Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206425F / *Space Situation Awareness Systems*							
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	25.540	48.448	134.463	0.000	134.463	122.698	78.476	51.407	30.912	0.000	491.944
65A006: *Space Based Space Surveillance*	0.000	25.540	48.448	134.463	0.000	134.463	122.698	78.476	51.407	30.912	0.000	491.944
Program MDAP/MAIS Code: 328												

A. Mission Description and Budget Item Justification

Space Situational Awareness (SSA) is knowledge of all aspects of space related to operations as described in the approved SSA Initial Capabilities Document (ICD). As the foundation for space control, SSA encompasses intelligence on adversary space operations; surveillance of all space objects and activities; detailed reconnaissance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; and conducting integrated command, control, communications, processing, analysis, disseminations, and archiving activities. This program develops new Air Force sensors and improved information capabilities for integration across the SSA network. It also includes developmental planning and technology forecasting for future blocks and emerging needs.

The Space-Based Space Surveillance (SBSS) Block 10 satellite was launched September 2010 with a design life through 2018 and an extended operational capability through 2020. The SBSS Follow-On (SBSS FO) program will develop and deliver a system to continue providing space object surveillance from space post SBSS Block 10 End-of-Life. AFSPC and NRO have signed a Memorandum of Agreement (MOA) partnering SBSS FO with an NRO program based on overlapping requirements. The new partner program is called SILENTBARKER. SILENTBARKER requirements will be based on a Statement of Capabilities (SOC) and upon the current SSA ICD architectural requirements focused on protecting High Value Assets (HVAs). SILENTBARKER will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above the weather collection of satellite metric data only possible with a space-based sensor and then communicates its findings to the Joint Space Operations Center (JSpOC), National Space Defense Center (NSDC), and other classified users.

The Space Situational Awareness Environmental Monitoring (SSAEM) program is a subset of COSMIC-2 that provides three sensors for each of the six spacecraft of the COSMIC-2 constellation. These sensors measure ionospheric density and irregularities to mitigate adverse space weather impacts on communication, navigation, surveillance, and other radio frequency systems used by the warfighter.
Development activities enable deployment of new advanced sensors capable of searching for and identifying threats, tracking the expanding number of debris objects on orbit, as well as the increasing number of satellites launched by other nations, many of which are smaller and more capable than previous spacecraft. These activities are also required to better integrate the disparate elements of SSA in order to enable rapid and responsive space operations.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*

decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space Situational Awareness 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 the initial contract has been awarded conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production. Milestone B approval and requirements validation are imminent.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	23.945	48.448	83.075	0.000	83.075
Current President's Budget	25.540	48.448	134.463	0.000	134.463
Total Adjustments	1.595	0.000	51.388	0.000	51.388
• 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	1.595	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	51.388	0.000	51.388

Change Summary Explanation

FY 2017: $1.595M increase for SSAEM

FY 2019: $52.400M increase for SBSS Follow-On to fund partnership with NRO to Office of Director of National Intelligence (ODNI) Independent Cost Estimate (ICE) levels.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206425F / *Space Situation Awareness Systems*	Project (Number/Name) 65A006 / *Space Based Space Surveillance*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A006: *Space Based Space Surveillance*	0.000	25.540	48.448	134.463	0.000	134.463	122.698	78.476	51.407	30.912	0.000	491.944
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space-Based Space Surveillance (SBSS) Block 10 satellite was launched September 2010 with a design life through 2018 and an extended operational capability through 2020. The SBSS Follow-On (SBSS FO) program will develop and deliver a system to continue providing space object surveillance from space post SBSS Block 10 End-of-Life. AFSPC and NRO have signed a Memorandum of Agreement (MOA) partnering SBSS FO with an NRO program based on overlapping requirements. The new partner program is called SILENTBARKER. SILENTBARKER requirements will be based on a Statement of Capabilities (SOC) and upon the current Space Situational Awareness (SSA) Initial Capabilities Document (ICD) architectural requirements focused on protecting High Value Assets (HVAs). SILENTBARKER will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above the weather collection of satellite metric data only possible with a space-based sensor and then communicates its findings to the Joint Space Operations Center (JSpOC), National Space Defense Center (NSDC), and other classified users.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: SBSS Follow-On (SBSS FO) Design & Development	25.540	48.448	134.463
Description: Performs space based SSA analysis, research, and development for the SBSS FO system (SILENTBARKER). ***FY 2018 Plans:*** Award contract and hold NRO Acquisition Board to declare Milestone B. Begin development of SBSS FO (SILENTBARKER) with entry into Engineering and Manufacturing Development (EMD) phase. Perform risk reduction activities and analyses based on threat paradigm analyzed/out-briefed by the Space Security and Defense Programs (SSDP). ***FY 2019 Plans:*** Continue SBSS FO (SILENTBARKER) development in EMD phase. Prepare for and conduct Preliminary Design Review (PDR). Continue development in EMD phase in preparation for Critical Design Review in FY 2020. Continue analyses of associated ground mission data processing and scheduling in order to draft an acquisition approach for ground architecture and mission data processing. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $86.015M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	25.540	48.448	134.463

