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Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-438



Space Fence Ground-Based Radar System Increment 1 (Space Fence Inc 1)

As of FY 2019 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

No originator info Available at this time.

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
\$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
\$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
\$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

Program Information

Program Name

Space Fence Ground-Based Radar System Increment 1 (Space Fence Inc 1)

DoD Component

Air Force

Responsible Office

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Date Assigned: April 2, 2017

References

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated June 18, 2014

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated June 18, 2014

Mission and Description

The Space Fence Ground-Based Radar System (Space Fence) replaces the mission of the Air Force Space Surveillance System (AFSSS) Very High Frequency (VHF) "fence" radar that performed detection of orbiting space objects before decommissioning in FY 2013. The Space Fence mission is to improve Space Situational Awareness by fielding a capability to detect and report small objects in Low Earth Orbit/Medium Earth Orbit (LEO/MEO). The system, comprising one operations center and two radar sites operating at S-band frequencies, will have a modern, net-centric architecture. Fielded capabilities will include uncued capability to find, fix and track small objects in LEO/MEO; improved completeness and accuracy of the space catalog; improved timeliness of orbital event information; and support for improved characterization of space objects.

The Space Fence Ground-Based Radar System Increment 1 (Space Fence Inc 1) includes the operations center, located at the Reagan Test Site Operations Center Huntsville, AL, and one radar site, located at Kwajalein Atoll, Republic of the Marshall Islands.

Executive Summary

Program Highlights Since Last Report

In CY 2017, the Space Fence Increment 1 program continued progress towards IOC in CY 2019. Completion of system transmit and receive array manufacturing production, shipment of equipment and materials to Kwajalein, and capping of the transmit and receive array buildings with radomes in February 2017 permitted the start of radar installation and checkout concurrent with remaining facilities construction and outfitting activities. The year ended with initial check-out testing in progress. Continued construction delays pushed the critical path out an additional quarter, shifting estimates from the first to the second quarter of CY 2019.

The government awarded a modification for risk reduction testing using the Integration Test Bed. The testing objective is early identification of interconnectivity, processing, and associated performance issues unique to the full population and integration of the system at the Kwajalein sensor site. Additional operational time of the Integration Test Bed will also build confidence in system stability.

The 20th Space Control Squadron stood up an operations detachment at the Space Fence Operations Center, hosted within the Reagan Test Site Operations Center in Huntsville, Alabama. Work to establish the required communication network support between the operations center and the sensor site at Kwajalein is ongoing. The program achieved requisite network planning documentation approvals and authorizations to include Information Support Plan approval, Net-Ready Key Performance Parameter Certification, and Interim Authorization to Test. Planning is ongoing to secure Authorization to Connect for the operations center and sensor site nodes.

The Space Fence and the Joint Space Operations Center (JSpOC) Mission System (JMS) programs continue coordination on three phases of integration planning, collaboration and testing (interface, functional, and operational) to ensure sufficient interoperability for Space Fence government test. The government conducted successful early interface testing of Space Fence with the Joint Space Operations Center Mission System Service Pack 11 in March and October 2017, identifying issues and verifying fixes. End-to-End testing with the Space Fence Kwajalein sensor site is projected for the second quarter of CY 2018.

Closure of defects from early integration and testing of software and firmware is tracking to plan. Overall software requirements specification level stability and defect resolution rates remain at goal.

The program completed multiple significant sustainment planning activities. The Air Force Program Executive Officer for Space approved the Material Fielding Plan and the Service Acquisition Executive approved the Product Support Business Case Analysis. A series of Spares Provisioning Conferences, Joint Technical Order Certification events were completed. Lockheed Martin made multiple Technical Order and Training Materials deliveries.

There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation	
History of Significant Developments Since Program Initiation	
Date	Significant Development Description
May 2013	Milestone B Approval
May 2014	Milestone B Acquisition Decision Memorandum signed.
June 2014	Prime contract awarded to Lockheed Martin.
June 2014	Acquisition Program Baseline approved.
September 2015	Acquisition Decision Memorandum delegates Milestone Decision Authority to the Service Acquisition Executive (SAF/AQ), redesignating the program as ACAT IC.

Threshold Breaches

APB Breaches

Schedule		<input type="checkbox"/>
Performance		<input type="checkbox"/>
Cost	RDT&E	<input type="checkbox"/>
	Procurement	<input type="checkbox"/>
	MILCON	<input type="checkbox"/>
	Acq O&M	<input type="checkbox"/>
O&S Cost		<input type="checkbox"/>
Unit Cost	PAUC	<input type="checkbox"/>
	APUC	<input type="checkbox"/>

