Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force											Date: February 2020	
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	-	195.323	137.909	121.512	0.000	121.512	66.358	67.856	43.360	62.528	Continuing	Continuing
672001: *Next-Generation Sensors/ASI*	-	0.000	0.000	36.263	0.000	36.263	20.488	20.111	24.009	23.164	Continuing	Continuing
672002: *Agile ISR*	-	0.000	0.000	5.342	0.000	5.342	5.495	5.652	6.744	0.000	Continuing	Continuing
672003: *Sensors Open System Architecture*	-	0.000	0.000	3.891	0.000	3.891	0.745	0.766	0.914	0.000	Continuing	Continuing
674818: *Imaging and Targeting Support*	-	133.309	29.729	0.000	0.000	0.000	0.000	0.000	0.000	27.456	Continuing	Continuing
674820: *Sensor Development*	-	43.681	82.724	62.914	0.000	62.914	24.287	24.789	0.000	0.000	0.000	238.395
675092: *JTC/SIL MUSE*	-	3.454	3.521	3.574	0.000	3.574	3.647	3.713	3.779	3.848	Continuing	Continuing
675291: *Gorgon Stare*	-	10.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
676025: *Data Compression*	-	4.879	6.935	9.528	0.000	9.528	11.696	12.825	7.914	8.060	Continuing	Continuing

Note

This program, BA 7, PE 0305206F, project 674820, Advanced Synthetic Aperture Radar System (ASARS)-2C (back-end), is a new start.

In FY2021 all funding in PE 0305206, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) will be realigned to provide greater visibility and transparency of funding into the projects.
In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next-Generation Sensors were transferred to Project 672001, (Next-Generation Sensors) in order to provide greater visibility and transparency.
In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency.
In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture) in order to provide greater visibility and transparency.
In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related ASARS-2B were transferred to Project 674820, (Sensors Development) in order to provide greater visibility and transparency.
In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674820, (Sensor Development) funds were transferred from PE 0604257F (Advanced Technology and Sensors), Project 645148, (Common Airborne Sense and Avoid), in order to align funding with Air Force project priorities and requirements.
In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 672001, (Next Generation Sensor) received $18M in funds that were intended for PE 0305202F (Dragon U-2), Project 674820, (Sensor Development), per FY21 PBD. Funds will be executed against U-2 avionics and sensor efforts under PE 0305202F (Dragon U-2).

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

A. Mission Description and Budget Item Justification

This program funds multi-domain, multi-Intelligence (multi-INT) research, development, test and evaluation (RDT&E) efforts in support of the National Defense Strategy (NDS) and 2018 DoD Artificial Intelligence Strategy, as applied by the Air Force in the Next Generation ISR Dominance Flight Plan. Specifically, Program 0305206F provides authorized and appropriated funding to multi-INT RDT&E efforts for utilization on airborne platforms. This program traditionally provides a venue for integration of technologies matured in both the Advanced Technology and Sensors(0604257F) and Airborne SIGINT Enterprise (0304260F) program elements.

According to the 2018 NDS, "we are facing an increasingly complex security environment as defined by ... adversaries in every operating domain." Additionally, to ensure (operations) sustainment while under persistent multi-domain attack, the Air Force has applied the NDS in the Next Generation ISR Dominance Flight Plan. The future ISR portfolio will "consist of a multi-domain, multi-intelligence," systems to "remain confident across the entire conflict spectrum." The Airborne Reconnaissance PE is integral to developing multi-domain, multi-INT systems capable of sustaining warfighter decisive advantage through all ranges of military operations, up to highly contested environments (HCE).

The Airborne Reconnaissance System (ARS) Program matures, develops, demonstrates, and rapidly transitions: next-generation, persistent, wide area surveillance and common imagery reconnaissance sensors, and both active and passive capabilities. ARS includes sensor data processing for multiple airborne platforms, in addition to sensor products aiding assisted target recognition algorithms and other artificial intelligence activities (e.g., geolocation models, sensor based exploitation tools, sensor networking capabilities). ARS provides for modeling & simulation, training and multi-INT systems engineering. This program also coordinates common collection, processing, and dissemination solutions for near-real-time multi-domain ISR development.

The ARS Program includes the following efforts: Next Generation Sensors efforts lead advancements in multi-INT, platform agnostic capability. The Next Generation Sensors (NGS) project is developing, demonstrating, and maturing Intelligence, Surveillance, and Reconnaissance (ISR) sensor suites in a platform agnostic environment. Sensor suites will include open architectures to further enable platform mobility and tech refresh as well as Artificial Intelligence (AI) algorithms to enable assisted target detection and identification. Efforts include but are not limited to, Triple Raven multi-GEOINT High Altitude Advanced Technology Demonstration, multi-INT Common Open Architecture Reconnaissance Programs Standard (MI-COARPS), and Assisted Target Recognition for ISR (ATRI). Agile ISR includes Detection Removal and Characterization Operations developing a robust image quality improvement capability for airborne synthetic aperture radar (SAR) products. Sensors Open Systems Architecture (SOSA) coordinates advanced technologies, and open architecture development for multi-INT sensor modalities. The program includes development of a family of government owned, open, platform agnostic pods - the AgilePod Family. Sensor Development includes Advanced Synthetic Aperture Radar System (ASARS) front end antenna array and receiver exciter advancements (ASARS-2B) and back end processor advancements (ASARS-2C). ASARS-2B follow on RDT&E extends range, enhances Ground Moving Target Indicator (GMTI) and Synthetic Aperture Radar (SAR) performance and introduces maritime capability while laying in the framework for future use of open architectures. ASARS-2C effort extends the functionality and performance of ASARS-2B through the addition of advanced radar capabilities by enabling use of third party vendor solutions and multi-platform integration. ASARS is the radar solution for Next Generation Sensors efforts. JTC supports ISR Training Systems Integration Laboratories. Gorgon Stare Wide Area Motion Imagery research, development, test and evaluation. Data Compression efforts are led by Reduction of Data Using Compression Enhancement (RDUCE). RDUCE develops data compression algorithms, addressing current and future date dissemination systems' bandwidth limitations. Consistent with NDS, algorithms are multi-INT sensor agnostic that are submitted for formal adoption by the DoD-Intelligence Community (IC) Joint Enterprise Standards Committee (JESC) GEOINT standards groups.

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

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	195.334	122.909	73.719	0.000	73.719
Current President's Budget	195.323	137.909	121.512	0.000	121.512
Total Adjustments	-0.011	15.000	47.793	0.000	47.793
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	15.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.011	0.000	47.793	0.000	47.793

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Project: 674818: *Imaging and Targeting Support*		
Congressional Add: *Sensor Open System Architecture (SOSA)*	10.000	0.000
Congressional Add Subtotals for Project: 674818	10.000	0.000
Project: 675291: *Gorgon Stare*		
Congressional Add: *Gorgon Stare*	10.000	15.000
Congressional Add Subtotals for Project: 675291	10.000	15.000
Congressional Add Totals for all Projects	20.000	15.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 672001 / *Next-Generation Sensors/ASI*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672001: *Next-Generation Sensors/ASI*	-	0.000	0.000	36.263	0.000	36.263	20.488	20.111	24.009	23.164	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next Generation Sensors were transferred to Project 672001, (Next Generation Sensors) in order to provide greater visibility and transparency. This project is not a new start.

A. Mission Description and Budget Item Justification

The Next Generation Sensors (NGS) project is developing, demonstrating, and maturing Intelligence, Surveillance, and Reconnaissance (ISR) sensor suites in a platform agnostic environment. Designated as a Middle Tier Acquisition, Section 804 effort, these sensor suites will include open architectures to further enable platform mobility and tech refresh as well as Artificial Intelligence (AI) algorithms to enable assisted target detection and identification. Efforts include but are not limited to, Triple Raven multi-GEOINT High Altitude Advanced Technology Demonstration, multi-INT Common Open Architecture Reconnaissance Program Standard (MI-COARPS), Assisted Target Recognition for ISR (ATRI), and radar open architecture development in support of ASARS-2B/2C.

