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 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*							
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	-	34.818	68.719	34.585	0.000	34.585	33.145	54.802	55.821	56.527	Continuing	Continuing
644818: *Imaging and Targeting Support*	-	18.583	45.588	16.942	0.000	16.942	16.987	15.943	16.154	16.138	Continuing	Continuing
645148: *Common-Airborne Sense and Avoid (C-ABSAA)*	-	14.784	21.647	17.643	0.000	17.643	16.158	38.859	39.667	40.389	Continuing	Continuing
646025: *Data Compression*	-	1.451	1.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.935

Note

In FY 2019, PE 0604257F, Advanced Technology and Sensors, efforts (Detection Removal and Characterization Operation (DRACO), Sensor Open System Architecture (SOSA) and a majority of Advanced Synthetic Aperture Radar (ASARS 2B) within Project 644818, Imaging and Targeting Support, were transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 674818, Imaging and Targeting Support, in order to align projects with the proper budget activities.
In FY 2019, PE 0604257, Advanced Technology and Sensors, Data Compression effort was transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 676025, Data Compression.

A. Mission Description and Budget Item Justification

The Advanced Technology and Sensors (ATS) program coordinates the development of advanced technologies (sensors, data links, targeting networks and products, and quick reaction capabilities) in support of multiple airborne reconnaissance platforms, both manned and unmanned. Its objectives are to develop, demonstrate, and rapidly transition advanced, interoperable, multi-platform solutions to reduce the find, fix, target, and track kill chain timeline, and to provide safe separation and collision avoidance for remotely piloted aircraft. This program also coordinates the development of common collection, processing, and dissemination solutions for near-real time intelligence, surveillance, and reconnaissance. The ATS program also increases interoperability by developing common standards and interfaces.

The funds in this project are distributed in priority order for the goal of building a comprehensive Geospatial Intelligence (GEOINT) capability for the USAF. On an annual basis, developmental technologies are reviewed against warfighter capabilities and requirements based on strategic roadmaps and on the results of the Airborne Sensors for ISR Analysis of Alternatives, as prefaced in the Challenging Targets Initial Capabilities Document. Efforts advancing the technological maturity of promising sensors and processing capabilities are reviewed and prioritized into a recommended list for senior executive direction to implement in the coming year. The program office has the ability to initiate an I&TS project, within the GEOINT Capabilities Working Group (GCWG) construct but outside the normal annual GCWG vetting process, to expedite development and acquisition of urgently needed capabilities for the warfighter. ASARS 2B efforts include, but are not limited to, development, design, fabrication, integration, demonstration, and transition of high altitude, deep look Intelligence, Surveillance and Reconnaissance (ISR) radar.

Funds in any project can also cover activities to include studies and analysis to support both current program planning and execution and future program planning. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program

funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

The FY 19 funding request for Project 645148, Common Airborne Sense and Avoid, (C-ABSAA)was reduced by $4 million to account for the availability of prior year execution balances.

This program is in Budget Activity 4, Advanced Component Development and Prototypes because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	34.818	68.719	68.155	0.000	68.155
Current President's Budget	34.818	68.719	34.585	0.000	34.585
Total Adjustments	0.000	0.000	-33.570	0.000	-33.570
• 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	0.000	0.000			
• Other Adjustments	0.000	0.000	-33.570	0.000	-33.570

Change Summary Explanation

In FY 2019, funding decreased due to multiple projects (DRACO and SOSA) being transferred to Program 0305206F, Airborne Reconnaissance Systems (ARS) Project 674818, Imaging and Targeting Support, in order to establish efforts as programs of record. The majority of the ASARS 2B effort have also been transferred and will be reported under Program 0305206F, Project 674818, Imaging and Targeting Support. Additionally, the FY 19 funding request for Project 645148, Common Airborne Sense and Avoid, (C-ABSAA)was reduced to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*	Project (Number/Name) 644818 / *Imaging and Targeting Support*	

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
644818: *Imaging and Targeting Support*	-	18.583	45.588	16.942	0.000	16.942	16.987	15.943	16.154	16.138	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019, PE 0604257F, Advanced Technology and Sensors, efforts (Detection Removal and Characterization Operation (DRACO), Sensor Open System Architecture (SOSA) and a majority of Advanced Synthetic Aperture Radar (ASARS 2B) within Project 644818, Imaging and Targeting Support, were transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 674818, Imaging and Targeting Support, in order to align projects with the proper budget activities.