Nunn-McCurdy Breaches

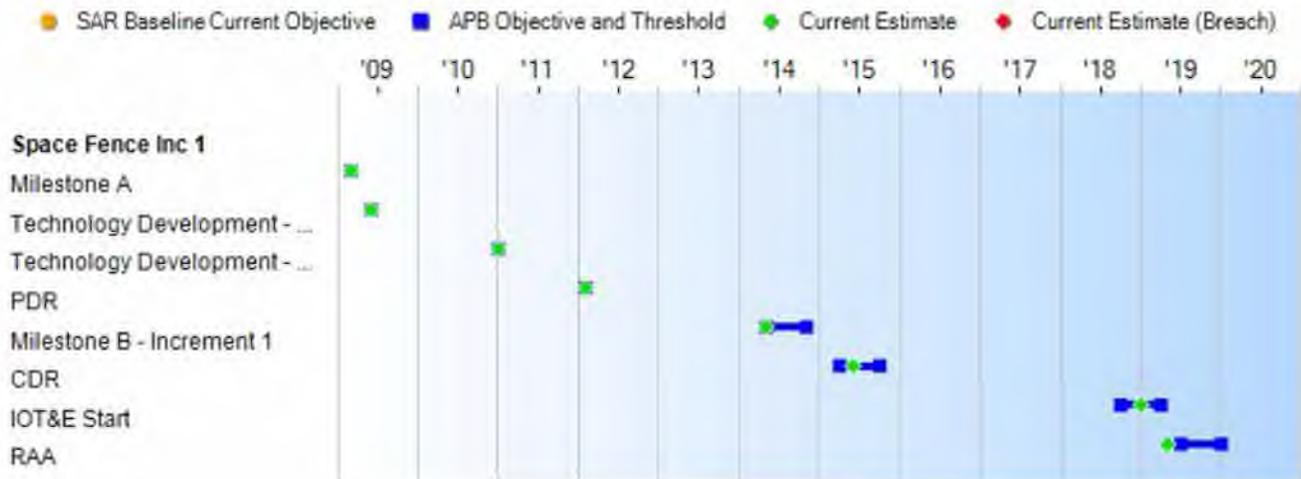
Current UCR Baseline

PAUC	None
APUC	None

Original UCR Baseline

PAUC	None
APUC	None

Schedule



Schedule Events					
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	
Milestone A	Mar 2009	Mar 2009	Mar 2009	Mar 2009	
Technology Development - Phase A - SDR Contract Award	Jun 2009	Jun 2009	Jun 2009	Jun 2009	
Technology Development - Phase A - PDR Contract Award	Jan 2011	Jan 2011	Jan 2011	Jan 2011	
PDR	Feb 2012	Feb 2012	Feb 2012	Feb 2012	
Milestone B - Increment 1	May 2014	May 2014	Nov 2014	May 2014	
CDR	Apr 2015	Apr 2015	Oct 2015	Jun 2015	
IOT&E Start	Oct 2018	Oct 2018	Apr 2019	Jan 2019	(Ch-1)
RAA	Jul 2019	Jul 2019	Jan 2020	May 2019	(Ch-2)

Change Explanations

(Ch-1) Initial Operational Test & Evaluation Start estimate changed from October 2018 to January 2019 driven by overall delays impacting critical path dependencies.
 (Ch-2) Required Assets Available estimate changed from February 2019 to May 2019 driven by overall delays impacting critical path dependencies.

Notes

RAA is defined as the date when the Program Manager has provided sufficient equipment and logistics resources to support IOC determination. The RAA objective date assumes the EMD contract award in June 2014, and consists of:

- DD250 of at least one radar sensor and SOC

- Ensuring communications links and connectivity to the Global Information Grid are in compliance with then-existing Net-Centric Enterprise Services standards, guidance and direction
- Initial spares for one radar sensor and SOC
- Common and peculiar support equipment
- Interim contractor support established
- Stand-alone training systems and resources at Initial Qualification Training and Upgrade Qualification Training locations

For this SAR, RAA is being used as a surrogate for IOC.

Acronyms and Abbreviations

CDR - Critical Design Review
IOT&E - Initial Operational Test & Evaluation
PDR - Preliminary Design Review
RAA - Required Assets Available
SDR - System Design Review
SOC - Space Operations Center

