Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Missile Defense Agency											Date: February 2015	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603895C / *Ballistic Missile Defense System Space Programs*							
COST ($ in Millions)	**Prior Years**	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
Total Program Element	44.030	6.412	6.389	23.289	-	23.289	21.433	16.108	11.933	11.952	Continuing	Continuing
MD33: *MD Space Exp Center (MDSEC)*	43.780	6.075	6.020	22.265	-	22.265	20.420	15.283	11.297	11.305	Continuing	Continuing
MD40: *Program-Wide Support*	0.250	0.337	0.369	1.024	-	1.024	1.013	0.825	0.636	0.647	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

FY 2016 increase is in support of the Space-based Kill Assessment (SKA) project to address the 2014 National Defense Authorization Act requirement for MDA to develop and field an improved kill assessment capability by FY 2020.

A. Mission Description and Budget Item Justification

This program element funds two activities: 1) The SKA project, a Missile Defense Agency (MDA) experiment to demonstrate kill assessment from space and 2) the Missile Defense Space Center (MDSC), an MDA facility at Schriever AFB, CO, dedicated to space systems. The MDSC facilitates the integration and demonstration of missile defense space capabilities with other defense and national security systems.

Kill assessment is the determination that the weapon hit a lethal object and that object is assessed to be no longer lethal. In FY 2014 a timely confluence of events was setting the stage for the kill assessment experiment that later became known as SKA. First, the cancellation of the Precision Tracking Space System (PTSS) program allowed residual FY 2013 PTSS funds in PE 0604883C to be used for space experimentation consistent with the intent of the original appropriation. Second, an MDA study called the “Space Layer Option Study” found that disaggregated systems could provide sensor capabilities at lower price points (later echoed in Government Accountability Office report GAO-15-7 on the same topic). Third, section 237 in the FY 2014 National Defense Authorization Act directed MDA to improve kill assessment for the Ground-based Midcourse Defense program.

Nine years of testing using the “Kill Assessment Sensor Package” sensor on the Aegis Ballistic Missile Defense program indicated that the physics of the kill assessment problem was well understood and that expensive and risky technology development was not needed for space-based kill assessment. This sensor testing on the Aegis Ballistic Missile Defense program also showed that an electro-optical / infrared sensor was the optimal sensor to observe an intercept and record data in the frequency bands most advantageous for kill assessment. Additionally, a United States Air Force space experiment highlighted an opportunity was still available to leverage remaining space on the replenishment of a commercial satellite constellation.

In April 2014, MDA began the SKA experiment remaining consistent with guidance to best leverage intellectual capital investment in the PTSS program while evolving the technical plan to respond to changes in circumstances, risk and budgetary environment. The SKA experiment will design and assemble a network of small sensors to be integrated onto commercial host satellites and while on orbit, observe missile defense intercepts and deliver a kill assessment declaration to the Ballistic Missile

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Missile Defense Agency	Date: February 2015
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*

Defense System. If deemed successful by the warfighter, this experiment has the potential to change the economics of the defense of the American homeland from enemy ballistic missiles.
The MDSC capabilities and infrastructure provide MDA user capabilities for supporting flight tests, conducting concept development, demonstrations, experiments, and developing and evaluating algorithms within a multi-security level, collaborative environment. As part of a collaborative environment, the Missile Defense Space Center (MDSC) conducts studies and experiments with Air Force Space Command seeking to optimize future Missile Defense Agency (MDA) space-layer options to support Space Situational Awareness (SSA).

The MDSC provides MDA elements with a centralized collaboration and integration environment for Ballistic Missile Defense System (BMDS) sensor operations and integration to support the ballistic missile defense mission. The infrastructure of the MDSC supports the operation and control of MDA space systems. In addition, the MDSC annual operating expenses provide infrastructure support for security, configuration management, engineering, test, experiment, data, and logistics and create a collaborative environment for the MDA community that includes the Space Tracking and Surveillance System (STSS); Near Field Infrared Experiment; BMDS Overhead Persistent Infrared Architecture; Command and Control, Battle Management and Communications (C2BMC); Integrated Sensor Manager; MDA C2BMC Experimentation Laboratory; MDA Enterprise Sensors Laboratory; and future MDA space-layer capabilities.

