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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	35.008	36.114	36.349	34.144	-	34.144	34.657	35.268	36.627	37.734	Continuing	Continuing
MD12: <i>Space Tracking and Surveillance System (STSS)</i>	32.051	31.448	32.633	32.044	-	32.044	32.439	32.989	33.836	34.740	Continuing	Continuing
MC12: <i>Cyber Operations</i>	1.424	2.925	2.190	0.744	-	0.744	0.843	0.861	0.917	0.936	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	1.533	1.741	1.526	1.356	-	1.356	1.375	1.418	1.874	2.058	Continuing	Continuing

**Program MDAP/MAIS Code:** 362

**Note**

N/A

**A. Mission Description and Budget Item Justification**

The two Space Tracking and Surveillance System (STSS) satellites launched in 2009 provide an on-orbit capability to validate remote sensor fire control integration to inform design and operation of the Missile Defense Agency (MDA) space-layer capabilities. MDA uses STSS data to characterize contribution of space data into the Missile Defense System (MDS) and to provide sensor measurements and background data supporting trade studies and analyses for MDA space-layer options for both Homeland and Regional Defense.

STSS continues to provide risk reduction for MDA space capabilities, models, algorithms, interface definitions, communications architectures, and performance across threat object acquisition, tracking, complex target signatures, discrimination and multi-mission support. STSS also informs the MDS Concept of Operations, timelines and performance requirements for remote space sensor cuing for ballistic missile engagements, expanding battle space for weapon systems such as Aegis Ballistic Missile Defense (BMD).

The STSS program demonstrates the functions and interfaces required for space data delivery to the MDS, validating the data quality necessary for interceptors to launch and/or engage on STSS sensor data. The two STSS satellites are operated from the ground station processing center at the Missile Defense Space Center (MDSC). The STSS satellites demonstrate MDA space-layer capabilities and reduce risk for future systems (e.g., Hypersonic and Ballistic Tracking Space Sensor) by viewing high-value Targets of Opportunity and participating in MDS flight tests. Though the STSS satellites are operating beyond their life expectancy, MDA will continue STSS operations due to the continued contributions to the MDS mission.

The MDSC provides MDA's only centralized collaboration and integration environment that leverages existing Overhead Persistent Infrared (OPIR) enterprise integration in support of MDS research and development test, and sensor operations. The MDSC capabilities and infrastructure support flight tests, operational concept and prototype development, technology demonstrations, experiments, and algorithm development within a multi-security, collaborative environment to integrate and exploit national space asset data. The MDSC also conducts studies and experiments with MDA assets such as the Spacebased Kill Assessment (SKA), and STSS, as well as other agencies' assets.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Missile Defense Agency	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	36.955	35.849	35.623	-	35.623
Current President's Budget	36.114	36.349	34.144	-	34.144
Total Adjustments	-0.841	0.500	-1.479	-	-1.479
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.841	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-1.479	-	-1.479

**Change Summary Explanation**

N/A

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Missile Defense Agency										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 0400 / 4					<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>				<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
MD12: <i>Space Tracking and Surveillance System (STSS)</i>	32.051	31.448	32.633	32.044	-	32.044	32.439	32.989	33.836	34.740	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

N/A

**A. Mission Description and Budget Item Justification**

Two Space Tracking and Surveillance System (STSS) satellites provide a low earth orbit sensor capability with visible and infrared sensors for integrated testing with other Missile Defense System (MDS) elements. STSS demonstrates space-based capabilities including persistent tracking and integrated MDS discrimination improvements. These two satellites provide valuable risk reduction for acquisition, tracking, complex scenes, and discrimination functionality to include stereo data fusion, cuing radars over the horizon and over-the-horizon fire control.

