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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 1206426F / <i>Space Fence</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	618.100	18.841	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	636.941
65A009: <i>Space Fence</i>	618.100	18.841	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	636.941
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Program MDAP/MAIS Code: 438

Note

In FY2020, Project 65A009, Space Fence, was completed.

A. Mission Description and Budget Item Justification

The Space Fence effort develops a system of ground-based sensors to improve upon the former Air Force Space Surveillance System (AFSSS), a Very High Frequency radar operational from 1961 to 2013. The Space Fence provides a more accurate and timely detection capability of smaller orbiting objects, primarily in low-earth orbit (LEO). The system uses higher frequency S-band radars at globally dispersed sites. As a result, it greatly expands the uncued detection and tracking capacity of the Space Surveillance Network, from around 20,000 to 100,000+ objects, while working in concert with other network sensors. Space Fence Radar Site-1 satisfies Initial Operational Capability (IOC) requirement and Radar Site-2 will satisfy Full Operational Capability (FOC) requirements and close the Space Domain Awareness (SDA) LEO gap for discovery and custody/tracking, and synchronize the Site-2 array size to match Site-1 to satisfy resiliency and SDA Geosynchronous Earth Orbit (GEO) sensitivity requirements. Requirements are identified in the June 2012 approved Space Fence Capabilities Development Document (CDD).

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the Space Fence weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	19.425	0.000	0.000	0.000	0.000
Current President's Budget	18.841	0.000	0.000	0.000	0.000
Total Adjustments	-0.584	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.584	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Space Fence	18.841	0.000	0.000
Description: Develops S-band SSA radar system to provide detection and tracking capability of objects in Low Earth Orbit.			
FY 2020 Plans: N/A			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	18.841	0.000	0.000

D. Other Program Funding Summary (\$ in Millions)	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
• SPAF 01 SPCFNC: <i>space fence</i>	46.361	57.784	0.000	-	0.000	-	-	-	-	0.000	104.145

Remarks

E. Acquisition Strategy
A single Engineering Manufacturing and Development (EMD) Production and Deployment contract was awarded on 2 June 2014 to Lockheed Martin Mission Systems and Training. The contract will take the contractor through Critical Design Review (CDR), fabrication, integration, test, production and deployment, with up to two years of

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Interim Contractor Support (ICS). The program will utilize a two increment approach. Increment 1/Initial Operational Capability (IOC) will consist of successful operations at the first radar site located on the Kwajalein Atoll and the Space Fence Operations Center (SOC) at Reagan Operations Center-Huntsville, AL (ROC-H). Increment 2 (contract option)/FOC will include completion of the second radar at a location to be determined pending a separate Memorandum of Agreement (MOA) decision approval and negotiations with the proposed host nation.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206426F / <i>Space Fence</i>	Project (Number/Name) 65A009 / <i>Space Fence</i>
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Product Development (\$ in Millions)				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			
Space Fence Development	C/FPIF	Lockheed Martin : Moorestown, NJ	546.966	14.679	Oct 2019	-		-		-		-	0.000	561.645	911.115
Various (Independent Program Assessment, site survey, software, Site Activation Task Force (SATAF), Space Fence Operations Center (SOC))	Various	Various : Various	18.924	2.421	Oct 2018	-		-		-		-	0.000	21.345	-
Space Fence Design Oversight and Management	SS/FP	MIT Lincoln Laboratory : Lexington, MA	3.268	0.499	Feb 2019	-		-		-		-	0.000	3.767	-
Subtotal			569.158	17.599		-		-		-		-	0.000	586.757	N/A

Remarks
 Prior to FY 2015 all funds were executed and reported in PE 0604425F (Space Domain Awareness Systems)
 Product Development: \$774.994M

Test and Evaluation (\$ in Millions)				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			
Test - 96th Cyberspace Test Group (CTG)	PO	96th CTG : Eglin AFB, FL	7.626	0.000		-		-		-		-	0.000	7.626	-
Test - Joint Interoperability Test Command	MIPR	Joint Interoperability Test Command : Fort Huachuca, AZ	0.241	0.039	Nov 2019	-		-		-		-	0.000	0.280	-
Subtotal			7.867	0.039		-		-		-		-	0.000	7.906	N/A

Remarks
 Prior to FY 2015 all funds were executed and reported in PE 0604425F (Space Domain Awareness Systems)
 Test and Evaluation: \$1.366M

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Management Services (\$ in Millions)				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			
A&AS	Various	Various : Various	20.128	0.461	Jan 2019	-		-		-		-	0.000	20.589	-
FFRDC	SS/FP	Various : Various	20.947	0.742	Dec 2018	-		-		-		-	0.000	21.689	-
Subtotal			41.075	1.203		-		-		-		-	0.000	42.278	N/A

Remarks
Prior to FY 2015 all funds were executed and reported in PE 0604425F (Space Domain Awareness Systems)
Management Services: \$68.683M

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	618.100	18.841	0.000	-	-	-	0.000	636.941	N/A

Remarks
FINANCIAL PERFORMANCE: Space Fence is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. Unlike many traditional R&D programs, however, the Space Fence System Engineering Manufacturing and Development contract is an FPIF contract with performance based payments. 11.3% of the incurred costs are withheld until the end of the contract, when they are liquidated. Mandatory funding obligations and payment withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
<i>Space Fence</i>																																		
Increment 1 EMD																																		
Development Test and Evaluation																																		
Initial Operational Test and Evaluation																																		
Initial Operational Capability (IOC) Increment 1																																		

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Space Fence</i>				
Increment 1 EMD	1	2019	4	2019
Development Test and Evaluation	2	2019	3	2019
Initial Operational Test and Evaluation	3	2019	4	2019
Initial Operational Capability (IOC) Increment 1	4	2019	4	2019