MDSC supports:
- BMDS integrated discrimination for Homeland Defense
- Engage on STSS against lethal object
- Launch on/Engage on using STSS against multiple targets
- Launch on/Engage on using STSS against a raid
- Ability to support hit/kill assessment from space
- Ability to support SSA mission from space
- Ability to cue BMDS sensors from space
- Ability to integrate space into emerging fire control loops
- Develop and refine ground operational concepts for MDA space systems, sensors, data, services, and networks
- Operate and refine the MDSC Interchange System to provide robust access to MDA space data and MDA user net-centric sensor tasking request interface
- Develop and maintain a security environment to support data integration, test, demonstrations, and experiments across multiple security levels
- Provide a Test Integration Lab to support testing, demonstrations, experiments, integration and algorithm development
- Demonstrate connectivity and integration of space sensor layer data for the BMDS community and external users
- Conduct experiments to test algorithm validity for Missile Defense space systems
- Mature BMDS space based sensing through studies, analysis, sensor data integration, algorithm development, performance assessments, and architecture improvements
- Develop and mature joint space sensing Concept of Operations, Tactics, Techniques, & Procedures, and asset management to evaluate space based sensor contributions to the BMDS
- Integrate and evaluate MDA, other Department of Defense agencies, and Services space capabilities to demonstrate space based sensing contributions for discrimination support, hit assessment, dim target detection and tracking, advanced threat tracking, and wideband infrared sensor data integration and exploitation

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Missile Defense Agency	Date: February 2015
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603895C *I Ballistic Missile Defense System Space Programs*

- Support development and demonstration of real-time Infrared/Radar data fusion (system track)
- Provide infrastructure to demonstrate integration of missile defense space capabilities with other defense and national security systems

MD40 Program-Wide Support (PWS) consists of essential non-headquarters management efforts providing integrated and efficient support to the MDA functions and activities across the entire Ballistic Missile Defense System (BMDS).

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	6.515	6.389	7.112	-	7.112
Current President's Budget	6.412	6.389	23.289	-	23.289
Total Adjustments	-0.103	-	16.177	-	16.177
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.103	-			
• Other Adjustment	-	-	16.177	-	16.177

Change Summary Explanation

In FY 2016, the Ballistic Missile Defense System Space Programs Program Element (PE) was increased to complete development and begin integration and testing of the Spacebased Kill Assessment (SKA), a project initiated with appropriated funds in PE 0604883C, budget project MD10, to address the 2014 National Defense Authorization Acts requirement for the Missile Defense Agency to develop and field an improved kill assessment capability by FY 2020.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency			Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD33 / *MD Space Exp Center (MDSEC)*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
MD33: *MD Space Exp Center (MDSEC)*	43.780	6.075	6.020	22.265	-	22.265	20.420	15.283	11.297	11.305	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

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

FY 2016 increase is in support of the Space-based Kill Assessment (SKA) project to address the 2014 National Defense Authorization Act requirement for MDA to develop and field an improved kill assessment capability by FY 2020.

A. Mission Description and Budget Item Justification

SPACEBASED KILL ASSESSMENT (SKA)
Kill assessment can be described as a determination that the weapon hit a lethal object and that object is assessed to be no longer lethal. The SKA system is designed to perform this determination and is made up of two segments: a space segment and a ground segment.

The space segment is a network of kill assessment sensors, the electronics that control them and the circuit card processors that mate the sensors to the satellite hosts. At approximately ten kilograms each, the sensors house three, single-pixel photodiodes that are commercially available today. The sensors themselves move in two axes, azimuth and elevation, by way of two, commercial-off-the-shelf actuators. Heaters and thermal blankets protect the sensor components from space's temperature fluctuations. Cabling connects the sensor assemblies to their circuit card processors which serve as the principal interface to the satellite hosts. The space segment is made up of a network of sensors, each mated to a different satellite; and the total number of sensors and where they are placed in the network are specifically tailored for the kill assessment mission.