The on-orbit sensors collect invaluable background, scene, and target signature data to support the Missile Defense Agency (MDA) space-layer and other weapon sensor development trade studies. STSS activities provide information for integration of space-based missile tracking (midcourse phase); remote sensor and weapons cuing via the Command and Control, Battle Management and Communications (C2BMC); features and discrimination; and hit/impact point assessments. STSS enables early capability assessment to address the Warfighter's need for highly available early missile tracking from space, providing an operationally suitable means of global persistent surveillance and engagement. Capabilities being assessed for MDA space-layer capabilities include detecting and acquiring missiles; tracking missiles and their deployed objects; performing autonomous acquisition-to-track handover within a satellite; performing tracking handover to a satellite from a ground cue; performing uplink and downlink of mission, health, and status data both directly and via crosslink between two satellites; reporting missile and intercept event to close the fire-control loop; filtering reports to C2BMC; and providing near real-time object data to external users. STSS support to other mission areas improves definition for Enterprise system approaches.

The Missile Defense Space Center (MDSC) provides capabilities and infrastructure to support space operations, integration and testing with the MDS. It provides a multi-level security environment for sensor data management and integration across space and terrestrial sensor data activities. MDSC experiments leverage DoD and national security space capabilities. MDSC activities support analyses, demonstration and integration of space sensor capabilities into developmental and operational MDA elements. MDSC enables the development of advanced technology and algorithms including fusion of multiple sensor types (radar, overhead persistent infrared, electro-optical and other emerging sensor technologies). It also supports mission integration of space-based missile tracking, sensor and weapons cuing via C2BMC, features and discrimination, kill and impact point assessments into the MDS and other non-MDA mission areas, including Space Situational Awareness and battle space characterization.

Lessons learned and data gathered from the STSS demonstration satellites program provide valuable information for MDA space-layer modeling and simulation activities in assessing the capability provided by Overhead Persistent Infrared sensors.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Demonstration Satellites		31.448	32.633	32.044
<b>Articles:</b>		-	-	-
<p><b>Description:</b> The Space Tracking and Surveillance System (STSS) demonstration satellites collect and deliver critical space and missile characterization data used to design and inform the Missile Defense System (MDS) and space-layer capabilities. The Missile Defense Space Center (MDSC) facilities and activities are required for safe STSS satellite operations and sustainment. STSS activities include:</p> <ul style="list-style-type: none"> <li>- Perform risk reduction for MDA tracking and surveillance initiatives and Overhead Persistent Infrared (OPIR) Enterprise integration and demonstrations across OPIR cuing, Joint Tasking Operations, and data utility</li> <li>- Collect data to support joint OPIR mission utility assessments across Space Situational Awareness, and Battle Space Awareness missions to include integration, analyses, and studies to confirm data sharing capabilities</li> <li>- Participate in Integrated Master Test Plan events</li> <li>- Conduct satellite testing to demonstrate critical space capabilities, including:               <ul style="list-style-type: none"> <li>-- Ability to support MDS integrated discrimination efforts</li> <li>-- Ability to support Hit/Kill assessment from space</li> <li>-- Ability to cue MDS sensors from space</li> <li>-- Ability to provide precision cue to MDS sensors</li> </ul> </li> <li>- Perform satellite functionality testing and calibration as part of the satellite operations</li> <li>- Conduct missile tracking experiments as identified in the test specific sections</li> <li>- Provide Air Force Space Command Space Situational Awareness support</li> </ul> <p>MDSC efforts related to STSS include:</p> <ul style="list-style-type: none"> <li>- Analyze space radiation environment and its influence on MDA space system performance</li> <li>- Analyze space based sensor data from STSS and OPIR observations, both individually and combined, to identify phenomenology and techniques to aid tracking and discrimination architectures</li> <li>- Provide data for concept studies and analyses for alternative sensor payload configurations</li> <li>- Sustain MDSC resources for all participant activities, including data, voice, and/or video communications, and support MDA cybersecurity directives</li> <li>- Document requirements and perform tracking, design, implementation, and verification necessary for the MDSC facility</li> <li>- Implement on-going and emerging cybersecurity requirements</li> </ul> <p>Specific and/or unique accomplishments to each Fiscal Year (FY) are as follows:</p> <p><b>FY 2020 Plans:</b></p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
- SEE ABOVE			
<b>FY 2021 Plans:</b> - SEE ABOVE			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	31.448	32.633	32.044

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 1206895C: <i>Ballistic Missile Defense System Space Programs</i>	96.146	140.565	32.068	-	32.068	28.591	41.201	39.090	39.630	Continuing	Continuing

