Community Right-to-Know Act, Sections 311-312; solid waste disposal, Resource Conservation & Recovery Act, Subtitle D - 40 CFR Parts 239 through 259; natural & cultural resources programs, National Environmental Policy Act, Environmental Protection Act, Marine Mammal Protection Act, Endangered Species Act, Archeological and Historic Preservation Act, maintaining of environmental permits, Clean Air Act, Clean Water Act, and environmental monitoring. Resource Conservation & Recovery Act, 42 U.S.C. Section 6901 et sequens 1976; Emergency Planning and Community Right-to-Know Act, 42 U.S.C. Section 11001-11050 et sequens 1986; National Environmental Policy Act, 42 U.S.C. Section 4331 et sequens 1969; Marine Mammal Protection Act, 16 U.S.C. Section 1361 et sequens 1972; Clean Water Act, 33 U.S.C. Section 1251-1387 1972; ESA, 7 U.S.C. Section 136, 16 U.S.C. Section 1531 et sequens 1973; Archeological and Historic Preservation Act, 16 USC Section 469-469c-2 1960; and Clean Air Act, Title V, 33 U.S.C. Section 1251 et sequens 1972.					
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0566 / *NAVAIR Environmental Compliance*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue the identification and funding of level 1 requirements that support compliance projects at Naval Air Systems Command Ranges to ensure applicable laws and regulations are met and Range mission/operations proceed unencumbered. Global Information Systems Encroachment Data Supporting Testing & Training, 0.2 Cultural Surveys Supporting Testing & Training, 0.1 ***FY 2020 Base Plans:*** Continue the identification and funding of level 1 requirements that support compliance projects at Naval Air Systems Command Ranges to ensure applicable laws and regulations are met and Range mission/operations proceed unencumbered. Global Information Systems Encroachment Data Supporting Testing & Training, 0.2 Cultural Surveys Supporting Testing & Training, 0.1 ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	4.373	4.428	4.572	0.000	4.572

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Funding and execution of 37 level 1 compliance projects with quarterly project reviews, and monthly monitoring of expenditures vs. execution of project deliverables/ objectives. Primary metric gauging performance of these projects is the maintaining of compliance with pertinent laws and regulations as noted in section B.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 0653 / *NAWC Weapons Division*	

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
0653: *NAWC Weapons Division*	0.000	140.001	143.497	155.097	-	155.097	151.429	157.103	159.224	162.410	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project provides continuing maintenance and operational support for the Naval Air Warfare Center Weapons Division Test and Evaluation capabilities. These capabilities include the Pacific Ranges and Facilities, consisting of China Lake Ranges and the Point Mugu Sea Range, aerial and surface targets, test instrumentation, and Test and Evaluation aircraft. The Pacific Ranges use China Lake's 1.1 million acres of land and 17,000 square miles of military restricted (R-2508) airspace together with Point Mugu's 125,000 square miles of instrumented sea range and 36,000 square miles of controlled overlying airspace, and airfield and test instrumentation at San Nicolas Island to perform its Test and Evaluation mission. Included in the China Lake ranges is the Electronic Combat Range, which provides outdoor free space development and operational testing of airborne electronic warfare systems and tactics against shipboard and land based air defense systems. These ranges perform metric radar, multilateration and optical tracking of test objects; command, control, and destruct for range safety purposes; communications; frequency interference control and analysis; collection processing and display of telemetered data; real-time data processing and display; and the operation of a sub scale aerial target launch capability. Other test capabilities include sled tracks, measurement facility; propulsion, warhead, environmental, rocket motor, and other missile component test facilities; and gun ranges. This project funds costs that are not chargeable to customers.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Pacific Ranges	57.657	59.339	63.221	0.000	63.221
Articles:	-	-	-	-	-
Description: In accordance with Department of Defense Directive 3200.11., this project funds the overhead/ institutional costs required to sustain the Major Range and Test Facility Base capabilities at the Pacific Ranges and Facilities located at China Lake and Point Mugu, CA. These facilities provide safe, instrumented, controlled open air testing utilizing the Land Range, Sea Range, Electronic Combat Ranges, and San Nicholas Island.					
FY 2019 Plans: Continue to maintain and operate mission/core test support resources. These resources include test article instrumentation and systems required to safely conduct flight and ground test missions as well as schedule and control air, land, sea and associated range operating areas required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased services contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0653 / *NAWC Weapons Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue to maintain and operate mission essential/core test support resources. These resources include test article instrumentation and/or modification for Flight Test Aircraft and Weapons Undersea Test as well as ground and flight test instrumentation systems, range instrumentation systems and data processing and communication systems required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. Maintenance will begin on five Radar Signal Emulators (RSEs) and a battlespace shaping capability that requires Special Access Program (SAP) facilities. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects inflation, Information Assurance certification, increased Electronic Warfare Threat System Maintenance, and SAP Facilities for new acquisition program T&E requirements, including F-35.					
Title: Navy Test Wing Pacific	21.646	22.521	27.118	0.000	27.118
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities of the Naval Test Wing Pacific located at China Lake and Point Mugu, CA. These facilities provide the Navy's principal Pacific test activity for Naval Aviation Systems Team aircraft, engaged in or supporting Test & Evaluation of aircraft, weapons and weapons systems. ***FY 2019 Plans:*** Continue to maintain and operate mission essential/core test support resources associated with 10 aircraft and related systems and flight test safety required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain Major Range and Test Facility Base operations. ***FY 2020 Base Plans:*** Continue to maintain and operate mission essential/core test support resources associated with airborne and seaborne targets required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0653 / *NAWC Weapons Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
necessary to manage and sustain the Major Range and Test Facility Base operations. Stand up maintenance activity for the new Gulf Stream C-20 aircraft. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects inflation and the stand up for the Gulf Stream Maintenance C-20 aircraft.					
Title: Threat/Target Systems	11.140	11.454	11.804	0.000	11.804
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities of the Threat/Target Systems facilities. These facilities provide the airborne and seaborne threats for test and evaluation. ***FY 2019 Plans:*** Continue to maintain and operate mission essential/core test support resources associated with airborne and seaborne targets required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 Base Plans:*** Continue to maintain and operate mission essential/core test support resources associated with airborne and seaborne targets required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: Test and Evaluation Ordnance	3.391	3.540	3.500	0.000	3.500
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0653 / *NAWC Weapons Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities of the Test and Evaluation Ordnance facilities. These facilities provide test and evaluation of All-Up live ordnance and components. ***FY 2019 Plans:*** Continue to maintain and operate mission essential/core test support resources associated propulsion, warhead, environmental, rocket motor, and other missile component test facilities required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain Major Range and Test Facility Base operations. ***FY 2020 Base Plans:*** Continue to maintain and operate mission essential/core test support resources associated propulsion, warhead, environmental, rocket motor, and other missile component test facilities required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain Major Range and Test Facility Base operations. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: Naval Air Warfare Center Weapons Division Command	46.167	46.643	49.454	0.000	49.454
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Naval Air Warfare Center Weapons Division Major Range and Test Facility Base Test and Evaluation capabilities. ***FY 2019 Plans:*** Continue to reimburse the Command for General and Administration Support services. Continue to fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities, Navy Marine Corps Intranet, and any costs necessary to manage and sustain Major Range and Test Facility Base operations. ***FY 2020 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0653 / *NAWC Weapons Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue to reimburse the Command for General and Administration Support services. Continue to fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities, Navy Marine Corps Intranet, and any costs necessary to manage and sustain Major Range and Test Facility Base operations. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects increased General and Administrative, and R2508 Range Management costs.					
Accomplishments/Planned Programs Subtotals	140.001	143.497	155.097	0.000	155.097

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain Major Range and Test Facility Base infrastructure in a ready state to provide between 4,300-4,800 range hours, 125-150 aerial target presentations, 400-450 surface target presentations, 11,000-11,500 ordnance test hours, and over 6,000 flight hours in support of multiple Navy and Department of Defense acquisition programs and fleet training.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 0654 / *NAWC Acft Division*	

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
0654: *NAWC Acft Division*	0.000	93.584	97.001	100.281	-	100.281	102.250	104.250	106.313	108.418	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides funds for the maintenance and operations of the Naval Air Warfare Center Aircraft Division's Major Range and Test Facility Base capabilities used to conduct test and evaluation for air platforms. Naval Air Warfare Center Aircraft Division has extensive airfield, flight test ranges, aircraft systems test facilities and simulation laboratories to support aircraft Research Development Test and Evaluation. This includes 50,000 square miles of airspace, 39,375 square miles of sea space, and 7,950 acres of land space. Product areas include aircraft systems flight test and evaluation, carrier suitability certification, test article preparation, installed system test and evaluation, and modeling and simulation support of the acquisition process. The Test and Evaluation Group, Patuxent River, performs development and operational test and evaluation of manned and unmanned air vehicle systems, including mission systems, equipment, subsystems, components, and support systems. This project also provides test and evaluation facilities for air-breathing propulsion systems and extensive facilities for conducting both installed and uninstalled aircraft engine development and test and evaluation. This project funds costs that are not chargeable to customers.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Atlantic Ranges	22.892	23.349	24.871	0.000	24.871
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities associated with the Atlantic Ranges and Facilities and Air Vehicle Modification and Instrumentation. These facilities provide safe, instrumented, controlled flight testing and training in air, sea, and land arenas.					
FY 2019 Plans: Continue to maintain and operate mission essential/core test support resources. These resources include test article instrumentation and/or modification for Flight Test Aircraft and Weapons Undersea Test as well as ground and flight test instrumentation systems, range instrumentation systems and data processing and communication systems required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations.					
FY 2020 Base Plans: Continue to maintain and operate mission essential/core test support resources. These resources include test article instrumentation and/or modification for Flight Test Aircraft and Weapons Undersea Test as well as ground and flight test instrumentation systems, range instrumentation systems and data processing and					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0654 / *NAWC Acft Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
communication systems required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. Maintenance will begin for two new control rooms that operate at the Special Access Program (SAP) level, including the IT equipment required to perform test and evaluation operations from the control rooms. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects Information Assurance Certification and maintenance required to support Special Access Program (SAP) Test and Evaluation facilities.					
Title: Electromagnetic Environmental Effects and Air Combat Environment Test and Evaluation Facility	19.267	20.188	21.084	0.000	21.084
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities associated with Electromagnetic Environmental Effects and Air Combat Environment Test and Evaluation Facility. These facilities provide Test and Evaluation support with integrated, interactive, and repeatable synthetic environments and reduce the risk and cost for programs with the use of installed systems tests to include simulation and stimulation tools, techniques and technologies. ***FY 2019 Plans:*** Continue to maintain and operate mission essential/core test support resources required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 Base Plans:*** Continue to maintain and operate mission essential/core test support resources required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 OCO Plans:*** Not applicable ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0654 / *NAWC Acft Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY19 to FY20 increase associated with T&E infrastructure maintenance for E3.					
Title: Propulsion Systems Evaluation Facility	4.444	4.498	4.587	0.000	4.587
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities of the Propulsion Systems Evaluation Facility. These facilities perform Test and Evaluation of propulsion systems in the laboratories, engine test chambers and component test rigs of the Propulsion Systems Evaluation Facility and the Aircraft Test and Evaluation Facility. Propulsion Systems consists of engines, engine components and accessories.					
FY 2019 Plans: Continue to maintain and operate mission essential/core test support resources required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations.					
FY 2020 Base Plans: Continue to maintain and operate mission essential/core test support resources required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations.					
FY 2020 OCO Plans: Not applicable.					
FY 2019 to FY 2020 Increase/Decrease Statement: There is no significant change from FY 2019 to FY 2020.					
Title: Threat/Target Systems	1.675	2.284	2.329	0.000	2.329
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities of the Threat/Target Systems facilities. These facilities provide the airborne and seaborne threats for Test and Evaluation.					
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0654 / *NAWC Acft Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue to maintain and operate mission essential/core test support resources associated with airborne and seaborne targets required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 Base Plans:*** Continue to maintain and operate mission essential/core test support resources associated with airborne and seaborne targets required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: Naval Test Wing Atlantic	19.018	22.320	22.757	0.000	22.757
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities of the Naval Test Wing Atlantic. These facilities provide support for Naval Aviation Systems Team aircraft, engaged in or supporting Test and Evaluation aircraft systems. ***FY 2019 Plans:*** Continue to maintain and operate mission essential/core test support resources associated with 11 aircraft and related systems and flight test safety required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 Base Plans:*** Continue to maintain and operate mission essential/core test support resources associated with 11 aircraft and related systems and flight test safety required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts,					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0654 / *NAWC Acft Division*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Title: Naval Air Warfare Center Aircraft Division Command ***Articles:*** ***Description:*** This project funds the overhead/institutional costs required to sustain the Naval Air Warfare Center Aircraft Division Major Range and Test Facility Base Test and Evaluation capabilities. ***FY 2019 Plans:*** Continue to reimburse the Command for General and Administrative support services. Continue to fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 Base Plans:*** Continue to reimburse the Command for General and Administrative support services. Continue to fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.	26.288 -	24.362 -	24.653 -	0.000 -	24.653 -
Accomplishments/Planned Programs Subtotals	93.584	97.001	100.281	0.000	100.281

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 0654 / *NAWC Acft Division*

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain Major Range and Test Facility Base infrastructure in a ready state to provide between 8,700-9,200 range hours, 4,900-5,300 chamber hours, 9,500-10,000 Electromagnetic Environmental Effects test hours, and over 10,000 flight hours in support of multiple Navy and Department of Defense acquisition programs and fleet training.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 2921 / *Pacific Missile Range Facility*	

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
2921: *Pacific Missile Range Facility*	0.000	6.277	5.219	5.394	-	5.394	5.499	5.610	5.722	5.836	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program provides continuing maintenance and operations support for Test and Evaluation related capabilities at the Pacific Missile Range Facility located at Barking Sands on Kauai, HI. Pacific Missile Range Facility's Test and Evaluation capabilities include precision radar and telemetry assets, the Mobile Aerial Target Support System, and Stabilized High-accuracy Optical Tracking System. These assets support Navy, Department of Defense, and Army Missile Defense Test and Evaluation. This project funds costs not chargeable to customers.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Pacific Missile Range Facility	6.277	5.219	5.394	0.000	5.394
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the recognized Major Range and Test Facility Base capabilities at Pacific Missile Range Facility in accordance with Department of Defense Directive 3200.11.					
FY 2019 Plans: Continue to maintain and operate mission essential/core test support resources including three precision radars and eight telemetry antennas, the Mobile Aerial Target Support System barge, and the four Optical Systems required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. Reimburse the Command for General and Administrative support services.					
FY 2020 Base Plans: Continue to maintain and operate mission essential/core test support resources including three precision radars and eight telemetry antennas, the Mobile Aerial Target Support System barge, and the four Optical Systems required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. Reimburse the Command for General and Administrative support services.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 2921 / *Pacific Missile Range Facility*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	6.277	5.219	5.394	0.000	5.394

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain Major Range and Test Facility Base infrastructure in a ready state to provide between 600-1,000 range hours in support of multiple Navy and Department of Defense acquisition programs and fleet training.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 2922 / *MRTFB Maint & Repair*	

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
2922: *MRTFB Maint & Repair*	0.000	43.738	45.383	41.382	-	41.382	43.831	44.650	45.543	46.532	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides funding for the maintenance and repair of the Major Range and Test Facility Base Real Property Maintenance Activities at the Naval Air Warfare Center Weapons Division, the Naval Air Warfare Center Aircraft Division, and the Atlantic Undersea Test and Evaluation Center. Funds mission critical emergency services, recurring maintenance and repair, and major repair projects. In addition it addresses priority items on the Backlog of Maintenance and Repair list.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Facility Maintenance and Repair	43.738	45.383	41.382	0.000	41.382
Articles:	-	-	-	-	-
Description: Maintenance and repair of the Major Range and Test Facility Base Real Property Maintenance Activities at Naval Air Warfare Center Weapons Division, Naval Air Warfare Center Aircraft Division, and the Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center.					
FY 2019 Plans: Continue to support mission critical emergency services, recurring maintenance and repair, and minor and major repair efforts at Naval Air Warfare Center Weapons Division, Naval Air Warfare Center Aircraft Division, and the Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center. FY19 budget funds Major Range and Test Facility Base facility to 75% of Department of Defense Facility Sustainment Model v19.1 with $11M to continue the Naval Air Systems Command Hangar recapitalization efforts and complete Atlantic Undersea Test and Evaluation Center Inspector General Compliance projects to improve security.					
FY 2020 Base Plans: Continue to support mission critical emergency services, recurring maintenance and repair, and minor and major repair efforts at Naval Air Warfare Center Weapons Division, Naval Air Warfare Center Aircraft Division, and the Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center. FY20 budget funds Major Range and Test Facility Base facility to 75% of Department of Defense Facility Sustainment Model v19.1 with $11M to continue the Naval Air Systems Command Hangar recapitalization efforts and complete Atlantic Undersea Test and Evaluation Center Inspector General Compliance projects to improve security.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 2922 / *MRTFB Maint & Repair*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding decrease from FY 2019 to FY 2020 reflects completion of the Atlantic Undersea Test and Evaluation Center Site 1 Security Compliance.					
Accomplishments/Planned Programs Subtotals	43.738	45.383	41.382	0.000	41.382

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain the 141, 357, and 784 building/structures at Naval Undersea Warfare Center Atlantic Undersea Test and Evaluation Center, Naval Air Warfare Center Aircraft Division, and Naval Air Warfare Center Weapons Division respectively. Execute 15-20 major repair projects per year to address mission critical services.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*				Project (Number/Name) 2958 / *Cyberspace Activities*			
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**
2958: *Cyberspace Activities*	0.000	0.000	0.000	0.433	-	0.433	0.445	0.445	0.445	0.454	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Project Unit 2958 realigned Cyberspace resources within the PE to cyber pure budget line and projects in order to ensure maximum visibility and enhanced oversight.

A. Mission Description and Budget Item Justification

This project provides funding for cyber requirements for the Major Range and Test Facility Base Real Property at the Atlantic Undersea Test and Evaluation Center. Funds critical cyber requirements as they arise and quickly transition these requirements to the warfighter.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Cyberspace Activities	0.000	0.000	0.433	0.000	0.433
Articles:	-	-	-	-	-
Description: In accordance with the FY 2017 President's Budget appropriation language, this project funds the sustainment of the cyberspace equipment, that is in the Major Range and Test Facility Base capabilities, at the Atlantic Undersea Test and Evaluation Center. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** Maintain critical cyber requirements and equipment at Atlantic Undersea Test and Evaluation Center as required to support test and evaluations operations at the Atlantic Undersea Test and Evaluation Center. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This project unit was separated from Project Unit 0541 in FY 2020 without a change to the funding level for cyberspace activities.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.433	0.000	0.433

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 2958 / *Cyberspace Activities*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain readiness with cyberspace equipment to support 2,500 hours of utilization per fiscal year.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 3154 / *Nanoose and Dabob Bay Ranges*	

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
3154: *Nanoose and Dabob Bay Ranges*	0.000	11.556	12.018	12.714	-	12.714	12.964	12.981	13.240	13.661	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides maintenance and operations support for the Nanoose and Dabob Bay Ranges along with associated support systems to provide Test and Evaluation and readiness assessment services for acquisition programs and the Fleet. Operates ocean-based environment, measurement and support systems. Maintains and repairs systems that measure warfare system performance. Oversees test, training, and measurement facilities, equipment, operations and maintenance processes. Satisfies customer exercise and measurement requirements through the operation of ocean based test and measurement systems. Assures the readiness of systems through the implementation of calibration, maintenance, repair and life cycle processes. Performs exercise planning, exercise interpretation and development of surrogate environments, measurement and support systems. Assists in the design, fabrication and testing of systems for Undersea Warfare warfare environment simulation and performance measurement. Oversees the manning and maintenance of Naval Undersea Warfare Center Division Keyport range craft and range craft systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Undersea Ranges	11.556	12.018	12.714	0.000	12.714
Articles:	-	-	-	-	-
Description: This project funds the overhead/institutional costs required to sustain the Major Range and Test Facility Base capabilities at the Nanoose and Dabob Bay undersea tracking ranges.					
FY 2019 Plans: Continue to maintain and operate mission essential/core test support resources associated with the unique test environments for Test and Evaluation of undersea weapons, sensors, submarines and other undersea systems required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary to manage and sustain the Major Range and Test Facility Base operations. Reimburse the Command for General and Administrative support services.					
FY 2020 Base Plans: Continue to maintain and operate mission essential/core test support resources associated with the unique test environments for Test and Evaluation of undersea weapons, sensors, submarines and other undersea systems required to meet customer test workload. Fund civilian labor, travel, transportation, equipment, supplies, communication, equipment maintenance, purchased service contracts, annual utilities and any costs necessary					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 3154 / *Nanoose and Dabob Bay Ranges*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
to manage and sustain the Major Range and Test Facility Base operations. Reimburse the Command for General and Administrative support services. ***FY 2020 OCO Plans:*** Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY19 to FY20 increase funds IA certifications (ATO) and maintenance; supports SAP facilities for new acquisition program T&E requirements.					
Accomplishments/Planned Programs Subtotals	11.556	12.018	12.714	0.000	12.714

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain Major Range and Test Facility Base infrastructure in a ready state to provide between 1,600-2,000 range hours in support of multiple Navy and Department of Defense acquisition programs and fleet training.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605864N / *Test & Evaluation Support*	Project (Number/Name) 3386 / *MRTFB Marine Vessels*	

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
3386: *MRTFB Marine Vessels*	0.000	8.891	13.092	19.640	-	19.640	23.956	16.545	16.876	17.214	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project is a new start FY17 program which funds the overhauls and preventative maintenance of the 23 Major Range and Test Facility Base marine vessels located at Naval Air Warfare Center Weapons Division, Point Mugu, CA, Pacific Missile Range Facility, Honolulu, HI, Naval Undersea Warfare Center Keyport, WA, Naval Air Warfare Aircraft Division, Patuxent River, MD, and Atlantic Undersea Test and Evaluation Center. These vessels are used to launch and recover torpedoes, acoustic systems, and other weapons, provide range surveillance and clearance, and can be configured as a target. Overhauls are required to operate ships over 300 tons overseas in compliance with American Bureau of Shipping "Load Line" certification requirements. Major preventative maintenance requiring shipyard support is also performed during these periods to mitigate risks of failures.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MRTFB Marine Vessels	8.891	13.092	19.640	0.000	19.640
Articles:	-	-	-	-	-
Description: This project funds the overhauls and preventative maintenance of the 23 Major Range and Test Facility Base marine vessels located at Naval Air Warfare Center Weapons Division, Point Mugu, CA, Pacific Missile Range Facility, Honolulu, HI, Naval Undersea Warfare Center Keyport Keyport Nanoose and Dabob Bay Ranges, Keyport, WA, Naval Air Warfare Aircraft Division, Patuxent River, MD, and Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center.					
FY 2019 Plans: Initiate overhauls and preventative maintenance on seven Major Range Test Facility Base vessels. Complete Service Life Extension Projects for YTT-10 and Transporter vessels, continue Service Life Extension Projects on YTT-11, and initiate purchase of Rover replacement vessel.					
FY 2020 Base Plans: Perform overhauls of a Naval Undersea Warfare Center Keyport, Atlantic Undersea Test and Evaluation Center, Naval Air Warfare Center Aircraft Division, and Naval Air Warfare Center Weapons Division vessel. Continue purchase of the Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation center Rover replacement vessel.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605864N / *Test & Evaluation Support*	**Project (Number/Name)** 3386 / *MRTFB Marine Vessels*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Not applicable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding increase from FY 2019 to FY 2020 reflects inflation, YTT-10 SLEP, YTT-11 SLEP, and long lead planning and purchases for the FY 2021 replacement of the NAWC WD Mobile Ship Target. FY 2018 YTT-10 SLEP was canceled due to the shipyard scheduled to perform the work declaring bankruptcy.					
Accomplishments/Planned Programs Subtotals	8.891	13.092	19.640	0.000	19.640

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Maintain Major Range and Test Facility Base marine vessels in a ready state to provide between 16,000-20,000 vessel hours in support of multiple Navy and Department of Defense acquisition programs and fleet training.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605865N *I Operational Test & Eval Capability*							
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	20.298	21.554	25.145	-	25.145	25.774	25.580	24.997	25.544	Continuing	Continuing
0831: *OPTEVFOR Support*	0.000	20.298	21.554	25.145	-	25.145	25.774	25.580	24.997	25.544	Continuing	Continuing

A. Mission Description and Budget Item Justification

Funding in this project funds the civilian salaries and operating costs for the Commander, Operational Test and Evaluation Force (COMOPTEVOR). In addition, it supports several senior management initiatives aimed at increasing efficiencies in Test and Evaluation (T&E). These initiatives include IT database and decision making technology
upgrades; implementation of Integrated Testing and Mission Based Test Design across all programs; and improved staffing and expertise in the areas of DON acquisition processes, Modeling and Simulation, Statistical Studies, Cybersecurity, and similar disciplines. All of these initiatives are aimed at improving the quality of testing and evaluation, thus ensuring delivery to fleet units of fully tested and capable combat systems.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	20.298	21.554	24.864	-	24.864
Current President's Budget	20.298	21.554	25.145	-	25.145
Total Adjustments	0.000	0.000	0.281	-	0.281
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	-0.068	-	-0.068
• Rate/Misc Adjustments	0.000	0.000	0.349	-	0.349

Change Summary Explanation

The FY 2019 to FY 2020 funding increase supports additional Cyber Security manpower to meet the Program Cyber Security Operational Tests (OT) required by DoD. DoD mandated an increase in Cyber Security testing due to an increase in cyber intrusions from adversaries. Cyber intrusions continue to challenge our weapon systems' ability to detect threats, react to threats, and restore system functionality after a cyber-attack. Cyber intrusion prevention requires specialized training, tool sets, and increased proficiency in COMOPTEVFOR's cyber security test manpower.