A. Mission Description and Budget Item Justification

The purpose of the Imaging and Targeting Support (I&TS) project is to develop, mature, demonstrate, and rapidly transition next-generation, persistent, wide area surveillance and common imagery reconnaissance sensor capabilities (active and passive systems), including sensor data processing, for multiple airborne platforms, as well as sensor products to aid in rapid targeting (geolocation models, sensor-based exploitation tools, sensor networking capabilities).

Developmental efforts pursued include: improved sensor capabilities such as hyperspectral imagery (HSI), measurement and signature intelligence, polarimetric imaging, ground moving target indication (GMTI), maritime search/track, Inverse Synthetic Aperture Radar, foliage penetration and additional radar, electro-optical, nuclear event detection, and other modalities; increased geolocation accuracy; increased dismount detection capability; advanced sensor data correlation; automated target detection; network centric warfare; and other ISR and associated planning and direction; collection; processing and exploitation; analysis and production; and dissemination capabilities. These efforts are intended to reduce both target search and kill chain timelines as well as supporting traditional intelligence activities. This project will also increase interoperability by developing common standards and interfaces.

The funds in this project are distributed in priority order for the goal of building a comprehensive GEOINT/Multi-INT capability for the USAF. On an annual basis, developmental technologies are reviewed against warfighter capabilities and requirements based on strategic roadmaps and on the results of the Airborne Sensors for ISR Analysis of Alternatives, as prefaced in the Challenging Targets Initial Capabilities Document. Efforts advancing the technological maturity of promising sensors and processing capabilities are reviewed and prioritized into a recommended list for senior executive direction to implement in the coming year. The program office has the ability to initiate an I&TS project, within the GCWG construct but outside the normal annual GCWG vetting process, to expedite development and acquisition of urgently needed capabilities for the warfighter. ASARS 2B efforts include, but are not limited to, development, design, fabrication, integration, demonstration, and transition of high altitude, deep look ISR radar.

Traditional focus areas include, but are not limited to: development, demonstration, and rapid transition of common radar and electro-optical sensors (Synthetic Aperture Radar (SAR), Low Frequency SAR, and antenna, Electro-Optical(EO), Infrared (IR), Hyperspectral Imagery (HSI), Light Detection And Ranging (LIDAR) and their operational modes (high resolution imagery, Ground and Dismount Moving Target Indication (GMTI/DMTI), persistent surveillance, wide area motion imagery, Spectral Identification) for multiple airborne platforms at all altitudes; development and demonstration of advanced tactical sensor and associated tasking, processing,

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

exploitation, and dissemination processing algorithms and tools (automatic registration, automatic and assisted target detection, network centric warfare). Development of integrated multi-sensor capabilities to detect and identify obscured targets; development and implementation of standards (Common GMTI/DMTI, National Imagery Transmission Format; and monitoring and enhancement of Imagery Intelligence product quality (radar and EO/IR imagery, GMTI data, and spectral information) and timeliness throughout the image chain (from sensor to user). Development and integration of airborne sensors to support an open systems architecture pod capability. These efforts focus on reducing the find, fix and track elements of the time critical targeting kill-chain timeline while improving operator and decision-maker efficiency and effectiveness.

