Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force											Date: May 2017	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	-	61.742	3.841	4.450	0.000	4.450	4.516	4.603	3.607	3.680	Continuing	Continuing
674818: *Imaging and Targeting Support*	-	21.534	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
675092: *JTC/SIL MUSE*	-	3.475	3.841	3.429	0.000	3.429	3.480	3.548	3.607	3.680	Continuing	Continuing
675148: *Common-Airborne Sense and Avoid (C-ABSAA)*	-	19.735	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
675291: *Gorgon Stare*	-	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.000
675292: *Hyperspectral Sensors*	-	2.195	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
676025: *Data Compression*	-	4.803	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
676031: *Dismount Detection RADAR*	-	0.000	0.000	1.021	0.000	1.021	1.036	1.055	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Airborne Reconnaissance Systems (ARS) 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 (RPAs). It provides for modeling/simulation, training and systems engineering. This program also coordinates the development of common collection, processing, and dissemination solutions for near-real time Intelligence, Surveillance, and Reconnaissance (ISR).

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 is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force	Date: May 2017
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	60.142	3.841	3.419	0.000	3.419
Current President's Budget	61.742	3.841	4.450	0.000	4.450
Total Adjustments	1.600	0.000	1.031	0.000	1.031
• 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	1.600	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	1.031	0.000	1.031

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2016	FY 2017
Project: 675291: *Gorgon Stare*		
Congressional Add: *Wide-Area Motion Imagery*	10.000	0.000
Congressional Add Subtotals for Project: 675291	10.000	0.000
Congressional Add Totals for all Projects	10.000	0.000

Change Summary Explanation

- In FY 2016, $1.6M Below Threshold Reprogramming for Agile Pod Phase I, Harvest Reaper, an MQ-9 demonstration project.
- In FY 2018, $1.031 increase to fund Next Generation ISR platforms and sensors integration

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 674818 / *Imaging and Targeting Support*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
674818: *Imaging and Targeting Support*	-	21.534	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 Intelligence, Surveillance, and Reconnaissance (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, as supported by the Challenging Targets Initial Capabilities Document and set by the Geospatial Intelligence (GEOINT) Capabilities Working Group, for the goal of building a comprehensive GEOINT capability for the USAF. On an annual basis, developmental technologies are reviewed against warfighter capabilities and requirements based on strategic roadmaps and 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.

Activities also include studies and analysis to support both current program planning and execution and future program planning.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Imaging and Targeting Support (I&TS)	21.434	0.000	0.000	-	0.000
Description: Developed/demonstrated and advance technical maturity of promising sensors and processing capabilities (ex: radar improvement, next-generation hyperspectral imagery (HSI), laser radar/light detection and ranging (LADAR/LIDAR), and data mitigation technologies).					
FY 2016 Accomplishments:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674818 / *Imaging and Targeting Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continued development, upgrade, and demonstration of advanced sensors and detection and processing algorithms, hyperspectral imaging technologies, multiband Electro-Optical/Infra-Red and Synthetic Aperture Radar sensor systems, enhanced light detection and ranging capabilities, polarimetric imaging, and other Geospatial Intelligence sensing modalities for Anti-Access Area Denial, permissive and non-permissive environments, foliage penetration, and littoral environments. ***FY 2017 Plans:*** - FY 2017 activities will be reported under PE 0604257F, Project 644818, Imaging and Targeting Support. ***FY 2018 Base Plans:*** - FY 2018 activities will be reported under PE 0604257F, Project 644818, Imaging and Targeting Support.					
Title: Advanced Synthetic Aperture Radar System (ASARS) 2B ***Description:*** Designed/fabricated/integrated/demonstrated completion of technical maturation effort for deep look high altitude synthetic aperture radar. Includes total government and contractor costs for this project. ***FY 2016 Accomplishments:*** - Continued technical maturation effort for deep look high altitude SAR. ***FY 2017 Plans:*** - FY 2017 activities will be reported under PE 0604257F, Project 644818, Imaging and Targeting Support. ***FY 2018 Base Plans:*** - FY 2018 activities will be reported under PE 0604257F, Project 644818, Imaging and Targeting Support.	0.100	0.000	0.000	-	0.000
Accomplishments/Planned Programs Subtotals	21.534	0.000	0.000	-	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• RDTE: BA07: PE 0305202F: *Dragon U-2 (JMIP)*	34.471	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000

Remarks

A portion of the funding within the U-2 RDT&E line will be used to advance Advanced Synthetic Aperture Radar (ASARS) design, development, test and demonstration.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674818 / *Imaging and Targeting Support*

D. Acquisition Strategy

Imaging and Targeting Support efforts are prioritized on an annual basis by the Geospatial Intelligence Capabilities Working Group, 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.