The FY 2019 to FY 2020 funding increase also supports the Network Modernization effort. Part of this modernization will strengthen COMOPTEVFOR's presence on the Defense Research Engineering Network (DREN) and enhance collaboration, access and data flow to stakeholders operating on NMCI.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605865N *I Operational Test & Eval Capability*

COMOPTEVOR legacy unclassified and classified networks prevent collaboration, sharing, and access to operational test tools, test results, and data with Commands that work for COMOPTEVOR while executing operational testing (VX-1, VX-9, VMX-1, HMX-1), organizations that use operational test products (SYSCOMs, PEO/PMs, Fleet Shore Commands), and VCNO, OPNAV Resource Sponsors, and ASN/RDA.

Technical: N/A

Schedule: N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605865N / *Operational Test & Eval Capability*	Project (Number/Name) 0831 / *OPTEVFOR 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
0831: *OPTEVFOR Support*	0.000	20.298	21.554	25.145	-	25.145	25.774	25.580	24.997	25.544	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element (PE) provides Commander, Operational Test and Evaluation Force (COMOPTEVFOR) general support funding for headquarters annual operating expenses and ensures COMOPTEVFOR compliance with Secretary of Defense (SECDEF) and Secretary of the Navy (SECNAV) directives during the conduct of independent operational testing and evaluation. This funding supports planning, testing, and reporting on the operational effectiveness, suitability, and cyber survivability of new and improved systems and recommending fleet usage to the Chief of Naval Operations (CNO). Funding also supports recently instituted initiatives (including the manpower to execute) that improve COMOPTEVFOR's ability to develop "minimum, adequate" test strategies maximizing efficiencies and minimizing assets required to conduct planned operational testing, thereby driving down overall test and evaluation costs for the Navy. The CNO, as well as acquisition executives and managers at all levels, have a continuing need for expeditious and efficient conduct of Operational Test and Evaluation (OT&E) by COMOPTEVFOR in support of training and equipping fleet forces. To this end, this funding supports COMOPTEVFOR's continued pursuit of a variety of senior management initiatives aimed at increasing efficiencies in T&E; these senior management initiatives include IT Network, database and decision making technology upgrades, implementation of Integrated Testing and Mission Based Test Design across all programs, and improved staffing and expertise in the areas of DON acquisition processes, Modeling and Simulation, Statistical Studies, Information Assurance, and similar disciplines. All of these initiatives are aimed at improving the quality of testing and evaluation, thus ensuring delivery to fleet units of fully tested and capable combat systems. OT&E issues have direct long term Navy-wide implications on the Fleet's readiness and warfighting capability. Rapid advances in technology, changes in fleet tactics, and increased complexity of weapons systems and platforms, combined with reductions in manpower, force structure, and budgets have created an increased need for technical and operational analyses that are sophisticated and timely in order to ensure an optimal return on investment of Navy resources.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: OPTEVFOR SUPPORT	20.298	21.554	25.145	0.000	25.145
Articles:	-	-	-	-	-
Description: Funding in this project funds the civilian salaries and operating costs for the Commander, Operational Test and Evaluation Force (COMOPTEVOR). In addition, it supports several senior management initiatives aimed at increasing efficiencies in Test and Evaluation (T&E). These initiatives include IT Network, database and decision making technology upgrades; implementation of Integrated Testing and Mission Based Test Design across all programs; and improved staffing and expertise in the areas of DON acquisition processes, Modeling and Simulation, Statistical Studies, Information Assurance, and related disciplines. All of these initiatives are aimed at improving the quality of testing and evaluation, thus ensuring delivery to fleet units of fully tested and capable combat systems.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605865N / *Operational Test & Eval Capability*	**Project (Number/Name)** 0831 / *OPTEVFOR Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: - This project will fund civilian salaries and operating costs for COMOPTEVOR - Agile IT: Agile IT is a Continuous Process Improvement (CPI) underway for IT Management. Expect to continue Agile IT OT&E efforts; additional programs are under consideration for inclusion in this method. - Test and Product Processes: as a learning organization, COMOPTEVOR will continue efforts to enhance and improve test processes and products in support of increasing the value of OT&E. - Continue to provide Warfare Capability Baseline (WCB) assessments and report on the Navy's capability across all platforms, networks, weapons, or sensors. The Warfare Capability Baseline assessment report distills the large volume of operational test data into clear, concise annotated charts that assist senior leaders in quickly identifying critical issues. - Continue electronic database efforts associated with Project for Holistic Evaluation for Navy Test Information Exchange (PHOENIX) - The increased CIVPERS end strength will continue to support the increased operational tempo in cyber security testing. - The 9th increment of Warfare Capability Baseline (WCB) is expected to be completed. - The Total Force Management Council is establishing professional development criteria for Modeling & Simulation.					
FY 2020 Base Plans: - This project will fund civilian salaries and operating costs for COMOPTEVOR - Agile IT: Agile IT is a Continuous Process Improvement (CPI) underway for IT Management. Expect to continue Agile IT OT&E efforts; additional programs are under consideration for inclusion in this method. - Test and Product Processes: as a learning organization, COMOPTEVOR will continue efforts to enhance and improve test processes and products in support of increasing the value of OT&E. - Continue to provide Warfare Capability Baseline (WCB) assessments and report on the Navy's capability across all platforms, networks, weapons, or sensors. The Warfare Capability Baseline assessment report distills the large volume of operational test data into clear, concise annotated charts that assist senior leaders in quickly identifying critical issues. - Continue electronic database efforts associated with Project for Holistic Evaluation for Navy Test Information Exchange (PHOENIX) - The increased CIVPERS end strength will continue to support the increased operational tempo in cyber security testing. - The 10th increment of Warfare Capability Baseline (WCB) is expected to be completed.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605865N / *Operational Test & Eval Capability*	**Project (Number/Name)** 0831 / *OPTEVFOR Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Total Force Management Council is establishing professional development criteria for Statistical Studies. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The FY 2019 to FY 2020 funding increase supports additional Cyber Security manpower to meet the Program Cyber Security Operational Tests (OT) required by DoD. DoD mandated an increase in Cyber Security testing due to an increase in cyber intrusions from adversaries. Cyber intrusions continue to challenge our weapon systems' ability to detect threats, react to threats, and restore system functionality after a cyber-attack. Cyber intrusion prevention requires specialized training, tool sets, and increased proficiency in COMOPTEVFOR's cyber security test manpower. The FY 2019 to FY 2020 funding increase also supports the Network Modernization effort. Part of this modernization will strengthen COMOPTEVFOR's presence on the Defense Research Engineering Network (DREN) and enhance collaboration, access and data flow to stakeholders operating on NMCI. COMOPTEVOR legacy unclassified and classified networks prevent collaboration, sharing, and access to operational test tools, test results, and data with Commands that work for COMOPTEVOR while executing operational testing (VX-1, VX-9, VMX-1, HMX-1), organizations that use operational test products (SYSCOMs, PEO/PMs, Fleet Shore Commands), and VCNO, OPNAV Resource Sponsors, and ASN/RDA.					
Accomplishments/Planned Programs Subtotals	20.298	21.554	25.145	0.000	25.145

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

As indicated in section A above, funding provides for core headquarters operations and support (O&S) costs related to required operational testing and evaluation (T&E) conducted in support of Navy acquisition programs. The preponderance of funding provides for the annual O&S costs for day to day operations of the staff/ headquarters of COMOPTEVFOR, located in Norfolk, Virginia. (Pursuant to DoD Financial Management Regulations and Navy financial policy guidance, as a T&E activity, COMOPTEVFOR's annual support costs are funded via RDTEN vice OMN; hence, and unlike most RDTEN programs, these funds provide for O&S costs

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605865N / *Operational Test & Eval Capability*	**Project (Number/Name)** 0831 / *OPTEVFOR Support*

typical of military field commands/activities). Within this project, over 1/2 of the funding supports salaries of assigned civilian personnel. The remaining funds provide for other routine support costs such as travel, IT support, supplies, and other overhead/administrative support costs. The primary metric used within the project involves support for scheduled Navy acquisition program testing and subsequent analysis and reporting of results of testing to appropriate senior Navy acquisition officials and to the Navy chain of command directly to the CNO and various OPNAV/SECNAV staff offices. The performance goal is met when all assigned/scheduled testing and reporting is supported each year. Specific test program success is measured through analytic results of testing conducted throughout the year and constant interaction with program offices, acquisition decision makers, OPNAV staff resource sponsor offices, OSD and other service T&E offices/activities, and miscellaneous other customers/stakeholders. This project also supports testing and evaluation of various Joint/multi-service programs in which the Navy shares responsibilities in support of the acquisition community. The following metrics relate directly to the funding provided and are applicable to current operations.

Number of Tests Conducted - FY 2018 = 110; FY 2019 = 112; FY 2020 = 114
Number of Programs Supported - FY 2018 = 424; FY 2019 = 427; FY 2020 = 430

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605866N *I Navy Space & Electr Warfare Supt*

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	16.274	16.227	15.773	-	15.773	17.632	17.789	16.952	17.136	Continuing	Continuing
0706: *EMC & RF Mgmt*	0.000	16.274	16.227	2.233	-	2.233	3.150	3.104	2.960	3.014	Continuing	Continuing
3239: *Real-Time Spectrum Operations (RTSO)*	0.000	0.000	0.000	13.540	-	13.540	14.482	14.685	13.992	14.122	Continuing	Continuing

A. Mission Description and Budget Item Justification

Project 0706, Electromagnetic Compatibility (EMC) and Radio Frequency (RF) Management Program: Develops advanced technology to identify and eliminate Electromagnetic Interference (EMI) sources from Navy systems. Supports research and development technology efforts, develops top-level plans, and supports systems in the Space and Electronic Warfare (SEW) mission area.

Project 3239, The Real-Time Spectrum Operations (RTSO) Program researches the Electromagnetic (EM) Environmental Effects (E3) between shipboard transmitters and receivers on ships and the interactions of the EM systems within the other systems installed on units within a strike group.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	17.341	16.227	22.450	-	22.450
Current President's Budget	16.274	16.227	15.773	-	15.773
Total Adjustments	-1.067	0.000	-6.677	-	-6.677
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.000	0.000			
• SBIR/STTR Transfer	-0.067	0.000			
• Program Adjustments	0.000	0.000	-6.500	-	-6.500
• Rate/Misc Adjustments	0.000	0.000	-0.177	-	-0.177

Change Summary Explanation

FY 2018 funding was reduced by $1 Million for SEWIP Block 3 efforts and by $67 Thousand for Execution Realignment SBIR.

FY 2020 funding was realigned into PU 3239 (SPAWAR) from PU 0706 (NAVSEA) starting in FY20 to support Real-Time Spectrum Operations (RTSO) transition to the designated lead capability integrator. Funding was realigned from NAVSEA to SPAWAR.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605866N *I Navy Space & Electr Warfare Supt*

FY 2020 funding request was reduced by $3 million (Proj 0706) to account for the availability of prior year balances.

Transfer from RDTE&N BA 6, Navy Space & Electronic Warfare Support (0605866N) to OMN BA 1, Ship Operational Support and Training (1B2B) for sustainment and integration for Real-Time Spectrum Operations (RTSO). (Baseline $0)

Transfer from RDTE&N BA 6, Navy Space & Electronic Warfare Support (0605866N) to OMN BA 3, Specialized Skill Training (3B1K) for sustainment and integration for Real-Time Spectrum Operations (RSTO). (Baseline $0)

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605866N / *Navy Space & Electr Warfare Supt*				Project (Number/Name) 0706 / *EMC & RF Mgmt*			
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**
0706: *EMC & RF Mgmt*	0.000	16.274	16.227	2.233	-	2.233	3.150	3.104	2.960	3.014	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Electromagnetic Compatibility (EMC) and Radio Frequency (RF) Management Program. This project develops tools, processes, and algorithms to identify and mitigate EMI sources for Navy systems and platforms.

(a) It will support the Afloat Electromagnetic Spectrum Operations Program (AESOP), an automated spectrum Fleet operational capability. The application will be enhanced to comply with fleet operational requirements and streamline Strike Force frequency management processes. It will provide automated Spectrum Management (SM) tools for development of operational task communication and radar/weapon plans to support fleet deployments, exercises, and contingency operations. It will provide identification and mitigation of EMI in Navy, North Atlantic Treaty Organization (NATO), Allied, Ashore and Joint Combat Operations. It will provide analysis related to spectrum reallocation proposals to assess impacts on Navy operations and systems, as well as for the Spectrum Supportability Risk Assessments.

(b) It will support the Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP) to identify, engineer, and evaluate effectiveness of potential EMI corrections. The program also characterizes and quantifies the operational impact of EMI problems on system's mission performance.

(c) It will support the Nuclear Electromagnetic Pulse (EMP) Survivability Program. The program assesses the EMP survivability of all mission critical systems and funds development of a hardness assurance and maintenance program. It will develop improved modeling capability to reduce hardness validation costs at delivery and over the lifetime of the system/platform. The program develops new and updated design criteria, test methodology, test limits, and survivability validation procedures for all Navy systems, ships, submarines and shore facilities.

(d) It will support the Real-Time Spectrum Operations Program (RTSO). The program researches the Electromagnetic (EM) Environmental Effects (E3)between shipboard transmitters and receivers on ships and the interactions of the EM systems within the other systems installed on units within a strike group. The program will develop a capability to monitor the EM Spectrum Usage on a ship and be able to validate the spectrum plan to ensure Electromagnetic Capability (EMC) is achieved within the strike group. The program will develop a capability to display compliance with the spectrum plan in a Common Operational Picture (COP) display. These initial capabilities of Own Force Monitoring provide Battlespace Awareness and will be instrumental in enabling Electromagnetic Maneuver Warfare. These capabilities of self-awareness will further enhance the Navy's ability to perform Command and Control (C2) of the EM Spectrum warfighting domain.

At the direction of OPNAV, in the beginning of FY2018 the project changed the technical approach to mitigate cost, schedule, and performance risks associated with the original Hardware (H/W) solution that required extensive

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605866N / *Navy Space & Electr Warfare Supt*	**Project (Number/Name)** 0706 / *EMC & RF Mgmt*

integration and networking of all spectrum dependent systems. The revised technical approach simplifies the original hardware plan required in favor of a centralized radio frequency monitoring capability with software applications that can still meet fleet requirements of own force monitoring. This has resulted in near term schedule delay that is recoverable in FY19.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Afloat Electromagnetic Spectrum Operations Program (AESOP)	0.680	0.324	0.300	0.000	0.300
Articles:	-	-	-	-	-
FY 2019 Plans: - Identify new/modified military equipment and update AESOP models and database to de-conflict and coordinate spectrum use. - Research and update spectrum usage in Numbered Fleet Standing Communications Plans to accommodate new communications systems and host nation infrastructure spectrum usage. - Develop and refine spectrum coordination new software for Zumwalt and Gerald R Ford class high-power radars and operational concepts. - Develop and refine software and database modifications to support new Navy shipboard and airborne spectrum-dependent systems (SDSs), i.e., AMDR and EASR slated for 2020-2021 fielding aboard USN ships. -Research, assess, and implement in software the international, national, DoD, and Navy spectrum littoral restrictions, laws, treaties, and policies to ensure compliance. - Conduct analysis for Spectrum Supportability Risk Assessments. - Update electromagnetic compatibility criteria in the NAVSEA Operational Publication S9407-AA-GYD-010/(S) OP-3840 "Electromagnetic Compatibility Criteria for Navy Systems (U)".					
FY 2020 Base Plans: - Identify new or modified military equipment, and prioritize systems and their impacts. - Develop software updates, for spectrum models, develop revised electromagnetic compatibility (EMC) criteria, spectrum coordination procedures, and update required databases. - Document electromagnetic compatibility criteria in the NAVSEA Operational Publication S9407-AA-GYD-010/(S) OP-3840 "Electromagnetic Compatibility Criteria for Navy Systems (U)". - Research and update spectrum usage and revised coordination procedures based on updates to Numbered Fleet Standing Communications Plans. - Research and update spectrum usage and revised coordination procedures based on updates to international or national guidance to ensure compliance. -Research and assess data sources for Navy ships and submarine location data. - Develop software architectures and spectrum compatibility and coordination procedures for Navy systems.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605866N / *Navy Space & Electr Warfare Supt*	**Project (Number/Name)** 0706 / *EMC & RF Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Monitor and assess revised cybersecurity regulations for potential impacts to deployed spectrum management software. - Develop mitigation strategies, and develop software updates. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of -0.018 from FY 2019 to FY 2020 is due to ExecRealign SB.					
Title: Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP)	1.915	1.677	1.273	0.000	1.273
Articles:	-	-	-	-	-
FY 2019 Plans: - Develop instrumentation to extract digital data and raw video from several different search radars enabling quantitate (instead of qualitative) assessment of performance degradation and electromagnetic interference. - Develop instrumentation to perform non-invasive (i.e. off satellite) bit error rate test methods for SATCOM system enabling EMI quantification at the modem later, rather than spectral layer, to quantify impacts in terms of data rate and satellite resources. - Develop and evaluate effectiveness of proposed EMI solutions and coordinate with system program managers for proper integration of the final EMI solution. - Perform EMI Problem Characterization and Quantification on approximately 60 specific EMI problems to identify level of problem severity and prioritize EMI mitigation efforts. - Evaluate the Navy's Next Generation: Radars (i.e., Enterprise Air Search Radar, Air & Missile Defense radar, Dual Band Radar, Next Gen Surface Search Radar, etc.), Electronic Warfare Systems (i.e., Surface Electronic Warfare Improvement Program and Ships Signal Exploitation Equipment Mods), Satellite Communication (i.e., the Navy Multi-Band Terminal and the Commercial Broadband Satellite Program), and Common Data Link Programs.					
FY 2020 Base Plans: - Characterize and quantify operational impact of Electromagnetic Interference (EMI) on approximately 60 specific EMI problems to identify level of problem severity and prioritize EMI mitigation efforts, with Fleet commanders, system and ship or submarine program managers. - Provide engineering, analytical, and technical support to achieve electromagnetic compatibility (EMC) among and between shipboard electronic/electric systems and/or equipment.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605866N / *Navy Space & Electr Warfare Supt*	**Project (Number/Name)** 0706 / *EMC & RF Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Develop and evaluate the effectiveness of proposed Electromagnetic Interference (EMI) solutions to mitigate interference among and between shipboard electronic/electric systems and/or equipment. - Coordinate the proposed solutions with the system and ship or submarine program managers for ensure proper integration, and long term logistic support. - Develop and field limited production fixes, and evaluate their effectiveness in mitigating shipboard Interference. - Investigate the operational impacts to deployed shipboard radars, based on the Radar Spectrum Engineering Criteria (RSEC) to ensure continued operational capability. - Develop innovative measurement capabilities, to reduce test time and to quantify electromagnetic environmental effects of Navy platforms, systems, subsystems, and equipment to and from their intended operational electromagnetic environment. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of 0.033 from FY 2019 to FY 2020 due to the required technical support needed to perform Radar Spectrum Engineering Criteria analysis.					
Title: Electromagnetic Pulse (EMP) Survivability	1.056	0.811	0.660	0.000	0.660
Articles:	-	-	-	-	-
FY 2019 Plans: - Develop computational electromagnetic (CEM) modeling capability to assist in ship hardness design. - Develop small-scale test capability to assist in understanding phenomena associated with complex shipboard electrical design and energy coupling/cross-coupling to the cables in order to support EMP critical item design, testing, maintenance, and repair required to incorporate EMP survivability into the fleet. - Complete Modeling and Simulation (M&S) Verification, Validation, & Accreditation (VV&A) efforts - Continue investigation of obtaining high confidence, low cost HEMP testing technology - Continue support for Naval Ordinance Transient Electromagnetic Simulator (NOTES) - Refine at-sea HEMP demonstration plan - Initiate Data Acquisition capability - Develop and/or improve design criteria, test methodology, test limits, and survivability validation procedures for Navy systems, ships, submarines and shore facilities. Continue research and development of integrated solutions that can be used for EMP hardening improvement and benefiting EMI reduction such as cable shield ground adapters (CSGAs) and terminal protection devices (TPDs).					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605866N / *Navy Space & Electr Warfare Supt*	**Project (Number/Name)** 0706 / *EMC & RF Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Enhance CSGA RDTE and Navy Pulse Current Injection (PCI) testing to meet requirements in Appendix C of MILSTD-4023, Shipyard Protective Elements Testing. Update appropriate MIL-STD procedures to reflect appropriate test methodologies and validation procedures. ***FY 2020 Base Plans:*** - Complete computational electromagnetic (CEM) modeling capability to assist in ship hardness design. - Develop new Hybrid-Based High Altitude Electrometric Pulse (HEMP) evaluation technique to evaluate HEMP hardness of navy ships via a low-cost, low potential for equipment damage and quicker method of analysis (decreasing costs in the performance of tests). - Investigate small, inexpensive measurement devices for incorporation into Hybrid-Based HEMP evaluation methodology. - Develop instrumentation and data acquisition capability in support of the HEMP Ashore Test Facility [i.e., Naval Ordinance Transient Electromagnetic Simulator]. - Develop and/or improve design criteria, test methodology, test limits, and survivability validation procedures for Navy systems, ships, submarines and shore facilities. - Perform research and development of integrated solutions that for EMP hardening. Investigate improvements to the cable shield ground adapters, terminal protection devices and cable maintenance procedures. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of 0.087 from FY 2019 to FY 2020 is due to support development of new Hybrid-Based High Altitude Electromagnetic Pulse (HEMP) evaluation technique					
Title: Real-Time Spectrum Operations (RTSO)	12.623	13.415	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: - Based on evolving fleet requirements and feedback on prior versions of RTSO software, research, develop, enhance, and refine recommended actions to; (a.) resolve interferences; (b.) refractivity, climatology, and propagation model accuracy; (c.) spectrum common operational picture, tailored to multiple users' perspectives and a chain of command spectrum briefing package generator; (d.) navigation, location, and position data interfaces;					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605866N / *Navy Space & Electr Warfare Supt*	**Project (Number/Name)** 0706 / *EMC & RF Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
(e.) frequency plan compliance validation; and (f.) automated Emissions Control (EMCON) bill generator. - Conduct research, development, testing, and evaluation for own-force spectrum monitoring capabilities, including commercial and military sensors, antenna, and network connections. - Research and develop proof-of-concept capabilities for spectrum mission planning decision aids and intelligent sectoring/cut-outs for radiating systems - Initiate research and development efforts for models to estimate effective RF performance ranges of spectrum dependent systems in the complex electromagnetic environment (one-on-one and multi-on-one effects) - Define RTSO Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy (DOTMLPF-P) requirements that effect Manpower, Personnel, Training and Education (MPT&E) requirements and solutions. - Perform initial DOTMLPF-P analysis to assess RTSO training requirements. - Perform review/update/development of Navy Tactical Tasks (NTAs) measures, standards, and criteria to support RTSO operation and maintenance. - Perform review/update of Defense Readiness Reporting System-Navy (DRRS-N) to evaluate RTSO Personnel, Equipment, Supply, Training, Ordnance and Facilities (PESTOF) resource measures. -Develop plan for RTSO training and certification requirements analysis for course development and implementation within the RTSO NTSP and Theater/Fleet Training Plans. - Develop/update Job Duty Task Analysis (JDTA) requirements to support RTSO equipment basic operation/ maintenance; and tactical operation to support Task Unit and Strike Group personnel. -Identify Knowledge, Skills, and Abilities (KSAs) necessary for leaders, warfighters, civilians, and contractor personnel to understand and effectively utilize RTSO. - Develop/update Personnel Qualification Standard (PQS) to support RTSO JDTA requirements. NSWCDD developed and fielded fleet-wide the "Spectrum Access and Awareness Guide" document providing the information necessary for leaders, warfighters, civilians, and contractor personnel to develop knowledge, skills, and abilities to understand and effectively utilize RTSO. - Continue incorporation of Spectrum Management tools in EMSOC COI and FSM COI to include RTSO V1.0.					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605866N / *Navy Space & Electr Warfare Supt*	**Project (Number/Name)** 0706 / *EMC & RF Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of 2.996 from FY 2019 to FY 2020 reduces FY 2020 funding due to FY 2018 under execution					
Accomplishments/Planned Programs Subtotals	16.274	16.227	2.233	0.000	2.233