Performance

Performance Characteristics			
SAR Baseline Development Estimate	Current APB Development Objective/Threshold	Demonstrated Performance	Current Estimate
System Training			
Using the ISD process, the Space Fence shall deliver a training system to applicable AFSPC and AETC units (TBD), that will enable units to possess and maintain a SORTS readiness Category Level rating of C-1 prior to operational acceptance. The training system shall include Contract Special Training (Type 1) that provides the requisite competencies training to test agency personnel, initial AFSPC cadre and AETC instructors to proficiency standards IAW AFI36-2201 (Ref 46). Before the start of Type 1 training, TOs must complete the contractor's TO certification process. Type 1 training shall be conducted prior to start of Operational Test & Evaluation, but no earlier than 12 months and not later than 6 months prior to operational acceptance of the weapon system. Type 1 training course(s) shall be tailored to meet the learning objectives of each duty position using the most cost-efficient training media, as determined by the AF ISD process. For CMR	Using the ISD process, the Space Fence shall deliver a training system to applicable AFSPC and AETC units (TBD), that will enable units to possess and maintain a SORTS readiness Category Level rating of C-1 prior to operational acceptance. The training system shall include Contract Special Training (Type 1) that provides the requisite competencies training to test agency personnel, initial AFSPC cadre and AETC instructors to proficiency standards IAW AFI36-2201 (Ref 46). Before the start of Type 1 training, TOs must complete the contractor's TO certification process. Type 1 training shall be conducted prior to start of Operational Test & Evaluation, but no earlier than 12 months and not later than 6 months prior to operational acceptance of the weapon system. Type 1 training course (s) shall be tailored to meet the learning objectives of each duty position using the most	(Threshold = Objective) Using the ISD process, the Space Fence shall deliver a training system to applicable AFSPC and AETC units (TBD), that will enable units to possess and maintain a SORTS readiness Category Level rating of C-1 prior to operational acceptance. The training system shall include Contract Special Training (Type 1) that provides the requisite competencies training to test agency personnel, initial AFSPC cadre and AETC instructors to proficiency standards IAW AFI36-2201 (Ref 46). Before the start of Type 1 training, TOs must complete the contractor's TO certification process. Type 1 training shall be conducted prior to start of Operational Test & Evaluation, but no earlier than 12 months and not later than 6 months prior to operational acceptance of the weapon system. Type 1 training course (s) shall be tailored to meet the learning objectives of each duty position using the most	TBD Using the ISD process, the Space Fence shall deliver a training system to applicable AFSPC and AETC units (TBD), that will enable units to possess and maintain a SORTS readiness Category Level rating of C-1 prior to operational acceptance. The training system shall include Contract Special Training (Type 1) that provides the requisite competencies training to test agency personnel, initial AFSPC cadre and AETC instructors to proficiency standards IAW AFI36-2201 (Ref 46). Before the start of Type 1 training, TOs must complete the contractor's TO certification process. Type 1 training shall be conducted prior to start of Operational Test & Evaluation, but no earlier than 12 months and not later than 6 months prior to operational acceptance of the weapon system. Type 1 training course (s) shall be tailored to meet the learning objectives of each duty position using the most

operations training and evaluation: The Space Fence shall deliver off-line training simulation capability with fidelity that emulates typical operations, which shall: Be physically and electronically separated from the operational system. Have software application(s) which utilize and integrate with the government-furnished SST software. Look, sound and feel like the actual operational equipment to support required proficiency levels. Be capable of being upgraded as operational functionality is upgraded. The Space Fence shall deliver the associated COTS-based hardware to applicable AFSPC and AETC units (TBD), that will: Fulfill the hardware compatibility requirements of the SST software. Fulfill the security accreditation requirements of the training simulation software. The Space Fence shall collaborate with the SST software vendor to integrate the simulation software with the COTS-based hardware and the government-furnished SST software. The Space Fence shall provide operations procedures and Type 1 training on the use of the integrated SST-based simulation capability to AETC instructors and AFSPC cadre. The integrated SST-based training simulation

cost-efficient training media, as determined by the AF ISD process. For CMR operations training and evaluation: The Space Fence shall deliver off-line training simulation capability with fidelity that emulates typical operations, which shall: Be physically and electronically separated from the operational system. Have software application(s) which utilize and integrate with the government-furnished SST software. Look, sound and feel like the actual operational equipment to support required proficiency levels. Be capable of being upgraded as operational functionality is upgraded. The Space Fence shall deliver the associated COTS-based hardware to applicable AFSPC and AETC units (TBD), that will: Fulfill the hardware compatibility requirements of the SST software. Fulfill the security accreditation requirements of the training simulation software. The Space Fence shall collaborate with the SST software vendor to integrate the simulation software with the COTS-based hardware and the government-furnished SST software. The Space Fence shall provide operations procedures and Type 1

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<p>capability shall be delivered no earlier than 12 months and not later than 6 months prior to operational acceptance. The integrated SST - based training simulation capability shall meet AFSPC SIMCERT requirements.</p>	<p>training on the use of the integrated SST - based simulation capability to AETC instructors and AFSPC cadre. The integrated SST-based training simulation capability shall be delivered no earlier than 12 months and not later than 6 months prior to operational acceptance. The integrated SST -based training simulation capability shall meet AFSPC SIMCERT requirements.</p>	<p>the integrated SST - based simulation capability to AETC instructors and AFSPC cadre. The integrated SST-based training simulation capability shall be delivered no earlier than 12 months and not later than 6 months prior to operational acceptance. The integrated SST -based training simulation capability shall meet AFSPC SIMCERT requirements.</p>	<p>training on the use of the integrated SST - based simulation capability to AETC instructors and AFSPC cadre. The integrated SST-based training simulation capability shall be delivered no earlier than 12 months and not later than 6 months prior to operational acceptance. The integrated SST -based training simulation capability shall meet AFSPC SIMCERT requirements.</p>
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Net-Ready