The ground segment is a small network of desktop computers, servers and routers that monitor the health of the on-orbit sensors, command the sensors to perform the kill assessment mission and analyze the data to make a kill assessment determination for the Ballistic Missile Defense System (BMDS). The ground segment hosts the complex kill assessment algorithms which accomplish several tasks, including flash detection and analysis; hit/miss/kill/glancing blow assessment of the intercept; and scheduling of the network of sensors for optimal observation opportunities. The ground segment also includes the equipment necessary for security and information assurance protection.

The Missile Defense Space Center (MDSC), located at the Missile Defense Integration and Operations Center, will act as the communications hub for SKA data. The MDSC will route and process SKA data for BMDS as it does for other sensor programs, so that the BMDS is presented with only a new data stream, not a new command and control system with which to interface.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

The SKA sensors are hosted on satellites that are not developed by the Missile Defense Agency, thus schedule performance is the highest priority of the experiment. Since the launch of the host satellites will not wait for hosted payloads that are delivered late, the management of the SKA project focuses on the ability to meet schedule commitments. This schedule discipline has one important benefit: cost containment. For example commercially available parts and components are chosen over those that require technology development, driving down non-recurring engineering costs. Additionally a fixed schedule addresses one of the largest contributors to cost overruns on space programs: the standing workforce that must be employed for longer durations as schedules slip.

The following activities were funded by the FY 2013 Precision Tracking Space System program element 0604883C in support of the Spacebased Kill Assessment (SKA) development:
- Developed SKA project strategy with stakeholders in February and March 2014
- Obtained project approval by Missile Defense Agency (MDA) executive leadership in April 2014
- Took delivery of all parts and components required for sensor engineering models (3) and qualification models (2) in May 2014
- Conducted Preliminary Design Review with warfighter and United States Air Force, United States Strategic Command and United States Northern Command participation in July 2014
- Successfully mated an engineering grade SKA processor card to a test figure simulating the host satellite in September 2014
- Assemble and deliver sensor assembly engineering model #1 and conduct testing
- Complete build out of initial instantiation of the ground segment development facility and processing equipment
- Assemble and deliver sensor assembly qualification model #1 and conduct testing
- Conduct Critical Design Review with warfighter and military service participation
- Conduct Production Readiness Review
- Begin assembly of sensor flight models
- Conduct Pre-Environmental Review

Funds requested for SKA in FY 2016 are to be used for three major activities:
- Complete assembly, integration and test of the sensor payloads with the host satellites
- Continue development of the ground system
- Begin preparations for on-orbit experimentation

MISSILE DEFENSE SPACE CENTER (MDSC)
The MDSC provides capabilities and infrastructure to support the Ballistic Missile Defense System (BMDS) as the single location for MDA elements to conduct space operations. The MDSC provides a multi-level security environment for sensor data management and integration across space and terrestrial sensor data activities. MDSC experiments leverage Department of Defense (DoD) (Defense Support Program, Space Based Infrared System) and national security space capabilities. MDSC activities support analysis, demonstration and integration of space sensor capabilities into developmental and operational MDA elements. MDSC enables the development of advanced technology and algorithms including fusion of multiple sensor types (radar, overhead persistent infrared, electro-optical and other emerging sensor technologies). MDSC supports mission integration of space-based missile tracking (boost and midcourse phases), sensor and weapons cueing via Command

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

and Control, Battle Management and Communications , features and discrimination, kill and impact point assessments into the BMDS and other (non-MDA) mission areas to include Space Situational Awareness, technical intelligence, and battle space characterization.

The MDSC continues to develop and refine current operations for BMDS Space systems. The MDSC hosts a collaborative experimentation environment via the MDSC Interchange System (MIS) and the MDSC Test Integration Lab (TIL) for BMDS elements that rely on, experiment with, integrate with, or seek to improve the BMDS capability by utilizing space-based, systems-derived data. The MIS provides common, secure data architecture for MDA, DoD and national security space sensor data and a satellite sensor tasking request tool interface with Missile Defense Agency (MDA) users. The Test Integration Lab provides a common location for MDA user collaboration with access to space sensor layer data via the Missile Defense Space Center (MDSC) Interchange System during tests and experiments. The MDSC supports efforts to increase the effectiveness of the Ballistic Missile Defense System (BMDS) (including probability of engagement success, increase in defended area and raid size capacity, additional redundancy of architecture, unity of command) through the integration of MDA developed capabilities.