**Remarks**

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

**D. Acquisition Strategy**

The STSS demonstration satellites program follows MDA's capability-based acquisition strategy that emphasizes testing, incremental development, and evolutionary acquisition. The STSS effort utilizes a single prime contractor, Northrop Grumman Aerospace Systems (NGAS) with the subcontractor Raytheon providing the sensor payload. This contract implements MDA's capability-based acquisition strategy by using existing satellite hardware as a low risk opportunity, building upon the lessons learned from previous development efforts, and establishing a series of planned enhancements to bring added capability to the MDS.

MDSC efforts will be acquired on the Specialized Warfighter Development Contract and Integrated Research and Development for Enterprise Solutions vehicles. These contracts are responsible for integrating Research, Development, Test and Evaluation, operations support, resource and infrastructure management for the MDSC.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Demonstration Satellites - Capability Based R&D	SS/CPAF	NGAS : Redondo Beach, CA, Schriever AFB, CO	21.306	21.001	Nov 2018	20.544	Nov 2019	20.859	Nov 2020	-		20.859	Continuing	Continuing	Continuing
Demonstration Satellites - STSS Support to Missile Defense Space Center (MDSC)	C/CPFF	Northrop Grumman/ Jacobs Engineering : Schriever AFB, CO	3.467	3.484	Nov 2018	4.087	Nov 2019	4.173	Nov 2020	-		4.173	Continuing	Continuing	Continuing
Demonstration Satellites - Systems Engineering	FFRDC	Aerospace : Los Angeles, CA	0.501	0.494	Nov 2018	0.573	Nov 2019	0.293	Nov 2020	-		0.293	Continuing	Continuing	Continuing
<b>Subtotal</b>			25.274	24.979		25.204		25.325		-		25.325	Continuing	Continuing	N/A

**Remarks**  
All efforts listed above are a continuation of Program Element (PE) 0603893C, MD12

<b>Support (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Demonstration Satellites - Contract Support Services (CSS)	C/Various	Various : AL, CO	2.881	2.241	Nov 2018	2.687	Nov 2019	2.645	Nov 2020	-		2.645	Continuing	Continuing	Continuing
Demonstration Satellites - IT User Services	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	0.590	0.604	Dec 2018	0.646	Dec 2019	0.651	Dec 2020	-		0.651	Continuing	Continuing	Continuing
Demonstration Satellites - MDA Civilian	Allot	MDA : AL, CO	2.181	2.204	Oct 2018	3.131	Oct 2019	2.542	Oct 2020	-		2.542	Continuing	Continuing	Continuing
Demonstration Satellites - Other Government Agency (OGA) Civilian	MIPR	SMC : Schriever AFB, CO	0.161	0.164	Nov 2018	0.167	Nov 2019	0.171	Nov 2020	-		0.171	Continuing	Continuing	Continuing
Demonstration Satellites - Program Mission Support	Various	Various : Various	0.556	0.828	Nov 2018	0.358	Nov 2019	0.258	Nov 2020	-		0.258	Continuing	Continuing	Continuing

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**Exhibit R-3, RDT&E Project Cost Analysis:** PB 2021 Missile Defense Agency **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Satellites - UARC	C/CPFF	Utah University, Space Dynamics Laboratory : AL, AK, CA, CO, HI, MA, UT, VA	0.408	0.428	Nov 2018	0.440	Nov 2019	0.452	Nov 2020	-		0.452	Continuing	Continuing	Continuing
<b>Subtotal</b>			6.777	6.469		7.429		6.719		-		6.719	Continuing	Continuing	N/A

**Remarks**  
All efforts listed above are a continuation of PE 0603893C, MD12

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	32.051	31.448	32.633	32.044	-	32.044	Continuing	Continuing	N/A