NGS program efforts are set by capabilities gaps within the Challenging Targets Initial Capabilities Document and as approved by the Capabilities Decision Memorandum (Signed Jan 2019). These requirements have been further verified, modeled, and developed through the Airborne Sensors for ISR (ASI) Analysis of Alternatives (AoA) and the Triple Raven ATD, which was approved by the Advanced Technology Council (ATC) in FY19.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Next Generation Sensors	0.000	0.000	36.263	-	36.263
Description: Mold current and future ISR into a platform agnostic, non-proprietary, autonomous multi-INT cross cueing solution that is designed based on mission requirements. Sensors will have to penetrate up to highly contested domains and survive to operate. This project will also increase interoperability by developing common standards and interfaces for mission and sensor systems.					
FY 2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672001 / *Next-Generation Sensors/ASI*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A. ***FY 2021 Base Plans:*** - Will transition projects from AFRL and Imaging & Targeting Support into programs of record to include new technologies in sensors and ISR technologies. - Triple Raven Advanced Technology Demonstration - Execute prototyping and requirements development for next generation platform agnostic, high altitude, non-obscured long-standoff telescope, dual-band EO/IR and multi-mode LiDAR prototype sensors. - Design and develop government owned, standards compliant sensor pods. - Develop specific Artificial Intelligence Target Recognition Algorithms for multi-mode, ISR platforms. Develop synthetic data sets to increase algorithm effectiveness. Maintain database of labeled data for assisted target recognition (ATR) community. Develop multi-INT Open Architecture processors and standards. - Mature open architectures for ISR systems including cybersecurity analysis, industry standardization, and open architecture demonstrations. - Begin integration of the dual-band EO/IR system, open architecture ISR standards, and an open architecture aircraft pod. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next-Generation Sensors were transferred to Project 672001, (Next-Generation Sensor) in order to provide greater visibility and transparency; and increased sensor development requirements for restoral of U-2 up to and through FY25.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	36.263	-	36.263

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 672001, (Next Generation Sensor) received $18M in funds that were intended for PE 0305202F (Dragon U-2), Project 674820, (Sensor Development), per FY21 PBD. Funds will be executed against U-2 avionics and sensor efforts under PE 0305202F (Dragon U-2).

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672001 / *Next-Generation Sensors/ASI*

D. Acquisition Strategy

Next Generation Sensors is currently executing under a Section 804, Middle Tier Acquisition authority and is currently in the Rapid Prototyping (Alpha) phase. Next Generation Sensors (Developed from and formerly known as ASI) is also utilizing Imaging and Targeting Support (I&TS) and other ISR programs to execute rapid Technology Maturation and Risk Reduction activities. Next Generation Sensors is leveraging Advanced Technology Demonstration authority to mature and demonstrate cutting-edge sensor technology. This program has established a forum consisting of multiple Other Government Agencies (OGAs), end users, and MAJCOMs to ensure that the program deliverables are answering identified warfighter needs, and have a clear transition path.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672001 / *Next-Generation Sensors/ASI*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Triple Raven ATD	SS/CPFF	Collins : Westford, MA	-	-		-		22.988	Nov 2020	-		22.988	Continuing	Continuing	-
Government-owned Podded Solution	Various	Various : TBD	-	-		-		4.000	Nov 2020	-		4.000	Continuing	Continuing	-
ATRI	Various	Various : TBD	-	-		-		2.000	Dec 2020	-		2.000	Continuing	Continuing	-
Open Architecture	Various	Various : TBD	-	-		-		2.000	Nov 2020	-		2.000	Continuing	Continuing	-
I&TS Technology Integration Efforts	Various	Various : TBD	-	-		-		2.000	Dec 2020	-		2.000	Continuing	Continuing	-
		Subtotal	-	-		-		32.988		-		32.988	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA: Other Gov't costs	Various	Not specified. : TBD	-	-		-		3.275	Oct 2020	-		3.275	Continuing	Continuing	-
		Subtotal	-	-		-		3.275		-		3.275	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		36.263		-		36.263	Continuing	Continuing	N/A

Remarks

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next Generation Sensors were transferred to Project 672001, (Next Generation Sensor) in order to provide greater visibility and transparency.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672001 / *Next-Generation Sensors/ASI*

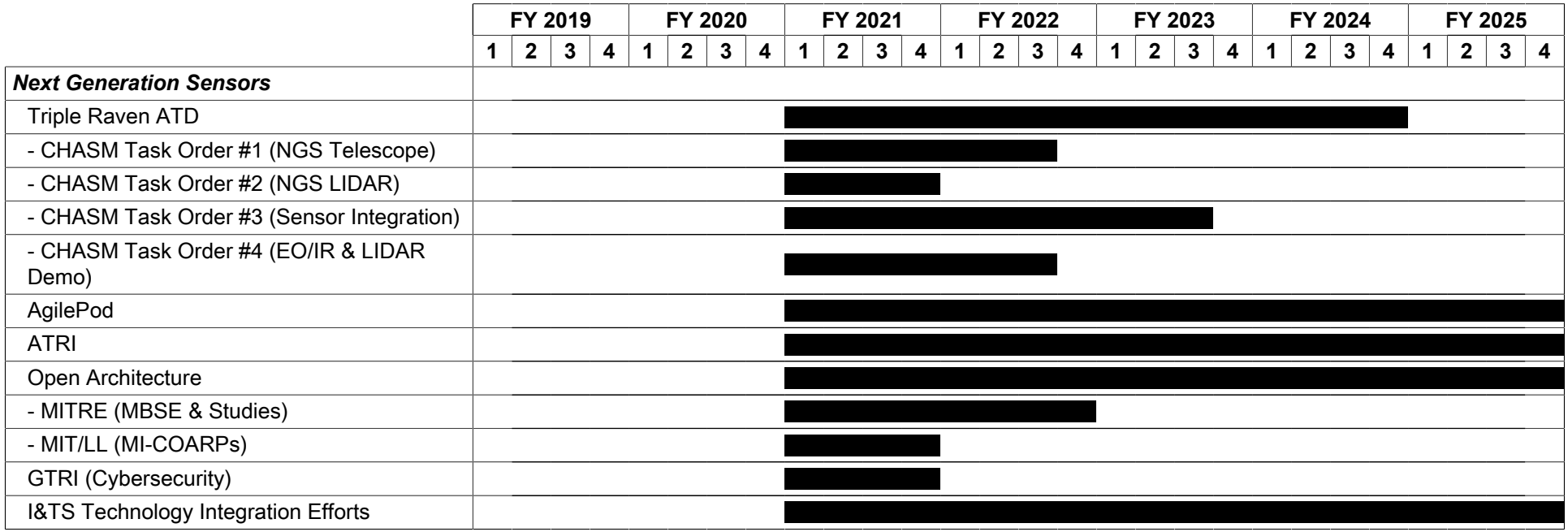

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672001 / *Next-Generation Sensors/ASI*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Next Generation Sensors				
Triple Raven ATD	1	2021	4	2024
- CHASM Task Order #1 (NGS Telescope)	1	2021	3	2022
- CHASM Task Order #2 (NGS LIDAR)	1	2021	4	2021
- CHASM Task Order #3 (Sensor Integration)	1	2021	3	2023
- CHASM Task Order #4 (EO/IR & LIDAR Demo)	1	2021	3	2022
AgilePod	1	2021	4	2025
ATRI	1	2021	4	2025
Open Architecture	1	2021	4	2025
- MITRE (MBSE & Studies)	1	2021	4	2022
- MIT/LL (MI-COARPs)	1	2021	4	2021
GTRI (Cybersecurity)	1	2021	4	2021
I&TS Technology Integration Efforts	1	2021	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 672002 / *Agile ISR*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672002: *Agile ISR*	-	0.000	0.000	5.342	0.000	5.342	5.495	5.652	6.744	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency. This project is not a new start.