The MDSC Sensor Registration Health & Status Monitoring Experiment addresses efforts such as sensor registration (reporting of sensor errors/biases) and correlation (ensuring the information from multiple sensors seeing a threat relates to the same object) and provides a platform for real-time algorithm integration and test. Other MDSC experiments explore areas including system track (creating a single engageable track of a threat from multiple reports provided by different land, sea, and space based multiple sensors), discrimination (identifying object details to determine the target from debris or decoys), battle management (combining the best sensors and shooters to ensure the highest probability of a kill), hit/kill Assessment (determining if the target selected was destroyed after missile impact), and communications (providing the worldwide connection of sensors and shooters to command authorities). These experiments are structured to be implemented across the BMDS elements to create and utilize system level data and decisions that allow Combatant Commanders the ability to automatically and manually optimize sensor coverage and interceptor inventory to defend against ballistic threats.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016
Title: Missile Defense Space Center (MDSC)	5.586	4.825	-
Articles:	-	-	-
Description: The MDSC provides a central collaborative environment to develop, operate, exploit, and integrate Joint Space Capabilities for the Ballistic Missile Defense System (BMDS).			
FY 2014 Accomplishments: - Supported Simulated Aegis (Hardware-in-the Loop (HWIL)) Engage-On Space Tracking and Surveillance System (STSS) satellites Tests and fulfillment of Overhead Persistent Infrared (OPIR) requests for STSS data - Conducted analysis of space radiation environment and its influence on Missile Defense Agency (MDA) space system performance - Conducted analysis of space based sensor data from STSS, Near Field Infrared Experiment (NFIRE), and OPIR observations, both individually and combined, to support signatures and algorithms to aid future tracking and discrimination architectures - Supported concept studies and analysis for alternative sensor payload configurations (e.g. hosted payloads)			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016
- Developed and integrated real time algorithms for dim target detection and tracking, discrimination support, hit assessment, and wideband IR sensor data integration and exploitation - Conducted algorithm development, performance assessments, architecture assessments, and concept evaluations of future MDA space-layer options ***FY 2015 Plans:*** - Support launch, integration, and operations of future Missile Defense Agency (MDA) space capabilities - Support Hardware-in-the Loop (HWIL) Engage-On STSS satellites tests and fulfill Overhead Persistent Infrared (OPIR) requests for STSS data based on satellite availability - Conduct analysis of space radiation environment and its influence on MDA space system performance - Conduct analysis of space based sensor data from STSS and OPIR observations, both individually and combined, to identify phenomenology and techniques to aid future tracking and discrimination architectures - Support concept studies and analysis for alternative sensor payload configurations (e.g. hosted payloads) - Develop and integrate real-time algorithms for dim target detection and tracking, discrimination support, hit/kill assessment, and wideband infrared sensor data integration and exploitation - Conduct algorithm development, performance assessments, architecture assessments, and concept evaluations of future MDA space-layer options. - Provides future space-layer capability risk reduction through analysis, test and demonstration - Support Air Force Space Command and joint mission partners with Space Situational Awareness, technical intelligence, battlespace awareness, and missile warning ***FY 2016 Plans:*** N/A			
Title: Spacebased Kill Assessment	0.489	1.195	22.265
Articles:	-	-	-
Description: Experimental system designed to demonstrate kill assessment for Homeland Defense Funding for the Spacebased Kill Assessment (SKA) was initiated in PE 0604883C (Precision Tracking Space System), budget project MD10. ***FY 2014 Accomplishments:*** - Developed SKA project strategy with stakeholders in February and March 2014 - Obtained project approval by Missile Defense Agency executive leadership in April 2014			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016
- Conducted Preliminary Design Review with warfighter and United States Air Force, United States Strategic Command and United States Northern Command participation in July 2014 ***FY 2015 Plans:*** The following tasks are planned to be conducted with the residual FY 2013 funds from program element 0604883C and appropriated funds in 0603895C - Assemble and deliver sensor assembly engineering model #1 and conduct testing - Complete build out of initial instantiation of the ground segment development facility and processing equipment - Assemble and deliver sensor assembly qualification model #1 and conduct testing - Conduct Critical Design Review with warfighter and military service participation - Conduct Production Readiness Review - Begin assembly of sensor flight models - Conduct Pre-Environmental Review ***FY 2016 Plans:*** Increase from FY 2015 to FY 2016 is for additional effort to complete development and begin integration and testing of the Spacebased Kill Assessment payload. - Complete sensor assembly and testing of SKA flight units - Complete delivery of flight unit sensors to integrator - Integrating and testing of SKA payload onto host payload module - Integrating and testing of host payload module onto host satellite - Prepare for on-orbit checkout of first SKA sensors			
Accomplishments/Planned Programs Subtotals	6.075	6.020	22.265