<p>Space Fence must fully support execution of all operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and must satisfy the technical requirements for transition to Net-Centric military operations to include: Solution architecture products compliant with DoD Enterprise Architecture based on integrated DoDAF content, including specified operationally effective information exchanges. Compliant with Net - Centric Data Strategy and Net-Centric Services Strategy, and the principles and rules identified in the DoD IEA, excepting tactical and non-IP communications. Compliant with GIG Technical Guidance</p>	<p>Space Fence must fully support execution of all operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and must satisfy the technical requirements for transition to Net-Centric military operations to include: Solution architecture products compliant with DoD Enterprise Architecture based on integrated DoDAF content, including specified operationally effective information exchanges. Compliant with Net -Centric Data Strategy and Net-Centric Services Strategy, and the principles and rules identified in the DoD IEA, excepting tactical and non-IP communi-</p>	<p>Space Fence must fully support execution of joint critical operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and must satisfy the technical requirements for transition to Net-Centric military operations to include: Solution architecture products compliant with DoD Enterprise Architecture based on integrated DoDAF content, including specified operationally effective information exchanges. Compliant with Net - Centric Data Strategy and Net-Centric Services Strategy, and the principles and rules identified in the DoD IEA, excepting tactical and non-IP communi-</p>	<p>TBD</p>	<p>Space Fence must fully support execution of all operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and must satisfy the technical requirements for transition to Net-Centric military operations to include: Solution architecture products compliant with DoD Enterprise Architecture based on integrated DoDAF content, including specified operationally effective information exchanges. Compliant with Net -Centric Data Strategy and Net-Centric Services Strategy, and the principles and rules identified in the DoD IEA, excepting tactical and non-IP communi-</p>
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to include IT Standards identified in the StdV-1 and implementation guidance of GESPs necessary to meet all operational requirements specified in the DoD Enterprise Architecture and solution architecture views. Information assurance requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA. Supportability requirements to include SAASM, Spectrum and JTRS requirements	cations. Compliant with GIG Technical Guidance to include IT Standards identified in the StdV-1 and implementation guidance of GESPs necessary to meet all operational requirements specified in the DoD Enterprise Architecture and solution architecture views. Information assurance requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA. Supportability requirements to include SAASM, Spectrum and JTRS requirements	GIG Technical Guidance to include IT Standards identified in the StdV-1 and implementation guidance of GESPs necessary to meet all operational requirements specified in the DoD Enterprise Architecture and solution architecture views. Information assurance requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an IATO or ATO by the DAA. Supportability requirements to include SAASM, Spectrum and JTRS requirements		cations. Compliant with GIG Technical Guidance to include IT Standards identified in the StdV-1 and implementation guidance of GESPs necessary to meet all operational requirements specified in the DoD Enterprise Architecture and solution architecture views. Information assurance requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA. Supportability requirements to include SAASM, Spectrum and JTRS requirements
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MDT Size

MDT = 10 cm (cubesat) at orbital altitudes \geq 250km and \leq 2,000 km. MDT = 20 cm (cubesat) at orbital altitudes \geq 2,000km and \leq 3,000 km	MDT = 10 cm (cubesat) at orbital altitudes \geq 250km and \leq 2,000 km. MDT = 20 cm (cubesat) at orbital altitudes \geq 2,000km and \leq 3,000 km	(Threshold = Objective) MDT = 10 cm (cubesat) at orbital altitudes \geq 250km and \leq 2,000 km. MDT = 20 cm (cubesat) at orbital altitudes \geq 2,000km and \leq 3,000 km	TBD	MDT = 10 cm (cubesat) at orbital altitudes \geq 250km and \leq 2,000 km. MDT = 20 cm (cubesat) at orbital altitudes \geq 2,000km and \leq 3,000 km
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Fence Integrity

\geq 95% (Cued); \geq 50% (Un-cued)	\geq 95% (Cued); \geq 50% (Un-cued)	(Threshold = Objective) \geq 95% (Cued); \geq 50% (Un-cued)	TBD	\geq 95% (Cued); \geq 50% (Un-cued)
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Surveillance and Track Coverage