A. Mission Description and Budget Item Justification

The Agile ISR BPAC matures, develops, and deploys projects started under the Imaging & Targeting Support (I&TS) program in support of current and future platform agnostic, non-proprietary, autonomous, multi-INT cross cueing ISR solutions based on Advanced Battle Management System (ABMS) and Joint All-domain Command and Control (JADC2) mission requirements. This includes, but is not limited to, Detection Removal and Characterization Operations (DRACO), support and development of AgilePod, and other projects. Portions of the developmental efforts under Agile ISR are classified.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: DRACO	0.000	0.000	5.342	-	5.342
Description: Detection Removal and Characterization Operations (DRACO) is a robust Image Quality improvement capability for Airborne Synthetic Aperture Radar (SAR) products. The software resides in multiple locations on the ground supporting the Air Force, Army, Navy and other customers. DRACO efforts include but are not limited to development, design, fabrication, integration, demonstration, test, and transition of image quality improvement capabilities. This project originated under the I&TS program. All other details are classified.					
FY 2020 Plans: N/A					
FY 2021 Base Plans: - Will mature, develop and deploy DRACO capabilities in order to give the warfighter a more efficient and effective tool. - Will complete DRACO 5.0 efforts and initiating DRACO 6.0. - Will increase interoperability by developing common standards and interfaces.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672002 / *Agile ISR*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Will increase access and expand user base. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	5.342	-	5.342

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Capabilities will be developed and integrated onto various platforms using an incremental acquisition approach. The projects will be executed and contracted with appropriate vendor(s) to deliver capability while driving competition where possible.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672002 / *Agile ISR*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DRACO	SS/CPFF	Lockheed Martin : King of Prussisa, PA	-	0.000		0.000		5.312	Mar 2021	-		5.312	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		5.312		-		5.312	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Services	Various	Not specified. : TBD	-	-		-		0.030	Oct 2020	-		0.030	Continuing	Continuing	-
		Subtotal	-	-		-		0.030		-		0.030	Continuing	Continuing	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		0.000		5.342		-		5.342	Continuing	Continuing	N/A

Remarks

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672002 / *Agile ISR*

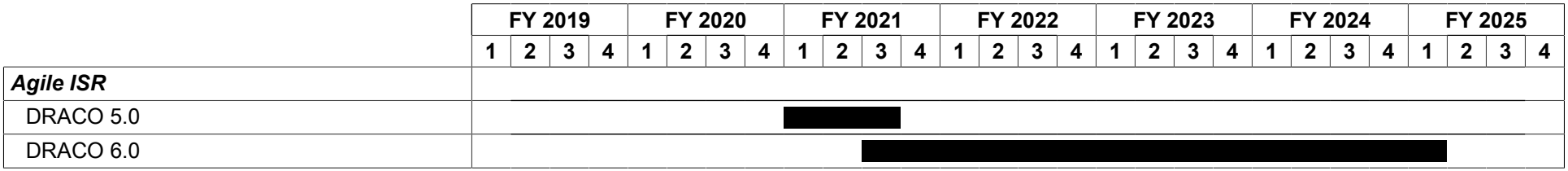

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672002 / *Agile ISR*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Agile ISR				
DRACO 5.0	1	2021	3	2021
DRACO 6.0	3	2021	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 672003 / *Sensors Open System Architecture*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672003: *Sensors Open System Architecture*	-	0.000	0.000	3.891	0.000	3.891	0.745	0.766	0.914	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture)in order to provide greater visibility and transparency. This project is not a new start.

A. Mission Description and Budget Item Justification

The Sensors Open System Architecture (SOSA) project coordinates the advanced technologies open architecture development for modalities of sensors, such as: RADAR, SIGINT, EW, Communications and EO/IR (development of standards and open architecture interfaces for Software, Hardware, and Electrical/Mechanical interfaces) in support of multiple airborne reconnaissance platforms, both manned and unmanned. Its objectives are to develop, demonstrate, and rapidly upgrade/ iterate 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 through development of abstraction interfaces for sense (such as RADAR, ADS-B, TCAS, Next Generation Sensors, ASIP, and ASARS) and avoid logic.

This project also coordinates the development of common collection, processing, and dissemination solutions for near-real time intelligence, surveillance, and reconnaissance. The SOSA project also increases interoperability by developing common standards and interfaces, as well as leveraging industry participation toward creating COTS solutions such as common C4ISR processor, AgilePOD interfaces, Red/Black separation on the sensor, data at rest, and security/AT with industry partners and other DoD services.

This project is designed to support development of the Next Generation Sensors program, as well as other AFLCMC/WI emerging and program of record needs. As part of the development effort SOSA will be funding and supporting first article development of key open architecture solutions to validate/verify open specifications as well as to prime the COTS vendors development strategies. The SOSA effort has stood up AFLCMC SIL (System Integration Laboratory) for Sensors Open System Architectures in order to establish a strong conformance/compliance program with industry partners for COTS products, in partnership with other DoD services.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Sensors Open System Architecture	-	0.000	3.891	-	3.891

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672003 / *Sensors Open System Architecture*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: The Sensors Open System Architecture (SOSA) project coordinates the advanced technologies open architecture development for modalities of sensors, such as: RADAR, SIGINT, EW, Communications and EO/IR (development of standards and open architecture interfaces for Software, Hardware, and Electrical/ Mechanical interfaces) in support of multiple airborne reconnaissance platforms, both manned and unmanned. ***FY 2020 Plans:*** N/A ***FY 2021 Base Plans:*** - Will support of RPA Sense and Avoid Technology (C-ABSAA Technology Maturation & Risk Reduction Phase) - Will develop prototype of SOSA SAR/SIGINT capability - Will develop AgilePod internal electrical/mechanical interfaces - Will work with other Services in producing SOSA V 1.0 snapshots based on current set of USAF needs - Will support EO/IR article prototyping - Will prepare and host industry and DOD partner interoperability demonstrations ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture) in order to provide greater visibility and transparency.					
Accomplishments/Planned Programs Subtotals	-	0.000	3.891	-	3.891

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Coalition of Industry, DoD, and OGA partnerships to develop Open Architecture specifications to support ACC and AFLCMC requirements for next generation sensors. At key specification milestones such as completion of incremental updates to SOSA a set of prototype activities will be generated to validate/verify solution, reduce risk to adopting programs and prime the industry investments.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 672003 / *Sensors Open System Architecture*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Sensors Open System Architecture Development	Various	Not specified. : TBD	-	-		-		2.891	Nov 2020	-		2.891	Continuing	Continuing	-
		Subtotal	-	-		-		2.891		-		2.891	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration (PMA)	Various	Not specified. : TBD	-	-		-		1.000	Mar 2021	-		1.000	Continuing	Continuing	-
		Subtotal	-	-		-		1.000		-		1.000	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		3.891		-		3.891	Continuing	Continuing	N/A

Remarks

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture)in order to provide greater visibility and transparency.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672003 / *Sensors Open System Architecture*