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

An acquisition strategy is not required.

E. Performance Metrics

Performance metrics will consist of quarterly program reviews.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605866N / *Navy Space & Electr Warfare Supt*	Project (Number/Name) 3239 / *Real-Time Spectrum Operations (RTSO)*	

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
3239: *Real-Time Spectrum Operations (RTSO)*	0.000	0.000	0.000	13.540	-	13.540	14.482	14.685	13.992	14.122	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Funding has been realigned into PU 3239 from PU 0706 starting in FY20 to support Real-Time Spectrum Operations (RTSO) transition to the designated lead capability integrator.

A. Mission Description and Budget Item Justification

The Real-Time Spectrum Operations (RTSO) Program researches the Electromagnetic (EM) Environmental Effects (E3) between shipboard transmitters and receivers on ships and the interactions of the EM systems within the other systems installed on units within a strike group. The program will develop a capability to monitor the EM Spectrum Usage on navy platforms and be able to validate the spectrum plan to ensure Electromagnetic Capability (EMC) is achieved within the strike group. The program will develop a capability to display compliance with the spectrum plan in a Common Operational Picture (COP) display. These initial capabilities of Own Force Monitoring provide Battlespace Awareness and will be instrumental in enabling Electromagnetic Maneuver Warfare (EMW). These capabilities of self-awareness will further enhance the Navy's ability to perform Command and Control (C2) of the EM Spectrum warfighting domain.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: New Accomplishment/Planned Program Entry	0.000	0.000	13.540	0.000	13.540
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: - Develop and field a capability to perform Frequency Plan Compliance Verification monitoring ship's radiating spectrum dependent systems ensuring compliance to frequency plans. - Develop new multi-mode radar coordination procedures and assignments to ensure new U.S. Navy radars are electromagnetically compatible within the strike group. - Leverage FY2019 Plans to build an initial Spectrum Operational Planning Tool (SOPT) developing alternate operational and map views, utilizing a Naval Tactical Data System (NTDS) type displays. - Develop a spectrum restrictions visualization map for shipboard personnel. - Develop the process and method to publish the emissions control (EMCON) bill for a given ship.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605866N / *Navy Space & Electr Warfare Supt*	**Project (Number/Name)** 3239 / *Real-Time Spectrum Operations (RTSO)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Develop the process and software capability for numbered fleet commands, combatant commands, and Navy Marine Corps Spectrum Offices to develop and publish littoral radiation restriction regulations. - Participate in the CANES Application Integration (AI) System Integration Test (SIT). - Participate in exercises and experiments. - Continue updates to Real-Time Spectrum Operations (RTSO) software documents and artifacts to include, but not limited to, the Top Level Requirements (TLR), Requirements Traceability Matrix (RTM), Requirements Definition Package (RDP), functional Architecture, RMF cybersecurity accreditation documentation, test and fielding plans, training development and consolidated training strategy, and sustainment plans. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding has been realigned into PU 3239 from PU 0706 starting in FY20 to support Real-Time Spectrum Operations (RTSO)transition to the designated lead capability integrator.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	13.540	0.000	13.540

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

An Acquisition strategy is not required

E. Performance Metrics

Performance metrics will consist of quarterly program reviews.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605867N *I Space & Elec War Surv/Recon*							
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	0.000	0.000	8.402	-	8.402	8.565	8.735	8.914	9.092	Continuing	Continuing
1034: *TAC SAT Recon Office*	0.000	0.000	0.000	8.402	-	8.402	8.565	8.735	8.914	9.092	Continuing	Continuing

Note

Efforts previously funded in FY18 and FY19 under PE 1206867N, SEW Surveillance/Reconnaissance Support. Beginning in FY20 is funding under PE 0605867N Space & Elec War Surv/Recon.

A. Mission Description and Budget Item Justification

(U) Link Crimson (Navy Tactical Exploitation of National Capabilities (TENCAP)) is a congressionally directed program to rapidly develop (12-18 months) systems, processes, and training that leverages and exploits National Technical Means (NTM) and Intelligence Community (IC) resources to meet fleet tactical warfighting gaps. This is done through innovative research and development of capabilities aligned with Navy Programs of Record (PoR), while influencing national systems support and development. These efforts include advanced sensors, platform and ground processing, and integrated national-to-tactical information fusion capabilities. Link Crimson supports all Navy mission areas, including Anti-Submarine Warfare (ASW), Integrated Air and Missile Defense, Mine Warfare (MIW), Power projection/Precision Strike, Maritime Domain Awareness (MDA), and Intelligence, Surveillance, and Reconnaissance (ISR), in support of the Navy's Information Dominance pillars: Assured Command and Control (AC2), Battlespace Awareness (BA) and Integrated Fires (IF).

(U) This program is funded under Budget Activity 6 because it supports the operations and installations required for general research and development. Program baseline addresses research and development on specific capabilities to support these mission areas such as signals collection and exploitation, acoustic and electronic signal detection, countering Unmanned Air Systems, Processing, Exploitation, and Dissemination (PED) processes, Commercial Maritime Navigation Radar (CMNR) detection and exploitation, open-ocean surveillance, and hostile threat geo-location. Link Crimson fields both prototypes to demonstrate new capabilities in real world environments in coordination with operational users, and develops warfighting capabilities for insertion into Navy, joint, and national agency programs of record. Additional detailed information is available at higher levels of classification.

(U) Project 1034: Established to exploit all National and Service sensor systems to improve tactical support to Fleet operational commanders. Project also supports equipment upgrades, training and Fleet exercises which provide the venue for testing modifications to existing programs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy					Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*			R-1 Program Element (Number/Name) PE 0605867N / *Space & Elec War Surv/Recon*		
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	0.000	8.402	-	8.402
Total Adjustments	0.000	0.000	8.402	-	8.402
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	8.402	-	8.402

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605867N / *Space & Elec War Surv/ Recon*	Project (Number/Name) 1034 / *TAC SAT Recon Office*	

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
1034: *TAC SAT Recon Office*	0.000	0.000	0.000	8.402	-	8.402	8.565	8.735	8.914	9.092	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

(U) Link Crimson (Navy Tactical Exploitation of National Capabilities (TENCAP)) is a congressionally directed program to rapidly develop (12-18 months) systems, processes, and training that leverages and exploits National Technical Means (NTM) and Intelligence Community (IC) resources to meet fleet tactical warfighting gaps. This is done through innovative research and development of capabilities aligned with Navy Programs of Record (PoR), while influencing national systems support and development. These efforts include advanced sensors, platform and ground processing, and integrated national-to-tactical information fusion capabilities. Link Crimson supports all Navy mission areas, including Anti-Submarine Warfare (ASW), Integrated Air and Missile Defense, Mine Warfare (MIW), Power projection/Precision Strike, Maritime Domain Awareness (MDA), and Intelligence, Surveillance, and Reconnaissance (ISR), in support of the Navy's Information Dominance pillars: Assured Command and Control (AC2), Battlespace Awareness (BA) and Integrated Fires (IF).

(U) This program is funded under Budget Activity 6 because it supports the operations and installations required for general research and development. Program baseline addresses research and development on specific capabilities to support these mission areas such as signals collection and exploitation, acoustic and electronic signal detection, countering Unmanned Air Systems, Processing, Exploitation, and Dissemination (PED) processes, Commercial Maritime Navigation Radar (CMNR) detection and exploitation, open-ocean surveillance, and hostile threat geo-location. Link Crimson fields both prototypes to demonstrate new capabilities in real world environments in coordination with operational users, and develops warfighting capabilities for insertion into Navy, joint, and national agency programs of record. Additional detailed information is available at higher levels of classification.

(U) Project 1034: Established to exploit all National and Service sensor systems to improve tactical support to Fleet operational commanders. Project also supports equipment upgrades, training and Fleet exercises which provide the venue for testing modifications to existing programs.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Assured Command and Control	0.000	0.000	0.627	0.000	0.627
Articles:	-	-	-	-	-
Description: The Navy must assure its ability to command and control forces. This requires capabilities that enable commanders to rapidly and with certainty: 1) exchange orders and responses with subordinates; 2) understand the disposition of friendly and adversarial forces, as well as uninvolved/neutral elements in the area of operations; 3) have access to target quality intelligence at the right time to conduct strikes as part of the joint force; and 4) assess the result of those strikes. Sensing the environment, understanding our adversaries, and operating and defending our communications and networked systems are inextricably linked to the assurance of C2.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605867N / *Space & Elec War Surv/ Recon*	**Project (Number/Name)** 1034 / *TAC SAT Recon Office*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: FY18 and FY19 efforts previously funded under PE 1206867N, SEW Surveillance/Reconnaissance Support. Additional details with respect to this line item are held at a higher classification. ***FY 2020 Base Plans:*** Additional details with respect to this line item are held at a higher classification. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY18 and FY19 efforts previously funded under PE 1206867N, SEW Surveillance/Reconnaissance Support. Additional details with respect to this line item are held at a higher classification.					
Title: Battlespace Awareness	0.000	0.000	5.737	0.000	5.737
Articles:	-	-	-	-	-
Description: This is the traditional mission of the Navy's Information Warfare and the constituent components of meteorology, oceanography, intelligence, cryptology, communications, networks, space, and electronic warfare (EW). It includes: 1) persistent surveillance of the maritime and information battlespace; 2) knowledge of how to employ existing and emerging collection capabilities to great effectiveness to gather critical intelligence; 3) penetrating knowledge of the capabilities and intent of our adversaries to hold our successful operations at risk; and 4) expertise within the electromagnetic spectrum. Automation in data extraction and alignment and machine learning algorithms can significantly enhance the human analyst's ability to achieve battlespace awareness in the face of vast data repositories and numerous collection platforms/opportunities. ***FY 2019 Plans:*** FY18 and FY19 efforts previously funded under PE 1206867N, SEW Surveillance/Reconnaissance Support. Additional details with respect to this line item are held at a higher classification. ***FY 2020 Base Plans:*** Additional details with respect to this line item are held at a higher classification. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605867N / *Space & Elec War Surv/ Recon*	**Project (Number/Name)** 1034 / *TAC SAT Recon Office*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY18 and FY19 efforts previously funded under PE 1206867N, SEW Surveillance/Reconnaissance Support. Additional details with respect to this line item are held at a higher classification.					
Title: Integrated Fires	0.000	0.000	2.038	0.000	2.038
Articles:	-	-	-	-	-
Description: Integration of the right combination of kinetic and/or non-kinetic fires to achieve the desired effect on the target and on the adversary's decision calculus requires: 1) in-depth understanding of the adversary's centers of gravity and vulnerabilities; 2) the right fidelity of the target's location, movement, and window of vulnerability; 3) commander's confidence that the weapon is postured to achieve the desired effect; and 4) the ability to provide this information to the weapon system(s) and weapon release authority(ies) before the target can employ effective defensive measures. ***FY 2019 Plans:*** FY18 and FY19 efforts previously funded under PE 1206867N, SEW Surveillance/Reconnaissance Support. Additional details with respect to this line item are held at a higher classification. ***FY 2020 Base Plans:*** Additional details with respect to this line item are held at a higher classification. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY18 and FY19 efforts previously funded under PE 1206867N, SEW Surveillance/Reconnaissance Support. Additional details with respect to this line item are held at a higher classification.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	8.402	0.000	8.402

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605867N / *Space & Elec War Surv/ Recon*	**Project (Number/Name)** 1034 / *TAC SAT Recon Office*

E. Performance Metrics

Not applicable

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605873M *I Marine Corps Program Wide Supt*							
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	21.423	21.538	37.265	-	37.265	36.338	32.809	33.290	31.839	Continuing	Continuing
0030: *Studies & Analysis/MC*	0.000	5.922	5.727	4.196	-	4.196	4.285	4.367	4.456	4.545	Continuing	Continuing
0033: *OT&E Support*	0.000	13.605	14.243	14.333	-	14.333	14.558	14.836	15.116	15.461	Continuing	Continuing
2330: *Chem Bio Consequence Mgmt*	0.000	1.896	1.568	1.591	-	1.591	1.620	1.654	1.687	1.721	Continuing	Continuing
3009: *Marine Corps Wargaming Capability*	0.000	0.000	0.000	14.000	-	14.000	12.000	8.000	8.000	6.000	Continuing	Continuing
3783: *Information Environment Strategy, Policy and Governance*	0.000	0.000	0.000	3.145	-	3.145	3.875	3.952	4.031	4.112	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) provides the analytical foundation for the Marine Corps Studies System (MCSS), including mandated Mission Area Analyses and Cost and Operational Effectiveness Analyses. The MCSS is the front end of the Marine Corps' acquisition system. This PE also supports the material acquisition process as follows: managing the Marine Corps Operational Test and Evaluations (OT&E); providing Chem Bio Consequence Management of capabilites for Weapons of Mass Destruction (WMD) incident response forces; and conducting Phase A activities to investigate potential material solutions that validate needs, program costs, business decisions, and prevent undue delays in pursuing priority requirements.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	21.751	24.303	20.267	-	20.267
Current President's Budget	21.423	21.538	37.265	-	37.265
Total Adjustments	-0.328	-2.765	16.998	-	16.998
• Congressional General Reductions	-	-0.060			
• Congressional Directed Reductions	-	-2.705			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.004	0.000			
• SBIR/STTR Transfer	-0.313	0.000			
• Program Adjustments	0.000	0.000	17.145	-	17.145
• Rate/Misc Adjustments	-0.001	0.000	-0.147	-	-0.147
• Congressional General Reductions Adjustments	-0.010	-	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605873M *I Marine Corps Program Wide Supt*

Change Summary Explanation

The net increase of $15.727M from FY19 to FY20 is primarily due to 1) the initiation of Milestone C activities, prototype integrated solutions, design and develop Information Technology (IT) and network infrastructure and identification and apply cybersecurity controls within Project 3009, the Marine Corps Wargaming Capability; and 2) the initiation of Project 3783 Information Environment (IE) efforts to address the significant role information now plays in current and future conflicts.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605873M / *Marine Corps Program Wide Supt*	Project (Number/Name) 0030 / *Studies & Analysis/MC*	

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
0030: *Studies & Analysis/MC*	0.000	5.922	5.727	4.196	-	4.196	4.285	4.367	4.456	4.545	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Marine Corps Wargaming Capability Center transitions from Project 0030 to Project 3009 in FY20.

A. Mission Description and Budget Item Justification

Marine Corps Requirements Oversight Council (MROC) established Operations Analysis Directorate (OAD) as the sole operations research, analytic support, and studies management program for the Marine Corps Study System (MCSS). MCSS analysis is achieving greater efficiency, productivity, and innovation through operations research methodologies such as: operational analysis, statistical analysis, multi-objective decision methods, optimization, cost analysis, and a wide range of computer-based models and combat simulations insuring the optimization of resources now and in the future. Analyses spans the spectrum of conflict in a Joint, Interagency, Intergovernmental, and Multinational (JIIM) context to inform critical senior level decision makers of current and future national security issues and provides unique and distinct analytic capabilities that enable the collaboration and sharing of analyses that reduces the duplication of topics that are of broad interest. MCSS is an integral part of the Marine Corps and Joint Chiefs decision-making processes to organize, man, train, equip, sustain, and transform resources from the current to the future force.

This program element has been revised into two specialized analytical divisions: (1) External Analysis Division (EAD) - responsible for providing joint external analysis is the Marine Corps' sole representative in the joint modeling arenas. Provides deployed on site professional operations analysis support to Special Purpose MAGTFs in CENTCOM and AFRICOM. (2) Combat Development Analysis Division responsible for executing a select portfolio of studies for senior leadership, Capabilities Based Assessment (CBA) and Marine Corps Enterprise Integration Plan (MCEIP).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Studies & Analysis/MC	5.922	5.727	4.196	0.000	4.196
Articles:	-	-	-	-	-
Description: The Marine Corps Studies System (MCSS), the sole responsibility of the Operations Analysis Directorate (OAD), Combat Development and Integration (CD&I), Marine Corps Combat Development Command (MCCDC) provides research and analysis to ensure a greater understanding of issues and alternatives concerning organizations, tactics, doctrine, policies, force plans, strategies, procedures, intelligence, weapon selection, systems' programs and resource allocation. Through the MCSS, the Marine Corps nominates, approves, commences, manages and distributes the resultant analytical products. Efforts are evaluated and selected by the Studies Requirements Review Board (SRRB) and approved by the CG, Combat Development					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 0030 / *Studies & Analysis/MC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
and Integration (CD&I)and is targeted to a particular audience that understands current and future USMC mission requirements and the need for comprehensive analyses that meets the Commandant's Strategic Goals, supports and protects forces in theater, and utilizes funds efficiently. Research conducted produces comprehensive and integrated analyses aligned to Senior Leadership's requirements and decision timelines. ***FY 2019 Plans:*** - Complete: Methodology and Cost Estimate for the Marine Corps Synthetic Training Environment (MCSTE) Marine Air Ground Task Force (MAGTF) Requirements Analysis Study in response to Congressional inquiries regarding Live, Virtual, Constructive (LVC) Training requirements and capabilities of the Marine Air Ground Task Force (MAGTF) to include all warfighting functions. Space-Based Capabilities efforts which details vulnerabilities and made recommendations to senior leadership to make systems more resilient. Provided recommendations to the Marine Corps Cyberspace Operations Group (MCCOG) to improve Marine Corps Enterprise Network (MCEN) defensive cyber operations. - Complete: Modeling Simulation and Analytical Support Toolkit (MSAT) Phase IV; Acquisition Category 1 (ACAT 1) Analysis of Alternatives (AoAs) to support major acquisition decisions at great savings to the Marine Corps. - Initiate and Complete: Analyses and research in the areas of: Intelligence, Information and Networks; Plans, Policy, and Operations; Infrastructure and Readiness; Resources, Programs,and Assessments; Capability Integration; Research, Development and Acquisition; General Concept Development; Wargaming Modeling and Simulation, Weapons Systems and Space Based Capabilities, Aviation, Command, Control, Communications, Computers, Cyber and Intelligence, Surveillance and Reconnaissance (C4ISR), Maneuver, Logistics, and Seabasing Capabilities. ***FY 2020 Base Plans:*** - Initiate: Studies and analysis submitted via the Marine Corps Studies System Call for Studies that support the Commandant's 2020-2025 Vision and Strategy Areas of concentration including:Force Development and Combat Readiness; National Security Environments Threats and Strategic Planning; Intelligence Information and Networks; Capability Integration; Weapons Systems and Space Based Capabilities. Provide focused analyses regarding force realignments, training and equipment support that best meet the tactical needs of the Marine Corps while building a leaner better educated force.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 0030 / *Studies & Analysis/MC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate: Studies and analysis requested adhoc by senior level leadership to support combat development and systems acquisition decisions. Core competencies include examination of Aviation, C4ISR, Maneuver, Logistics, and Seabasing capabilities in order to evaluate and identify operational deficiencies, and to explore potential solutions. - Initiate: Provide combat analyst assessment teams for national emergencies and contingencies. Conduct baseline analysis to support Mission Capability Packages (MCPs), Investment Strategy, Joint Capability Areas (JCAs), and the Naval Strategic Plan providing assessments for future force development. Provide analysis of tactical operations within the USMC and formulate ways to improve the effectiveness of the forces to win and minimize costs and lives lost. - Initiate: The Modeling and Simulation Analytical Toolkit (MSAT) Phase V that supports analysis involving irregular warfare missions executed in a future Defense Planning Guidance scenario. These missions include information operations, offensive tactical and operational CYBER operations, foreign internal defense, special direct action arising from intelligence gathered from Human Intelligence (HUMINT) and technical (SIGINT,CYBER) means. - Update to Data Center equipment as required. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Net decrease of $1.531M from FY19 to FY20 reflects establishment of Project 3009 USMC Wargaming Center previously funded under Project 0030 in conjunction with Marine Corps Studies and Analysis.					
Accomplishments/Planned Programs Subtotals	5.922	5.727	4.196	0.000	4.196

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 0030 / *Studies & Analysis/MC*

E. Performance Metrics

Efforts are guided by:

- Commandant's Strategic Plan; Marine Corps Operating Concepts (MOC) provides the foundation and context for operating and functional concepts; guides analysis; informs capability development and budget programming decisions.