IOC: 1) 250-800 km: determined by scan angle required 800-3,000 km; 2) 800-3,000 km: 2 tracks (Cued /Un-cued); FOC: 1) 250-550 km: determined by scan angle required for 550-3,000 km; 2) 550-800 km: 2 tracks (Cued /Un-cued) • 800-3,000 km: 2	IOC: 1) 250-800 km: determined by scan angle required 800-3,000 km; 2) 800-3,000 km: 2 tracks (Cued /Un-cued); FOC: 1) 250-550 km: determined by scan angle required for 550-3,000 km; 2) 550-800 km: 2 tracks (Cued /Un-cued) • 800-	(Threshold = Objective) IOC: 1) 250-800 km: determined by scan angle required 800-3,000 km; 2) 800-3,000 km: 2 tracks (Cued /Un-cued); FOC: 1) 250-550 km: determined by scan angle required for 550-3,000 km; 2) 550-800 km: 2 tracks	TBD	IOC: 1) 250-800 km: determined by scan angle required 800-3,000 km; 2) 800-3,000 km: 2 tracks (Cued /Un-cued); FOC: 1) 250-550 km: determined by scan angle required for 550-3,000 km; 2) 550-800 km: 2 tracks (Cued /Un-cued) • 800-
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tracks (Un-cued); 4 tracks (Cued)	3,000 km: 2 tracks (Un-cued); 4 tracks (Cued)	(Cued /Un-cued) • 800-3,000 km: 2 tracks (Un-cued); 4 tracks (Cued)		3,000 km: 2 tracks (Un-cued); 4 tracks (Cued)
E3				
All components of the Space Fence shall operate in their intended operational electro-magnetic environment without suffering or causing unacceptable performance degradation due to EMI from other electronic equipment in the same environment. The Space Fence shall not cause negative impacts, mission degradation, or other interference with systems operating in the same shared electro-magnetic environment. Systems operating in the same shared electro-magnetic environment as the Space Fence shall not cause unacceptable impacts, mission degradation, or other interference with normal operations of the Space Fence.	All components of the Space Fence shall operate in their intended operational electro-magnetic environment without suffering or causing unacceptable performance degradation due to EMI from other electronic equipment in the same environment. The Space Fence shall not cause negative impacts, mission degradation, or other interference with systems operating in the same shared electro-magnetic environment. Systems operating in the same shared electro-magnetic environment as the Space Fence shall not cause unacceptable impacts, mission degradation, or other interference with normal operations of the Space Fence.	(Threshold = Objective) All components of the Space Fence shall operate in their intended operational electro-magnetic environment without suffering or causing unacceptable performance degradation due to EMI from other electronic equipment in the same environment. The Space Fence shall not cause negative impacts, mission degradation, or other interference with systems operating in the same shared electro-magnetic environment. Systems operating in the same shared electro-magnetic environment as the Space Fence shall not cause unacceptable impacts, mission degradation, or other interference with normal operations of the Space Fence.	TBD	All components of the Space Fence shall operate in their intended operational electro-magnetic environment without suffering or causing unacceptable performance degradation due to EMI from other electronic equipment in the same environment. The Space Fence shall not cause negative impacts, mission degradation, or other interference with systems operating in the same shared electro-magnetic environment. Systems operating in the same shared electro-magnetic environment as the Space Fence shall not cause unacceptable impacts, mission degradation, or other interference with normal operations of the Space Fence.
Sustainment Ao				
Space Fence System (excluding SOC) Ao >= 95% SOC Ao >= 98%	Space Fence System (excluding SOC) Ao >= 95% SOC Ao >= 98%	(Threshold = Objective) Space Fence System (excluding SOC) Ao >= 95% SOC Ao >= 98%	TBD	Space Fence System (excluding SOC) Ao >= 95% SOC Ao >= 98%

Requirements Reference

CDD dated June 11, 2012

Change Explanations

None

Acronyms and Abbreviations

AETC - Air Education and Training Command
AF - Air Force
AFI - Air Force Instruction
AFSPC - Air Force Space Command
Ao - Operational Availability
ATO - Authority To Operate
cm - centimeter
CMR - Combat Mission Ready
COTS - Commercial Off The Shelf
DAA - Designating Accrediting Authority
DoD IEA - DoD Information Enterprise Architecture
DoDAF - Department of Defense Architecture Framework
E3 - Electromagnetic Environmental Effects
EMI - Electromagnetic Interference
GESPs - GIG Enterprise Service Profiles
GIG - Global Information Grid
IAW - In Accordance With
IP - Internet Protocol
ISD - Instructional Systems Design/Development
IT - Information Technology
JTRS - Joint Tactical Radio System
km - Kilometer
MDT - Minimum Detectable Target
Ref - Reference
SAASM - Selective Availability Anti-spoofing Module
SIMCERT - Simulator Certification
SOC - Space Operations Center
SORTS - Status of Resources and Training System
SST - Standard Space Trainer
StdV - Standards View
TO - Technical Order

Track to Budget

RDT&E			
Appn	BA	PE	
Air Force	3600	05	0604425F
	Project	Name	
	65A009	Space Fence	(Shared) (Sunk)
Air Force	3600	05	0604426F
	Project	Name	
	65A009	Space Fence	(Sunk)
Air Force	3600	05	1206426F
	Project	Name	
	65A009	Space Fence	

Notes

Prior to FY 2015 all funds were executed and reported in PE 0604225F (Space Situational Awareness Systems). Beginning in FY 2018, all funds will be executed and reported in PE 1206426F.