Activities also include studies and analysis to support both current program planning and execution and future program planning. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Imaging & Targeting Support (I&TS)	9.505	24.505	15.492	-	15.492
Description: Develop/demonstrate and advance technical maturity of promising sensors and processing capabilities (ex: radar improvement, next-generation HSI, laser detection and ranging/laser identification detection and ranging, and data mitigation technologies). ***FY 2018 Plans:*** - Continue development, modernization, and demonstration of advanced sensors and detection and processing algorithms, hyperspectral imaging technologies, multiband EO/IR and SAR sensor systems, enhanced LIDAR capabilities, polarimetric imaging, and other GEOINT sensing modalities for Anti-Access Area Denial, permissive and non-permissive environments, foliage penetration, and littoral environments as well as other prioritized GCWG technology efforts. Other efforts include but are not limited to MTS-B, DRACO, Full Spectrum HSI MQ-9 Pod, Advanced Large Optical Freeform Telescope (ALOFT), Long Wave Infrared (LWIR) Polarization Information (PI), CERBERUS (Full Spectrum HSI in AgilePod (MQ-9)). Standoff High-altitude Enhanced Reconnaissance Long-range Operational Concept (SHERLOC) and other GCWG approved projects. ***FY 2019 Base Plans:*** - Will continue development, modernization, and demonstration of advanced sensors and detection and processing algorithms, hyperspectral imaging technologies, multiband EO/IR and SAR sensor systems, enhanced lidar capabilities, polarimetric imaging,and other GEOINT sensing modalities for Anti-Access Area Denial, permissive and non-permissive environments, foliage penetration, and littoral environments as well					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
as other prioritized GCWG technology efforts. Other efforts include but are not limited to CERBERUS (Full Spectrum HSI in AgilePod (MQ-9), SHERLOC, ALOFT, LWIR PI, and other GCWG approved projects. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 funding decreased due to a return to normal funding as well as the transfer of DRACO and SOSA to Program 0305206, Project 674818.					
Title: Advanced Synthetic Aperture Radar System (ASARS) 2B ***Description:*** Develop/design/fabricate/integrate/demonstrate/rapidly transition deep look high altitude ISR radar capabilities. ***FY 2018 Plans:*** - Develop/design/fabricate/integrate/demonstrate/rapidly transition deep look high altitude ISR radar capabilities. ***FY 2019 Base Plans:*** - Will continue to develop/design/fabricate/integrate/demonstrate/rapidly transition deep look high altitude ISR radar capabilities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decrease due to majority of effort moved to Program 0305206F, Project 674818, Imaging and Targeting Support.	6.078	21.083	1.450	-	1.450
Title: Nuclear Forensics - Prompt Diagnostics ***Description:*** Development of nuclear event detection and characterization capabilities. ***FY 2018 Plans:*** - Effort moved to National Technical Nuclear Forensics (NTNF) program (0207573F) in FY18. ***FY 2019 Base Plans:*** N/A	3.000	0.000	0.000	-	0.000
Accomplishments/Planned Programs Subtotals	18.583	45.588	16.942	-	16.942

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• RDTE 07 PE 0305202F: *Dragon U-2 (JIMP)*	37.217	34.486	48.883	-	48.883	38.682	16.994	17.120	17.428	Continuing	Continuing
• RDTE 07 PE 0305206F: *Airborne Reconnaissance Systems*	13.465	4.450	29.872	-	29.872	41.532	65.006	66.931	66.828	Continuing	Continuing

Remarks

A portion of the funding within the U-2 RDTE line will be used to support ASARS design, development, integration and test.

D. Acquisition Strategy

Imaging and Targeting Support efforts are prioritized on an annual basis by the GCWG, in accordance with the validated gaps in the Challenging Targets Initial Capabilities Document. Resulting funded efforts are then contracted for and/or executed by either various program offices, laboratories, industry, and/or other government agencies.

Advanced Synthetic Aperture Radar 2B efforts are conducted by Air Force Lifecycle Management Center/Intelligence, Surveillance, and Reconnaissance and Special Operations Forces Program Office(AFLCMC/WIN), in conjunction and cooperation with AFLCMC/HBG (Robins AFB) for flight test support.

Acquisition strategy is to maximize commercial and national development efforts and investment through multiple contracting methods, including the use of Engineering Change Proposals to modify existing contracts and new contracts that were awarded both competitively or on a sole source basis.

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 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