ASARS technology maturation is conducted by Air Force Life Cycle Management Center/Intelligence, Surveillance, and Reconnaissance and Special Operations Forces (AFLCMC/WIN), in conjunction and cooperation with AFLCMC/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-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 675092 / *JTC/SIL MUSE*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
675092: *JTC/SIL MUSE*	-	3.475	3.841	3.429	0.000	3.429	3.480	3.548	3.607	3.680	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Technology Center/Systems Integration Laboratory (JTC/SIL) is a center of technical excellence to support Unmanned Aircraft Systems (UAS) and Remotely Piloted Aircraft (RPA) programs within the services. The mission includes Service-specific and Joint Command, Control, Communications, Computers and Intelligence, Surveillance, and Reconnaissance (C4ISR) programs throughout DoD. The JTC/SIL provides a Government testbed for interoperability, rapid prototyping, technology insertion and transition, systems engineering, modeling/simulation, training and C4ISR optimization. The cornerstone of JTC/SIL's diverse tool set is the Multiple Unified Simulation Environment (MUSE), which is the DoD simulation/training system of choice for many UAS, RPA and Intelligence, Surveillance, and Reconnaissance systems. The MUSE is also known as the Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS) in its Air Force application. The MUSE/ AFSERS simulates Air Vehicles, Sensors, Datalinks, Takeoff and Landing Systems, and to some degree, surrogate UAS and RPA ground stations, when actual ground stations are unavailable.

The Services and combatant commanders have a requirement for the capability to train with a system that provides a real-time simulation environment containing multiple intelligence systems that can be integrated with larger force-on-force simulations. The MUSE creates a realistic operational environment which supports the ability to assess military utility, architecture and concept of employment development, and Tactics, Techniques, and Procedures refinement, conduct emerging concepts experimentation, and optimize C4ISR within warfighting exercises and experiments. It is the preferred simulation system used by the combatant commanders and Joint Services to support command and battle staff C4ISR training.

The MUSE/AFSERS also creates a realistic operational environment that supports: an embedded training capability for multiple Program Managers; tools to minimize acquisition and life cycle cost and schedule impacts; ability to conduct emerging concepts experimentation, future systems exploration, systems integration, and technology insertion; applications for Joint and Service-specific warfighting exercises; and C4ISR optimization.

MUSE/AFSERS is currently in use within all Services and most unified commands simulating MQ-1, MQ-9, RQ-4, MQ-1C, M/RQ-5, RQ-7, national and commercial satellite collectors, P-3, E-8, and the U-2. During warfighting exercises, the JTC/SIL integrates imagery simulations with associated C4ISR systems to support the execution of critical imagery processes. For those assets normally not available for training, the JTC/SIL provides surrogate systems and interfaces. Distributed training environments, virtually linking participants from various locations worldwide, are routinely supported within the MUSE architecture. The MUSE/AFSERS is also used as a mission rehearsal tool for current, on-going military combat operations.

The JTC/SIL supports the Office of the Secretary of Defense UAS Task Force staff and the Standards and Interoperability Integrated Product Team, as well as the joint team working the Ground Segment Interface. The JTC/SIL is the primary custodian of this interface and in that role performs various supporting tasks including development of tools for helping the definition and execution of open architecture for joint service ground control systems, developing and maintaining Standardization Agreement 45 joint interoperability tasks to be defined on an annual basis.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675092 / *JTC/SIL MUSE*