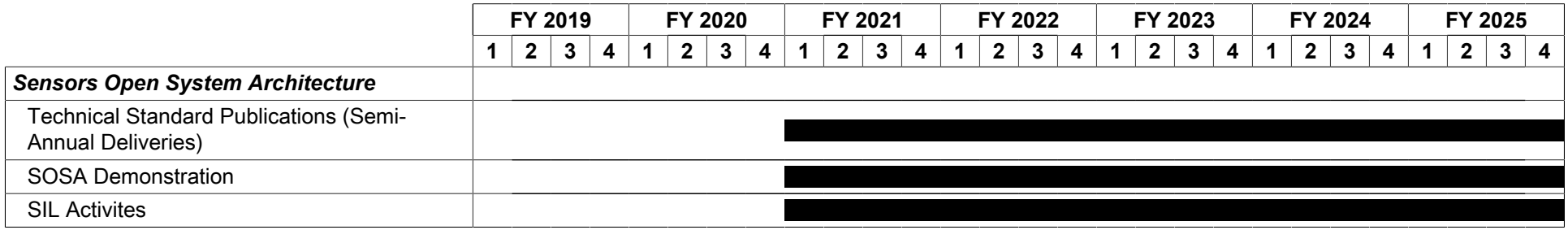

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 672003 / *Sensors Open System Architecture*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Sensors Open System Architecture				
Technical Standard Publications (Semi-Annual Deliveries)	1	2021	4	2025
SOSA Demonstration	1	2021	4	2025
SIL Activites	1	2021	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674818: *Imaging and Targeting Support*	-	133.309	29.729	0.000	0.000	0.000	0.000	0.000	0.000	27.456	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, all funds in PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to NGS, Agile ISR, SOSA, and ASARS were transferred to Project 672001 (Next-Generation Sensors/ASI), Project 672002, (Agile ISR), Project 672003 (Sensors Open System Architecture), and Project 674820 (Sensor Development) in order to provide greater visibility and transparency.

A. Mission Description and Budget Item Justification

The I&TS purpose 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 but are not limited to: Radar, Electro-Optical/Infrared, hyperspectral imagery (HSI), Lidar/Ladar, and other technologies to improve measurement and signature intelligence, polarimetric imaging, ground moving target indicator (GMTI), maritime search/track, foliage penetration, 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, as supported by the Challenging Targets Initial Capabilities Document and set by the GCWG, 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 ASI AoA 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.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Agile ISR	109.390	6.404	0.000	-	0.000
Description: Mold current and future ISR into a platform agnostic, non-proprietary, autonomous Multi-INT fusion and cross cuing solution that is designed based on mission requirements. Sensors will have to penetrate up to highly contested domains and survive to operate. This project will also increase interoperability by developing common standards and interfaces for mission and sensor systems. Through the AoA execution, the solution set will improve requirements and the development path for High Altitude SAR (ASARS), Next Generation Sensors, DRACO, SOSA, as well as other GCWG approved projects. ***FY 2020 Plans:*** - Continue Section 804 efforts and execute various ATD efforts including, but not limited to Triple Raven which supports Tech Maturation and Risk Reduction (TMRR), - M&S to advance current and future ISR into a platform agnostic, non-proprietary, autonomous Multi-INT fusion and cross cuing solution that is designed based on mission requirements. - Includes but not limited to Next Generation Sensors, Detection Removal and Characterization Operation (DRACO), Sensor Open System Architecture (SOSA), and other GCWG approved projects. - Continue working interoperability by developing common standards and interfaces. - Continue support of C-ABSAA Technology Maturation and risk reduction phase - Continue first article development of SOSA, SAR/SIGINT prototype - Continue support development of AgilePOD internal electrical/mechanical interfaces - Continue further work with other Services in producing SOSA V 1.0 snapshots based on current set of USAF needs. ***FY 2021 Base Plans:*** - Agile ISR, Next Generation Sensors and Sensors Open System Architecture will be transferred to individual Projects within PE0305206F in order to provide greater visibility and transparency into these activities. These transferred efforts will not be new starts. The new Projects are: -- Next Generation Sensors, Project 672001 -- Agile ISR, Project 672002 -- Sensors Open System Architecture, Project 672003 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding decreased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to NGS, Agile ISR, and SOSA were transferred to Project 672001 (Next-					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Generation Sensors/ASI), Project 672002, (Agile ISR) and Project 672003 (Sensors Open System Architecture) in order to provide greater visibility and transparency.					
Title: ASARS-2B ***Description:*** Develop/design/fabricate/integrate/demonstrate/test and field deep look high altitude ISR radar capabilities. ***FY 2020 Plans:*** - Continue to develop/design/fabricate/integrate/demonstrate/test and field deep look high altitude ISR radar capabilities. ***FY 2021 Base Plans:*** - ASARS efforts realigned to Project 674820 Sensor Development for consolidation and clarity of reporting. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding decreased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related ASARS-2B were transferred to Project 674820, (Sensors Development) in order to provide greater visibility and transparency.	13.919	23.325	0.000	-	0.000
Accomplishments/Planned Programs Subtotals	123.309	29.729	0.000	-	0.000

	FY 2019	FY 2020
Congressional Add: Sensor Open System Architecture (SOSA) ***FY 2019 Accomplishments:*** - Continue work with other Services in producing SOSA snapshots based on current set of USAF needs. ***FY 2020 Plans:*** N/A	10.000	0.000
Congressional Adds Subtotals	10.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTE 07 0305202F: *Dragon U-2*	87.618	36.389	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674818 / *Imaging and Targeting Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

A portion of the funding within the U-2 RDT&E line will be used to advance ASARS development/design/fabrication/integration/demonstration/testing and fielding deep look high altitude ISR radar capabilities.

D. Acquisition Strategy

Imaging and Targeting Support and Agile ISR 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.

ASARS / High Altitude SAR 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/HBG (Robins AFB) for 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674818 / *Imaging and Targeting Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SOSA	Various	Various : TBD	-	13.523	Feb 2019	2.683	Feb 2020	-		-		-	0.000	16.206	-
DRACO	SS/CPFF	Lockheed Martin : King of Prussisa, PA	-	2.849	Nov 2018	3.721	Mar 2020	-		-		-	0.000	6.570	-
ASARS-2B EMD	SS/CPIF	Raytheon : El Segundo, CA	-	13.481	Feb 2019	17.831	Feb 2020	-		-		-	0.000	31.312	170.430
Triple Raven ATD	SS/CPFF	Collins : Westford, MS	-	67.092	Mar 2019	0.000		-		-		-	0.000	67.092	-
Aether Spy	Various	Various : TBD	-	33.000	Sep 2019	-		-		-		-	0.000	33.000	-
		Subtotal	-	129.945		24.235		-		-		-	0.000	154.180	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	MIPR	Not specified. : TBD	-	-		0.130	Nov 2019	-		-		-	0.000	0.130	-
		Subtotal	-	-		0.130		-		-		-	0.000	0.130	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA: Other Govt Cost	SS/T&M	Various : Dayton, OH	-	3.364	Mar 2020	5.364	Jan 2020	-		-		-	0.000	8.728	-
		Subtotal	-	3.364		5.364		-		-		-	0.000	8.728	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	133.309		29.729		-		-		-	0.000	163.038	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 674818 / *Imaging and Targeting Support*	

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

In FY2019, The 267 line was rescinded -$26M amount in FY19 of the FY20 HR1158 Appropriations Bill and is not reflected in this document. The rescission was applied towards the Aether Spy effort, but still listed due to technical error from PRCP transfer.