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
MTS-B Track Through Launch Transient	SS/CPFF	Raytheon : McKinney, TX	-	1.045	Mar 2017	0.342	Nov 2017	-		-		-	Continuing	Continuing	1.400
DRACO 4.0	SS/CPFF	Lockheed Martin : King of Prussia, PA	-	2.000	Jan 2017	1.900	Nov 2017	-		-		-	Continuing	Continuing	3.900
CERBERUS (Full Spectrum HSI AgilePod)	SS/CPFF	Raytheon : McKinney, TX	-	2.600	Apr 2017	2.458	Jan 2018	-		-		-	Continuing	Continuing	2.000
ALOFT	SS/CPFF	UTC Aerospace Systems : Westford, MA	-	-		1.400	Dec 2017	-		-		-	Continuing	Continuing	1.400
LWIR PI	C/CPFF	Raytheon : El Segundo, CA	-	-		2.000	Jan 2018	-		-		-	Continuing	Continuing	-
Agile Pod Harvest Reaper	SS/CPFF	Various : Various	-	1.615	Feb 2017	0.131	Dec 2017	-		-		-	Continuing	Continuing	0.200
SHERLOC	SS/CPAF	UTAS : Westford, MA	-	-		5.000	May 2018	5.000	Jan 2019	-		5.000	Continuing	Continuing	10.000
PROSIT	SS/CPAF	Various : Various	-	-		2.500	Feb 2018	2.250	Dec 2018	-		2.250	Continuing	Continuing	4.750
Other Technology Efforts (Prioritized by GCWG)	Various	Various : Various	-	2.619	Dec 2016	13.102	Dec 2017	5.607	Nov 2018	-		5.607	Continuing	Continuing	-
ASARS 2B	SS/CPIF	Raytheon : El Segundo, CA	-	3.409	Jul 2017	14.075	Mar 2018	1.450	Mar 2018	-		1.450	Continuing	Continuing	-
Nuclear Forensics - Prompt Diagnostics	MIPR	Various : Various	-	2.950	Feb 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	16.238		42.908		14.307		-		14.307	Continuing	Continuing	N/A

Remarks

On an annual basis, the GEOINT Capabilities Working Group reviews developmental technologies against warfighter capabilities and requirements based on strategic roadmaps and on the Airborne Sensors for ISR Analysis of Alternatives. Projects advancing the technological maturity of promising sensors and processing capabilities are reviewed and prioritized into a recommended list for senior executive direction to implement for the coming fiscal year.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

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
PMA: Other Govt Cost	Various	Various : Dayton, OH	-	2.345	Dec 2016	2.680	Nov 2017	2.635	Nov 2018	-		2.635	Continuing	Continuing	-
		Subtotal	-	2.345		2.680		2.635		-		2.635	Continuing	Continuing	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	-	18.583		45.588		16.942		-		16.942	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