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	1,064.445	873.923	1,284.891	-	1,284.891	936.425	803.392	903.539	912.890	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	340.391	270.901	233.588	-	233.588	228.437	142.363	140.740	141.733	Continuing	Continuing
• 0603892C: *AEGIS BMD*	885.704	764.224	843.355	-	843.355	762.740	748.354	564.827	579.585	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0603893C: *Space Tracking and Surveillance System*	41.618	31.331	31.632	-	31.632	17.917	23.937	28.789	30.344	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	390.207	428.277	450.085	-	450.085	461.759	423.843	442.926	460.112	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	50.271	58.503	49.211	-	49.211	58.074	53.655	55.194	57.162	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	342.695	366.302	274.323	-	274.323	298.390	345.333	330.404	350.747	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	501.170	455.068	513.256	-	513.256	585.727	484.242	442.202	460.945	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Spacebased Kill Assessment (SKA) experiment will leverage experience that the Johns Hopkins University Applied Physics Laboratory (APL) has gained in its 9-year history of performing kill assessment studies and conducting experiments associated with the Aegis Ballistic Missile Defense program. The APL is the developer of the SKA experiment and its primary subcontractor will be responsible for payload integration and hosting accommodation using a firm fixed price contract to contain costs. The SKA experiment is following precedent established by a United States Air Force experiment using a commercial satellite program as the platform host for a Department of Defense payload; thus taking full advantage of a multi-billion dollar space and ground system that already exists.

Functions and operations of the Missile Defense Space Center (MDSC) were financed through a 10-year MDSC Joint National Integration Center Research and Development Contract Services Contract. The sole-source contractor, Northrop Grumman Information Systems, was responsible for integrating Research, Development, Test and Evaluation, operations support, and resource and infrastructure management for the MDSC, providing customer support, while achieving efficiencies through approaches that exceed customer requirements.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Missile Defense Space Center (MDSC) - MDSC Support (JRDC Services Contract)	SS/CPAF	NGIS : Schriever AFB, CO	28.221	2.931		1.800	Dec 2014	-		-		-	-	32.952	36.537
Missile Defense Space Center (MDSC) - MDSC/ Enterprise Sensors Laboratory (ESL) Experiments	C/Various	Various : Various	6.542	0.504		-		-		-		-	-	7.046	7.351
Spacebased Kill Assessment - Spacebased Kill Assessment Development and Experimentation	C/CPFF	JHU/APL : Laurel, MD	0.000	-		-		21.264	Oct 2015	-		21.264	Continuing	Continuing	Continuing
		Subtotal	34.763	3.435		1.800		21.264		-		21.264	-	-	-