In FY2021, all funds in PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to NGS, Agile ISR, SOSA, and ASARS were transferred to Project 672001 (Next-Generation Sensors/ASI), Project 672002, (Agile ISR), Project 672003 (Sensors Open System Architecture), and Project 674820 (Sensor Development) in order to provide greater visibility and transparency.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674818 / *Imaging and Targeting Support*

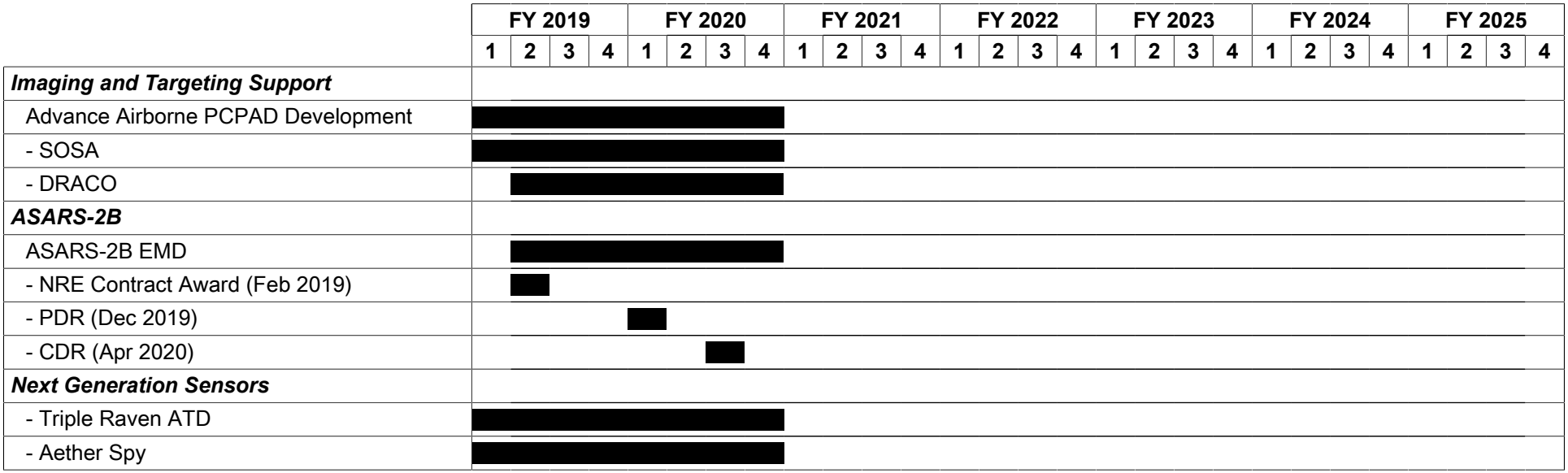

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674818 / *Imaging and Targeting Support*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Imaging and Targeting Support				
Advance Airborne PCPAD Development	1	2019	4	2020
- SOSA	1	2019	4	2020
- DRACO	2	2019	4	2020
ASARS-2B				
ASARS-2B EMD	2	2019	4	2020
- NRE Contract Award (Feb 2019)	2	2019	2	2019
- PDR (Dec 2019)	1	2020	1	2020
- CDR (Apr 2020)	3	2020	3	2020
Next Generation Sensors				
- Triple Raven ATD	1	2019	4	2020
- Aether Spy	1	2019	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 674820 / *Sensor Development*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674820: *Sensor Development*	-	43.681	82.724	62.914	0.000	62.914	24.287	24.789	0.000	0.000	0.000	238.395
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 0305206F, project 674820, Advanced Synthetic Aperture Radar System (ASARS)-2C (back-end), is a new start.

A. Mission Description and Budget Item Justification

The Sensors Development project increases the range and collection capability, interoperability and processing of the Advanced Synthetic Aperture Radar Systems (ASARS) through design, development, testing, and fielding efforts. The Sensors Development efforts advance the capability of ASARS for U-2 employment, and is a critical component for the multi-INT Next Generation Sensors, project 672001, efforts. ASARS-2B (front-end) & ASARS-2C (back-end) efforts provide critical advancements and risk reduction in SAR/Moving Target Indication capability to be implemented in the future multi-INT, platform agnostic capability that Next Generation Sensors will provide.

The ASARS effort is a fifth generation, deep-look, high-altitude, ISR radar that is the foundation for the radar component of the Next Generation Sensors (NGS) family of systems as outlined in the AFROC approved ASARS-2C draft Capabilities Development Document (CDD). ASARS-2B (front-end) is the antenna and receiver exciter replacement. The ASARS-2C (back end) data processing efforts extend the ASARS-2B (front-end) radar capability using open architecture data processing and multi-platform integration. Open architecture improves performance and lowers cost by facilitating and enabling qualified third party software vendors to incorporate future multi-ISR capability to advance interoperability across joint operations. ASARS increases current capability and addresses National Defense Strategy Key Operational Problems and ISR Dominance flight plan.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Advanced Synthetic Aperture Radar System (ASARS)-2B (front-end)	43.681	82.724	60.914	-	60.914
Description: Develop, design, fabricate, integrate, test and field deep look high altitude ISR radar capabilities.					
FY 2020 Plans: - Develop, design, fabricate, integrate, test and field deep look high altitude ISR radar capabilities.					
FY 2021 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674820 / *Sensor Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Will continue to develop, design, fabricate, integrate, test and field deep look high altitude ISR radar capabilities. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding decreased due to funding alignment with Air Force priorities and some related efforts funded through Project 672001, (Next-Generation Sensors).					
Title: Advanced Synthetic Aperture Radar System (ASARS)-2C (back-end) ***Description:*** Integrate open radar processing architectures for enhanced RF capabilities and third party mode development ***FY 2020 Plans:*** N/A ***FY 2021 Base Plans:*** - Will mature standards and technologies, and develop acquisition strategy for start in FY2021. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increased due to start of ASARS-2C (back-end) efforts.	0.000	0.000	2.000	-	2.000
Accomplishments/Planned Programs Subtotals	43.681	82.724	62.914	-	62.914

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTE 07 0305202F: *Dragon U-2 (JMIP)*	87.618	36.389	18.660	-	18.660	18.319	19.813	20.167	0.000	Continuing	Continuing
• APAF 06 0305206F: *Airborne Reconnaissance Systems*	0.000	0.000	48.138	-	48.138	72.268	28.071	15.860	12.593	0.000	176.930

Remarks

A portion of the funding within the U-2 RDT&E line will be used to advance ASARS development / design/fabrication/integration/demonstration/testing and fielding deep look high altitude ISR radar capabilities.
In FY19/FY20, a portion of funding within project 674818 (Imaging and Targeting Support) is being used to advance ASARS-2B (front-end) efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674820 / *Sensor Development*

D. Acquisition Strategy

ASARS / High Altitude SAR 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/HBG (Robins AFB) for test support.

Acquisition strategy is to maximize commercial and national development efforts and investment through multiple contracting methods, including but not limited to the use of engineering change proposals to modify existing contracts and new contracts that were awarded both competitively or on a sole source basis.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674820 / *Sensor Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ASARS-2B (front-end)	SS/CPIF	Raytheon : El Segundo, CA	-	43.681	Feb 2019	82.724	Feb 2020	57.005	Nov 2020	-		57.005	Continuing	Continuing	-
ASARS-2C (back-end)	C/Various	Unknown : TBD	-	-		-		2.000	Jul 2021	-		2.000	Continuing	Continuing	-
		Subtotal	-	43.681		82.724		59.005		-		59.005	Continuing	Continuing	N/A

Remarks

ASARS-2C, due to the competitive contracting method, it is unknown at this point who the winning contractor will be.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Not specified.	Various	Not specified. : TBD	-	-		-		3.909	Jan 2021	-		3.909	Continuing	Continuing	-
		Subtotal	-	-		-		3.909		-		3.909	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	43.681		82.724		62.914		-		62.914	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674820 / *Sensor Development*