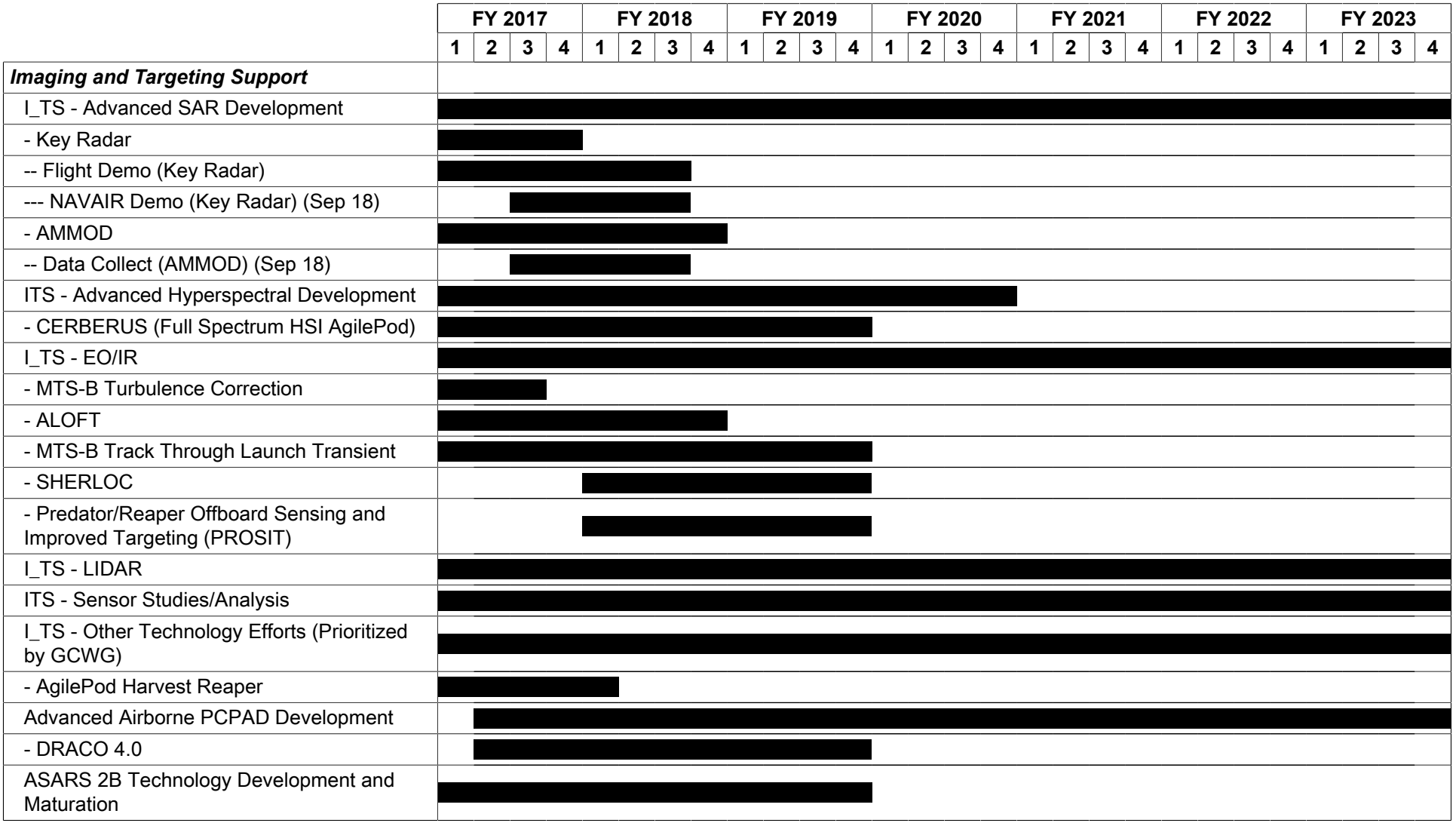

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
- ASARS 2B Flight Demonstration																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Imaging and Targeting Support				
I_TS - Advanced SAR Development	1	2017	4	2023
- Key Radar	1	2017	4	2017
-- Flight Demo (Key Radar)	1	2017	3	2018
--- NAVAIR Demo (Key Radar) (Sep 18)	3	2017	3	2018
- AMMOD	1	2017	4	2018
-- Data Collect (AMMOD) (Sep 18)	3	2017	3	2018
ITS - Advanced Hyperspectral Development	1	2017	4	2020
- CERBERUS (Full Spectrum HSI AgilePod)	1	2017	4	2019
I_TS - EO/IR	1	2017	4	2023
- MTS-B Turbulence Correction	1	2017	3	2017
- ALOFT	1	2017	4	2018
- MTS-B Track Through Launch Transient	1	2017	4	2019
- SHERLOC	1	2018	4	2019
- Predator/Reaper Offboard Sensing and Improved Targeting (PROSIT)	1	2018	4	2019
I_TS - LIDAR	1	2017	4	2023
ITS - Sensor Studies/Analysis	1	2017	4	2023
I_TS - Other Technology Efforts (Prioritized by GCWG)	1	2017	4	2023
- AgilePod Harvest Reaper	1	2017	1	2018
Advanced Airborne PCPAD Development	2	2017	4	2023
- DRACO 4.0	2	2017	4	2019
ASARS 2B Technology Development and Maturation	1	2017	4	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
- ASARS 2B Flight Demonstration	3	2018	4	2018

Note

Starting in FY 2019, DRACO and SOSA efforts were transferred from PE 0604257F, Advanced Technology and Sensors, Project 644818, Imaging and Targeting Support transferred to PE 0305206F, Airborne Reconnaissance Systems, Project 674818. Also, the majority of ASARS will be reported under PE 0305206F, Project 674818, Imaging and Targeting Support.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*	Project (Number/Name) 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*	

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
645148: *Common-Airborne Sense and Avoid (C-ABSAA)*	-	14.784	21.647	17.643	0.000	17.643	16.158	38.859	39.667	40.389	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Common-Airborne Sense and Avoid (C-ABSAA) is an analysis development, maturation and transition effort in the Materiel Solutions Analysis phase of the acquisition lifecycle which supports emerging warfighter requirements to fully integrate Group 4-5 Remotely Piloted Aircraft (RPA) into the National Airspace System (NAS), international airspace, other nations' sovereign airspace, and operational combat airspace to conduct the entire range of military operations across all mission environments.

C-ABSAA also supports the "Worldwide Operations" key performance parameter in larger RPA requirement documents, and Public Law 112-239 directing DoD collaboration with the Federal Aviation Administration (FAA) and the National Air and Space Administration (NASA) to safely integrate RPA in the NAS. Funding in this project supports the development of a Sense and Avoid (SAA) capability set for Group 4-5 RPA and covers analysis, research, developmental, demonstration, and transition activities as well as infrastructure and other government costs.