Remarks

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

Funding for the Spacebased Kill Assessment was initiated in PE 0604883C, budget project MD10.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Missile Defense Space Center (MDSC) - Contract Support Services (CSS)	C/Various	Various, MDA : CO/ AL	3.728	1.527		1.410	Oct 2014	-		-		-	-	6.665	-
Missile Defense Space Center (MDSC) - MDA Civilian	Allot	MDA : Schriever AFB, CO	1.753	0.466		1.615	Oct 2014	-		-		-	-	3.834	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Spacebased Kill Assessment - Contract Support Services (CSS)	C/Various	Various, MDA : CO/AL	0.000	-		-		0.312	Oct 2015	-		0.312	Continuing	Continuing	Continuing
Spacebased Kill Assessment - FFRDC	FFRDC	Various : CO/AL/MD/VA	0.000	0.339		0.513		0.455	Oct 2015	-		0.455	Continuing	Continuing	Continuing
Spacebased Kill Assessment - MDA Civilian	Allot	MDA : VA	0.000	-		0.181		0.199	Oct 2015	-		0.199	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Program Mission Support	C/Various	Various : CO/AL/MD/VA	0.000	0.150		0.501		0.035	Oct 2015	-		0.035	Continuing	Continuing	Continuing
		Subtotal	5.481	2.482		4.220		1.001		-		1.001	-	-	-

Remarks

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

Funding for the Spacebased Kill Assessment was initiated in PE 0604883C, budget project MD10.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	-

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Missile Defense Space Center (MDSC) - Mission Planning and Analysis	C/CPFF	Utah State University Space Dynamics Laboratory : UT	3.536	0.158		-		-		-		-	-	3.694	3.694
		Subtotal	3.536	0.158		-		-		-		-	-	3.694	3.694

Remarks

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

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	43.780	6.075		6.020		22.265		-		22.265	-	-	-