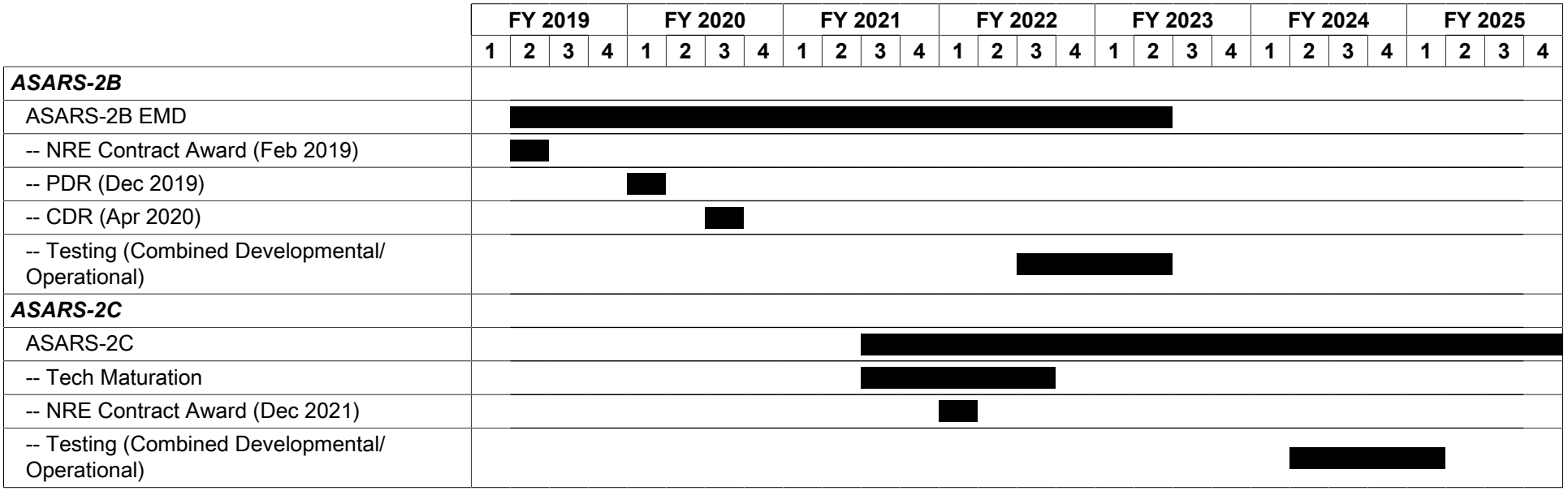

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 674820 / *Sensor Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ASARS-2B				
ASARS-2B EMD	2	2019	2	2023
-- NRE Contract Award (Feb 2019)	2	2019	2	2019
-- PDR (Dec 2019)	1	2020	1	2020
-- CDR (Apr 2020)	3	2020	3	2020
-- Testing (Combined Developmental/Operational)	3	2022	2	2023
ASARS-2C				
ASARS-2C	3	2021	4	2025
-- Tech Maturation	3	2021	3	2022
-- NRE Contract Award (Dec 2021)	1	2022	1	2022
-- Testing (Combined Developmental/Operational)	2	2024	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675092: *JTC/SIL MUSE*	-	3.454	3.521	3.574	0.000	3.574	3.647	3.713	3.779	3.848	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Multiple Unified Simulation Environment (MUSE) is the DoD flight simulation/training system of choice for many Unmanned Aircraft Systems (UAS), RPA, and airborne platforms. MUSE is also known as the Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS) in its Air Force training application. The MUSE/AFSERS is a software suite that simulates UAS/RPA (e.g., MQ-9) systems, tailored air vehicle & data links, and visualization systems used for payload product outputs-including Full Motion Video (FMV), Fixed Frame Imagery (FFI), Ground Moving Target Indicator (GMTI) data, and Link 16 (J2.2 and J3.5) tracking messages. Outputs are compliant with applicable DoD standards and are continually tested against actual ground data processors to ensure DoD systems interoperability.

The Services and Combatant Commanders have a requirement for training with a system that provides a real-time simulation environment containing multiple domain systems that can be integrated with larger force-on-force simulations. The MUSE creates a realistic operational environment supporting military utility assessment, architecture, and employment concept development. Training, Tactics, Techniques and Procedures (TTP) refinement, practice Processing, Exploitation and Dissemination (PED) of multi-domain information. Conduct emerging concepts experimentation, optimizing Command, Control, Communications, and Computing (C4) with warfighting exercises and experiments. MUSE is the preferred UAS/RPA simulation system used by US Combatant Commanders and Joint Services to support command and battle staff C4 training.

The MUSE also creates a realistic operational environment that supports: an embedded training capability for new UAS/RPA system Program Managers; tools to minimize acquisition and life cycle cost and schedule impacts. MUSE conducts emerging concepts experimentation, future systems exploration, systems integration, and technology insertion; applications for Joint and Service-specific warfighting exercises; and C4 training optimization.

MUSE is currently used by all Services and most unified commands simulating MQ-1, MQ-9, RQ-4, MQ-1C, M/RQ-5, RQ-7, national and commercial satellite systems, P-3, E-8 and the U-2 during warfighting exercises. The AFSERS provides National Imagery Transmission Format (NITF) information for simulated data collection systems, supporting PED training. The MUSE is also used as a mission rehearsal tool for current, on-going military combat operations. Most of the MUSE/AFSERS software suite components are also used in multiple airborne platform system training devices. Including the MQ-9 [Medium Altitude Long Endurance Tactical (MALET) JSIL Aircrew Trainer (MJAT)] and RQ-4 [Global Hawk Sensor Operator Part Task Trainer (GHSOPTT), and Global Hawk Weapon System Trainer (WST)].

The Joint Technology Center/Systems Integration Laboratory (JTC/SIL) is the training center of excellence supporting UAS and RPA programs for the Services. JTC/SIL provides the system engineering, test and integration, interoperability, rapid technology insertion to address MUSE training requirements. The JTC/SIL combines the UAS/RPA knowledge of communications standards (such as STANAGs 4586, 4607, 4545 and 4609) with Hardware in the Loop (HIL) testing, MUSE, integrating with other DoD modeling and simulation (M&S) architectures. For those airborne assets normally not available for training, the JTC/SIL provides surrogate systems and interfaces. The JTC/SIL contributes to the distributed training environments, virtually linking participants from various locations worldwide, and are routinely supported

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675092 / *JTC/SIL MUSE*

within the MUSE architecture. The JTC/SIL continues to develop leading edge technologies supporting the rapidly evolving UAS/RPA training requirements required to support NDS future fighting force.

MUSE project funds may be utilized to cover the GCWG Secretariat, studies and analysis activities, supporting current program planning, execution, and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS) Development	3.454	3.521	3.574	-	3.574
Description: DoD's simulation/training system of choice for Intelligence Surveillance and Reconnaissance (ISR)systems, sensors, and platforms. Includes AFSERS, Common Ground Station Interface, and infrastructure support. ***FY 2020 Plans:*** - Development and release of MUSE/AFSERS RPA and ISR simulation capability supporting theater level exercises such as Dong Maeng (formerly Ulchi Freedom Guardian and Key Resolve), Yama Sakura, Talisman Saber, Pacific Sentry, Austere Challenge, and associated events. - Continue incorporation of mandated Cyber Security updates. - Develop higher fidelity in the Moving Target Indicator payload model into MUSE/AFSERS - Develop and integrate multi-sensor full motion video (FMV) payload simulations to support training missions - Complete the redesign of Connect and Netlink routing software to improve network routing and large data feeds, be web browser accessible, and incorporate the use of Windows Active Directory authentication. - Continue the re-architecture of Vignette Planning & Rehearsal Software (ViPRS) capability. - Continue software architecture optimization and modularization, to facilitate extensibility and scalability. - Extend current Link 16 simulation capabilities to include surface tracks (J3.3). - Conduct an image generator trade study to determine the best image generator to meet USAF training requirements of the future, to include investigating the use of "Gaming Engine" based Image Generation capability such as Unreal4. - Begin development the simulated GPS jamming effects on aircraft systems. - Improve Moving Target Indicator/Synthetic Aperture Radar payload models into MUSE/AFSERS - Continue integration testing with designated federations (ASCCE, JLVC, JLCCTC) ensuring joint interoperability with services and JS/J7 capabilities.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Complete certification and interoperability requirements of AFSERS components to run on the Distributed Mission Operations Network (DMON). ***FY 2021 Base Plans:*** JTC/SIL will: - Continue development and release of MUSE/AFSERS RPA and ISR simulation capability supporting theater level exercises such as Dong Maeng (formerly Ulchi Freedom Guardian and Key Resolve), Yama Sakura, Talisman Saber, Pacific Sentry, Austere Challenge, and associated events. - Continue incorporation of mandated Cyber Security updates. - Complete the re-architecture of Vignette Planning & Rehearsal Software (ViPRS) capability to include transitioning it to be web browser accessible, developing an after action report (AAR) capability, and more realistic attrition. - Continue architecture software optimization and modularization to facilitate extensibility and scalability. - Begin prototype development of an improved image generator based upon the results of the image generator trade study conducted during FY20. - Fully integrate the high fidelity SAR model into the MUSE/AFSERS baseline which provides realistic SAR imagery based upon material encoded terrain. - Fully integrate MTI/SAR sensor cross-cuing capability in MUSE/AFSERS. - Develop and integrate low-cost, fixed-wing support to RPA operations. - Integrate a Vehicle and Dismount Exploitation Radar (VADER) sensor model in MUSE/AFSERS. - Begin development of the Long Range Radar (LRR) sensor MUSE/AFSERS model. - Develop IFF Modes 4, 5, & S in MUSE/AFSERS. - Continue integration testing with designated federations (ASCCE, JLVC, JLCCTC) ensuring joint interoperability with services and JS/J7 capabilities. - Assess services and Joint Staff emerging environments and the impact to MUSE/AFSERS integration and interoperability ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increased due to small inflation increase					
Accomplishments/Planned Programs Subtotals	3.454	3.521	3.574	-	3.574