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







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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2019	1	2019	1	2019
STSS Demonstration Satellites On-Orbit Operations - 1Q2019-4Q2019	1	2019	4	2019
MIS Operations - 1Q2019-4Q2019	1	2019	4	2019
Mission Planning, Tasking and Analysis - 1Q2019-4Q2019	1	2019	4	2019
MDSC TIL Operations - 1Q2019-4Q2019	1	2019	4	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2019	2	2019	2	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2019	3	2019	3	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2019	4	2019	4	2019
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2020	1	2020	1	2020
STSS Demonstration Satellites On-Orbit Operations - 1Q2020-4Q2020	1	2020	4	2020
MIS Operations - 1Q2020-4Q2020	1	2020	4	2020
Mission Planning, Tasking and Analysis - 1Q2020-4Q2020	1	2020	4	2020
MDSC TIL Operations - 1Q2020-4Q2020	1	2020	4	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2020	2	2020	2	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2020	3	2020	3	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2020	4	2020	4	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2021	1	2021	1	2021
STSS Demonstration Satellites On-Orbit Operations - 1Q2021-4Q2021	1	2021	4	2021
MIS Operations - 1Q2021-4Q2021	1	2021	4	2021
Mission Planning, Tasking and Analysis - 1Q2021-4Q2021	1	2021	4	2021
MDSC TIL Operations - 1Q2021-4Q2021	1	2021	4	2021
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2021	2	2021	2	2021

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Missile Defense Agency **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2021	3	2021	3	2021
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2021	4	2021	4	2021
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2022	1	2022	1	2022
STSS Demonstration Satellites On-Orbit Operations - 1Q2022-4Q2022	1	2022	4	2022
MIS Operations - 1Q2022-4Q2022	1	2022	4	2022
Mission Planning, Tasking and Analysis - 1Q2022-4Q2022	1	2022	4	2022
MDSC TIL Operations - 1Q2022-4Q2022	1	2022	4	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2022	2	2022	2	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2022	3	2022	3	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2022	4	2022	4	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2023	1	2023	1	2023
MDSC TIL Operations - 1Q2023-4Q2023	1	2023	1	2023
Mission Planning, Tasking and Analysis - 1Q2023-4Q2023	1	2023	1	2023
STSS Demonstration Satellites On-Orbit Operations - 1Q2023-4Q2023	1	2023	4	2023
MIS Operations - 1Q2023-4Q2023	1	2023	4	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2023	2	2023	2	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2023	3	2023	3	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2023	4	2023	4	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2024	1	2024	1	2024
MDSC TIL Operations - 1Q2024-4Q2024	1	2024	1	2024
Mission Planning, Tasking and Analysis - 1Q2024-4Q2024	1	2024	1	2024
STSS Demonstration Satellites On-Orbit Operations - 1Q2024-4Q2024	1	2024	4	2024
MIS Operations - 1Q2024-4Q2024	1	2024	4	2024
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2024	2	2024	2	2024
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2024	3	2024	3	2024

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

Events	Start		End	
	Quarter	Year	Quarter	Year
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2024	4	2024	4	2024
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2025	1	2025	1	2025
MDSC TIL Operations - 1Q2025-4Q2025	1	2025	4	2025
STSS Demonstration Satellites On-Orbit Operations - 1Q2025-4Q2025	1	2025	4	2025
Mission Planning, Tasking and Analysis - 1Q2025-4Q2025	1	2025	4	2025
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2025	2	2025	2	2025
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2025	3	2025	3	2025
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2025	4	2025	4	2025

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Missile Defense Agency **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MC12 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC12: <i>Cyber Operations</i>	1.424	2.925	2.190	0.744	-	0.744	0.843	0.861	0.917	0.936	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Decrease from FY 2020 to FY 2021 reflects completion of hardware replacement and executing steady-state support to meet cybersecurity requirements.

**A. Mission Description and Budget Item Justification**

Space Tracking and Surveillance System (STSS) Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/ Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA STSS mission systems. Activities in this Project are necessary to comply with the Federal Information Security Management Act (FISMA).