Ongoing activities include support to the development of warfighter requirements and analysis of possible solution alternatives, collaboration with the FAA, NASA, and the other Services to develop national policy and standards, and SAA related studies, analysis, modeling and simulation, flight demonstrations of critical technologies, and program transition planning and project execution. RPA platform specific integration and testing is not included.

Activities also include studies and analysis to support both current and future program planning and execution. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Sense and Avoid (SAA)-Related Requirements Development and Analysis, National Policy Standards Development, and Technology Development and Demonstration	14.784	21.647	17.643	-	17.643
Description: Support development and analysis of warfighter requirements and analysis of possible solution alternatives. Develop SAA technology and capabilities for Group 4-5 remotely. Collaborate with the Federal Aviation Administration, National Air and Space Administration, and other Services to develop national policy and standards. Conduct SAA related studies, analysis, modeling and simulation, demonstrations, program transition planning and project execution.					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: - Complete C-ABSAA Materiel Solution Analysis activities - Begin C-ABSAA Technology Maturation & Risk Reduction Phase - Support development of Capabilities Development Document and System Requirements Document/Technical Requirements Document - Prepare/present all documentation/results as part of C-ABSAA Milestone A decision review - Continue to build and exercise modeling and simulation capabilities to support requirements analysis, cost/capability trades, policy/standards development, and technology maturation and availability evaluation. - Continue SAA science and technology research and development with AFRL for future planning and development. - Continue to collaborate with FAA, NASA, and other Services and agencies on national policy and standards - Begin design/development of open modular architecture to minimize A/C integration costs and facilitate capability upgrades. ***FY 2019 Base Plans:*** - Will continue C-ABSAA Technology Maturation & Risk Reduction Phase - Will support validation of CDD and System Requirements Document/Technical Requirements Document - Will prepare/present all documentation/results as part of C-ABSAA Milestone B decision review - Will continue to collaborate with FAA, NASA, and other Services and agencies on national policy and standards - Will continue development/test/certification of open modular architecture. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 19 funding decrease was a reduction due to prior year balances.					
Accomplishments/Planned Programs Subtotals	14.784	21.647	17.643	-	17.643

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

C-ABSAA materiel solutions will be developed by the Air Force Life Cycle Management Center's Sensors Program Office under direction of the Program Executive Office for Intelligence, Surveillance, and Reconnaissance and Special Operations Forces, in response to a deliberate requirements definition process. C-ABSAA will integrate applicable Better Buying Power 3.0 initiatives throughout its acquisition lifecycle and rely upon acquisition of government data rights to maximize contractor

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

competition from technology development through production. The program intends to provide the warfighter with platform independent sense and avoid capability for Group 4-5 RPA through increased, time-phased capability improvements as technology and risks achieve satisfactory levels. Group 4-5 RPA platforms will be expected to integrate C-ABSAA capability into their unique systems either via retrofit or in design, development, and/or production.

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 / 4	R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*	Project (Number/Name) 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*	

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
C-ABSAA Technology Development	C/Various	Various : Various, NV	-	13.254	Oct 2016	20.071	Oct 2017	16.020	Oct 2018	-		16.020	Continuing	Continuing	-
		Subtotal	-	13.254		20.071		16.020		-		16.020	Continuing	Continuing	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
Program Management Administration (PMA)	Various	Various : Various, NV	-	1.530	Oct 2016	1.576	Oct 2017	1.623	Oct 2018	-		1.623	Continuing	Continuing	-
		Subtotal	-	1.530		1.576		1.623		-		1.623	Continuing	Continuing	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	-	14.784		21.647		17.643		-		17.643	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