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2014 \$M			BY 2014 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	1567.7	1567.7	1724.5	1477.6	1594.2	1594.2	1487.6
Procurement	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flyaway	--	--	--	0.0	--	--	0.0
Recurring	--	--	--	0.0	--	--	0.0
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	0.0	--	--	0.0
Other Support	--	--	--	0.0	--	--	0.0
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1567.7	1567.7	N/A	1477.6	1594.2	1594.2	1487.6

Current APB Cost Estimate Reference

CAPE ICE dated May 23, 2014

Cost Notes

In accordance with Section 842 of the National Defense Authorization Act for FY 2017, which amended title 10 U.S.C. § 2334, the Director of Cost Assessment and Program Evaluation, and the Secretary of the military department concerned or the head of the Defense Agency concerned, must issue guidance requiring a discussion of risk, the potential impacts of risk on program costs, and approaches to mitigate risk in cost estimates for MDAPs and major subprograms. The information required by the guidance is to be reported in each SAR. This guidance is not yet available; therefore, the information on cost risk is not contained in this SAR.

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	1	1	1
Procurement	0	0	0
Total	1	1	1

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2019 President's Budget / December 2017 SAR (TY\$ M)									
Appropriation	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
RDT&E	1431.5	35.9	20.2	0.0	0.0	0.0	0.0	0.0	1487.6
Procurement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2019 Total	1431.5	35.9	20.2	0.0	0.0	0.0	0.0	0.0	1487.6
PB 2018 Total	1447.4	36.0	5.3	0.0	0.0	0.0	0.0	0.0	1488.7
Delta	-15.9	-0.1	14.9	0.0	0.0	0.0	0.0	0.0	-1.1

Funding Notes

Interim Contractor Support is 3021 funded. This period (FY 2019 and FY 2020) is included in the Operations & Sustainment Phase. Therefore, these funds are included in the total Life Cycle Cost, but not included in the Program Acquisition Cost.

Quantity Summary										
FY 2019 President's Budget / December 2017 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
Development	1	0	0	0	0	0	0	0	0	1
Production	0	0	0	0	0	0	0	0	0	0
PB 2019 Total	1	0	0	0	0	0	0	0	0	1
PB 2018 Total	1	0	0	0	0	0	0	0	0	1
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding							
3600 RDT&E Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2005	--	--	--	--	--	--	5.2
2006	--	--	--	--	--	--	6.6
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	13.8
2009	--	--	--	--	--	--	25.5
2010	--	--	--	--	--	--	62.8
2011	--	--	--	--	--	--	138.4
2012	--	--	--	--	--	--	111.4
2013	--	--	--	--	--	--	203.6
2014	--	--	--	--	--	--	279.3
2015	--	--	--	--	--	--	191.7
2016	--	--	--	--	--	--	230.7
2017	--	--	--	--	--	--	162.5
2018	--	--	--	--	--	--	35.9
2019	--	--	--	--	--	--	20.2
Subtotal	1	--	--	--	--	--	1487.6

Annual Funding							
3600 RDT&E Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2014 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2005	--	--	--	--	--	--	6.1
2006	--	--	--	--	--	--	7.5
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	15.0
2009	--	--	--	--	--	--	27.3
2010	--	--	--	--	--	--	66.4
2011	--	--	--	--	--	--	143.7
2012	--	--	--	--	--	--	113.7
2013	--	--	--	--	--	--	204.3
2014	--	--	--	--	--	--	276.5
2015	--	--	--	--	--	--	187.9
2016	--	--	--	--	--	--	222.9
2017	--	--	--	--	--	--	154.3
2018	--	--	--	--	--	--	33.5
2019	--	--	--	--	--	--	18.5
Subtotal	1	--	--	--	--	--	1477.6

Low Rate Initial Production

There is no LRIP for this program.

Foreign Military Sales

None

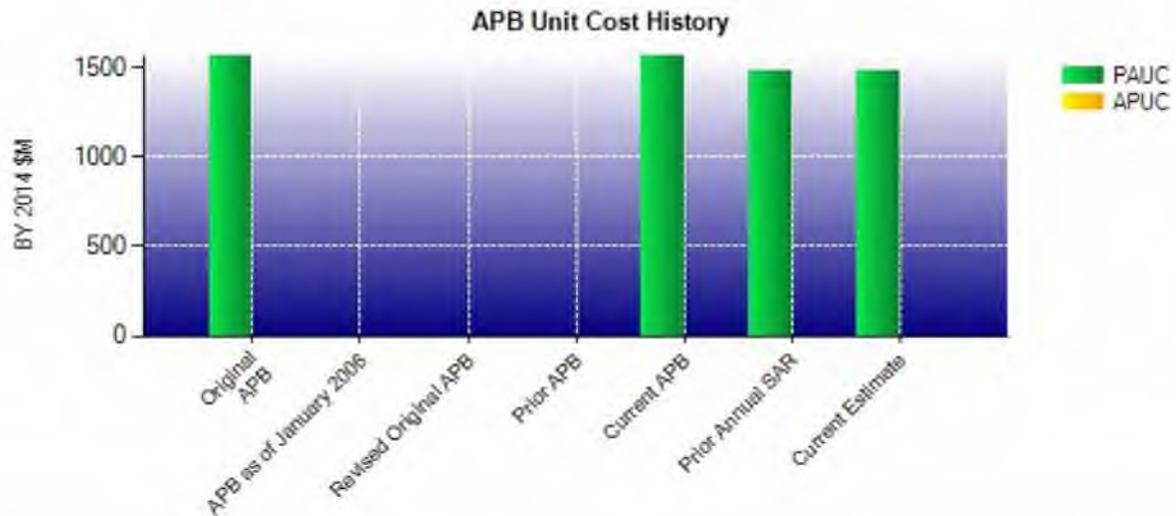
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2014 \$M	BY 2014 \$M	% Change
	Current UCR Baseline (Jun 2014 APB)	Current Estimate (Dec 2017 SAR)	
Program Acquisition Unit Cost			
Cost	1567.7	1477.6	
Quantity	1	1	
Unit Cost	1567.700	1477.600	-5.75
Average Procurement Unit Cost			
Cost	0.0	0.0	
Quantity	0	0	
Unit Cost	--	--	--