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2019	FY 2020	FY 2021
<b>Title:</b> Network / System Certification and Accreditation (C&A)	2.925	2.190	0.744
<b>Articles:</b>	-	-	-
<p><b>Description:</b> This activity maintains the Assessment and Authorization (A&amp;A) and C&amp;A data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&amp;Ms on all MDA information systems. This activity prepares and submits C&amp;A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) /Certification Authority and the DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of MDA mission, test, and administrative systems.</p> <p>Recurring accomplishments include the following:</p> <ul style="list-style-type: none"> <li>- Monitor and track cybersecurity and mitigations detailed in Information Technology security POA&amp;Ms</li> <li>- Conduct cybersecurity design, engineering, and architecture planning for STSS information technology systems</li> <li>- Plan and test the cybersecurity controls for STSS and MDSC systems</li> <li>- Conduct SCA testing continuous monitoring of STSS and MDSC mission systems and provide POA&amp;Ms to mitigate cybersecurity vulnerabilities</li> </ul> <p>Specific and/or unique accomplishments to each Fiscal Year (FY) are as follows:</p> <p><b>FY 2020 Plans:</b></p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Missile Defense Agency	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MC12 / <i>Cyber Operations</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2019	FY 2020	FY 2021
- Completes STSS system hardware replacement for cyber security requirements compliance and executes steady-state support to meet cyber security requirements  <b><i>FY 2021 Plans:</i></b> See Above  <b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Decrease from FY 2020 to FY 2021 reflects completion of hardware replacement and executing steady-state support to meet cybersecurity requirements.			
<b>Accomplishments/Planned Programs Subtotals</b>	2.925	2.190	0.744

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MC12 / <i>Cyber Operations</i>
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<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Certification and Accreditation (C&A) - Civ Cyber Labor	Allot	MDA : Schriever AFB	0.176	0.170	Oct 2018	0.180	Oct 2019	0.171	Oct 2020	-		0.171	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Contractor Support	C/Various	Various : AL, CO	0.352	0.574	Nov 2018	0.571	Nov 2019	0.573	Nov 2020	-		0.573	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Information Assurance	C/CPAF	NGAS : Schriever AFB, CO/Redondo Beach, CA	0.896	2.181	Nov 2018	1.439	Mar 2020	0.000		-		0.000	0.000	4.516	4.516
<b>Subtotal</b>			1.424	2.925		2.190		0.744		-		0.744	Continuing	Continuing	N/A

**Remarks**  
N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	1.424	2.925	2.190	0.744	-	0.744	Continuing	Continuing	N/A

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

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**Exhibit R-4, RDT&E Schedule Profile:** PB 2021 Missile Defense Agency **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MC12 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆							
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇							
					FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
MC12 Cyber Operations					◇	◇	◇	◇	◇	◇	◇

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MC12 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC12 Cyber Operations	1	2019	4	2025

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Missile Defense Agency **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	1.533	1.741	1.526	1.356	-	1.356	1.375	1.418	1.874	2.058	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

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

**A. Mission Description and Budget Item Justification**

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

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2019	FY 2020	FY 2021
<b>Title:</b> Program Wide Support	1.741	1.526	1.356
<b>Articles:</b>	-	-	-
<b>Description:</b> PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.</p> <p><b>FY 2020 Plans:</b> - SEE ABOVE.</p> <p><b>FY 2021 Plans:</b> - SEE ABOVE.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		1.741	1.526	1.356
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
N/A				

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**Exhibit R-3, RDT&E Project Cost Analysis:** PB 2021 Missile Defense Agency **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>
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<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations and Support Services	C/CPAF	Northrop Grumman : CO	1.260	1.332	Aug 2019	1.503	Jul 2020	1.315	Nov 2020	-		1.315	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various Multi: AL, CA, CO, : VA	0.054	0.409	Jul 2019	0.023	Jul 2020	0.041	Jul 2021	-		0.041	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	0.219	0.000		0.000		0.000		-		0.000	0.000	0.219	0.000
<b>Subtotal</b>			1.533	1.741		1.526		1.356		-		1.356	Continuing	Continuing	N/A

**Remarks**  
N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	1.533	1.741	1.526	1.356	-	1.356	Continuing	Continuing	N/A

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

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆							
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇							
					FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
MD40 Program-Wide Support					◇	◇	◇	◇	◇	◇	◇

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Missile Defense Agency		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 1206893C / <i>Space Tracking and Surveillance System</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2019	4	2025