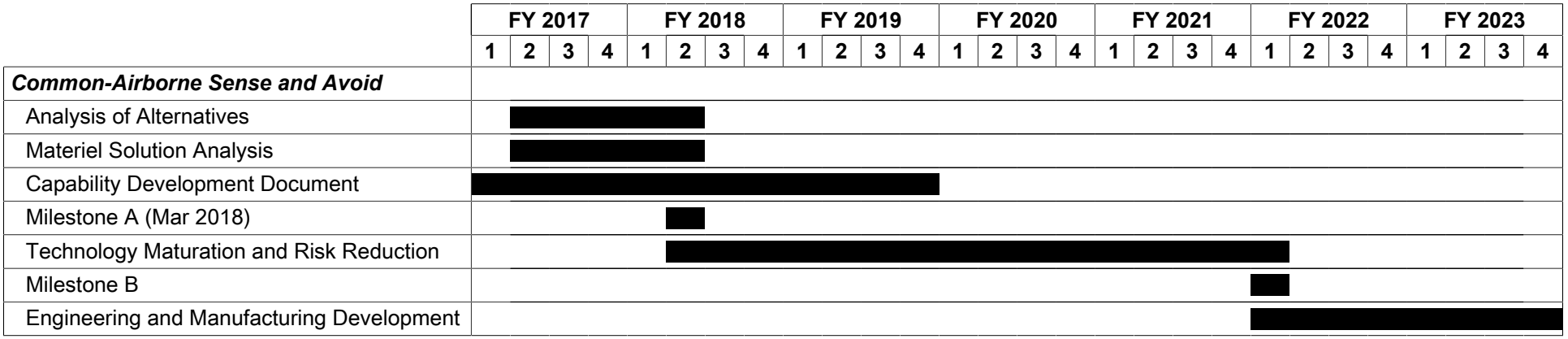

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Common-Airborne Sense and Avoid				
Analysis of Alternatives	2	2017	2	2018
Materiel Solution Analysis	2	2017	2	2018
Capability Development Document	1	2017	4	2019
Milestone A (Mar 2018)	2	2018	2	2018
Technology Maturation and Risk Reduction	2	2018	1	2022
Milestone B	1	2022	1	2022
Engineering and Manufacturing Development	1	2022	4	2023

Note

In FY15, efforts were reported in PE 0305220F, RQ-4, Project 675148, Common Airborne Sense and Avoid (C-ABSAA). In FY16, efforts were reported in PE 0305206F, Airborne Reconnaissance Systems, Project 675148, C-ABSAA.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*	Project (Number/Name) 646025 / *Data Compression*	

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
646025: *Data Compression*	-	1.451	1.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.935
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019, PE 0604257, Advanced Technology and Sensors, Data Compression effort was transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 676025, Data Compression.

A. Mission Description and Budget Item Justification

The Data Compression effort provides the warfighter with capability to efficiently compress and decompress airborne ISR sensor data and transmit near real time to tactical users through current and future bandwidth limited commercial satellite communications (SATCOM) or military SATCOM. The effort develops, tests, and will implement new sensor data compression and decompression algorithms for current and emerging airborne ISR sensors. Additionally, the program develops compression and decompression capabilities for manned and unmanned airborne platforms, associated ground stations, and Distributed Common Ground System (DCGS). Outputs will meet standard certification for use within the Department of Defense GEOINT and Measurement and Signatures Intelligence(MASINT) architectures. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Reduction of Data Using Compression Enhancements (RDUCE)	1.451	1.484	0.000	0.000	0.000
Description: The Data Compression effort provides the warfighter a capability to efficiently compress and decompress airborne Intelligence, Surveillance, and Reconnaissance (ISR) sensor data and transmit near real time to tactical users through current and future bandwidth limited commercial satellite communications (SATCOM) or military SATCOM. The effort will develop, test and implement new sensor data compression and decompression algorithms for current and emerging airborne ISR sensors. Additionally, the program develops compression and decompression capabilities for manned and unmanned airborne platforms, associated ground stations, and the DCGS. Outputs will meet standard certification for use within the Department of Defense GEOINT and MASINT architectures. ***FY 2018 Plans:*** - Will continue to develop and test our existing data compression capabilities including SAR, Phase History SAR and HSI/MSI. - Will develop compression capabilities for other phenomenologies,					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
including, but not limited to, SIGINT, LIDAR, and EO/IR. - Will support integration of compression capabilities into operational sensors including, but not limited to, the U2/ASARS, Global Hawk MP-RTIP/EISS, and Reaper/LynxSAR. - Will continue to develop and test compression and decompression algorithms for Persistent SAR and Smart Data Discrimination. - Will continue to develop documentation for DoD and international standards acceptance of our compression capabilities. - Will continue to provide engineering services for algorithm familiarization, assessment, and improvement. - Will continue to participate in SOSA (and other open standards) planning and integration. ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** - Funding decreased due to effort transferred and reported under Program 0305206, Project 676025, Data Compression.					
Accomplishments/Planned Programs Subtotals	1.451	1.484	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Data Compression acquisition approach is to design and develop compression and decompression technology hardware and software components, interfaces and standards for various airborne intelligence, surveillance, and reconnaissance platforms, ground stations, data storage facilities, and exploitation tools utilizing existing contracts with full and open competition where appropriate. Integration will be accomplished by the requisite program offices.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