Activities also include studies and analysis supporting current and future program planning and project execution.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS) Development	3.475	3.841	3.429	-	3.429
Description: DoD's simulation/training system of choice for Intelligence Surveillance and Reconnaissance systems, sensors, and platforms. Includes AFSERS, Common Ground Station Interface, and infrastructure support. ***FY 2016 Accomplishments:*** - Advanced redesign the Vignette Planning and Rehearsal Software by implementing a Service Oriented Architecture to facilitate external users developing generic solutions and to optimize the software baseline to maintain pace with the training audience's requirements, thereby reducing the costs of travel and training. - Redesigned Multiple Unified Simulation Environment (MUSE/AFSERSU2/RQ-4) Fixed Frame Imagery simulation Capability. - Designed and implemented a Heads Up Display (HUD) wizard. - Completed the full virtualization of MUSE/AFSERS. - Continued to implement Web enabled MUSE/AFSERS that will allow users to train via a web browser, without needing the MUSE/AFSERS software installed on their systems. - Implemented ports management into the MUSE/AFSERS baseline to better facilitate Information Assurance guidance and to be in accordance with the upcoming Risk Management Framework that will replace Department of Defense Information Assurance and Accreditation Process. - Provided Exercise Support for Unified Endeavor, Key Resolve (Korean Air Simulation Center & Korean Battle Simulation Center) & Ulchi Freedom Guardian. - Continued Intel Simulation Training support at Goodfellow Air Force Base. ***FY 2017 Plans:*** - Continue HUD creator - Redesign Windows Entity Server and NeLink software tools to support the increased scale of exercises - Redesign Control Station Surrogate to support the increased scale of exercises while leveraging technology advances - Continue migration of legacy code to C# and/or 64 Bit - Migrate from Department of Defense Information Assurance and Accreditation Process to RMF - Enhance Weaponization capability					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675092 / *JTC/SIL MUSE*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continue integration with Night Vision Image Generator (NVIG) ***FY 2018 Base Plans:*** - Will continue integration of NVIG into the Modeling & Simulation domain as it pertains to unmanned aircraft systems simulation. Terrain, and model development for NVIG and Virtual Reality Scene Generator to increase fidelity. - Will continue support of theater level exercises: Ulchi Freedom Guardian, Key Resolve and Pacific Sentry. - Will work on the Global Hawk trainer, blocks 30 & 40. - Will support improvement of mapping capability for mission planning. - Will redesign Windows Entity Server and NetLink to improve network routing, thus lessening bandwidth consumption. - Will incorporate Common Image Generator Interface to provide an Image Generator (IG) agnostic solution to allow other IGs to be supported. - Will continue to implement tactical protocols into the simulation domain to enhance interoperability. - Will continue development of a HUD designer application that will allow for the creation and modification of HUDs without having to touch the software baseline thereby reducing costs and increasing fidelity and speed of solution in theater. - Will redesign the generic 6 Degree of Freedom application that will allow for creation of new platforms without touching code; again a reduction in costs and increased solution delivery speed.					
Accomplishments/Planned Programs Subtotals	3.475	3.841	3.429	-	3.429

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• RDTE: BA07: PE 0305204A: *Tactical Unmanned Aerial Vehicles*	2.498	3.942	4.568	0.000	4.568	4.615	4.832	4.979	5.231	Continuing	Continuing

Remarks

D. Acquisition Strategy

This is an enterprise services effort, jointly funded and centrally managed by the US Army. AFLCMC/WIN MIPRs funds in support of Unmanned Aircraft Systems modeling and simulation efforts.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675092 / *JTC/SIL MUSE*