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Acquisition Strategy was approved to minimize the space-based SSA gap post-SBSS Block 10. The SBSS FO anticipates Initial Launch Capability (ILC) in FY 2022 with Full Operational Capability (FOC) by FY 2022. The SBSS FO Material Development Decision was approved by the Milestone Decision Authority on 5 April 2016. The Acquisition Strategy Panel (ASP) was completed with the MDA on 29 August 2016. To satisfy the SSA architecture needs, the SBSS FO program requirements combined with an NRO program and were updated in the December 2017 SILENTBARKER Statement of Capabilities. The SBSS FO program remains an Air Force program, but will leverage NRO processes to fulfill SBSS FO space segment and telemetry, tracking, and commanding (TT&C) program segments in order to further National Security Space objectives. Mutual investment for the non-recurring engineering (NRE) cost enables the potential for a larger initial constellation buy and lower unit costs. The Air Force and NRO will determine the approach to meet mission processing requirements and will develop the ground architecture.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBSS Follow On Prime Development	TBD	TBD : TBD	-	15.689	Sep 2017	36.824	Dec 2017	119.962	Dec 2018	-		119.962	236.476	408.951	-
SBSS Follow On Technical Mission Analysis	Various	Various : Various, CA	-	3.309	Oct 2016	3.385	Dec 2017	0.824	Dec 2018	-		0.824	3.465	10.983	-
		Subtotal	-	18.998		40.209		120.786		-		120.786	239.941	419.934	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	C/FFP	Aerospace Corp. : Los Angeles, CA	-	0.784	Oct 2016	0.808	Oct 2017	0.824	Oct 2018	-		0.824	3.465	5.881	-
A&AS	Various	Various : CA	-	5.703	Oct 2016	7.376	Oct 2017	12.753		-		12.753	39.687	65.519	-
Other Support	Various	Various : TBD	-	0.055	Oct 2016	0.055	Oct 2017	0.100	Oct 2018	-		0.100	0.400	0.610	-
		Subtotal	-	6.542		8.239		13.677		-		13.677	43.552	72.010	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	25.540		48.448		134.463		-		134.463	283.493	491.944	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

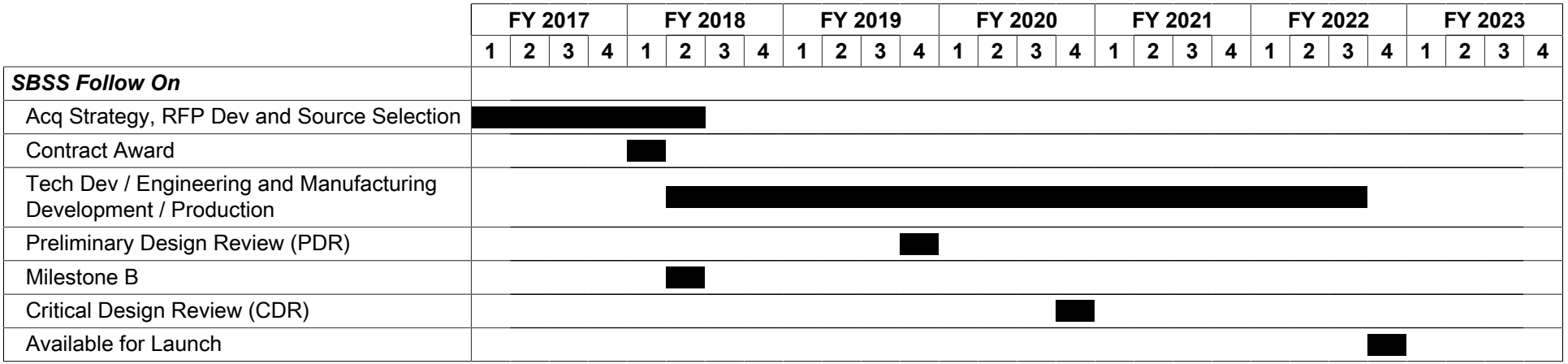

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SBSS Follow On				
Acq Strategy, RFP Dev and Source Selection	1	2017	2	2018
Contract Award	1	2018	1	2018
Tech Dev / Engineering and Manufacturing Development / Production	2	2018	3	2022
Preliminary Design Review (PDR)	4	2019	4	2019
Milestone B	2	2018	2	2018
Critical Design Review (CDR)	4	2020	4	2020
Available for Launch	4	2022	4	2022

Note

Event dates are aligned with SILENTBARKER program threshold schedule