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 / 4	R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*	Project (Number/Name) 646025 / *Data Compression*	

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
LIDAR Integration	MIPR	AFRL : Dayton, OH	-	-		0.000	Feb 2018	0.000		-		0.000	Continuing	Continuing	-
Technology Development	C/CPFF	General Atomics : San Diego, CA	-	0.707	Dec 2016	1.312		0.000		-		0.000	Continuing	Continuing	-
ASARS 2B Integration	C/CPFF	Raytheon : El Segundo, CA	-	-		0.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.707		1.312		0.000		-		0.000	Continuing	Continuing	N/A

Support ($ 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
Common Sense Testbed Demonstration Support	MIPR	AFRL : Dayton, OH	-	0.250	Oct 2016	0.000	Oct 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.250		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Test and Evaluation ($ 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
Phase History Flight Test	C/CPFF	AFRL : Dayton, OH	-	0.250	Apr 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.250		-		-		-		-	Continuing	Continuing	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
Program Office Support	Various	Govt/Contractors : Dayton, NV	-	0.244	Oct 2016	0.172	Oct 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.244		0.172		0.000		-		0.000	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*	Project (Number/Name) 646025 / *Data Compression*	

	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	-	1.451		1.484		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

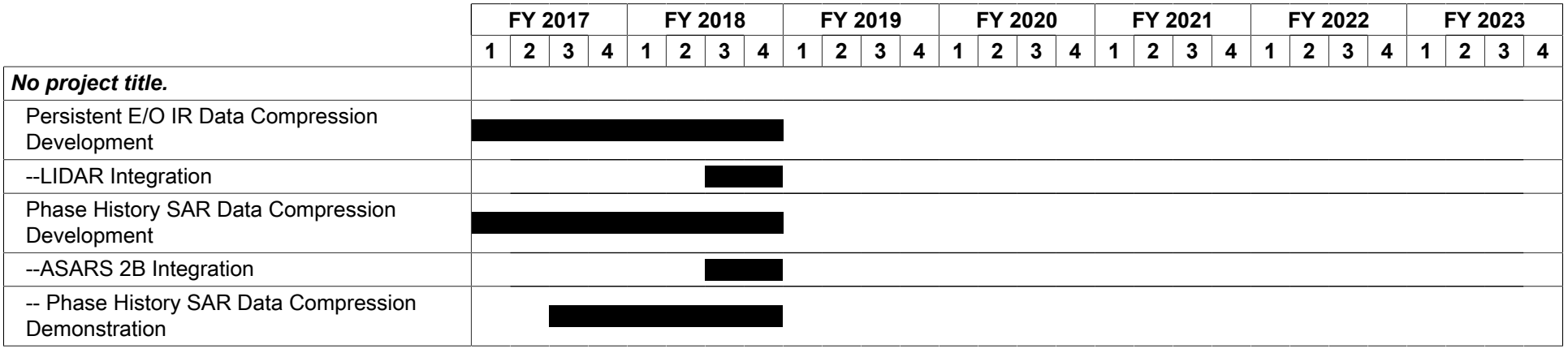

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
Persistent E/O IR Data Compression Development	1	2017	4	2018
--LIDAR Integration	3	2018	4	2018
Phase History SAR Data Compression Development	1	2017	4	2018
--ASARS 2B Integration	3	2018	4	2018
-- Phase History SAR Data Compression Demonstration	3	2017	4	2018

Note

In FY 2015, efforts were reported under PE 0305208F, Distributed Common Ground/Surface Systems, Project 676025, Data Compression. In FY 2016, efforts were reported in PE 0305206F, Airborne Reconnaissance Systems, Project 676025, Data Compression. In FY 2017, PE 0305206F, Airborne Reconnaissance Systems, Project 676025, Data Compression, efforts transferred to PE 0604257F, Advanced Technology and Sensors, Project 646025, Data Compression.