Remarks

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

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

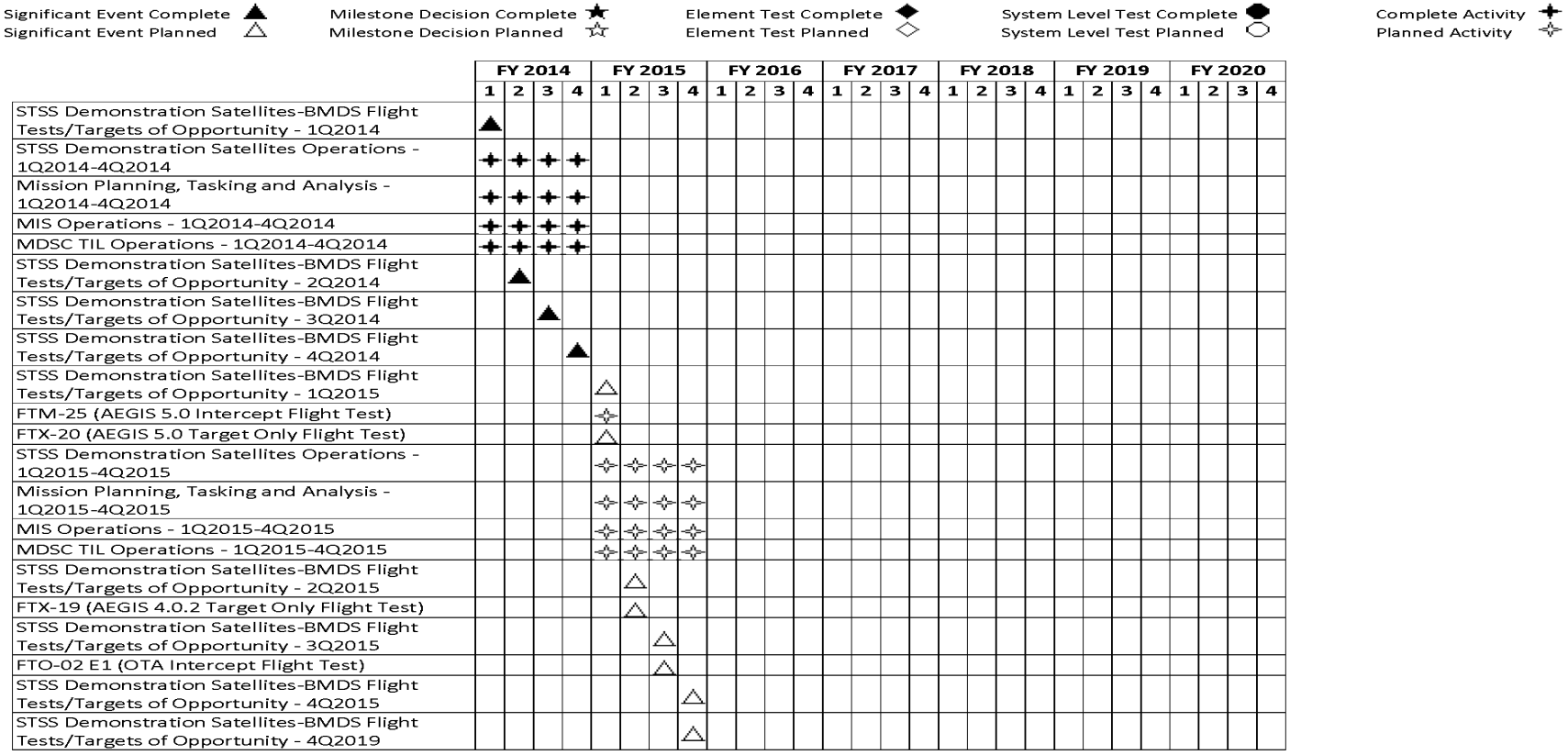

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

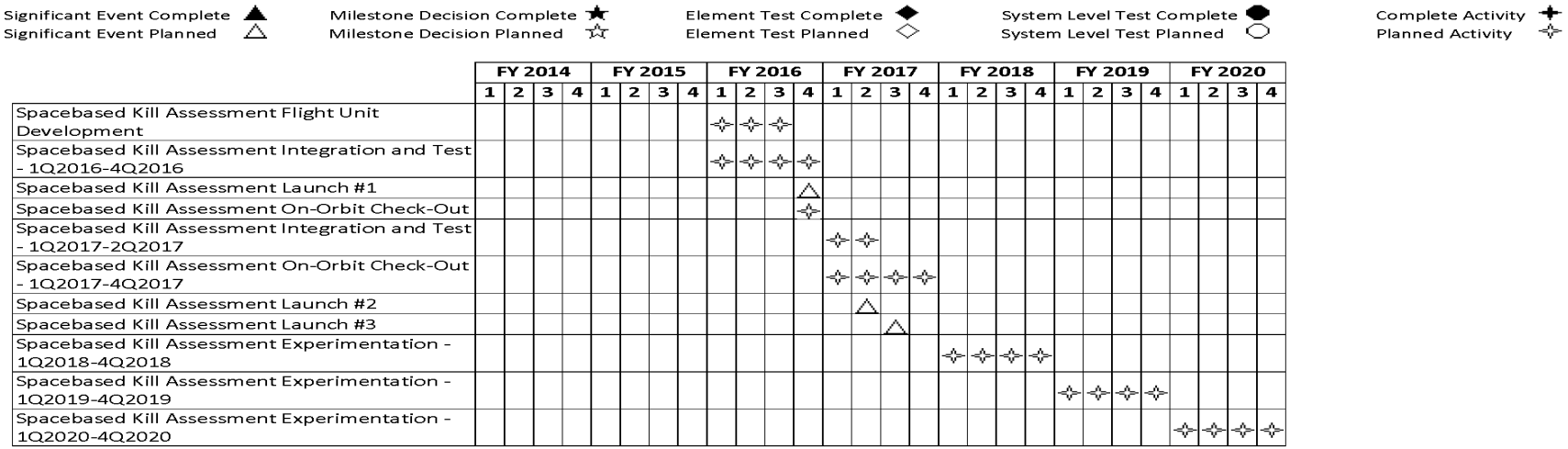

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2014	1	2014	1	2014
STSS Demonstration Satellites Operations - 1Q2014-4Q2014	1	2014	4	2014
Mission Planning, Tasking and Analysis - 1Q2014-4Q2014	1	2014	4	2014
MIS Operations - 1Q2014-4Q2014	1	2014	4	2014
MDSC TIL Operations - 1Q2014-4Q2014	1	2014	4	2014
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2014	2	2014	2	2014
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2014	3	2014	3	2014
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2014	4	2014	4	2014
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2015	1	2015	1	2015
FTM-25 (AEGIS 5.0 Intercept Flight Test)	1	2015	1	2015
FTX-20 (AEGIS 5.0 Target Only Flight Test)	1	2015	1	2015
STSS Demonstration Satellites Operations - 1Q2015-4Q2015	1	2015	4	2015
Mission Planning, Tasking and Analysis - 1Q2015-4Q2015	1	2015	4	2015
MIS Operations - 1Q2015-4Q2015	1	2015	4	2015
MDSC TIL Operations - 1Q2015-4Q2015	1	2015	4	2015
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2015	2	2015	2	2015
FTX-19 (AEGIS 4.0.2 Target Only Flight Test)	2	2015	2	2015
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2015	3	2015	3	2015
FTO-02 E1 (OTA Intercept Flight Test)	3	2015	3	2015
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2015	4	2015	4	2015
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2019	4	2015	4	2015
Spacebased Kill Assessment Flight Unit Development	1	2016	3	2016

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Spacebased Kill Assessment Integration and Test - 1Q2016-4Q2016	1	2016	4	2016
Spacebased Kill Assessment Launch #1	4	2016	4	2016
Spacebased Kill Assessment On-Orbit Check-Out	4	2016	4	2016
Spacebased Kill Assessment Integration and Test - 1Q2017-2Q2017	1	2017	2	2017
Spacebased Kill Assessment On-Orbit Check-Out - 1Q2017-4Q2017	1	2017	4	2017
Spacebased Kill Assessment Launch #2	2	2017	2	2017
Spacebased Kill Assessment Launch #3	3	2017	3	2017
Spacebased Kill Assessment Experimentation - 1Q2018-4Q2018	1	2018	4	2018
Spacebased Kill Assessment Experimentation - 1Q2019-4Q2019	1	2019	4	2019