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675092 / *JTC/SIL MUSE*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTE 07 PE 0305204A: *Tactical Unmanned Aerial Vehicles*	4.748	4.954	4.833	-	4.833	4.327	4.244	4.099	-	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. JTC/SIL falls under US Army Futures Command. The Air Force POC is Dr. Lillian-Campbell from AF Agency for Modeling & Simulation which falls under HAF/A3T.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 675092 / *JTC/SIL MUSE*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AFSERS Development	MIPR	Redstone Arsenal : Huntsville, AL	-	3.454	Feb 2019	3.521	Dec 2019	3.574	Dec 2020	-		3.574	Continuing	Continuing	-
		Subtotal	-	3.454		3.521		3.574		-		3.574	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	3.454		3.521		3.574		-		3.574	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675092 / *JTC/SIL MUSE*

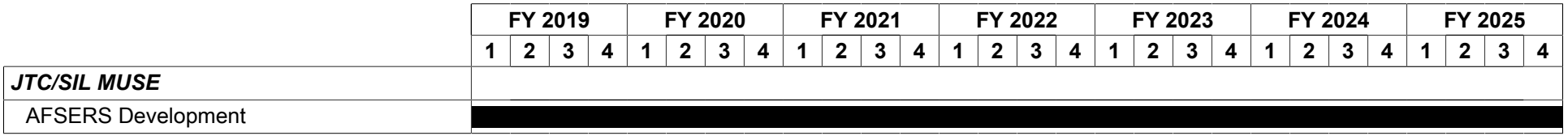

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675092 / *JTC/SIL MUSE*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JTC/SIL MUSE				
AFSERS Development	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675291: *Gorgon Stare*	-	10.000	15.000	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 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 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). The acquisition strategy for this Air Force podded sensor suite solution is sustainment of the currently fielded capabilities with any upgrades implemented via validated -1067s or Urgent Operational Needs.

Development efforts conducted with FY 2015 Congressionally-added funds included efforts focused primarily on the development of a Beyond Line of Sight (BLOS) capability in support of an Urgent Operational Need. Development efforts conducted with FY 2016 Congressionally-added RDT&E funds included further development and 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 2017 Congressionally-added funds further progressed efforts associated with BLOS, to include first article testing for phase 1 and a limited BLOS capability delivered to the field in FY2019. Development efforts conducted with FY 2018 Congressional added funds included further development of the next phase of BLOS to enable freedom of maneuverability and development of system imagery improvements. Development efforts conducted with FY 2019 Congressionally added funds included completion of BLOS Phase II system design and aircraft certification to enable full freedom on maneuverability, completing imagery improvements and continuation of data automation through Area of Interest (AOI) tagging and tracking efforts. Development efforts to be conducted with FY2020 Congressionally added funds include but are not limited to continuation of tagging and tracking efforts, development of an electro-optical (EO)/infrared (IR) fusion capability, and development of tip and cue airborne cueing.

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

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Gorgon Stare capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
Congressional Add: Gorgon Stare	10.000	15.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675291 / *Gorgon Stare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
FY 2019 Accomplishments: - BLOS Phase II pod system design approved and ground testing initiated. ***FY 2020 Plans:*** - Will continue tagging and tracking development efforts, development of an EO/IR fusion capability, and development of tip and cue airborne cueing.		
Congressional Adds Subtotals	10.000	15.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APAF 05 PRDTB3: *MQ-9 UAS Payloads*	23.000	19.800	0.000	46.100	46.100	0.000	0.000	0.000	0.000	0.000	88.900
• APAF 06 PRDTB3: *Gorgon Stare*	7.500	1.500	0.000	10.700	10.700	0.000	0.000	0.000	0.000	0.000	19.700

Remarks

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 645th 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675291 / *Gorgon Stare*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Gorgon Stare System Development	SS/CPFF	Sierra Nevada Corporation : Sparks, NV	-	10.000	Jan 2019	15.000	Jan 2020	-		-		-	Continuing	Continuing	25.000
		Subtotal	-	10.000		15.000		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	10.000		15.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675291 / *Gorgon Stare*

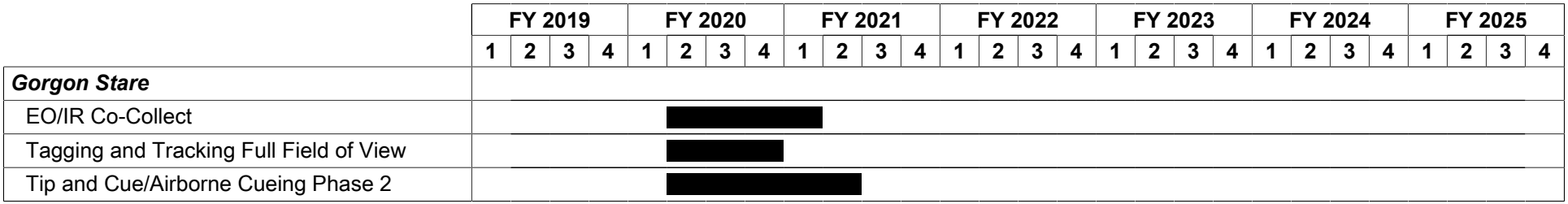

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 675291 / *Gorgon Stare*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Gorgon Stare				
EO/IR Co-Collect	2	2020	1	2021
Tagging and Tracking Full Field of View	2	2020	4	2020
Tip and Cue/Airborne Cueing Phase 2	2	2020	2	2021

Note

Gorgon Stare will continue operations as required using sustainment funding.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
676025: *Data Compression*	-	4.879	6.935	9.528	0.000	9.528	11.696	12.825	7.914	8.060	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

RDUCE provides efficient and integrated compression of airborne Intelligence, Surveillance, and Reconnaissance (ISR) sensor data, maximizing the use of limited bandwidth and delivering more data to the tactical user in the field. RDUCE develops, tests, and implements new sensor data compression algorithms for current and emerging airborne ISR sensors. The program develops compression capabilities for manned and unmanned airborne platforms, associated ground stations, and the Distributed Common Ground System (DCGS). Outputs will meet standard certification for use within the Department of Defense and Intelligence Community (IC) Geospatial Intelligence (GEOINT), Signals Intelligence (SIGINT), and Measurement and Signatures Intelligence (MASINT) compression applications.