- Combat Development and Integration (CD&I) Force Development Strategic Plan provides Marine Corps Combat Development Command (MCCDC)/(CD&I) personnel framework designed to promote a collaborative, cohesive, "learning organization" that can effectively prepare the Nation's expeditionary force in readiness for a complex and uncertain future.
- FRAGO 2017 to support the USMC to adapt, innovate, and change to meet future threats.

- Executive Order #13589, Department of Defense (DoD) Directive 8260.05 Support for Strategic Analysis, and DoD Instruction 8260.2 Implementation of Data Collection, Development, and Management for Strategic Analyses, directs analytic teams apply the following analytic principles: Transparency, Consistency, Integration, use of Standardized and Accepted Methods, thorough consideration of Quantitative and Qualitative Factors and documentation of Assumptions and Constraints.

- MROC requirement to develop and maintain a current operations analysis reach back network with other government and Coalition agencies such as Center for Army Analysis, Joint Capabilities Integration and Development System (JCIDS), JIEDDO J9, Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC) program, The Technical Cooperation Program (TTCP), NATO Systems Analysis & Studies (SAS), etc.

Analytic Categories Include but not limited to:

- Operational and Strategic Assessments: Provides analysis, alternatives, and changes to current plans for military operations at the mission, campaign, and strategic levels. Analysis results are employed to assist the Commandant, Assistant Commandants, Unit Commanders and the Commanding General (CG), Combat Integration Division, Marine Corps Combat Development Command (CD&I,MCCDC), Crisis Response (CR) Special Purpose Marine Air-Ground Task Forces (SPMAGTFs; CENTCOM, AFRICOM and SOUTHCOM), in addition to the Marine Expeditionary Units that are deployed around the globe and provide a continuous program of mission area analyses, formal studies, rapid response analytic efforts, and the supervision of research projects to fulfill mission.

- Force Structure Analyses: Analyses performed to define and modify manpower requirements. Analysts develop quantitative measures and comparisons that inform force structure decision processes and support defensible evidence.

- Strategic Planning Analyses: Analyst develop and integrate data sets, and analytic frameworks to strategic plans, goals, and processes. Analysts determine alternative force structures in terms of strategic-level goals, effects, risks, and measurements.

- Strategic and Operational Analyses: Analyses that provides leadership with defensible decisions, alternatives and changes to current plans for military operations at the mission, campaign, and strategic levels.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 0030 / *Studies & Analysis/MC*

- Resource Analyses: Analyses of manpower and personnel as well as equipment modernization, recapitalization, operation and sustainment. Providing senior leadership with defensive evidence to support major changes to force structure or equipment procurements and sustainment.

- Modeling and Simulation: Support Marine Air-Ground Task Forces (MAGTF's) and Marine Expeditionary Units (MEU's) with research analysis and modeling and simulation focused on aviation, amphibious, warfighting, and ground operations enhancing the ability of the Marine Corps to increase operational, logistical and equipment efficiencies and capabilities and provide a unique, well trained, equipped and educated force.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605873M / *Marine Corps Program Wide Supt*	Project (Number/Name) 0033 / *OT&E 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
0033: *OT&E Support*	0.000	13.605	14.243	14.333	-	14.333	14.558	14.836	15.116	15.461	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Marine Corps Operational Test and Evaluation Activity (MCOTEA) supports the material acquisition process by managing the Marine Corps Operational Test (OT) programs for Acquisition Categories (ACAT) I through ACAT IV (less OT of manned aircraft) and performs other functions that may be directed by the Commandant of the Marine Corps. The primary purpose of Operational Test and Evaluation (OT&E) is to provide information to the Milestone Decision Authority (MDA) regarding the Operational Effectiveness (OE) and Operational Suitability (OS) of the system addressed at a decision point. MCOTEA must ensure that the Marines in the Operating Forces receive the very best possible equipment and support. MCOTEA must also ensure each system proposed for acquisition is tested adequately, evaluated objectively and reported independently.

Marine Corps Operational Test and Evaluation Activity (MCOTEA) is the only unit that provides the Marine Corps with required operational test and evaluation (OT&E) capability, ensuring the Marine Corps is compliant with laws and regulations, and ensuring that training and equipment are operationally effective, relevant, and suitable. Additionally, MCOTEA's early involvement, coordination, and oversight in developmental testing and evaluation of new combat and combat support systems ensures that our Marines are the best trained, and have the best equipment, with the lowest test costs for taxpayers. Finally, MCOTEA's support of rapid acquisitions ensures that Marines in the fight are supported with the newest and most advanced equipment and that the Marine Corps is compliant with regulations.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MCOTEA	12.605	14.243	14.333	0.000	14.333
Articles:	-	-	-	-	-
FY 2019 Plans: Continue with evaluating, quantifying and reporting on programs for the operational effectiveness, suitability and survivability of planned acquisitions to meet warfighting capabilities and will be providing Milestone Decision Authority (MDAs) to programs that are inherently governmental and a comprehensive understanding of operational risk associated with ACAT programs.					
FY 2020 Base Plans: Continue evaluating, quantifying and reporting on programs for the operational effectiveness, suitability and survivability of planned acquisitions to meet warfighting capabilities and will be providing Milestone Decision					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 0033 / *OT&E Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Authority (MDAs) to programs that are inherently governmental and a comprehensive understanding of operational risk associated with ACAT programs. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.09M from FY19 to FY20 is a result of the Pay and Inflation Rate assumptions.					
Title: Cyber Awareness Red Team Support ***Articles:*** ***Description:*** This effort supports NDAA S. 1647 requirements. ***FY 2019 Plans:*** - See Project 4038. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A	1.000 -	0.000 -	0.000 -	0.000 -	0.000 -
Accomplishments/Planned Programs Subtotals	13.605	14.243	14.333	0.000	14.333

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
• RDTEN/0606942M/4038: *Cyber Vulnerability Evaluation*	0.000	7.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.000

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605873M / *Marine Corps Program Wide Supt*	Project (Number/Name) 2330 / *Chem Bio Consequence Mgmt*	

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
2330: *Chem Bio Consequence Mgmt*	0.000	1.896	1.568	1.591	-	1.591	1.620	1.654	1.687	1.721	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Family of Incident Response Systems (FIRS) consists of equipment, systems, and services designed to provide Weapons of Mass Destruction (WMD) incident response forces the capabilities needed to effectively respond to a terrorist attack using Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE). FIRS meets the mission requirements for the detection; mass casualty decontamination; force protection; responder inter-agency interoperability; Command, Control, Communications, Computers & Intelligence (C4I); urban search and rescue; medical and general support requirements needed by these forces to mitigate the effects of a CBRNE terrorist attack. FIRS relies primarily on Commercial Off-The-Shelf/Non-Developmental Items (COTS/NDI) equipment and systems that meet the particular mission requirements of Consequence Management (CM). Nuclear, Biological, and Chemical (NBC) systems are adopted if they meet the CM mission requirements. FIRS Research & Development effort allows the program to keep abreast of emerging technologies in the commercial sector and address operational capability gaps that cannot be met by commercial items.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: FIRS: Reconnaissance Mission Area	0.910	0.603	0.300	0.000	0.300
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue CALS FC-IS naval system integration. - Complete chemical contamination early warning research in support of technical refresh/replacement material solution. ***FY 2020 Base Plans:*** -Complete CALS FC-IS naval system integration. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of $0.303M between FY19 and FY20 due to completion of chemical contamination early warning research in support of technical refresh/replacement material solution.					
Title: FIRS: Force Protection Mission Area	0.986	0.965	1.291	0.000	1.291
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 2330 / *Chem Bio Consequence Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: - Complete verification and validation testing at Dugway Proving Ground in support of the Operating Forces that employ DRSKO sets and the CBIRF in support of technical refreshes of new area monitoring devices. - Complete performance and durability test for low profile self contained breathing apparatus masks in support of EOD bomb suit integration. - Initiate durability test of CBIRF's CBRN personal protection equipment items, including Class 2 and Class 3 suits. ***FY 2020 Base Plans:*** -Continue durability test of CBIRF's CBRN personal protection equipment items, including Class 2 and Class 3 suits. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.326M between FY19 and FY20 due to ramp up of durability testing efforts related to protection equipment.					
Accomplishments/Planned Programs Subtotals	1.896	1.568	1.591	0.000	1.591

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
• PMC/2220: *Wpns & Cmbt Vehs under $5 million*	0.454	0.476	0.540	-	0.540	0.556	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605873M / *Marine Corps Program Wide Supt*	Project (Number/Name) 3009 / *Marine Corps Wargaming Capability*	

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
3009: *Marine Corps Wargaming Capability*	0.000	0.000	0.000	14.000	-	14.000	12.000	8.000	8.000	6.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Previously executed within Proj 0030 Studies & Analysis/MC

A. Mission Description and Budget Item Justification

Wargaming capability efforts are focused within multiple areas to include identifying, defining, and documenting requirements and capabilities; directing cyber security support for initiatives to boost information assurance in the areas of modeling & simulation, network configuration, security control validation, and type accreditation; development of performance specifications; and modeling and simulation prototyping efforts. The wargaming capability facilitates the assessment and evaluation of operating and functional concepts, operational and technology-based approaches, current concepts of operations, and principles and methods that inform decisions in support of force development and requirements generation. Wargaming capability results are used to develop, assess, and refine future operating and functional concepts across the full range of military operations (ROMO). Additionally, they test current OPLANS and CONOPS; examine operational and tactical actions through repeated, multiple iterations; enable the full development of concepts through opportunities for examination and evaluation; assess capability investments while guiding capability resourcing actions and informing the POM development; and provide education and leadership development.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Wargaming Capability	0.000	0.000	14.000	0.000	14.000
Articles:	-	-	-	-	-
FY 2019 Plans: Executed within Proj 0030 Studies & Analysis/MC.					
FY 2020 Base Plans: Continue Engineering and Manufacturing Development phase activities including an Integration Readiness Review, documentation of the Allocated Baseline, preparation for the Critical Design Review to be held in FY21, development of sustainability and maintainability approaches, development of manpower and training plans, and initiation of documentation for a Milestone C in FY21. Begin prototyping two or more integrated wargaming capability solutions that will demonstrate the ability to conduct world class wargaming while incorporating data capture tools, data analysis tools, advanced models and simulations, cross domain solutions, dynamic 2-D to 3-D visualization, player interface tools, automated					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 3009 / *Marine Corps Wargaming Capability*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
adjudication, scenario generation and wargame design tools, virtualization, and prototype algorithms and data integration. Design and develop Information Technology (IT) and network infrastructure and identify and apply cybersecurity controls to specific technologies. Continue all efforts not completed in FY19. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY2018 & FY2019 executed within Project 0030 Studies & Analysis/MC. The FY19 budget within Project 0030 was $5.865M therefore the overall increase from FY19 to FY20 of $8.135M for Marine Corps Wargaming efforts can be attributed to the initiation of Milestone C activities, prototyping of integrated solutions, design and development of Information Technology (IT) and network infrastructure, and identification and application of cybersecurity controls.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	14.000	0.000	14.000

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
• PMC/4630: *Marine Corps Wargaming Capabilites*	0.000	0.000	0.000	-	0.000	12.000	28.000	9.000	6.991	0.000	55.991

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Wargaming capability results are used to develop, assess, and refine future operating and functional concepts across the full range of military operations (ROMO). Additionally, they test current OPLANS and CONOPS; examine operational and tactical actions through repeated, multiple iterations; enable the full development of concepts through opportunities for examination and evaluation; assess capability investments while guiding capability resourcing actions and informing the POM development; and provide education and leadership development.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605873M / *Marine Corps Program Wide Supt*	Project (Number/Name) 3783 / *Information Environment Strategy, Policy and Governance*	

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
3783: *Information Environment Strategy, Policy and Governance*	0.000	0.000	0.000	3.145	-	3.145	3.875	3.952	4.031	4.112	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This is a new Project in FY 2020.

A. Mission Description and Budget Item Justification

The Information Environment (IE) is a global, interconnected, complex, continuously changing eco-system that is increasingly connected across our war fighting functions. Given the complexity and the speed of changes in the IE and to address the significant role information now plays in current and future conflicts, a unifying operational and technical strategy must be developed to outpace our adversaries.

Analysis will inform the development and integration of Marine Corps Information Environment Operations (IE Ops) that are guided by the Commandant's Strategic Plan, Marine Corps Operating Concepts (MOC). Research and analysis efforts support: design and coordinated implementation of an Objective Network to fight on and through a contested environment; design and collaboration on a Naval Tactical Grid and a Joint Tactical Grid; a threat estimate to inform capability development; and analysis to inform the development and fielding of an integrated information capability. These efforts will be accomplished leveraging analytic support from government Labs and Industry to dynamically exploit our National Defense Strategy (NDS) priority operational problems related to the Information Environment through limited user evaluations and functional capability assessments with Marines. In addition, rapid development of capabilities to address problems in the IE Ops will be developed utilizing the Accelerator process which utilizes best commercial practice of design thinking.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Information Environment Strategy	0.000	0.000	3.145	0.000	3.145
Articles:	-	-	-	-	-
FY 2019 Plans: Not Applicable					
FY 2020 Base Plans: -Initiate innovation activities across the information domain to develop user centered capabilities for the future operating environment. -Implement a data science team to support the digital transformation of Marine Corps data stores to data and information across the Services and other DoD partners and position the Marine Corps to leverage DoD investments in Artificial Intelligence and Machine Learning.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605873M / *Marine Corps Program Wide Supt*	**Project (Number/Name)** 3783 / *Information Environment Strategy, Policy and Governance*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Implementation of Accelerator Team and methods, scaling best commercial practices of Agile Development and Design Thinking tools, to support the rapid design and development of Minimally Viable Products (MVPs) with Marines/stakeholders for the information environment. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase of $3.145M from FY19 to FY20 is because this project is a new start to support Information Environment analysis and integration to address the significant role information now plays in current and future conflicts.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.145	0.000	3.145

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605898N *I (U)MANAGEMENT HQ - R&D*							
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	43.266	41.765	39.673	-	39.673	41.064	42.081	42.607	43.549	Continuing	Continuing
0223: *Sub Combat System Improvement (ADV)*	0.000	0.141	0.149	0.141	-	0.141	0.129	0.134	0.137	0.140	Continuing	Continuing
1447: *Surf Combatant Combat System Imp*	0.000	0.165	0.174	0.178	-	0.178	0.180	0.184	0.188	0.192	Continuing	Continuing
3159: *Naval Integrated Fire Control-Counter Air SE&I*	0.000	0.165	0.173	0.177	-	0.177	0.179	0.183	0.187	0.191	Continuing	Continuing
3186: *Air and Missile Defense Radar*	0.000	0.493	0.514	0.524	-	0.524	0.534	0.546	0.557	0.568	Continuing	Continuing
3216: *Tactical Support Center-Integration*	0.000	0.025	0.027	0.025	-	0.025	0.026	0.027	0.028	0.029	Continuing	Continuing
3345: *ONR Management Headquarters*	0.000	42.277	40.728	38.628	-	38.628	40.016	41.007	41.510	42.429	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): P384

A. Mission Description and Budget Item Justification

The Management HQ - R&D program funds management headquarter civilian personnel salaries at the Office of Naval Research (ONR). These personnel support the management of the Naval Science and Technology (S&T) programs. This program also funds management headquarter contractor support for the Integrated Warfare Systems (IWS) Program Executive Office.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy					Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*			R-1 Program Element (Number/Name) PE 0605898N *I (U)MANAGEMENT HQ - R&D*		
B. Program Change Summary ($ in Millions)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	44.279	43.262	42.134	-	42.134
Current President's Budget	43.266	41.765	39.673	-	39.673
Total Adjustments	-1.013	-1.497	-2.461	-	-2.461
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.497			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.012	0.000			
• Program Adjustments	0.000	0.000	-0.782	-	-0.782
• Rate/Misc Adjustments	-0.001	0.000	-1.679	-	-1.679

Change Summary Explanation

The FY 2020 funding request was reduced by $.782 million to account for the availability of prior year execution balances. The funding change from FY 2019 to FY 2020 reflects planned reductions in Management Headquarter activity contracted work hours.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605898N / *(U)MANAGEMENT HQ - R&D*	Project (Number/Name) 0223 / *Sub Combat System Improvement (ADV)*	

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
0223: *Sub Combat System Improvement (ADV)*	0.000	0.141	0.149	0.141	-	0.141	0.129	0.134	0.137	0.140	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides management headquarters contractor support to the Integrated Warfare Systems (IWS) Program Executive Office (PEO). This work supports Navy Acoustic Superiority and Technology Insertion Initiatives through the application of advanced development and testing of sensors and sensor processing systems supporting tactical control systems improvements. This addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Management Headquarters Personnel	0.141	0.149	0.141	0.000	0.141
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue Advanced Processing Build (APB) development, integration, land-based testing, at-sea testing, and establishment of tactical scenarios.					
FY 2020 Base Plans: - Continue Advanced Processing Build (APB) development, integration, land-based testing, at-sea testing, and establishment of tactical scenarios.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	0.141	0.149	0.141	0.000	0.141

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605898N / *(U)MANAGEMENT HQ - R&D*	**Project (Number/Name)** 0223 / *Sub Combat System Improvement (ADV)*

D. Acquisition Strategy

N/A

E. Performance Metrics

This program funds management headquarter contractor support. Performance is measured by attaining the administrative and financial tasks necessary to support program office management.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605898N / *(U)MANAGEMENT HQ - R&D*	Project (Number/Name) 1447 / *Surf Combatant Combat System Imp*	

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
1447: *Surf Combatant Combat System Imp*	0.000	0.165	0.174	0.178	-	0.178	0.180	0.184	0.188	0.192	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides management headquarters contractor support to the Integrated Warfare System (IWS) Program Executive Office (PEO). This work supports Cruiser and Destroyer AEGIS Combat System (ACS) upgrades and integrates new equipment and systems to pace the threat and capture advances in technology.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Management Headquarter Personnel	0.165	0.174	0.178	0.000	0.178
Articles:	-	-	-	-	-
FY 2019 Plans: -Support Cruiser and Destroyer AEGIS Combat System (ACS) upgrades and integrate new equipment and systems to pace the threat and capture advances in technology.					
FY 2020 Base Plans: -Support Cruiser and Destroyer AEGIS Combat System (ACS) upgrades and integrate new equipment and systems to pace the threat and capture advances in technology.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	0.165	0.174	0.178	0.000	0.178

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605898N / *(U)MANAGEMENT HQ - R&D*	**Project (Number/Name)** 1447 / *Surf Combatant Combat System Imp*

E. Performance Metrics

This PE funds contractor support for management headquarter contractors. Performance is measured by attaining the administrative and financial tasks necessary to support program office management.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605898N / *(U)MANAGEMENT HQ - R&D*	Project (Number/Name) 3159 / *Naval Integrated Fire Control-Counter Air SE&I*	

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
3159: *Naval Integrated Fire Control-Counter Air SE&I*	0.000	0.165	0.173	0.177	-	0.177	0.179	0.183	0.187	0.191	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides management headquarters contractor support to the Integrated Warfare System (IWS) Program Executive Office (PEO). This work supports Naval Integrated Fire Control - Counter Air (NIFC-CA) project. Through this support technological advances are being developed enabling PEO IWS to extend the Naval Theater Air and Missile Defense battlespace out to the maximum kinematic range of our weapons.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Management Headquarter Personnel	0.165	0.173	0.177	0.000	0.177
Articles:	-	-	-	-	-
FY 2019 Plans: Support the Navy's research and development efforts for NIFC-CA's System Engineering, Integration and Test (SEI&T) project. -Provide system engineering to upgrade the White Sands Missile Range (WSMR) Desert Ship complex to an AEGIS Advanced Capability Build (ACB).					
FY 2020 Base Plans: Support the Navy's research and development efforts for NIFC-CA's System Engineering, Integration and Test (SEI&T) project. -Provide system engineering to upgrade the White Sands Missile Range (WSMR) Desert Ship complex to an AEGIS Advanced Capability Build (ACB).					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	0.165	0.173	0.177	0.000	0.177

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605898N / *(U)MANAGEMENT HQ - R&D*	**Project (Number/Name)** 3159 / *Naval Integrated Fire Control-Counter Air SE&I*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This PE funds contractor support for management headquarter contractors. Performance is measured by attaining the administrative and financial tasks necessary to support program office management.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605898N / *(U)MANAGEMENT HQ - R&D*	Project (Number/Name) 3186 / *Air and Missile Defense 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
3186: *Air and Missile Defense Radar*	0.000	0.493	0.514	0.524	-	0.524	0.534	0.546	0.557	0.568	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: P384

A. Mission Description and Budget Item Justification

This project provides management headquarters contractor support to the Integrated Warfare System (IWS) Program Executive Office (PEO). Through this support, technological advances are being developed, enabling PEO IWS to deliver "Enterprise" solutions for Naval Warfare Systems that operate seamlessly and effectively within the Fleet and Joint Forces.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Management Headquarter Personnel	0.493	0.514	0.524	0.000	0.524
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue support for combat system integration and DDG 51 FLT III integration, including preparing for ACB20 CDR - Provide system engineering and software support for combat system integration efforts - Initiate risk reduction testing at Advanced Radar Development Evaluation Laboratory (ARDEL), including refinement of radar operation functions (calibration, fault detection/fault isolation, environmental adaptation), improving electronic protection capabilities, and continue data collection on ballistic missile defense targets of opportunity.					
FY 2020 Base Plans: - Continue risk reduction testing at ARDEL, including refinement of radar operation functions (calibration, fault detection/fault isolation, environmental adaptation), improving electronic protection capabilities, and continue data collection on ballistic missile defense targets of opportunity.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605898N / *(U)MANAGEMENT HQ - R&D*	**Project (Number/Name)** 3186 / *Air and Missile Defense Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	0.493	0.514	0.524	0.000	0.524

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
• RDT&E/0604522N: *Air and Missile Defense Radar (AMDR) System*	31.119	27.059	55.535	-	55.535	78.440	88.190	80.715	80.156	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

This PE funds contractor support for management headquarter contractors. Performance is measured by attaining the administrative and financial tasks necessary to support program office management.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605898N / *(U)MANAGEMENT HQ - R&D*	Project (Number/Name) 3216 / *Tactical Support Center-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
3216: *Tactical Support Center-Integration*	0.000	0.025	0.027	0.025	-	0.025	0.026	0.027	0.028	0.029	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides management headquarters contractor support to the Integrated Warfare System (IWS) Program Executive Office (PEO). This supports AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC) fulfillment of Anti-Submarine Warfare (ASW) and Surface Warfare (SUW) coordination functions utilizing data received from multiple sources to assess the threat and assist the Tactical Action Officer (TAO) and Composite Warfare Commander (CWC) in effectively applying available resources to support CVN self-defense. This supports CV-TSC functionality updates being implemented through an evolutionary acquisition approach, providing phased incremental builds that are developed, tested, certified and fielded.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Management Headquarter Personnel	0.025	0.027	0.025	0.000	0.025
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue CV-TSC Development/Integration including development of software builds and systems engineering efforts, conduct of incremental requirements, design, and test reviews.					
FY 2020 Base Plans: - Continue CV-TSC Development/Integration including development of software builds and systems engineering efforts, conduct of incremental requirements, design, and test reviews.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: There is no significant change from FY 2019 to FY 2020.					
Accomplishments/Planned Programs Subtotals	0.025	0.027	0.025	0.000	0.025

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605898N / *(U)MANAGEMENT HQ - R&D*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

D. Acquisition Strategy

N/A

E. Performance Metrics

This PE funds contractor support for management headquarter contractors. Performance is measured by attaining the administrative and financial tasks necessary to support program office management.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605898N / *(U)MANAGEMENT HQ - R&D*	Project (Number/Name) 3345 / *ONR 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
3345: *ONR Management Headquarters*	0.000	42.277	40.728	38.628	-	38.628	40.016	41.007	41.510	42.429	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds all basic costs of Office of Naval Research Management Headquarters Activity (MHA) salaries and non-labor in support of the entire Navy Science & Technology (S&T) program. Through this support, the S&T enterprise pursues the technological advances that enable the Fleet's ability to operate from a position of technological superiority.