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2014 \$M	BY 2014 \$M	% Change
	Original UCR Baseline (Jun 2014 APB)	Current Estimate (Dec 2017 SAR)	
Program Acquisition Unit Cost			
Cost	1567.7	1477.6	
Quantity	1	1	
Unit Cost	1567.700	1477.600	-5.75
Average Procurement Unit Cost			
Cost	0.0	0.0	
Quantity	0	0	
Unit Cost	--	--	--



APB Unit Cost History					
Item	Date	BY 2014 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Jun 2014	1567.700	N/A	1594.200	N/A
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	N/A	N/A	N/A	N/A	N/A
Current APB	Jun 2014	1567.700	N/A	1594.200	N/A
Prior Annual SAR	Dec 2016	1478.000	N/A	1488.700	N/A
Current Estimate	Dec 2017	1477.600	N/A	1487.600	N/A

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)										
PAUC Development Estimate	Changes								PAUC Current Estimate	
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total		
1594.200	-14.000	0.000	0.000	0.000	-92.600	0.000	0.000	-106.600	1487.600	

Current SAR Baseline to Current Estimate (TY \$M)										
Initial APUC Development Estimate	Changes								APUC Current Estimate	
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total		
0.000	--	--	--	--	--	--	--	--	0.000	

An APUC Unit Cost History is not available, since no Initial APUC Estimate had been calculated due to a lack of defined quantities.

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	Jun 2009	N/A	Jun 2009
Milestone B	N/A	May 2014	N/A	May 2014
Milestone C	N/A	N/A	N/A	N/A
IOC	N/A	Jul 2019	N/A	May 2019
Total Cost (TY \$M)	N/A	1594.2	N/A	1487.6
Total Quantity	N/A	1	N/A	1
PAUC	N/A	1594.200	N/A	1487.600

Cost Variance

Summary TY \$M					
Item	RDT&E	Procurement	MILCON	Total	
SAR Baseline (Development Estimate)	1594.2	--	--	1594.2	
Previous Changes					
Economic	-12.6	--	--	-12.6	
Quantity	--	--	--	--	
Schedule	--	--	--	--	
Engineering	--	--	--	--	
Estimating	-92.9	--	--	-92.9	
Other	--	--	--	--	
Support	--	--	--	--	
Subtotal	-105.5	--	--	-105.5	
Current Changes					
Economic	-1.4	--	--	-1.4	
Quantity	--	--	--	--	
Schedule	--	--	--	--	
Engineering	--	--	--	--	
Estimating	+0.3	--	--	+0.3	
Other	--	--	--	--	
Support	--	--	--	--	
Subtotal	-1.1	--	--	-1.1	
Total Changes	-106.6	--	--	-106.6	
CE - Cost Variance	1487.6	--	--	1487.6	
CE - Cost & Funding	1487.6	--	--	1487.6	

Summary BY 2014 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	1567.7	--	--	1567.7
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-89.7	--	--	-89.7
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-89.7	--	--	-89.7
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-0.4	--	--	-0.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-0.4	--	--	-0.4
Total Changes	-90.1	--	--	-90.1
CE - Cost Variance	1477.6	--	--	1477.6
CE - Cost & Funding	1477.6	--	--	1477.6

Previous Estimate: December 2016

RDT&E	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	-1.4
Revised estimate for Below Threshold Reprogramming to the to the MILSATCOM Enhanced Polar System Program. (Estimating)	-9.7	-10.0
Reduced estimate for Small Business Innovation Research. (Estimating)	-5.6	-5.9
Additional funding for Risk Management Framework and Coherent Integration initiatives. (Estimating)	+13.6	+14.9
Adjustment for current and prior escalation. (Estimating)	+1.3	+1.3
RDT&E Subtotal	-0.4	-1.1

Contracts

Contract Identification	
Appropriation:	RDT&E
Contract Name:	Space Fence
Contractor:	Lockheed Martin Corp.
Contractor Location:	199 Borton Landing Rd Moorestown, NJ 08057
Contract Number:	FA8709-14-C-0001
Contract Type:	Fixed Price Incentive(Firm Target) (FPIF), Cost Plus Fixed Fee (CPFF), Cost (CR)
Award Date:	June 02, 2014
Definitization Date:	June 02, 2014

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
914.7	977.8	1	921.0	976.1	1	921.0	921.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to multiple awarded ECPs and Requests for Equitable Adjustment due to Differing Site Conditions.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/24/2017)	-20.6	-24.5
Previous Cumulative Variances	-16.5	-27.2
Net Change	-4.1	+2.7

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to higher than planned construction subcontractor costs and added Level of Effort incurred against design issues and delays during early integration and test.