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-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 675148 / *Common-Airborne Sense and Avoid (C-ABSAA)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
675148: *Common-Airborne Sense and Avoid (C-ABSAA)*	-	19.735	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Common-Airborne Sense and Avoid (C-ABSAA) is an analysis and developmental effort in the pre-Materiel Development Decision 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, and developmental 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 other Services to develop national policy and standards, and SAA related studies, analysis, modeling and simulation, program planning and project execution. RPA platform specific integration and testing is not included.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Sense and Avoid (SAA) Related Requirements Development and Analysis, National Policy Standards Development, and Technology Development and Demonstration	19.735	0.000	0.000	0.000	0.000
Description: Support development and analysis of warfighter requirements and analysis of possible solution alternatives. Develop SAA technology and capabilities for Group 4-5 remotely piloted aircraft. 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 planning and project execution.					
FY 2016 Accomplishments: - Continued Developmental Planning/Pre-Analysis of Alternatives activity leading to a Material Development Decision - Continued to collaborate with FAA, NASA, and other Services on national policy and standards, and to build and exercise modeling and simulation capabilities to support requirements, policy/standards, and technology development					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continued SAA science and technology research and development with the Air Force Research Labratory ***FY 2017 Plans:*** - FY 2017 efforts will be reported under PE 0604257F, Advanced Technology and Sensors, Project 645148, Common-Airborne Sense & Avoid (C-ABSAA). ***FY 2018 Base Plans:*** - FY 2018 efforts will be reported under PE 0604257F, Advanced Technology and Sensors, Project 645148 C-ABSAA. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	19.735	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Common-Airborne Sense and Avoid (C-ABSAA) will integrate Better Buying Power 3.0 initiatives throughout its acquisition lifecycle and rely upon acquisition of government data rights to maximize contractor competition from Technology Development through Production. The program uses an incremental acquisition strategy to provide the warfighter with sense and avoid capability for Group 4-5 Remotely Piloted Aircraft (RPA) with increased, time-phased capability improvements as technology and risks achieve satisfactory levels. Group 4-5 RPA platforms will be expected to integrate the C-ABSAA provided capability into their unique systems 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-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 675291 / *Gorgon Stare*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
675291: *Gorgon Stare*	-	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Gorgon Stare system is a podded airborne sensor suite that provides city-sized wide area airborne surveillance and is integrated on specially-modified MQ-9 Reaper Remotely Piloted Aircraft (RPA). The Air Force Requirements Oversight Council (AFROC) approved Air Combat Command's recommendation to transition Gorgon Stare from a Quick Reaction Capability (QRC) to an Air Force Enduring Capability in November 2014. Gorgon Stare's requirements are documented in the Gorgon Stare Wide Area Airborne Sensor Capabilities Production Document (draft).

Development efforts conducted with FY 2014 Congressionally-added RDT&E funds included system integration lab testing of Near Vertical Direction Finding (NVDF) with Gorgon Stare Increment 2 Wide Area Motion Imagery (WAMI) sensors. Funds spent on NVDF will provide a ramp for future airborne integration efforts as required. Development efforts conducted with FY 2015 Congressionally-added funds included efforts focused primarily on beyond line of sight in support of an Urgent Operational Need. Development efforts conducted with FY 2016 Congressionally-added funds continued development efforts associated with NVDF integration and furthered RDT&E efforts for persistent day and night WAMI capability.

Activities also include studies and analysis to support both current program planning and execution as well as future program planning.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017
Congressional Add: Wide-Area Motion Imagery	10.000	0.000
FY 2016 Accomplishments: Continued development activities associated with near vertical direction finding integration.		
FY 2017 Plans: N/A		
Congressional Adds Subtotals	10.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• N/A: *N/A*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-

Remarks

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675291 / *Gorgon Stare*

D. Acquisition Strategy

The wide area airborne surveillance requirement is being delivered via the Gorgon Stare podded wide area motion imagery sensor suite integrated on dedicated, specially-modified MQ-9 Reaper RPA. Gorgon Stare transitioned from a QRC to an Air Force Enduring Capability under AFROC authority in November 2014. The program is executed by the 645 Aeronautical Systems Group, Intelligence, Surveillance, and Reconnaissance and Special Operations Forces Directorate as a post-MS C program. The sensor suite will be sustained in its current configuration. Any future capability upgrades will be fielded as a result of validated -1067s or Urgent Operational Needs.

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-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 675292 / *Hyperspectral Sensors*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
675292: *Hyperspectral Sensors*	-	2.195	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Hyperspectral Sensors project develops Hyperspectral Imagery (HSI) sensors and capabilities for MQ-1 remotely piloted aircraft and other manned or unmanned aircraft. Within this project, the Airborne Cueing & Exploitation System-Hyperspectral (ACES HY) program helps to fulfill a portion of the sponsoring combatant command and Central Command's current HSI requirements. The ACES HY program developed sensors for the MQ-1B Predator Block 15 and included development of the required training, maintenance and fielding plans to support a working architecture.