Activities also include continuous studies, analysis and updates to support program planning and execution.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Data Compression	4.879	6.935	9.528	-	9.528
Description: The Data Compression effort provides the warfighter capabilities to efficiently compress ISR data and to enable dissemination in near real time to tactical users through bandwidth limited dissemination systems. The program focuses on current and emerging ISR sensors, including incorporation into open architectures like Common Open Architecture Radar Programs (COARPs), Future Airborne Capability Environment (FACE), and Sensor Open System Architecture (SOSA). The algorithms can be leveraged for any platform. For example, the HSI algorithm was selected by NASA to be included in an experimental system on the ISS. Outputs will meet standards certification for use within the DoD Geospatial Intelligence, Signals Intelligence and Measurement and Signatures Intelligence data compression applications.					
FY 2020 Plans: - For mature algorithms (e.g. SAR, Hyper-Spectral Imagery (HSI), SAR Phase History) optimize software reference implementations, provide integration assistance, and SME support to platforms/sensors (e.g. ASARS, MP-RTIP/EISS, others) seeking to adopt the algorithm(s)					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- For less mature algorithms (e.g. SIGINT, LIDAR, and EO/IR) refine the algorithms, identify platform and exploitation partners for initial testing, and analyze results in an operationally representative environment - Publish and update compressed SAR and HSI samples to promote standards acceptance - Publish initial SAR Phase History draft standard and begin the process of formal acceptance through relevant and/or appropriate standards bodies - Incorporate the TRL mature algorithms into DoD open architectures such as SOSA, Open Mission Systems (OMS), COARPs, and FACE ***FY 2021 Base Plans:*** - Will provide continuous updates and integration support for the mature TRL modalities (SAR, HSI, SAR Phase History) - Will finalize SAR Phase history standard for formal adoption - Will complete initial development of LIDAR and SIGINT modalities - W identify platform/sensor partners for initial test/integration - Will begin feature updates to address any issues or previously uncaptured use cases to ensure the compression algorithms are operationally relevant - Will begin studies and initial development of EO/IR compression algorithms ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increased due to additional sensor modes added to the Data Compression portfolio.					
Accomplishments/Planned Programs Subtotals	4.879	6.935	9.528	-	9.528

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

In FY21/22/23, Project 676025-Data Compression, is adding additional sensor modes to its portfolio each year.

D. Acquisition Strategy

Data Compression program is conducted by Air Force Life Cycle Management Center/ Intelligence, Surveillance, and Reconnaissance and Special Operations Forces (AFLCMC/WIN). Acquisition strategy is to develop data compression hardware/software, and data compression standards for various ISR applications to include airborne, ground stations, data storage facilities, and exploitation tools. RDUCE will utilize existing contracts with full and open competition where appropriate. Integration will be accomplished by the requisite program offices.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 676025 / *Data Compression*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LIDAR	Various	Various : Various	-	1.800	Mar 2019	1.000	Feb 2020	1.000	Dec 2020	-		1.000	Continuing	Continuing	-
SIGzip Phase II	Various	Various : Various	-	-		2.100	Jan 2020	2.000	Jun 2021	-		2.000	Continuing	Continuing	-
EO/IR	Various	Various : Various	-	-		0.100	May 2020	1.786	Jun 2021	-		1.786	Continuing	Continuing	-
		Subtotal	-	1.800		3.200		4.786		-		4.786	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Standardization Development	C/CPAF	Various : Various	-	1.427	Feb 2019	1.000	Dec 2019	0.000		-		0.000	0.000	2.427	-
Standardization Development (FLEX)	C/CPAF	Various : Various	-	-		-		1.000	Dec 2020	-		1.000	Continuing	Continuing	-
Standardization Development (SARzip)	C/CPAF	Various : Various	-	-		-		0.690	Dec 2020	-		0.690	Continuing	Continuing	-
Standardization Development (zPHD)	C/CPAF	Various : Various	-	-		-		1.000	Dec 2020	-		1.000	Continuing	Continuing	-
		Subtotal	-	1.427		1.000		2.690		-		2.690	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ADDA Lab	C/CPAF	Various : Various	-	0.500	Jan 2019	1.750	Jan 2020	0.500	Nov 2020	-		0.500	Continuing	Continuing	-
COMPASE Lab	C/CPAF	Various : Various	-	0.300	Jan 2019	0.100	Jan 2020	0.400	Nov 2020	-		0.400	Continuing	Continuing	-
		Subtotal	-	0.800		1.850		0.900		-		0.900	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / *Airborne Reconnaissance Systems*	Project (Number/Name) 676025 / *Data Compression*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA: Other Govt Cost	Various	Not specified. : TBD	-	0.852	May 2020	0.885	May 2020	1.152	May 2021	-		1.152	Continuing	Continuing	-
		Subtotal	-	0.852		0.885		1.152		-		1.152	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.879		6.935		9.528		-		9.528	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 676025 / *Data Compression*

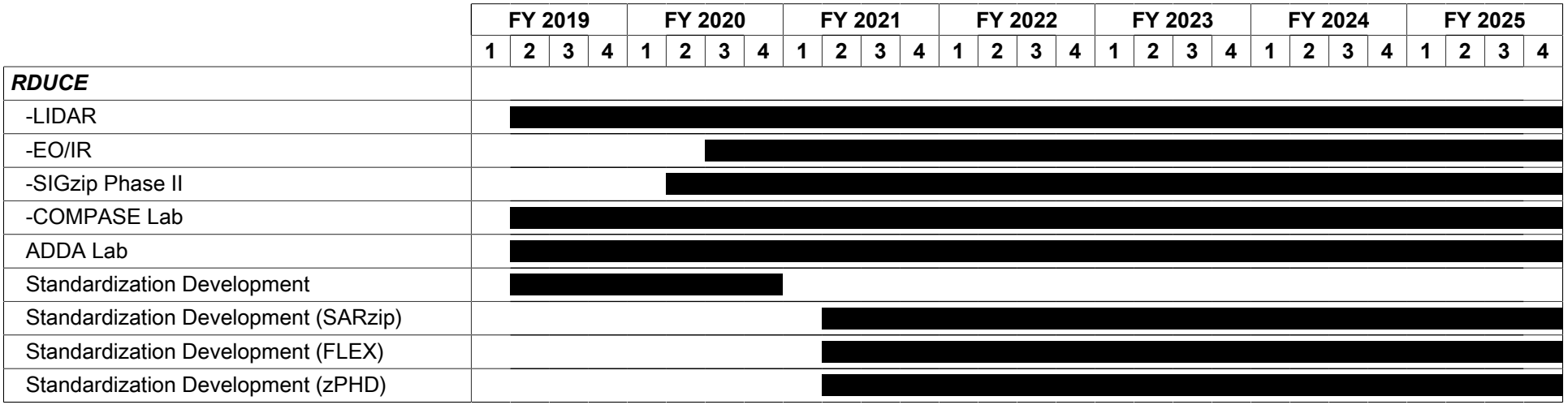

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305206F / *Airborne Reconnaissance Systems*	**Project (Number/Name)** 676025 / *Data Compression*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
RDUCE				
-LIDAR	2	2019	4	2025
-EO/IR	3	2020	4	2025
-SIGzip Phase II	2	2020	4	2025
-COMPASE Lab	2	2019	4	2025
ADDA Lab	2	2019	4	2025
Standardization Development	2	2019	4	2020
Standardization Development (SARzip)	2	2021	4	2025
Standardization Development (FLEX)	2	2021	4	2025
Standardization Development (zPHD)	2	2021	4	2025