The favorable net change in the schedule variance is due to efficiencies in materials and supplies procurement and fee adjustments.

Notes

Contract performance data is based solely on CLIN 0001 data from the contract.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	1	0.00%
Production	0	0	0	--
Total Program Quantity Delivered	0	0	1	0.00%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	1487.6	Years Appropriated	14
Expended to Date	1162.1	Percent Years Appropriated	93.33%
Percent Expended	78.12%	Appropriated to Date	1467.4
Total Funding Years	15	Percent Appropriated	98.64%

The above data is current as of February 12, 2018.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	May 01, 2014
Source of Estimate:	CAPE ICE
Quantity to Sustain:	1
Unit of Measure:	System
Service Life per Unit:	20.00 Years
Fiscal Years in Service:	FY 2019 - FY 2039

Space Fence Inc 1 unit of measure (system) consists of one control center and one radar site.

Sustainment Strategy

The Space Fence System will employ a two level maintenance and support concept (organizational and depot) similar to the current Space Surveillance Network (SSN) sensors. The development contractor will provide Interim Contractor Support (ICS), for both organizational and depot, for Increment 1 of the Space Fence system for up to two years after IOC for Kwajalein Atoll, Marshall Islands. During the ICS period, the contractor will perform both organizational and depot level maintenance on the Space Fence weapon system.

The Space Fence Depot Source of Report (DSOR) is complete and has indicated all Space Fence depot repairable workload (hardware and software) as well as cryptological equipment is considered core workload. Oklahoma City Air Logistics Center (OC-ALC) is designated as the depot for hardware and software and the Cryptologic Systems Group in San Antonio, TX is designated as the depot for cryptological equipment.

Planning activity for the depot maintenance with OC-ALC is underway to identify depot requirements and ensure proper activation of the sustainment capability at OC-ALC. As the activities progress, the information gained from the process, as well as the business case analysis, will influence sustainment support strategy after full operational capability. This will ensure the best mix of public and/or private capabilities will be used to sustain the system while meeting statutory requirements. Three essential areas are being addressed: (1) item management of parts (supply source), (2) depot repair, i.e., software/hardware maintenance, and (3) depot management type activities.

System logistics support for the Space Fence Inc 1 program will be performed over the life of the system, expected to be 20 years. This support includes maintenance and periodic technology refreshes to assure the system continues to meet required performance, and allows upgrades when mission requirements dictate as well as the government management of these processes.

The full product support package, including technical orders, support equipment, training, and initial spares, will be delivered by the development contractor prior to fielding, which will enable full sustainment of the system.

Antecedent Information

The Antecedent system is Air Force Space Surveillance System (AFSSS). AFSSS estimates are based on one unit with a service life of 15 years (FY 1998 to FY 2013). The AFSSS was closed October 1, 2013. Cost details were provided by the Air Force Total Ownership Cost database.

Annual O&S Costs BY2014 \$M		
Cost Element	Space Fence Inc 1 Average Annual Cost Per System	Air Force Space Surveillance System (AFSSS) (Antecedent) Average Annual Cost Per System
Unit-Level Manpower	5.221	0.705
Unit Operations	16.990	5.050
Maintenance	2.422	1.240
Sustaining Support	11.262	1.432
Continuing System Improvements	14.224	0.610
Indirect Support	9.828	1.595
Other	0.274	0.000
Total	60.221	10.632

Other costs include Depot Standup amortized over the 20 year design life.

Item	Total O&S Cost \$M			
	Space Fence Inc 1		Air Force Space Surveillance System (AFSSS) (Antecedent)	
	Current Development APB Objective/Threshold	Current Estimate		
Base Year	1208.6	1329.5	1204.3	159.5
Then Year	1554.1	N/A	1554.1	0.0

Disposal Cost is included in the Operating and Support Cost of the current APB objective and threshold for this program.

Equation to Translate Annual Cost to Total Cost

Total O&S Costs = Unitized cost * number of systems * service life per system

Total O&S Costs = \$60.221M * 1 Space Fence Inc 1 system * 20 year design life = \$1204M

O&S Cost Variance		
Category	BY 2014 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2016 SAR	1204.3	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	1204.3	

Disposal Estimate Details

Date of Estimate:	May 01, 2014
Source of Estimate:	CAPE ICE
Disposal/Demilitarization Total Cost (BY 2014 \$M):	Total costs for disposal of all System are 4.3