Specifically, funding facilitates the execution of the Navy's basic research, applied research, and advanced technology development programs at the nation's universities/colleges, Navy laboratories, Warfare Centers, and private industry.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Management Headquarters Personnel	42.277	40.728	38.628	0.000	38.628
Articles:	-	40	39	-	39
Description: N/A					
FY 2019 Plans: Provides corporate MHA personnel salaries and Non-Labor support in facilitating the purchase of the S&T programs for the Navy to ensure consistent external reporting. All Non-Operational HQ is now Major Headquarters Activity (MHA). Continue to reduce auditability challenges to meet the mandate.					
FY 2020 Base Plans: Provides corporate MHA personnel salaries and Non-Labor support in facilitating the purchase of the S&T programs for the Navy to ensure consistent external reporting. All Non-Operational HQ is now Major Headquarters Activity (MHA). Continue to reduce auditability challenges to meet the mandate.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0605898N / *(U)MANAGEMENT HQ - R&D*	**Project (Number/Name)** 3345 / *ONR Management Headquarters*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding decrease from FY 2019 to FY 2020 reflects planned reductions in Management Headquarter activity contracted work hours.					
Accomplishments/Planned Programs Subtotals	42.277	40.728	38.628	0.000	38.628

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Program performance is measured by attaining financial benchmarks for planned obligations vs. actual obligations and planned expenditures vs. actual expenditures.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0606355N *I (U)Warfare Innovation Management*							
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	27.759	41.918	28.750	-	28.750	39.456	43.884	40.802	43.570	Continuing	Continuing
0798: *Allied/Coalition Maritime Environment (ACME)*	0.000	0.000	1.076	1.114	-	1.114	1.157	1.204	1.250	1.272	Continuing	Continuing
2144: *Space & Elec Warfare Engineering*	0.000	0.000	22.058	14.535	-	14.535	23.841	28.209	24.635	26.165	Continuing	Continuing
2147: *ISR Architecture*	0.000	0.000	1.583	1.535	-	1.535	1.534	1.566	1.593	1.625	Continuing	Continuing
3319: *Fleet Experimentation*	0.000	11.131	9.090	9.281	-	9.281	10.594	10.525	10.897	12.033	Continuing	Continuing
3320: *TRIDENT Warrior*	0.000	2.200	2.284	2.285	-	2.285	2.330	2.380	2.427	2.475	Continuing	Continuing
3420: *Expeditionary Submarine Fiber Optic Cable (SFOC)*	0.000	14.428	5.827	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	20.255

A. Mission Description and Budget Item Justification

Allied/Coalition Maritime Environment (ACME) 0798:
This project promotes interoperability with allied and coalition forces by facilitating maritime interoperability in both processes and communication systems, including emerging capabilities, to counter growing high-end asymmetric threats.

Space & Electronic Warfare (SEW) Engineering 2144:
This project is a systems engineering non-acquisition program to develop, test, implement Technical Authority (TA) products, and validate Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System architectures to support naval, Joint and Coalition missions across normal, contested, and degraded cyber/operational environments. The objective of this project is carried out by multiple tasks that ensure development and delivery of naval Information Warfare (IW) capabilities that are well-integrated, interoperable, secure, and resilient to meet validated warfighting requirements.

The Intelligence, Surveillance, and Reconnaissance (ISR) Architecture 2147:
This project is intended to guide system of systems capability development and promote interoperability across Navy ISR programs, as well as interoperability and alignment with Department of Defense (DoD)-wide enterprise initiatives including Joint Information Environment (JIE) and Intelligence Community (IC) Information Technology Environment (ITE). This effort to develop integrated ISR architectures will also help instill systems engineering discipline and standardization across the Navy ISR Enterprise and provide a means by which to assess ISR POR progress in conforming to a single Navy architecture.

Fleet Experimentation 3319:

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606355N *I (U)Warfare Innovation Management*

The U.S. Navy's Fleet Experimentation (FLEX) project advances/augments operational and tactical warfighter capabilities through the experimentation of high payoff initiatives, technologies and concepts, Fleet Concepts of Operations (CONOPS), doctrine, and new tactics, techniques and procedures (TTP). The main focus of FLEX between 2018 and 2024 is to operationalize "A Design For Maintaining Maritime Superiority" Blue Line of Effort (LOE) through the execution of Fleet Design materiel/ non-materiel capability employment.

Trident Warrior Project 3320:
The U.S. Navy's Trident Warrior (TW) experimentation campaign enables early delivery of capabilities to the warfighter via Fleet-directed Trident Warrior operational events with an emphasis on United States Fleet Forces/Commander Pacific Fleet (USFF/CPF) directed focus areas.

Maritime Communications Demonstration Project 3420:
Classified Project Maritime Communications Demonstration (MCD) is not a new start. Funding was realigned from project 3319 FLEX in FY18. The Expeditionary SFOC Communications is developing and experimenting innovative concepts designed to validate both materiel and non-materiel methodologies to provide resilient command and control within the maritime domain. Identified previous work done within OSD channels, and will leverage lessons learned.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	28.841	41.918	36.877	-	36.877
Current President's Budget	27.759	41.918	28.750	-	28.750
Total Adjustments	-1.082	0.000	-8.127	-	-8.127
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.082	0.000			
• Program Adjustments	0.000	0.000	-8.067	-	-8.067
• Rate/Misc Adjustments	0.000	0.000	-0.060	-	-0.060

Change Summary Explanation

The FY2020 funding request for project 2144 (Space & Electronic Warfare Engineering) was reduced by $5.218 million to account for the availability of prior year execution balances.

The FY2020 funding request for project 3319 (Fleet Experimentation) was reduced by $0.906 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0606355N / *(U)Warfare Innovation Management*	Project (Number/Name) 0798 / *Allied/Coalition Maritime Environment (ACME)*	

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
0798: *Allied/Coalition Maritime Environment (ACME)*	0.000	0.000	1.076	1.114	-	1.114	1.157	1.204	1.250	1.272	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The ACME program advances Information Warfare (IW) (to include Command, Control, Communications, Computers; Intelligence, Surveillance and Reconnaissance (C4ISR); Electronic Warfare (EW); and Cyber Warfare), interoperability with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS), North Atlantic Treaty Organization (NATO), and other Allied and Coalition partners. The program determines maritime operational gaps with our allies, identifies Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities (DOTMLPF) solutions with the potential to fill those gaps, and assesses these solutions and associated concepts of operation in laboratory and at-sea environments. The ACME program includes integration and testing in support of joint and Allied war fighting capabilities, including interoperability testing of IW equipment. Allied and joint interoperability is critical for future maritime operations, especially as the United States Navy (USN) expands Internet Protocol (IP) networking throughout the fleet via Consolidated Afloat Networks and Enterprise Services (CANES), Next Generation Networks (NGEN), Mission Partner Environment/ Future Mission Networking (MPE/FMN), the U.S. Battlefield Information Collection and Exploitation System - eXtended (BICES-X), and with the Joint Information Environment (JIE).

Currently, IP connectivity with AUSCANNZUKUS and other Allied/Coalition forces is limited, requiring extensive backhaul through ashore infrastructure. Higher bandwidth solutions suitable for use over tactical networks require development and assessment for emerging coalition and joint interoperability requirements, such as Maritime Domain Awareness (MDA), Network Operations Without Shore (NOWS), Satellite Communications (SATCOM) Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operations, and to counter Anti-Access Area Denial (A2/AD) threats. Increases in data throughput are required for the effective exchange of rich IW data sets and services via Service Oriented Architectures (SOA) within the limitations of High Frequency (HF), Ultra-High Frequency (UHF), and other portions of the radio frequency spectrum, coupled with appropriate Information Assurance and Computer Network Defense (IA/CND) mechanisms. Development and assessment of potential solutions will integrate improved IP capabilities with the Advanced Digital Network Systems (ADNS) and existing international standards (e.g. Allied Communications Publication 200, NATO Standardization Agreements 5066 and 4691). The continued development and refinement of advanced tactical networking technologies and protocols, to include Low Probability of Intercept (LPI), Low Probability of Detection (LPD), and Anti-Jam (AJ) capabilities as well as Automatic Link Establishment (ALE) standards, will provide for a significant improvement in secure data sharing within, and between, coalition maritime elements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Advanced Relay Capabilities	0.000	1.076	1.114	0.000	1.114
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue to develop and evaluate secure and interoperable technologies and capabilities supporting Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operations, to include multibearer routing, distributed					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 0798 / *Allied/Coalition Maritime Environment (ACME)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
applications and services and their integration with Mission Partner Environment/ Future Mission Networking (MPE/FMN). This will include Allied/Coalition Shared Situational Awareness, cross-domain and data labeling solutions in maritime tactical networking environments, and advanced Information Assurance and Computer Network Defense (IA/CND) solutions (with common and interoperable processes and technologies). - Assess technologies for interoperable maritime networking with the continued refinement of advanced tactical networking and communication capabilities, including high-latitude/polar environments, which promote task group-centric operations. Solutions will address higher bandwidth, Low Probability of Intercept (LPI)/Low Probability of Detection (LPD)/Anti-Jam (AJ) technologies across the Radio Frequency (RF) and Optical spectrum and include airborne capabilities. Evaluation of electromagnetic spectrum management and visualization technologies, force-level Electronic Warfare/Electro-magnetic Maneuver Warfare (EW/EMW) will also enhance interoperable Information Warfare (IW). - Continue to increase Allied IW interoperability with other joint and maritime multi-national forums, such as the Combined Communications Electronic Board (CCEB), Multinational Maritime Information-system Interoperability Steering Group (M2I2), MPE/FMN, and Joint Information Environment (JIE) forums. - Continue to assess and validate individual technologies, integrated solutions, and associated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) through experimentation, trials and demonstrations with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS) and other Allied/Coalition partners during operational venues, such as the United States Navy (USN) Rim of the Pacific (RIMPAC) or United Kingdom (UK) Joint Warrior exercise series.					
FY 2020 Base Plans: - Continue to develop and evaluate secure, interoperable technologies and capabilities supporting Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operations including Allied/Coalition Shared Situational Awareness, cross-domain and data labeling solutions in maritime tactical networking environments, and advanced Information Assurance and Computer Network Defense (IA/CND) solutions (with common and interoperable processes and technologies). - Continue to evaluate technologies for interoperable maritime networking. Solutions will address higher bandwidth, Low Probability of Intercept (LPI)/Low Probability of Detection (LPD)/Anti-Jam (AJ) technologies across the Radio Frequency (RF) and Optical spectrum and include airborne capabilities. Evaluation of electromagnetic spectrum management and visualization technologies, force-level Electronic Warfare/Electro-magnetic Maneuver Warfare (EW/EMW) will also enhance interoperable Information Warfare (IW).					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 0798 / *Allied/Coalition Maritime Environment (ACME)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue to enhance Allied IW interoperability with other joint and maritime multi-national forums, such as the Combined Communications Electronic Board (CCEB), Multinational Maritime Information-system Interoperability Steering Group (M2I2), MPE/FMN, and Joint Information Environment (JIE) forums. - Continue to assess and validate individual technologies, integrated solutions, and associated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) through experimentation, trials and demonstrations with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS) and other Allied/Coalition partners during operational venues, such as the United States Navy (USN) Rim of the Pacific (RIMPAC) or United Kingdom (UK) Joint Warrior exercise series. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The $0.038 million increase is attributed to additional support required for Allied Information Warfare (IW) interoperability exercises with other joint and maritime multi-national forums.					
Accomplishments/Planned Programs Subtotals	0.000	1.076	1.114	0.000	1.114

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Advanced Relay Capabilities: The ACME program will employ laboratory testing and at-sea demonstrations to assess specific technologies, operational concepts, and integrated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) solutions pertaining to Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operational environments, Network Operations Without Shore (NOWS), Maritime Domain Awareness (MDA), Mission Partner Environment/ Future Mission Networking (MPE/FMN), Joint Information Environment (JIE), and other aspects of Information Warfare (IW). These assessments will report on identified capability gaps, link capability gaps to technology/DOTMLPF gaps, identify technologies and DOTMLPF solutions considered ready for deployment, transition to a program of record to enhance Fleet war fighting capability, and enhance Allied interoperability.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0606355N / *(U)Warfare Innovation Management*				Project (Number/Name) 2144 / *Space & Elec Warfare Engineering*			
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**
2144: *Space & Elec Warfare Engineering*	0.000	0.000	22.058	14.535	-	14.535	23.841	28.209	24.635	26.165	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

To support Navy objectives in advancing Information Warfare (IW) capabilities, the Space and Electronic Warfare (SEW) Engineering project provides six main functions:

(1) Develop the architectures, specifications and standards, tools, and processes to support a single integrated Navy plan for cybersecurity. These engineering artifacts provide Navy specific guidance to drive common and consistent implementation of security controls across current and future Navy Programs of Record/projects. This eliminates redundancies and inefficiencies characteristic of previous stove-pipe development efforts in which each system addressed security individually. These efforts enable a standardized approach to move out faster to improve the Navy's cyber resiliency.

(2) Provide the cybersecurity vulnerability and functional test capability which supports cybersecurity test requirements and the Command, Control, Communications, Computers, Intelligence (C4I) components of USS Secure. USS Secure is a cyber assessment program within the Navy. This System of Systems (SoS) (Afloat, Aloft, C4I & Shore) capability in a test laboratory environment provides a rapidly re-configurable capability that integrates maritime hardware systems into a virtual platform. This platform level SoS provides cybersecurity research, development, test and evaluation, and training, not otherwise possible. This combination of Systems Commands (SYSCOM) laboratories, cyber ranges, and Red Teams simulating Navy platforms in operational maritime environments is critical for effectively evaluating cyber threats against specified mission threads.

(3) Define an integrated Enterprise Architecture to support design, development and delivery of integrated Navy Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System capabilities. This architecture reflects current (as-is) and future (target) end states to support technical analyses, program planning, and enterprise-level investment decisions across IW capabilities. Perform mission based system of systems analysis to ensure integration and interoperability, and validate end-to-end warfighting capabilities to quickly address emerging threats.

(4) Provides engineering tools and processes to drive rigorous Systems Engineering discipline across the acquisition lifecycle to support rapid development and delivery of secure and interoperable C4ISR, Business IT, and Space Systems capabilities that meet Fleet requirements. Conduct Systems Engineering Technical Reviews (SETRs) to provide independent, objective assessments of technical maturity and compliance with applicable architectures, specifications and standards across IW capabilities.

(5) The Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) provides a means to demonstrate and evaluate the interoperability of United States (US), North Atlantic Treaty Organization (NATO), and coalition information sharing systems.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

(6) Navy Additive Manufacturing (AM) technology aligns to CNO priorities to deliver revolutionary capabilities to improve fleet readiness. These enterprise solutions will provide the foundation to (1) enhance warfighter capability through new innovative system designs; (2) increase readiness through low volume production of hard to source items; and (3) improve warfighting capacity by enabling production at or near the point of need. Specific efforts include the development of an Enterprise Digital Manufacturing Architecture which addresses design and certification of AM capabilities for both afloat and ashore, development of Cyber Security Risk Management Profiles for devices and applications on operational networks, definition of a secure Technical Data Package to describe components that can be digitally manufactured, and the development of an overarching, enterprise-level Digital Manufacturing Thread (device management, digital rights management, licensing, configuration management, data storage rule/access and application programing interfaces).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Cybersecurity Architecture, Specifications and Standards	0.000	7.890	6.793	0.000	6.793
Articles:	-	-	-	-	-

FY 2019 Plans:
- Continue to develop the architectures, specifications, and standards that provide the technical foundation of a single, integrated Navy plan for cybersecurity in accordance with changes in the threat environment, advances in technology, evolving Department of Defense (DoD) guidance, and results of USS SECURE cyber test activities.
- Continue to assess Navy Programs of Record (PoR) plans for implementation of cybersecurity controls, assess compliance to determine cyber risk with Information Assurance (IA) Technology Authority (TA) cybersecurity architectures and standards, and perform risk assessments that articulate systems' ability to effectively support operational missions in various cyber conditions.
- Continue Defense-in-Depth Functional Implementation Architecture Network Transformation (DFIANT) work across Naval Systems Commands (SYSCOMs) to develop domain-specific implementations of the Defense-in-Depth Functional Implementation Architecture (DFIA) by defining control points, IA and logical attributes, controlling parameters, and inheritable security controls to establish a layered approach to cybersecurity.
- Develop detailed design artifacts for PoRs to ensure integration between Navy Cyber Situational Awareness (NCSA) tools and the Defensive Cyber Operations (DCO) enclave to enable command and control of Navy networks under all cyber conditions.
- Continue to assess Acquisition Category (ACAT) programs compliance with Information Technology (IT) and IA TA architectures, specifications and standards. Pilot the newly developed Cybersecurity Figure of Merit (CFOM) to refine the process and toolset for quantifying cybersecurity readiness.