Spacebased Kill Assessment Experimentation - 1Q2020-4Q2020	1	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency			Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	0.250	0.337	0.369	1.024	-	1.024	1.013	0.825	0.636	0.647	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016, Program Wide Support reflects a proportional change as a result of increases in Ballistic Missile Defense System Space Programs.
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

A. Mission Description and Budget Item Justification

Program-Wide Support (PWS) contains non-headquarters management costs in support of Missile Defense Agency (MDA) functions and activities across the entire Ballistic Missile Defense System (BMDS). It Includes Government Civilians, Contract Support Services, and Federally Funded Research and Development Center (FFRDC) support. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation and, provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office and equipment leases; utilities; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. Program Wide Support is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes:0305103C Cyber Security Initiative, 0603274C Special Program, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016
Title: Program Wide Support	0.337	0.369	1.024
Articles:	-	-	-
Description: N/A			
FY 2014 Accomplishments: See paragraph A: Mission Description and Budget Item Justification			
FY 2015 Plans: See paragraph A: Mission Description and Budget Item Justification			
FY 2016 Plans: See paragraph A: Mission Description and Budget Item Justification			
Accomplishments/Planned Programs Subtotals	0.337	0.369	1.024

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Missile Defense Agency			Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	0.250	0.246		0.369	Jun 2015	-		-		-	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: Al, CA, CO, VA	0.000	0.091		-		1.024	Nov 2015	-		1.024	Continuing	Continuing	Continuing
		Subtotal	0.250	0.337		0.369		1.024		-		1.024	-	-	-

Remarks

N/A

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.250	0.337		0.369		1.024		-		1.024	-	-	-

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

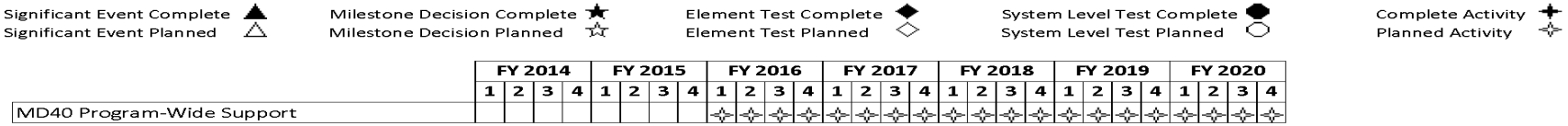

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Missile Defense Agency		Date: February 2015
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2016	4	2020