Activities within this project also include studies and analysis supporting current and future program planning and tech development for advanced HSI sensors and capabilities, including high altitude HSI sensor developments per the HSI strategic roadmap.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Airborne Cueing & Exploitation System - Hyperspectral (ACES HY)	2.195	0.000	0.000	-	0.000
Description: Develop capability enhancements for the ACES HY sensor system. Provide support data to accompany sensors and modifications. Tech development supporting sensor improvements and possible integration on other platforms. ***FY 2016 Accomplishments:*** - Completed high resolution camera development and test and prepare for camera production effort. - Conducted prelimary and critical design reviews and build one unit to support qualification testing. ***FY 2017 Plans:*** - N/A ***FY 2018 Base Plans:*** - N/A					
Accomplishments/Planned Programs Subtotals	2.195	0.000	0.000	-	0.000

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675292 / *Hyperspectral Sensors*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• APAF: BA05: Line Item # PRDT01: *MQ-1 Mods*	3.173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Remarks

A portion of the Predator modification funding listed above is used to support ACES HY integration.

D. Acquisition Strategy

ACES HY production sensor deliveries were completed in July of 2014, using the Advanced Technology Support Program process developed by Office of the Secretary of Defense Defense MicroElectronics Activity at McClellan AFB, CA. Sensors are currently managed at AFLCMC/WIILR, the MQ-1 Predator sustainment program office, Robins AFB GA.

ACES HY utilized a sole source Basic Ordering Agreement with Raytheon (McKinney, TX) for system modifications.

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-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 676025 / *Data Compression*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
676025: *Data Compression*	-	4.803	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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 is developing, testing 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. Outputs will meet standard certification for use within the Department of Defense Geospatial Intelligence and Measurement and Signatures Intelligence architectures.

Activities also include studies and analysis to support both current and future program planning and execution.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Data Compression	4.803	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 Defense Common Ground System. Outputs will meet standard certification for use within the Department of Defense Geospatial Intelligence and Measurement and Signatures Intelligence architectures.					
FY 2016 Accomplishments: - Developed and tested Phase History Synthetic Aperture Radar (SAR) data compression capabilities, and other phenomenologies. - Developed and tested compression and decompression algorithms for Persistent SAR and Smart Data Discrimination. - Developed documentation for standards acceptance. - Provided engineering services for algorithm familiarization, assessment, and improvement.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 676025 / *Data Compression*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Participated in Sensors Open System Architecture planning and integration. ***FY 2017 Plans:*** - N/A ***FY 2018 Base Plans:*** - N/A					
Accomplishments/Planned Programs Subtotals	4.803	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.

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-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 676031 / *Dismount Detection RADAR*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
676031: *Dismount Detection RADAR*	-	0.000	0.000	1.021	0.000	1.021	1.036	1.055	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 (MASINT), polarimetric imaging, ground moving target indication (GMTI), maritime search/track, Inverse Synthetic Aperture Radar (ISAR), 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 Intelligence, Surveillance, and Reconnaissance (ISR) and associated Tasking, Processing, Exploitation, and Dissemination (TPED) 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 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 (ASI) 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. Advanced Synthetic Aperture Radar System (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), HSI, Low Light, Laser Radar (LADAR), 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 (WAMI), Spectral Identification) for multiple airborne platforms, including medium and high altitude platforms; development and demonstration of advanced tactical sensor and associated TPED 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 (OT); development and implementation of standards (Common GMTI/DMTI, National Imagery Transmission Format (NITF); and monitoring and enhancement of Imagery Intelligence (IMINT) 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 decisionmaker efficiency and effectiveness.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 676031 / *Dismount Detection RADAR*

Activities also include studies and analysis to support both current program planning and execution and future program planning.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Various projects	0.000	0.000	1.021	0.000	1.021
Description: Develop/demonstrate and advance technical maturity of promising sensors and processing capabilities (ex: radar improvement, next-generation Hyperspectral Imagery (HSI), Laser Detection and Ranging (LADAR)/Laser Identification Detection and Ranging (LIDAR), and data mitigation technologies). ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** - Will develop, modernize, and demonstrate advanced sensors and detection and processing algorithms, hyperspectral imaging technologies, multiband Electro-Optical (EO), Infrared (IR) and Synthetic Aperture Radar (SAR) sensor systems, enhanced lidar capabilities, polarimetric imaging, and other Geospatial Intelligence (GEOINT) sensing modalities for Anti-Access Area Denial, permissive and non-permissive environments, foliage penetration, and littoral environments. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	0.000	0.000	1.021	0.000	1.021

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• N/A: *N/A*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 676031 / *Dismount Detection RADAR*

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.