FY 2020 Base Plans:
- Assess emerging threats, advances in technology, updates to National Institute of Standards and Technology (NIST) and DoD guidance, and results of USS SECURE cyber test activities to inform the need for new technical artifacts that provide cybersecurity guidance to Navy Programs of Record (PoR) and projects. Continue to

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
develop the architectures, specifications, and standards that provide the technical foundation of the single, integrated Navy plan for cybersecurity. - Continue to evaluate and provide feedback on Navy PoRs plans for implementation of cybersecurity controls. Support program reviews and milestones by assessing compliance with Informational Assurance (IA) Technology Authority (TA) cybersecurity architectures and standards, and perform risk assessments that articulate systems' ability to effectively support operational missions in various cyber conditions. - Drive implementation of IA TA cybersecurity architectures and standards across programs and projects. - Develop detailed design artifacts for PoRs to ensure integration between Navy Cyber Situational Awareness (NCSA) tools and the Defensive Cyber Operations (DCO) enclave to enable command and control of Navy networks under all cyber conditions. - Continue to assess Acquisition Category (ACAT) programs compliance with Information Technology (IT) and IA TA architectures, specifications and standards. Refine the Cybersecurity Figure of Merit (CFOM) to assess Information Warfare programs and projects effectiveness in meeting cybersecurity requirements. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The $1.097 million decrease is attributed to reduced domain-specific implementation of the in Depth Functional Implementation Architecture (DFIA).					
Title: Cybersecurity Vulnerability & Functional Test Capability	0.000	4.123	0.831	0.000	0.831
Articles:	-	-	-	-	-
FY 2019 Plans: - Install Command, Control, Communications, Computers, Intelligence (C4I) components within two test laboratory assets procured in FY18 to allow platforms to test their C4I systems in a threat environment. - Utilize lab assets for cross-Systems Command(SYSCOM) USS SECURE serial test events. - Continue to develop and mature connectivity (including assessment and authorization) strategies to combine Systems Command (SYSCOM) laboratories, cyber ranges, and Red Teams to develop more accurate simulations of Navy platforms in operational maritime environments allowing for critical, effective, and expeditious evaluation of cyber threats against specified mission threads. ***FY 2020 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue to utilize lab assets for cross-SYSCOM USS SECURE serial test events. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The $3.292 million decrease is attributed to the availability of prior year execution balances and a decrease in support for cross-SYSCOM USS SECURE test events.					
Title: Enterprise Architecture	0.000	0.746	0.668	0.000	0.668
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue development of an overarching Space and Naval Warfare Systems Command (SPAWAR) Enterprise Architecture with associated specifications, standards and profiles to support effective engineering, design, development, acquisition, and delivery of Navy Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System capabilities. - Continue to develop the capabilities of the Architecture Data Repository. - Continue development of Model Based System Engineering (MBSE) capabilities, processes and tools to support technical performance gap analysis and trade recommendations by identifying capability gaps and overlaps, interoperability issues, and cybersecurity risks between Navy System of Systems (SoS) capabilities. - Continue to refine the Integration and Interoperability (I&I) Capability framework to support SoS analyses of how well systems operate together across the Naval enterprise to deliver validated warfighting capabilities. - Continue to use Command and Control (C2), Battlespace Awareness, and Integrated Fires (IF) Integrated Capabilities Technical Baseline (ICTBs) to perform analysis of mission performance, identify capability gaps, and perform engineering trade studies, to better inform investment decisions and ensure alignment to all emerging warfighting objectives for increased interoperability and information sharing across weapons, sensors, and shooters. ***FY 2020 Base Plans:*** - Support Navy digital requirements by continuing to grow the capabilities of the Architecture Data Repository to effectively share data across the SPAWAR enterprise and with other Naval Systems Commands (SYSCOMs). Provide the infrastructure critical to implementing an integrated Model Based Systems Engineering environment, and provide configuration management					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue development of Model Based System Engineering (MBSE) capabilities, processes and tools to support complex technical performance gap analysis and trade recommendations by identifying capability gaps and overlaps, interoperability issues, and cybersecurity risks between Navy System of Systems (SoS) capabilities. - Continue to refine the Integration and Interoperability (I&I) Integrated Capability Framework to support SoS analyses of how well systems operate together across the Naval enterprise to deliver validated warfighting capabilities. - Continue to use Command and Control (C2), Battlespace Awareness, and Integrated Fires (IF) Integrated Capabilities Technical Baseline (ICTBs) to perform analysis of mission performance, identify capability gaps, and perform engineering trade studies for prioritized missions, to better inform investment decisions and ensure alignment to all emerging warfighting objectives for increased interoperability and information sharing across weapons, sensors, and shooters. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 decrease of $0.078 million is driven by reduced support associated with the development of an overarching SPAWAR Enterprise Architecture.					
Title: SYSCOM Systems Engineering	0.000	2.216	1.979	0.000	1.979
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue to perform Systems Engineering Technical Reviews (SETRs) of acquisition programs ensuring compliance with statutory and regulatory directives, as well as applicable Information Technology (IT) and Information Assurance (IA) Technical Authority (TA) architectures, specifications, standards and profiles. - Continue to develop and perform technical reviews of formal acquisition and engineering documentation to ensure the application of sound systems engineering analysis and design principles to system planning requirements, design, testing, and supportability. Provided independent technical analyses to support Milestone Decisions. - Continue to conduct Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) certifications through design and testing analysis, ensuring interoperability with platform, force level, and joint/allied/coalition forces.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue engineering evaluations, assessments of compliance with authoritative architectures and technical standards, and address technical issues in the following domains: Command and Control (C2); Intelligence, Surveillance, & Reconnaissance/Information Operations (ISR/IO); Space Systems, Business IT; and Communications & Networks. - Continue maturation of the Space and Naval Warfare Systems Command (SPAWAR) Engineering Competency Development Model (CDM) framework.					
FY 2020 Base Plans: - As the Technical Authority for acquisition programs, continue to perform Systems Engineering Technical Reviews (SETRs) to ensure compliance with statutory and regulatory directives, as well as applicable Information Technology (IT) and IA TA architectures, specifications, standards and profiles. Provide an independent assessment of technical risk to support milestone decision authority and program manager decisions. - Continue to develop and perform technical reviews of formal acquisition and engineering documentation to ensure the application of sound systems engineering analysis and design principles to system planning requirements, design, testing, and supportability. Implement applicable current TA architectures, specifications, standards, policies and processes in documentation. Provide independent technical analyses to support Milestone Decisions. - Continue to conduct Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) certifications through design and testing analysis, ensuring interoperability with platform, force level, and joint/allied/coalition forces. - Continue engineering evaluations, assessments of compliance with authoritative architectures and technical standards, and address technical issues in the following domains: Command and Control (C2); Intelligence, Surveillance, & Reconnaissance/Information Operations (ISR/IO); Space Systems, Business IT; and Communications & Networks.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The $0.237 million decrease eliminated the development of the role-based Competency Development Models (CDM), which defines specialty and sub-specialty roles, as well as associated Knowledge, Skills and Abilities					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
(KSAs) required to meet evolving mission requirements for the Space and Naval Warfare Systems Command (SPAWAR) CDM framework.					
Title: Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX)	0.000	1.033	1.048	0.000	1.048
Articles:	-	-	-	-	-
FY 2019 Plans: -Continue to develop interoperability and information sharing through coalition engagement, technology, demonstrations, and assessments leading to improvements of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems within the Navy and in conjunction with Joint Services and Coalition efforts. -Continue to pursue and utilize greater Pacific Command (PACOM) and Southern Command (SOUTHCOM) Partner Nation engagement by fostering a connected, distributed experimentation environment suitable for expanded experimentation in those areas. -Continue to enhance interoperability across North Atlantic Treaty Organization (NATO) and affiliated Coalition Partners by participating in the planning and execution of Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX). -Continue to assess Coalition Interoperability assurance, validation, and verification as related to the engineering and execution of the Mission Partner Environment (MPE) in the appropriate venues. -Utilize connected environments such as the Combined Federated Battle Laboratories Network (CFBLNet) to experiment with innovative technical solutions in order to evaluate their value in fostering enhanced interoperability across Coalition Partner Nations and the United States (US).					
FY 2020 Base Plans: - Continue to develop interoperability and information sharing through coalition engagement, technology, demonstrations, and assessments leading to improvements of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems within the Navy and in conjunction with Joint Services and Coalition efforts. -Coordinate with the MultiNational Maritime Informational Technology and Interoperability Board (M2I2) to facilitate interaction between OPNAV Resource Sponsor guidance and experimentation desires of Coalition Partner Nations. -Continue to pursue and utilize greater Pacific Command (PACOM) and Southern Command (SOUTHCOM) Partner Nation engagement by fostering a connected, distributed experimentation environment suitable for expanded experimentation in those areas.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Continue to enhance interoperability across North Atlantic Treaty Organization (NATO) and affiliated Coalition Partners by participating in the planning and execution of Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX). -Continue to assess Coalition Interoperability assurance, validation, and verification as related to the engineering and execution of the Mission Partner Environment (MPE) in the appropriate venues. -Continue to utilize connected environments such as the Combined Federated Battle Laboratories Network (CFBLNet) to experiment with innovative technical solutions in order to evaluate their value in fostering enhanced interoperability across Coalition Partner Nations and the United States (US). ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There are no appreciable changes in funding from FY19 to FY20.					
Title: Additive Manufacturing	0.000	6.050	3.216	0.000	3.216
Articles:	-	-	-	-	-
FY 2019 Plans: -Stand-up the Additive Manufacturing (AM) Test-bed, a rapid prototyping environment that facilitates risk reduction through the integration of AM machines, hardware and software in a controlled environment. -Develop architectural baselines supporting the digital thread to be incorporated in Afloat and Ashore networked AM nodes. -Develop Risk Management Framework (RMF) Profiles for the various components and interfaces required to network AM hardware and software assets. -Establish certification and technical authority for the AM effort. ***FY 2020 Base Plans:*** -Utilize the Additive Manufacturing Test-Bed to develop specifications, standards, and architecture to drive interoperability across the Navy Enterprise Digital Thread for Additive Manufacturing. -Continue development of Risk Management Framework (RMF) Profiles for the various components and interfaces required to network AM hardware and software assets. -Define a Defense-in-Depth Functional Implementation Architecture Network Transformation(DFIANT) architecture for additive manufacturing.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2144 / *Space & Elec Warfare Engineering*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Initiate an additive manufacturing data strategy. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 decrease of $2.834K was primarily attributed to the establishment of the AM Test-bed in FY19, and utilizing this AM Test-bed beginning in FY20. Establishing the test-bed required hardware and software purchases in the initial set-up and now that those are in place the program requires less funding for the AM mission efforts.					
Accomplishments/Planned Programs Subtotals	0.000	22.058	14.535	0.000	14.535

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The SEW engineering program will employ rigorous and consistent system engineering practices in an evolving value model to support development and deployment of shipboard, undersea, and land based capabilities based on mission and performance requirements, integrated enterprise architectures, model-validated solutions, and sustainment and supportability needs for the Command and Control (C2), Intelligence, Networks, Communications, Space, and Business Information Technology (IT) domains.

CWIX Performance Metrics: Three key metrics: (1) Interoperability and compliance with Naval (Navy and Marine Corps), joint, coalition and other non-governmental organization architectures, systems and equipment; (2) Compliance with Defense Information Services Agency (DISA), National Security Agency (NSA), and other joint and coalition information assurance and security standards; and (3) warfighter utility assessment across the joint and coalition spectrum. Specific metrics validate performance of individual technologies participating in CWIX as well as in other venues as appropriate.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0606355N / *(U)Warfare Innovation Management*	Project (Number/Name) 2147 / *ISR Architecture*	

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
2147: *ISR Architecture*	0.000	0.000	1.583	1.535	-	1.535	1.534	1.566	1.593	1.625	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Integrated architectures provide a technical framework for assessing capability gaps and performance of individual systems and System of Systems (SoS) and their ability to effectively provide the desired effects to support warfighting missions. They also serve as a means to influence and drive Programs of Record (PoR) toward a common, more efficient state that promotes interoperability and security.

The Naval Intelligence, Surveillance, and Reconnaissance (ISR) Reference Architecture project is intended to guide system of systems capability development and promote interoperability across Navy ISR programs, as well as interoperability and alignment with Department of Defense (DoD)-wide enterprise initiatives including Joint Information Environment and Intelligence Community Information Technology Environment and Space & Naval Warfare Systems Command-wide Enterprise Architecture policies. This effort to develop integrated ISR architectures will instill systems engineering discipline and standardization across the Navy ISR Enterprise and provide a means by which to assess ISR PoR progress in conforming to a single Navy architecture. These efforts will reduce Information Technology/ISR infrastructure complexity and variances, making it easier to manage, operate and defend our ISR capabilities, and help inform investment decisions across the Navy's ISR enterprise to support Assured Command and Control, Battlespace Awareness and Integrated Fires.

This effort will encompass the documentation and analysis of current ISR enterprise architectures to inform and guide requirements for target architecture development and performance requirements to support full use and incorporation of ISR capabilities to advance Navy operations afloat. The associated studies will produce both technical and non-technical implementation guidance across the Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities spectrum.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Intelligence, Surveillance, and Reconnaissance (ISR) Architecture	0.000	1.583	1.535	0.000	1.535
Articles:	-	-	-	-	-
FY 2019 Plans: -Continue to analyze the current Intelligence, Surveillance, and Reconnaissance(ISR) capabilities of afloat, ashore, joint, and national systems within mission contexts to demonstrate gaps and overlaps in Information Warfare capabilities and document in engineering artifacts and architectures. Perform trade space analysis and develop and quantify solutions using technical and operational performance parameters. -Continue to build on the documentation and analysis of the enterprise ISR capabilities to support System of Systems engineering assessments to identify integration and interoperability gaps, trades, and solutions to support investment decision-making across the ISR portfolio.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2147 / *ISR Architecture*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Continue to integrate the National, Joint, and Naval ISR architectures within mission contexts to identify functional capacities, materiel integration and interoperability gaps and overlaps, as well as any policy and doctrine impacts. -Continue to perform verification and validation (V&V) to ensure ISR architecture and analytic products accurately capture system performance specifications. -Continue to capture all architectural data in the Space & Naval Warfare Systems Command (SPAWAR) analysis tool suite to support rigorous engineering assessments and architecture excursions against solution alternatives. -Continue to ensure alignment and interoperability between ISR Architectures and Joint Information Enterprise, Intelligence Community Information Technology Enterprise and SPAWAR Enterprise Architectures.					
FY 2020 Base Plans: -Continue to analyze the current ISR capabilities of afloat, ashore, joint, and national systems within mission contexts to demonstrate gaps and overlaps in Information Warfare capabilities and document in engineering artifacts and architectures. Perform trade space analysis and develop and quantify solutions using technical and operational performance parameters. -Continue to build on the documentation and analysis of the enterprise ISR capabilities to support System of Systems engineering assessments to identify integration and interoperability gaps, trades, and solutions to support investment decision-making across the ISR portfolio. -Continue to integrate the National, Joint, and Naval ISR architectures within mission contexts to identify functional capacities, materiel integration and interoperability gaps and overlaps, as well as any policy and doctrine impacts. -Continue to perform verification and validation (V&V) to ensure ISR architecture and analytic products accurately capture system performance specifications. -Continue to capture all architectural data in the Space & Naval Warfare Systems Command (SPAWAR) analysis tool suite to support rigorous engineering assessments and architecture excursions against solution alternatives. -Continue to ensure alignment and interoperability between ISR Architectures and Joint Information Enterprise, Intelligence Community Information Technology Enterprise and SPAWAR Enterprise Architectures.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 2147 / *ISR Architecture*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The $0.048 million decrease is attributed to a reduced amount of support for documenting and analyzing enterprise ISR capabilities due to efficiencies in the decision-making process.					
Accomplishments/Planned Programs Subtotals	0.000	1.583	1.535	0.000	1.535

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The Naval (Navy and Marine Corps) ISR Reference Architecture effort will use consistent systems engineering practices to support development of integrated ISR enterprise architectures, and model-validated solution recommendations against quantified technical and operational performance parameters.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0606355N / *(U)Warfare Innovation Management*	Project (Number/Name) 3319 / *Fleet Experimentation*	

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
3319: *Fleet Experimentation*	0.000	11.131	9.090	9.281	-	9.281	10.594	10.525	10.897	12.033	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The U.S. Navy's Fleet Experimentation (FLEX) program examines doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPFP) solutions to identified warfighter capability gaps within the Future Years Defense Program (FYDP). The Navy's FLEX program considers warfighting gaps identified in: Integrated Prioritized Capability Lists (IPCL) generated by Warfighting Development Centers (WDC); Navy Integrated Priorities Letter (IPL); Navy Commanders' FLEX Guidance; and Navy Urgent Operational Needs Statements. Additionally, the Navy's FLEX program addresses innovative concepts, tactics, techniques, and procedures (TTP), and Fleet Concepts of Operation (CONOPS) that collectively mitigate Fleet-identified warfighting capability gaps. Through experimentation activities such as workshops, system or seminar war simulations, live at-sea events, and experimentation campaigns, the FLEX program examines potential materiel and non-materiel tangible solutions that will enhance the Fleet's ability to execute assigned missions. FLEX events and campaigns are comprised of all facets of experimentation including design, planning, systems engineering and integration, execution, data collection, analysis, assessment, and the delivery of tangible products to the fleet. While Naval-centric, FLEX efforts include joint, coalition, Science and Technology (S&T), academia, and industry partners.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Fleet Experimentation	11.131	9.090	9.281	0.000	9.281
Articles:	-	-	-	-	-
Description: The U.S. Navy's Fleet Experimentation (FLEX) program is a collaborative effort with multiple partners designed to address fleet prioritized capability gaps to produce doctrine, organization, training, materiel, leadership development, personnel, facilities, and policy (DOTMLPF-P) actions. FLEX program deliverables are focused on operational and tactical warfighting capabilities prioritized near term (within the Future Years Defense Program). U.S. Navy staff manages DOTMLPF-P actions resulting from experiment execution to establish or enhance warfighting capability in Fleet Design, Integrated Air and Missile Defense (IAMD), Amphibious Warfare (AMW), Surface Warfare (SUW), Strike Warfare (STW), Anti-Submarine Warfare (ASW), Expeditionary Warfare (EXW), Information Warfare (IW), Mine Warfare (MIW) and Anti-Terrorism/Force Protection (AT/FP). FLEX supports Operational/Tactical venues to experiment, demonstrate, and assess warfighting CONOPS development, concepts, doctrine/training development, tactics, techniques and procedures (TTPs), and technologies. Multi-year experiment campaigns focus on warfighting capability in accordance with U.S. Navy guidance to evaluate and transition DOTMLPF-Policy change recommendations.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3319 / *Fleet Experimentation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: The Navy's FY19 FLEX program aligns to U.S. Navy's Fleet Design and associated Campaign Plan and will drive implementation of Fleet Design by 2023. Realizing Fleet Design necessitates introduction of three enabling components. (1) Fleet Fighting Power via Distributed Maritime Operations - materiel/non-materiel capabilities. The FY19 FLEX program will execute the following events: a. Command and Control b. Operational Level Multi-Domain Joint Enablers c. Maneuver Fleet Tactical Grid d. Cooperative Engagements Mode Options (2) Digital and Spectrum Warfare via a Fleet Tactical Grid will integrate communications, command and control systems, computers, sensors, combat systems, and weapons at the technical level to facilitate an intelligent exchange and analysis of data to provide warfighters with actionable knowledge in support of Distributed Maritime Operations. The FY19 FLEX program will execute the following events: a. Combat Identification and Targeting b. Battlespace Management and Decision Aids c. Tactical Networking d. NET Enabled Weapons e. Unmanned Systems Autonomy f. Sensor/Platform/Weapon Employment g. Fleet Tactical Grid/Netted Sensors (3) Force Development, Fleet Design implementation requires fleet experimentation to support Force Development and inform Force Generation for fleet-centric fighting power, enabled by integration, distribution and maneuver to simultaneously employ synchronized kinetic/non-kinetic mission execution across multiple domains in a complex/contested environment. The FY19 FLEX program will execute the following events: a. Tactical and technical integration in support of Force Generation, Large Scale Exercise (LSE) 2020; specifically, increased use of Modeling and Simulation (M&S) to accelerate capability development and learning.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3319 / *Fleet Experimentation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FLEX will provide support in the execution of these additional events: a. Fleet Design Experiments b. Human-Machine Integration (HMI) and Artificial Intelligence (AI) Experimentation c. Electromagnetic Maneuver Warfare (EMW) Experimentation d. Office of Naval Research (ONR) Technology Innovation Games (TIGS) e. Maritime Cyberspace Experiment f. Pandarra Wave 19 At-Sea Experiment g. Red Nitrum 19 At-Sea Experiment h. Counter-Unmanned Systems (C-UXS) Experiment Series I. Naval Force Integration Experimentation j. Integrated Fire Control Non-Kinetic Operator in the Loop War Game k. F-35C First Deployment War Simulation l. Mine Warfare (MIW) Experimentation m. Mine Counter Measure (MCM) Adaptive Force Packages (AFP) At-Sea Experiment n. Space Experiment Series					
FY 2020 Base Plans: The Navy's FY20 FLEX program aligns to U.S. Navy's Fleet Design and associated Campaign Plan and will drive implementation of Fleet Design by 2023. The Navy will continue to provide experiment, analytical and naval mission subject matter expertise support throughout the planning and execution process; identify fleet warfighting deficiencies through experimentation; identify and capture innovative solutions for fleet experiments that address prioritized fleet warfighting gaps; and identify suitable events to support execution of the following experimentation campaigns: FLEET DESIGN EXPERIMENTS Aligning with CNO's Design for Maintaining Maritime Superiority, the emerging ""Fleet Design"" concept has been developed and promulgated. Development of the supporting doctrine, TTP, Command and control (C2), as well as the integration and interoperability required between weapon systems and decision makers, requires a methodical experimental approach. FY 20 experiments (both at-sea and via war simulations) will strive to achieve the objectives laid out in the Fleet Design action/implementation plan.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3319 / *Fleet Experimentation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Specific events planned for FY20 include: OPERATIONAL LEVEL OF WAR/TACTICAL LEVEL OF WAR OLW/TLW) INTEGRATION EXPERIMENTATION OLW/TLW integration experiments (workshops, war simulations and at-sea events) will examine current and emerging tactics, techniques, and procedures TTPs) and current and emerging technologies with a goal of identifying innovative solutions that will support the capstone naval concept of a Fleet Design based on integration, distribution, and maneuver. HUMAN-MACHINE INTEGRATION(HMI) AND ARTIFICIAL INTELLIGENCE (AI) EXPERIMENTATION - This effort will examine the incorporation of AI capabilities into Naval technologies, TTPs, and C2 processes such as the development of AI-enabled Tactical Decision Aids that autonomously transition data into information. ELECTROMAGNETIC MANEUVER WARFARE(EMW) EXPERIMENTATION Navy will conduct multiple events designed to synchronize and align experiment initiatives with EMW tasks to provide solutions to EMW capability gaps and to ensure development of doctrine and TTP is synchronized with the introduction of new technology and provides the Fleet and Fleet trainers with required doctrine tools at the tactical and operational levels. OFFICE OF NAVAL RESEARCH(ONR) TECHNOLOGY INNOVATION GAMES (TIGS) This series of workshops executed in conjunction with ONR will give Fleet operators the opportunity to examine emerging capabilities and determine potential concepts of employment to effectively incorporate innovative capabilities into Fleet warfighting missions and tasks. MARITIME CYBERSPACE EXPERIMENT - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary cyber capabilities. PANDARRA WAVE 20 At-Sea Experiment - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary ISR capabilities. RED NITRUM 20 At-Sea Experiment - This classified effort builds upon prior year experiments to further examine U.S. Navy vulnerabilities to adversary electronic attack capabilities.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3319 / *Fleet Experimentation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
COUNTER-UNMANNED SYSTEMS(C-UXS) EXPERIMENT SERIES - This effort will build upon prior year experimentation by examining emerging TTPs and technologies to counter the proliferation of unmanned undersea, surface, and air vehicles. The series will consist of workshops focused on countering various types of unmanned systems culminating in an at-sea cross domain C-UxS experiment. NAVAL FORCE INTEGRATION EXPERIMENTATION Naval Force Integration experiments (workshops, war simulations, and at-sea events) will examine integration and interoperability issues associated with coordinated USN-USMC operations. The primary goal of the campaign is to reexamine Navy and Marine Corps organizational and command relationships in order to enable effective Naval operations across the maritime domain. LARGE SCALE EXERCISE(LSE) 2020 - This Naval exercise conducted at the Operational to Tactical Level of War in a maritime theater with assigned live and synthetic assets in stressing competitor conditions will provide a comprehensive assessment of the three enabling components of Fleet Design - Integration, Distribution, and Maneuver. INTEGRATED FIRE CONTROL KINETIC OPERATOR IN THE LOOP WAR SIMULATION - This effort builds upon prior year experiments to further examine U.S. Navy Carrier Strike Group(CSG) capabilities to successfully employ Navy Integrated Fire Control capabilities with a focus on submarine integration, unmanned systems integration, and Navy/Marine Corps integration. MINE WARFARE (MIW) EXPERIMENTATION Through workshops, war games and at-sea events, FY20 efforts will continue to examine TTP and Command and Control(C2) construct for our future Mine Counter Measure(MCM) force as new programs of record and unmanned systems come on line, and legacy systems begin to decommission. DISTRIBUTED MARITIME OPERATIONS(DMO) Experimentation - Efforts will address key DMO concept action plan items such as the examination of Fleet Command and Maritime Operation Center(MOC) capabilities and the employment of unmanned systems in support of DMO.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3319 / *Fleet Experimentation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
SPACE EXPERIMENT SERIES - This effort will build upon prior year experimentation on the employment of space-based capabilities at the OLW/TLW. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY19 to FY20 increase will support Large Scale Exercise 2020, specifically in the following areas: (1) Assess and refine the enabling components of Fleet Design (2) Validate operational to tactical level of war concepts, CONOPS and TTP (3) Train against stressing competitors (4) Evaluate the Integrated Fleet Training System					
Accomplishments/Planned Programs Subtotals	11.131	9.090	9.281	0.000	9.281

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

FLEX is a non-acquisition program.

E. Performance Metrics

Fleet Experimentation Measure of Performance (MOP):
FLEX funding is used for approximately 20-25 annual experimental efforts which includes 100+ initiatives focused on addressing Fleet-identified capability gaps. The majority of this funding is used to acquire
intellectual capital, via contracts in areas providing engineering expertise, experiment design, execution and analysis support. This funding is also used to support select engineering and integration costs.

Fleet Experimentation Measures of Effectiveness (MOE):
- CNO/CUSFF/CPF directed experimentation for emerging future capabilities
- Fleet Design outcomes
- Mitigation of critical capability gaps
- Informing Doctrine, TTP, and training

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3319 / *Fleet Experimentation*

- Informing Fleet platform wholeness or warfighter CONOPS validation
- Impact to Fleet warfighting within the FYDP

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0606355N / *(U)Warfare Innovation Management*	Project (Number/Name) 3320 / *TRIDENT Warrior*	

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
3320: *TRIDENT Warrior*	0.000	2.200	2.284	2.285	-	2.285	2.330	2.380	2.427	2.475	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

U.S. Navy's Trident Warrior (TW) experiment campaign enables early delivery of Information Warfare (IW) capabilities to the warfighter via Fleet-directed TW operational events. Integrates stand-alone systems and efforts to achieve substantially enhanced capability, demonstrates/tests these capabilities in both laboratory and operational environments, and evaluates their effectiveness. Develops supporting concepts and Concept of Operations to improve warfighting effectiveness. Coordinates IW efforts with other Service/Joint/Department of Defense/National efforts to ensure Joint/Interagency/ Allied/Coalition applicability and interoperability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Trident Warrior	2.200	2.284	2.285	0.000	2.285
Articles:	-	-	-	-	-
FY 2019 Plans: - Evaluate TW18 executed experiments and recommend next steps for WDCs. - Promote broad participation in Trident Warrior (TW) by researching advanced technology solution candidates, in conjunction with other services, commercial entities and academic research in order to fill Information Warfare (IW) technology gaps. - In accordance with standardized procedures, lead TW participant efforts with the following: specific goal identification; risk identification; experiment plans (to include data requirements and collection); and required installation and security certifications, accreditations, and approvals. - Provide Subject Matter Expertise (SME) for core ship services during the experimentation period. - Provide independent experts to ensure compliance with experiment plans, lead analysis effort, and deliver unbiased assessments. - Provide results to government sponsors to support the program's engineering recommendations. - Plan and execute Trident Warrior 2019 (TW19) experiments to accelerate the transition of IW capability to the Fleet. - Begin Trident Warrior 2020 (TW20) planning, taking into consideration identified Naval Capability Gaps.					
FY 2020 Base Plans: - Evaluate TW19 executed experiments and recommend next steps to all stakeholders.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3320 / *TRIDENT Warrior*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Promote broad participation in Trident Warrior (TW) by researching advanced technology solution candidates, in conjunction with other services, and academic research in order to fill Information Warfare (IW) technology gaps. - In accordance with standardized procedures, lead TW participant efforts with the following: specific goal identification; risk identification; experiment plans (to include data requirements and collection); and required installation and security certifications, accreditations, and approvals. - Provide Subject Matter Expertise (SME) for core ship services during the experimentation period. - Provide independent experts to ensure compliance with experiment plans, lead analysis effort, and deliver unbiased assessments. - Provide Subject Matter Expertise to ensure initiative readiness and compliance in the following areas: Information Assurance, Naval Modernization Process, Experimentation Design, Data Collection and Analysis, Report writing and dissemination. - Provide results to government sponsors to support the program's engineering recommendations. - Plan and execute Trident Warrior 2020 (TW20) experiments to accelerate the transition of IW capability to the Fleet. - Begin Trident Warrior 2021 (TW21) planning, taking into consideration identified Naval Capability Gaps. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** There are no appreciable changes from FY19 to FY20.					
Accomplishments/Planned Programs Subtotals	2.200	2.284	2.285	0.000	2.285

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Confirmation of Fleet and Joint Interoperability with technology candidates, Information Assurance Certification and Accreditation, and alignment with U.S. Navy Guidance, as well as related Program Executive Office (PEO) objectives and stakeholder projected architectures.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0606355N / *(U)Warfare Innovation Management*	Project (Number/Name) 3420 / *Expeditionary Submarine Fiber Optic Cable (SFOC)*	

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
3420: *Expeditionary Submarine Fiber Optic Cable (SFOC)*	0.000	14.428	5.827	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	20.255
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Maritime Communications Demonstration (MCD) project, also called the Expeditionary Submarine Fiber Optic Cable (SFOC) Communications Project, is a classified program responsible for developing concepts designed to validate material and non-material solutions providing resilient Command and Control (C2) within the maritime domain. The focus is to demonstrate capabilities leveraging existing DOD investments and infrastructure to move data and information. Demonstration will include maritime assets, experimental methodologies, and current backhaul architecture for data movement. Solutions will address technologies across the Radio Frequency (RF) and Optical spectrum using SFOC communications systems. The key deliverable will be a series of at sea demonstrations to validate maritime segment components in an operationally representative environment. This is not a new start. In FY17 $2.8M of funding was managed from within the Fleet Experimentation (FLEX) program and used for MCD project tasking for transparency. This effort is part of Secretary of Defense's (SECDEF) third offset initiative and was identified as a required operational capability by USEUCOM, USNORTHCOM, USPACOM, and USSTRATCOM. This effort will fund limited technical development and a series of at-sea demonstrations raising the technical readiness levels of various components with a cable handling and deployment system in an operationally representative environment, with the intent to rapidly transition to an operational capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Expeditionary Submarine fiber Optic Cable (SFOC)	14.428	5.827	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Classified Project - the Maritime Communications Demonstration (MCD) project is developing and experimenting innovative concepts designed to validate both materiel and non-materiel methodologies to provide resilient command and control within the maritime and littoral domains. The project focus is to demonstrate capabilities that leverage existing industry and DOD investments and infrastructure using non-traditional means to move data and information. The key deliverable will be a series of at-sea demonstrations to validate maritime segment components in an operationally representative environment.					
FY 2019 Plans: This project will continue to provide funds for the development and refinement of advance networking and communication capabilities in a maritime environment that promote Command and Control (C2) interoperability in Satellite Communications (SATCOM) - Restricted and SATCOM - Denied environments, and support the defeat of Anti-Access Area Denial (A2/AD). FY19 technical tasking will showcase advanced technologies in					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606355N / *(U)Warfare Innovation Management*	**Project (Number/Name)** 3420 / *Expeditionary Submarine Fiber Optic Cable (SFOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
deep water cable connection design that will be demonstrated in a harsh and operationally representative environment. - Complete Submarine Fiber Optic Cable (SFOC) design and prototyping - Complete connection design and prototyping - Charter vessel for hardware demonstration - Complete cable and connection demonstration - Begin deployment subsystem development - Additional details provided at a higher classification level ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Project 3420 was a short term add to this program element. This project ends after FY19.					
Accomplishments/Planned Programs Subtotals	14.428	5.827	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Expeditionary SFOC Communications is a non-acquisition program that promotes DoD interoperability to achieve resilient C2 data flows by facilitating maritime architectures in both processes and communications systems, including emerging capabilities, to counter growing high-end asymmetric threats, and is a key enabler of the Combatant Commanders C2 functionality.

E. Performance Metrics

Expeditionary SFOC Communications will employ laboratory testing and at-sea demonstrations to assess specific technologies, operational concepts, and integrated Doctrine, Organization, Training, Materiel, Leadership, Personnel and Facilities (DOTMLPF) solutions pertaining to C2 communications and other aspects of Information Dominance. These assessments will report on identified capability gaps, link capability gaps to technology/DOTMLPF gaps, and identify technologies and DOTMLPF solutions considered ready for deployment to enhance war fighting capability and enhance interoperability.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606942M *I (U)Assessments and Evals 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	0.000	7.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.000
4038: *Cyber Vulnerability Evaluation*	0.000	0.000	7.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.000

Note

Efforts in this PE were previously funded (FY18) in PE 0605873M, PRJ 0033.

A. Mission Description and Budget Item Justification

This effort provides an OT&E approach to protect Marine Corps critical Cyber information and intelligence through vulnerability evaluations of all major DoD weapons systems and critical military installations; as directed by Section 1650 of Public Law 114-328 (NDAA for FY2017) and Section 1647 of Public Law 114-92 (NDAA FY2016). This will be accomplished through protection, detection, response, restoration, remediation, and mitigation. Testing and evaluation will be completed at Marine Corps facilities and Government Labs, to include the Marine Corps Cyber Range, Naval Air Systems Command (NAVAIR) and Marine Corps Tactical Systems Support Activity (MCTSSA).

Sec. 1647 of the FY16 NDAA directs the Secretary of Defense to complete an evaluation of the cyber vulnerabilities of each major weapon system of the Department of Defense by not later than December 31, 2019. Funded vulnerability assessments will build upon existing efforts regarding the identification and mitigation of cyber vulnerabilities of major weapons systems, and shall not duplicate similar ongoing efforts such as Task Force Cyber Awakening or conduct redundant assessment on systems that have already been evaluated.

Sec. 1647 assessment will be formalized in Vulnerability Assessment Reports (VARs), Cyber Table Top Exercises (CTTXs), Cyber Risk Analysis (CRAs) and other reporting.

Sec. 1650 of the FY17 NDAA directs the Secretary of Defense to submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessment of this infrastructure during a preliminary pilot program that will assess no fewer than two installations by December, 31 2019. Assessments will end in 2020 with the submission of the final report. Strategies mitigating the risk of cyber vulnerabilities should be identified during the course of evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606942M *I (U)Assessments and Evals Cyber Vulnerabilities*

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	7.000	0.000	-	0.000
Current President's Budget	0.000	7.000	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	0.000	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0606942M / *(U)Assessments and Evals Cyber Vulnerabilities*				Project (Number/Name) 4038 / *Cyber Vulnerability Evaluation*			
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**
4038: *Cyber Vulnerability Evaluation*	0.000	0.000	7.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.000
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Efforts in this PRJ were previously funded (FY18) in PE 0605873M, PRJ 0033.

A. Mission Description and Budget Item Justification

This effort provides an OT&E approach to protect Marine Corps critical Cyber information and intelligence through vulnerability evaluations of all major DoD weapons systems and critical military installations; as directed by Section 1650 of Public Law 114-328 (NDAA for FY2017) and Section 1647 of Public Law 114-92 (NDAA FY2016). This will be accomplished through protection, detection, response, restoration, remediation, and mitigation. Testing and evaluation will be completed at Marine Corps facilities and Government Labs, to include the Marine Corps Cyber Range, Naval Air Systems Command (NAVAIR) and Marine Corps Tactical Systems Support Activity (MCTSSA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Cyber Assessments/Cyber Awareness Red Team Support	0.000	7.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: In Section 1650 of Public Law 114-328, the NDAA for FY2017, the Congress mandated that the DoD conduct Cyber Vulnerability evaluations of critical military installations by December 31,2019. In section 1647 of Public Law 114-92, the NDAA for FY2016, the Congress mandated that DoD conduct cyber vulnerability evaluations of all major DoD weapons systems by 31 December 2019.					
FY 2019 Plans: -Evaluation and testing at the Marine Corps Cyber Range will develop artifacts required to complete the report to Congress required by Section 1647 of the FY16 NDAA. -Complete Vulnerability Assessments, adversarial assessments, and mitigation efforts, in support of the Marine Corps Cyber Awareness Red Team and the reporting requirements in 1647. -Conduct assessments of Marine Aviation platforms that are required to be tested by the NDAA Sec. 1647. - Complete efforts to train, equip, and augment the Cyber Threat Assessment Team (CTE) to meet all DoD Red Team established standards and testing requirements.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606942M / *(U)Assessments and Evals Cyber Vulnerabilities*	**Project (Number/Name)** 4038 / *Cyber Vulnerability Evaluation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of $7.0M from FY19 to FY20 is attributable to the completion of cyber vulnerability evaluations.					
Accomplishments/Planned Programs Subtotals	0.000	7.000	0.000	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
• RDTEN/0605873M/0033: *OT&E Support*	1.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Quarterly updates and reports are submitted as required by Section 1647 of the FY16 NDAA.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0606942N *I (U)Assessments and Evals 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	0.000	48.800	0.000	-	0.000	0.000	2.000	2.000	2.000	Continuing	Continuing
4038: *Cyber Vulnerability Evaluation*	0.000	0.000	48.800	0.000	-	0.000	0.000	2.000	2.000	2.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Cyber Vulnerability Assessments and Evaluations program funds for cyber vulnerability assessments of major Navy weapons systems and cyber vulnerability assessments of critical shore infrastructure as directed by Sec. 1647 of the FY16 National Defense Authorization Act (NDAA) and Sec. 1650 of the FY17 NDAA, respectively. Funding will be used for assessments and non-recurring engineering for mitigations related to the Navy's major weapons systems identified in Joint Requirements Oversight Committee Memorandum (JROCM) 039-16 and on prioritized critical shore infrastructure prioritized.

Sec. 1647 of the FY16 NDAA directs the Secretary of Defense to complete an evaluation of the cyber vulnerabilities of each major weapon system of the Department of Defense by not later than December 31, 2019. Funded vulnerability assessments will build upon existing efforts regarding the identification and mitigation of cyber vulnerabilities of major weapons systems, and shall not duplicate similar ongoing efforts such as Task Force Cyber Awakening or conduct redundant assessment on systems that have already been evaluated.

Sec. 1647 assessment will be formalized in Vulnerability Assessment Reports (VARs), Cyber Table Top Exercises (CTTXs), Cyber Risk Analysis (CRAs) and other reporting.

Sec. 1650 of the FY17 NDAA directs the Secretary of Defense to submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessment of this infrastructure during a preliminary pilot program that will assess no fewer than two installations by December, 31 2019. Funded vulnerability assessments will end by calendar year 2020 and will build upon existing mission assurance, blue team, and red team capabilities. As instructed by the Congressional language, the assessments will utilize Department of Energy (DoE) and Department of Defense (DoD) national laboratory partnerships. Assessments will end with the submission of a final report to Congress. Strategies and procedures for mitigating the risk of cyber vulnerabilities should be identified during the course of evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606942N *I (U)Assessments and Evals Cyber Vulnerabilities*

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	48.800	0.000	-	0.000
Current President's Budget	0.000	48.800	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	0.000	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Change Summary Explanation

The funding decrease from FY 2019 to FY 2020 is due to the completion of the one year Cyber Vulnerability assessments of major Navy weapon systems and critical infrastructure.

Technical: Not applicable.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0606942N / *(U)Assessments and Evals Cyber Vulnerabilities*	Project (Number/Name) 4038 / *Cyber Vulnerability Evaluation*	

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
4038: *Cyber Vulnerability Evaluation*	0.000	0.000	48.800	0.000	-	0.000	0.000	2.000	2.000	2.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cyber Vulnerability Assessments and Evaluations program funds for cyber vulnerability assessments of major Navy weapons systems and cyber vulnerability assessments of critical shore infrastructure as directed by Sec. 1647 of the FY16 National Defense Authorization Act (NDAA) and Sec. 1650 of the FY17 NDAA, respectively. Funding will be used for assessments and non-recurring engineering for mitigations related to the Navy's major weapons systems identified in Joint Requirements Oversight Committee Memorandum (JROCM) 039-16 and on prioritized critical shore infrastructure.

Sec. 1647 of the FY16 NDAA directs the Secretary of Defense to complete an evaluation of the cyber vulnerabilities of each major weapon system of the Department of Defense by not later than December 31, 2019. Funded vulnerability assessments will build upon existing efforts regarding the identification and mitigation of cyber vulnerabilities of major weapons systems, and shall not duplicate similar ongoing efforts such as Task Force Cyber Awakening or conduct redundant assessment on systems that have already been evaluated.

Sec. 1647 assessment will be formalized in Vulnerability Assessment Reports (VARs), Cyber Table Top Exercises (CTTXs), Cyber Risk Analysis (CRAs) and other reporting.

Sec. 1650 of the FY17 NDAA directs the Secretary of Defense to submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessment of this infrastructure during a preliminary pilot program that will assess no fewer than two installations by December, 31 2019. Funded vulnerability assessments will end by calendar year 2020 and will build upon existing mission assurance, blue team, and red team capabilities. As instructed by the Congressional language, the assessments will utilize DoE and DoD national laboratory partnerships. Assessments will end with the submission of a final report to Congress. Strategies and procedures for mitigating the risk of cyber vulnerabilities should be identified during the course of evaluation.
Program is to support Cyber Vulnerability Evaluations Assessments of E6B and Other Aviation Platforms.
The Cyber Vulnerability Assessments and Evaluations program funds for cyber vulnerability assessments of major Navy weapons systems and cyber vulnerability assessments of critical shore infrastructure as directed by Sec. 1647 of the FY16 National Defense Authorization Act (NDAA) and Sec. 1650 of the FY17 NDAA, respectively. Funding will be used for assessments and non-recurring engineering for mitigations related to the Navy's major weapons systems identified in Joint Requirements Oversight Committee Memorandum (JROCM) 039-16 and on prioritized critical shore infrastructure.

Sec. 1647 of the FY16 NDAA directs the Secretary of Defense to complete an evaluation of the cyber vulnerabilities of each major weapon system of the Department of Defense (DoD) by no later than December 31, 2019. Funded vulnerability assessments will build upon existing efforts regarding the identification and mitigation of cyber vulnerabilities of major weapons systems, and shall not duplicate similar ongoing efforts such as Task Force Cyber Awakening or conduct redundant assessment on systems that have already been evaluated.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606942N / *(U)Assessments and Evals Cyber Vulnerabilities*	**Project (Number/Name)** 4038 / *Cyber Vulnerability Evaluation*

Sec. 1647 assessment will be formalized in Vulnerability Assessment Reports (VARs), Cyber Table Top Exercises (CTTXs), Cyber Risk Analysis (CRAs) and other reporting.

Sec. 1650 of the FY17 NDAA directs the Secretary of Defense to submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessment of this infrastructure during a preliminary pilot program that will assess no fewer than two installations by December, 31 2019. Funded vulnerability assessments will end by calendar year 2020 and will build upon existing mission assurance, blue team, and red team capabilities. As instructed by the Congressional language, the assessments will utilize Department of Energy (DoE) and DoD national laboratory partnerships. Assessments will end with the submission of a final report to Congress. Strategies and procedures for mitigating the risk of cyber vulnerabilities should be identified during the course of evaluation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Cyber Vulnerability Evaluation for Ship Weapons Systems:	0.000	4.800	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: CVN 78 - Analyze cybersecurity vulnerabilities using a system of systems approach and conduct system-of-systems cyber vulnerability assessments on CVN 78. - Utilize CVN 78 analysis to assess the vulnerability of the platform's vast control system networks. This assessment will play an integral role in identifying the most efficient and effective incremental improvements in CVN 78's cybersecurity, holistically maximizing cybersecurity of the platform's interconnected control system networks with the limited modernization budget available. -Execute modeling, simulation and analysis to capture system impacts of cyber vulnerabilities and identified mitigations, specifically situational awareness (SA) tools and continuous monitoring (CM) tools. - Leverage the model and analysis of CVN 78 as evidence of the platforms cyber survivability in a contested cybersecurity environment. The Cooperative Engagement Capability (CEC) and Navigation systems interface with multiple combat system and sensor types. Extensive and complex analysis is required to characterize and address cybersecurity and cyber vulnerability aspects of network operations over multiple interfaces. - Conduct a tabletop cyber assessment of critical hardware/software components and platform interfaces that could result in degradation of a mission enabling system. - Analyze cyber assessment results to determine the cyber resilience methods that could be further incorporated into modernization efforts.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606942N / *(U)Assessments and Evals Cyber Vulnerabilities*	**Project (Number/Name)** 4038 / *Cyber Vulnerability Evaluation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Execute modeling, simulation and analysis to develop war fighting metrics to capture cyber vulnerabilities and identified mitigations to provide increased mission assurance. Ship Self Defense System (SSDS) -Conduct system-of-systems cyber vulnerability assessments on the SSDS Weapon System. - Identify elements within the Secure Combat System Domain, define threat scenarios, analyze risk through engineering assessments and table tops and prioritize development of cybersecurity capabilities to apply cyber controls and introduce resilience. - Ensure Combat System Enclave and networks successfully operate in adversarial cyber contested environment. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is due to the completion of the one year effort.					
Title: Cyber Vulnerability Assessments of Other Aviation Platforms	0.000	2.900	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: - Conduct system-of-systems cyber vulnerability assessments on Other Aviation Platforms aircraft and associated support systems. - Execute modeling, simulation and analysis to capture the mission impacts of the cyber vulnerabilities. - Enhance emulation lab penetration testing capabilities to improve Other Aviation Platforms cyber risk assessment capacity and expand to include additional systems. - Conduct collaborative cyber security assessments and exercises with fleet operational community to assess vulnerability operational impacts and identify potential mitigations. - Align the cyber vulnerability assessments and findings to future Fleet or COCOM exercise(s). - Execute analysis and prototyping activities to mitigate identified cyber vulnerabilities. ***FY 2020 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606942N / *(U)Assessments and Evals Cyber Vulnerabilities*	**Project (Number/Name)** 4038 / *Cyber Vulnerability Evaluation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is due to the completion of the one year effort.					
Title: E6B ***Articles:*** ***FY 2019 Plans:*** - Conduct system-of-systems cyber vulnerability assessments on E-6B aircraft and associated support systems. - Execute modeling, simulation and analysis to capture the mission impacts of the cyber vulnerabilities. - Enhance emulation lab penetration testing capabilities to improve E-6B cyber risk assessment capacity and expand to include additional E-6B systems. - Conduct collaborative cyber security assessments and exercises with fleet operational community to assess vulnerability operational impacts and identify potential mitigations. - Align the cyber vulnerability assessments and findings to future Fleet or COCOM exercise(s). - Execute analysis and prototyping activities to mitigate identified cyber vulnerabilities. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is due to the completion of the one year effort.	0.000 -	2.100 -	0.000 -	0.000 -	0.000 -
Title: SWS Cyber Evaluations ***Articles:*** ***FY 2019 Plans:*** Conduct Trident system and sub-system cyber testing during Strategic Systems Programs (SSP) Development and Operational Testing. Conduct additional cyber testing to establish a cyber baseline for the current Strategic Weapon System. ***FY 2020 Base Plans:***	0.000 -	3.500 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606942N / *(U)Assessments and Evals Cyber Vulnerabilities*	**Project (Number/Name)** 4038 / *Cyber Vulnerability Evaluation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is associated with the SWS Cyber Evaluations completing in FY 2019.					
Title: Trident System Cyber Hardening ***Articles:*** ***FY 2019 Plans:*** Conduct a tabletop cyber assessment of critical hardware/software components and platform interfaces that could result in a mission degrade. Analyze cyber assessment results to determine the cyber resilience methods that could be further incorporated into Strategic Weapon System modernization efforts. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is attributed to the Trident System Cyber Hardening completing in FY 2019.	0.000 -	5.500 -	0.000 -	0.000 -	0.000 -
Title: Cyber Vulnerability Assessments of Information Warfare Weapons Systems ***Articles:*** ***FY 2019 Plans:*** -Conduct system-of-systems cyber vulnerability assessments on Information Warfare Weapons Systems. -Execute modeling, simulation and analysis to develop warfighting metrics to capture the mission impacts of the cyber vulnerabilities and identified mitigations. -Overlay the cyber vulnerability assessment construct and findings during a major Fleet or Combatant Command (COCOM) exercise.	0.000 -	5.000 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606942N / *(U)Assessments and Evals Cyber Vulnerabilities*	**Project (Number/Name)** 4038 / *Cyber Vulnerability Evaluation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Enhance red teaming and penetration testing capabilities to improve Navy cyber risk assessment capacity and proficiency. -Increase red teaming and penetration testing activities and conduct Navy Information Warfare cyber risk assessments. -Conduct cyber penetration testing to confirm/deny the presence of vulnerabilities and assess the effectiveness of mitigations. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is due to the completion of the one year effort.					
Title: Cyber Vulnerability Assessments of Critical Infrastructure	0.000	25.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: The Cyber Vulnerability Assessments and Evaluations program funds cyber vulnerability assessments of critical shore infrastructure as directed by Section 1650 of the FY17 National Defense Authorization Act (NDAA). Funding will be used for assessments of prioritized critical shore infrastructure. Sec. 1650 of the FY17 NDAA directs the Secretary of Defense to submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessment of this infrastructure during a preliminary pilot program that will assess no fewer than two installations by December, 31 2019. Funded vulnerability assessments will end by calendar year 2020 and will build upon existing mission assurance, blue team, and red team capabilities. As instructed by the Congressional language, the assessments will utilize DoE and DoD national laboratory partnerships. Assessments will end with the submission of a final report to Congress. Strategies and procedures for mitigating the risk of cyber vulnerabilities should be identified during the course of evaluation.					
FY 2019 Plans: Conduct comprehensive red (penetration-level), blue team assessments, and non-recurring engineering for mitigations identified related to facility related control systems. This includes those systems integrated into, as well as supporting, critical infrastructure for the Navy. As directed by Congressional language, these all-inclusive vulnerability assessments will require the development of multifaceted testing capabilities within the Navy shore domain while leveraging existing resources across the Fleet in addition to strategies and competencies					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0606942N / *(U)Assessments and Evals Cyber Vulnerabilities*	**Project (Number/Name)** 4038 / *Cyber Vulnerability Evaluation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
from our national laboratory partners. Supporting these vulnerability assessments will be the identification and development of mission modeling artifacts outlining the relationship between those identified facility related control systems and the relevant DoD and Navy mission and operational plans. These efforts will provide increased survivability and cyber resiliency of the Naval shore domain. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding decrease from FY 2019 to FY 2020 is due to the completion of assessments of cyber vulnerability of critical defense infrastructure as directed by Section 1650 of the FY17 National Defense Authorization Act (NDAA).					
Accomplishments/Planned Programs Subtotals	0.000	48.800	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Deliverable of appropriate Cyber Vulnerability reports
Performance will be measured by Cyber Assessments completed.
Deliverable of appropriate Cyber Vulnerability reports.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0305327N / *Insider Threat*							
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	0.000	1.682	2.645	-	2.645	2.500	2.532	2.465	2.515	Continuing	Continuing
3442: *Insider Threat*	0.000	0.000	1.682	2.645	-	2.645	2.500	2.532	2.465	2.515	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Navy Counter Insider Threat Capability (CITC) meets National, Department of Defense (DoD) and Department of the Navy (DoN) direction to deter, detect, and mitigate the threat from witting and unwitting insiders. Counter Insider Threat program accomplishes these objectives by monitoring users' computers and network activities, fusing that information with security risk data from multiple other sources, and providing the fused information to analysts for threat identification and initial response action. All agencies that manage classified networks are required to establish an Insider Threat program consisting of User Activity Monitoring (UAM) and an Analytical Hub. As a Presidential Directive, Navy will come under increased Congressional scrutiny if Insider Threat does not maintain funding.

Navy currently does not fully meet CITC requirements. As the CITC Mission requires Navy to establish a new capability to identify a specific type of person, as defined above, RDT&E,N funding is required to appropriately develop and integrate this capability effectively.

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	1.682	2.680	-	2.680
Current President's Budget	0.000	1.682	2.645	-	2.645
Total Adjustments	0.000	0.000	-0.035	-	-0.035
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	-0.035	-	-0.035

Change Summary Explanation

Funding: The increase in funding from FY2019 to FY2020 will develop and integrate the new capability to identify a specific type of person, as defined above, as required by the Counter Insider Threat Capability (CITC) Mission.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0305327N / *Insider Threat*	Project (Number/Name) 3442 / *Insider Threat*	

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
3442: *Insider Threat*	0.000	0.000	1.682	2.645	-	2.645	2.500	2.532	2.465	2.515	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Navy Counter Insider Threat Capability (CITC) meets National, Department of Defense (DoD) and Department of the Navy (DoN) direction to deter, detect, and mitigate the threat from witting and unwitting insiders. Counter Insider Threat program accomplishes these objectives by monitoring users' computers and network activities, fusing that information with security risk data from multiple other sources, and providing the fused information to analysts for threat identification and initial response action. All agencies that manage classified networks are required to establish an Insider Threat program consisting of User Activity Monitoring (UAM) and an Analytical Hub.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Insider Threat	0.000	1.682	2.645	0.000	2.645
Articles:	-	-	-	-	-
FY 2019 Plans: Research and design a Hub to receive, analyze and appropriately report data from User Activity Monitoring (UAM), Random Polygraph program, Law Enforcement, Counter Intelligence, Travel/Border data, Hotline tips, Identity Matching Engine for Security and Analysis (IMESA), Inspector General (IG) and others; participate in Trident Warrior 19 to determine effectiveness and impact of the UAM tool (test & evaluate).					
FY 2020 Base Plans: Develop and integrate the new capability to identify a specific type of person, as required by the CITC Mission. Continue to research and design a Hub to receive, analyze and appropriately report data from UAM, Random Polygraph program, Law Enforcement, Counter Intelligence, Travel/Border data, Hotline tips, IMESA, IG and others; participate in Trident Warrior 20 to determine effectiveness and impact of the UAM tool (test & evaluate).					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The increase in funding from FY2019 to FY2020 will develop and integrate the new capability to identify a specific type of person, as required by the CITC Mission.					
Accomplishments/Planned Programs Subtotals	0.000	1.682	2.645	0.000	2.645

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0305327N / *Insider Threat*	**Project (Number/Name)** 3442 / *Insider Threat*

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
• OPN/8106/0305327N: *Command Support Equipment/Insider Threat*	1.000	1.707	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.707
• OPN/3415/0305327N: *Info Systems Security Program*	0.000	0.000	2.619	-	2.619	6.459	6.756	6.756	6.891	Continuing	Continuing

Remarks

OPN/8106 - FY19 will be the last year Insider Threat is in LI 8106. In FY20 Insider Threat will be part of LI 3415.

D. Acquisition Strategy

N/A

E. Performance Metrics

Test Cases, risk case measure one thing in R&D, but measure other things in operations.

In the R&D phase, performance will be measured by bandwidth utilization and identification of software configuration setting.

Operational performance measurements will include enumeration of false positives, and the successful collection, identification and reporting of insider threat indicators.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0902498N *I Management Headquarters (Departmental Spt Acts)*							
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	1.749	1.579	1.460	-	1.460	1.484	1.515	1.540	1.576	Continuing	Continuing
0831: *OPTEVFOR Support*	0.000	1.749	1.579	1.460	-	1.460	1.484	1.515	1.540	1.576	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) provides Commander, Operational Test and Evaluation Force (COMOPTEVFOR) general support funding and operating costs for Management Headquarter Activity (MHA) functions that support COMOPTEVFOR compliance with Secretary of Defense (SECDEF) and Secretary of the Navy (SECNAV) directives to conduct independent operational testing and evaluation as described in PE 0605865N Operational Test & Evaluation Capability.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	1.749	1.579	1.479	-	1.479
Current President's Budget	1.749	1.579	1.460	-	1.460
Total Adjustments	0.000	0.000	-0.019	-	-0.019
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	-0.019	-	-0.019

Change Summary Explanation

Beginning in Fiscal Year 2018, Management Headquarter Activity (MHA) labor and operating costs in support of 14 Full Time Equivalents (FTEs) has been realigned from 0605865N Operational Test and Evaluation Capability into this program element 0902498N Management Headquarters (Departmental Support Accounts) to identify all MHA costs separately. The funding decrease from FY 2019 to FY 2020 reflects a reduction in MHA support costs in accordance with the FY 2018 NDAA Sec. 922 and 923 requirements for MHA reductions.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0902498N / *Management Headquarters (Departmental Spt Acts)*	Project (Number/Name) 0831 / *OPTEVFOR 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
0831: *OPTEVFOR Support*	0.000	1.749	1.579	1.460	-	1.460	1.484	1.515	1.540	1.576	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element (PE) provides Commander, Operational Test and Evaluation Force (COMOPTEVFOR) general support funding and operating costs for Management Headquarter Activity (MHA) functions that support COMOPTEVFOR compliance with Secretary of Defense (SECDEF) and Secretary of the Navy (SECNAV) directives during the conduct independent operational testing and evaluation as described in PE 0605865N Operational Test & Evaluation Capability.

Beginning in Fiscal Year 2018, MHA labor and operating costs in support of 14 Full Time Equivalents (FTEs) has been realigned from 0605865N Operational Test and Evaluation Capability into this newly established program element 0902498N Management Headquarters (Departmental Support Accounts) as a result of SECDEF and SECNAV direction to identify all MHA costs separately.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: OPTEVFOR Support	1.749	1.579	1.460	0.000	1.460
Articles:	-	-	-	-	-
Description: Beginning in Fiscal Year 2018, MHA labor and operating costs in support of 14 FTE has been realigned from 0605865N Operational Test and Evaluation Capability into this program element 0902498N Management Headquarters (Departmental Support Accounts) to identify all MHA costs separately.					
FY 2019 Plans: This project will provide for the basic costs of the COMOPTEVFOR headquarters activities. Specifically, it will pay for salaries and support costs of civilian personnel who support COMOPTEVFOR compliance with directives during the conduct of independent operational testing and evaluation to determine the operational effectiveness, suitability, and cyber survivability of new and improved systems.					
FY 2020 Base Plans: This project will provide for the basic costs of the COMOPTEVFOR headquarters activities. Specifically, it will pay for salaries and support costs of civilian personnel who support COMOPTEVFOR compliance with directives during the conduct of independent operational testing and evaluation to determine the operational effectiveness, suitability, and cyber survivability of new and improved systems.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0902498N / *Management Headquarters (Departmental Spt Acts)*	**Project (Number/Name)** 0831 / *OPTEVFOR Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The funding decrease from FY 2019 to FY 2020 reflects a reduction in MHA support costs in accordance with the FY 2018 NDAA Sec. 922 and 923 requirements for MHA reductions.					
Accomplishments/Planned Programs Subtotals	1.749	1.579	1.460	0.000	1.460

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

As indicated in Section A above, funding is for general support and operating costs for Management Headquarter Activity (MHA) functions that support COMOPTEVFOR compliance with Secretary of Defense (SECDEF) and Secretary of the Navy (SECNAV) directives to conduct independent operational testing and evaluation as described in PE 0605865N Operational Test & Evaluation Capability.

Beginning in Fiscal Year 2018, MHA labor and operating costs in support of 14 FTEs has been realigned from 0605865N Operational Test and Evaluation Capability into this newly established program element 0902498N Management Headquarters (Departmental Support Accounts) as a result of SECDEF and SECNAV direction to identify all MHA costs separately.

MHA Functions support more than 400 Programs and HQ support needs to include:

-Financial Management Systems: Fund execution is accomplished through the use of Standard Accounting Budgeting Reporting System (SABRS), Standard Accounting and Reporting System - Field Level(STARS-FL), Defense Travel System (DTS), Wide Area WowrkFlow (WAWF), Electronic Business Suite (EB Suite), and Electronic Document Access (EDA) for current and prior year financial transactions.

-Financial Management Analysis: The mission, functions, and tasks of the command are met through funds allocated from the following appropriations: RDT&E, OMN, APN, OPN, and DoD. Funds are authorized, committed, obligated, and executed IAW Navy and DoD guidance. In order to ensure fund integrity, transactions are monitored in accordance with FIAR and audit readiness requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 0902498N / *Management Headquarters (Departmental Spt Acts)*	**Project (Number/Name)** 0831 / *OPTEVFOR Support*

-Budget Formulation, Justification, Presentation: Supports current and future year requirements resulting in POM development, OPTAR management, and preparation of budget exhibits.

-Acquisition/Contracting: Supports the acquisition of test and evaluation services and support requirements from various firm fixed price multiple award contracts. Invoice payments are processed through the use of WAWF and Invoicing, Receipt, Acceptance and Property Transfer (iRAPT).

-Management Internal Control Program: Monitors the compliance of Navy Programs.

-Facilities Management: Coordinates the maintenance and repair of plant, property, and equipment and other base operating services.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0909999N / *Cancelled Account Adjustments*							
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	0.071	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.071
0000: *UNDIST*	0.000	0.071	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.071

A. Mission Description and Budget Item Justification

Funding is to reimburse the Department of the Treasury for cancelled account liabilities.

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	0.071	0.000	0.000	-	0.000
Total Adjustments	0.071	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.071	0.000			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Change Summary Explanation

Technical: Not applicable.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0909999N / *Cancelled Account Adjustments*	Project (Number/Name) 0000 / *UNDIST*	

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
0000: *UNDIST*	0.000	0.071	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.071
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding is to reimburse the Department of the Treasury for cancelled account liabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Cancelled Account Adjustment	0.071	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	0.071	0.000	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-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206867N *I (U)SEW Surveillance/Reconnaissance 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	0.000	9.408	8.684	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.092
1034: *TAC SAT Recon Office*	0.000	9.408	8.684	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.092

Note

Efforts previously funded under PE 0605867N, Space & Elec War Surv/Recon. In FY18 and FY19 is funded under PE 1206867N SEW Surveillance/Reconnaissance Support. Beginning in FY20 is funded under PE 0605867N Space & Elec War Surv/Recon.

A. Mission Description and Budget Item Justification

(U) Link Crimson (Navy Tactical Exploitation of National Capabilities (TENCAP)) is a congressionally directed program to rapidly develop (12-18 months) systems, processes, and training that leverages and exploits National Technical Means (NTM) and Intelligence Community (IC) resources to meet fleet tactical warfighting gaps. This is done through innovative research and development of capabilities aligned with Navy Programs of Record (PoR), while influencing national systems support and development. These efforts include advanced sensors, platform and ground processing, and integrated national-to-tactical information fusion capabilities. Link Crimson supports all Navy mission areas, including Anti-Submarine Warfare (ASW), Integrated Air and Missile Defense, Mine Warfare (MIW), Power projection/Precision Strike, Maritime Domain Awareness (MDA), and Intelligence, Surveillance, and Reconnaissance (ISR), in support of the Navy's Information Dominance pillars: Assured Command and Control (AC2), Battlespace Awareness (BA) and Integrated Fires (IF).

(U) This program is funded under Budget Activity 6 because it supports the operations and installations required for general research and development. Program baseline addresses research and development on specific capabilities to support these mission areas such as signals collection and exploitation, acoustic and electronic signal detection, countering Unmanned Air Systems, Processing, Exploitation, and Dissemination (PED) processes, Commercial Maritime Navigation Radar (CMNR) detection and exploitation, open-ocean surveillance, and hostile threat geo-location. Link Crimson fields both prototypes to demonstrate new capabilities in real world environments in coordination with operational users, and develops warfighting capabilities for insertion into Navy, joint, and national agency programs of record. Additional detailed information is available at higher levels of classification.

(U) Project 1034: Established to exploit all National and Service sensor systems to improve tactical support to Fleet operational commanders. Project also supports equipment upgrades, training and Fleet exercises which provide the venue for testing modifications to existing programs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy					Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 6: *RDT&E Management Support*			R-1 Program Element (Number/Name) PE 1206867N *I (U)SEW Surveillance/Reconnaissance Support*		
B. Program Change Summary ($ in Millions)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	9.408	8.684	8.402	-	8.402
Current President's Budget	9.408	8.684	0.000	-	0.000
Total Adjustments	0.000	0.000	-8.402	-	-8.402
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	-8.402	-	-8.402
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 1206867N / *(U)SEW Surveillance/ Reconnaissance Support*	Project (Number/Name) 1034 / *TAC SAT Recon Office*	

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
1034: *TAC SAT Recon Office*	0.000	9.408	8.684	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.092
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

(U) Link Crimson (Navy Tactical Exploitation of National Capabilities (TENCAP)) is a congressionally directed program to rapidly develop (12-18 months) systems, processes, and training that leverages and exploits National Technical Means (NTM) and Intelligence Community (IC) resources to meet fleet tactical warfighting gaps. This is done through innovative research and development of capabilities aligned with Navy Programs of Record (PoR), while influencing national systems support and development. These efforts include advanced sensors, platform and ground processing, and integrated national-to-tactical information fusion capabilities. Link Crimson supports all Navy mission areas, including Anti-Submarine Warfare (ASW), Integrated Air and Missile Defense, Mine Warfare (MIW), Power projection/Precision Strike, Maritime Domain Awareness (MDA), and Intelligence, Surveillance, and Reconnaissance (ISR), in support of the Navy's Information Dominance pillars: Assured Command and Control (AC2), Battlespace Awareness (BA) and Integrated Fires (IF).

(U) This program is funded under Budget Activity 6 because it supports the operations and installations required for general research and development. Program baseline addresses research and development on specific capabilities to support these mission areas such as signals collection and exploitation, acoustic and electronic signal detection, countering Unmanned Air Systems, Processing, Exploitation, and Dissemination (PED) processes, Commercial Maritime Navigation Radar (CMNR) detection and exploitation, open-ocean surveillance, and hostile threat geo-location. Link Crimson fields both prototypes to demonstrate new capabilities in real world environments in coordination with operational users, and develops warfighting capabilities for insertion into Navy, joint, and national agency programs of record. Additional detailed information is available at higher levels of classification.

(U) Project 1034: Established to exploit all National and Service sensor systems to improve tactical support to Fleet operational commanders. Project also supports equipment upgrades, training and Fleet exercises which provide the venue for testing modifications to existing programs.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Assured Command and Control	0.962	0.721	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: The Navy must assure its ability to command and control forces. This requires capabilities that enable commanders to rapidly and with certainty: 1) exchange orders and responses with subordinates; 2) understand the disposition of friendly and adversarial forces, as well as uninvolved/neutral elements in the area of operations; 3) have access to target quality intelligence at the right time to conduct strikes as part of the joint force; and 4) assess the result of those strikes. Sensing the environment, understanding our adversaries, and operating and defending our communications and networked systems are inextricably linked to the assurance of C2.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 1206867N / *(U)SEW Surveillance/ Reconnaissance Support*	**Project (Number/Name)** 1034 / *TAC SAT Recon Office*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: Additional details with respect to this line item are held at a higher classification. ***FY 2020 Base Plans:*** FY20 efforts will be funded under PE 0605867N, Space & Elec War Surv/Recon. Additional details with respect to this line item are held at a higher classification. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 efforts will be funded under PE 0605867N, Space & Elec War Surv/Recon. Additional details with respect to this line item are held at a higher classification.					
Title: Battlespace Awareness	6.072	5.831	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: This is the traditional mission of the Navy's Information Warfare and the constituent components of meteorology, oceanography, intelligence, cryptology, communications, networks, space, and electronic warfare (EW). It includes: 1) persistent surveillance of the maritime and information battlespace; 2) knowledge of how to employ existing and emerging collection capabilities to great effectiveness to gather critical intelligence; 3) penetrating knowledge of the capabilities and intent of our adversaries to hold our successful operations at risk; and 4) expertise within the electromagnetic spectrum. Automation in data extraction and alignment and machine learning algorithms can significantly enhance the human analyst's ability to achieve battlespace awareness in the face of vast data repositories and numerous collection platforms/opportunities. ***FY 2019 Plans:*** Additional details with respect to this line item are held at a higher classification. ***FY 2020 Base Plans:*** FY20 efforts will be funded under PE 0605867N, Space & Elec War Surv/Recon. Additional details with respect to this line item are held at a higher classification. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 1206867N / *(U)SEW Surveillance/ Reconnaissance Support*	**Project (Number/Name)** 1034 / *TAC SAT Recon Office*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY20 efforts will be funded under PE 0605867N, Space & Elec War Surv/Recon. Additional details with respect to this line item are held at a higher classification.					
Title: Integrated Fires	2.374	2.132	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Integration of the right combination of kinetic and/or non-kinetic fires to achieve the desired effect on the target and on the adversary's decision calculus requires: 1) in-depth understanding of the adversary's centers of gravity and vulnerabilities; 2) the right fidelity of the target's location, movement, and window of vulnerability; 3) commander's confidence that the weapon is postured to achieve the desired effect; and 4) the ability to provide this information to the weapon system(s) and weapon release authority(ies) before the target can employ effective defensive measures. ***FY 2019 Plans:*** Additional details with respect to this line item are held at a higher classification. ***FY 2020 Base Plans:*** FY20 efforts will be funded under PE 0605867N, Space & Elec War Surv/Recon. Additional details with respect to this line item are held at a higher classification. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 efforts will be funded under PE 0605867N, Space & Elec War Surv/Recon. Additional details with respect to this line item are held at a higher classification.					
Accomplishments/Planned Programs Subtotals	9.408	8.684	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 6	**R-1 Program Element (Number/Name)** PE 1206867N / *(U)SEW Surveillance/ Reconnaissance Support*	**Project (Number/Name)** 1034 / *TAC SAT Recon Office*

E. Performance Metrics

Not applicable