

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force **Date:** February 2019

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>
--	---

COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	34.486	87.618	38.939	0.000	38.939	18.694	18.347	19.849	20.206	Continuing	Continuing
674820: <i>Sensor Development</i>	-	34.486	87.618	38.939	0.000	38.939	18.694	18.347	19.849	20.206	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The U-2S Dragon Lady platform is a high-demand/low-density aircraft equipped with state-of-the-art sensor and data link systems providing mission essential Intelligence, Surveillance, and Reconnaissance (ISR) to the Combatant Commands, Joint and Combined forces, and the IC community in peacetime and wartime. The program supports core missions such as Sensitive Reconnaissance Operations (outlined in CJCSI 3250.01) in addition to other missions that include execution of CCMD OPLANs and CONPLANs, Humanitarian Assistance/Disaster Response (HADR), Counter-Insurgency (COIN) operations and third-party treaty verification/monitoring via the OLIVE HARVEST mission.

The Air Force continues to invest and modernize the U-2 program in the 2020 President's Budget by addressing reliability, maintainability, supportability, diminishing manufacturing sources/ material shortages (DMS/MS), flight test, safety issues, and integration of capability development activities in support of the broader ISR portfolio. RDT&E efforts will address sustainment, modification, and modernization of sensors and associated mission equipment, and focus on integrating/expanding platform capabilities within the larger ISR portfolio; these efforts include (but are not limited to) ASARS 2B/C, avionics and navigation tech refresh, mission planning software and infrastructure upgrades, modernization of aircraft data links, next generation SIGINT, and developing a quick reaction capability (QRC), enabling improved collection against emerging threats and capabilities.

Additionally, the U-2 program will continue to prioritize emergent and/or experimental RDT&E efforts designed to mitigate the rapidly evolving combat environment (e.g. electromagnetic requirements) in order to maintain safety and operational relevance through current and future U-2 operating locations.

Currently, the U-2 Program provides funding for an Advanced Synthetic Aperture Radar System (ASARS) acquisition effort. This effort will design, fabricate, integrate, and demonstrate system capability enhancements for a high altitude deep look SAR system. This mitigates a Diminishing Manufacturing Supply and Material Shortages (DMSMS) issue with the current U-2 SAR sensor.

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is \$14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

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.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force **Date:** February 2019

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>
--	---

B. Program Change Summary (\$ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	34.486	70.618	38.939	0.000	38.939
Current President's Budget	34.486	87.618	38.939	0.000	38.939
Total Adjustments	0.000	17.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	17.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

FY16 increase across FYDP due to AF decision to rephase U-2 divestiture to FY19.

FY17 increase to address DMSMS issues in the program.

FY18 and FY19 increase due to the retention of the U-2. Addresses prudent acquisition efforts to address safety-of-flight and DMSMS issues. +17M Congressional add for EO/IR upgrade

FY20 base decrease reflects beginning of program stabilization following divestiture decisions. FY20 funding more accurately reflects future program costs. Continuing to address safety-of-flight and DMSMS issues.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019	FY 2020
Title: U-2 Aircraft Update Block 20.1	23.488	40.498	38.389
Description: Aircraft sustainment and/or enhancement development includes activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, avionics system upgrades, emergency egress system sustainability and suitability effort, airframe Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation, mission planning system migration, navigation system and stellar tracker initiatives, Open Mission Systems and Unmanned Aerospace Systems Command and Control Standard Initiative (OMS/UCI) standards compliance, GPS technical refresh, helmet and Full Pressure Suit technical refresh, and tactical data-link (L-16, IBS, IFDL, MADL, etc.) design and integration.			
FY 2019 Plans:			

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force		Date: February 2019		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
<p>FY 19 continues to support sustainment and/or enhancement development including activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, avionics system upgrades, emergency egress system sustainability and suitability effort, airframe Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation, mission planning system migration, navigation system and stellar tracker initiatives, advanced and agile systems, Open Mission Systems and Unmanned Aerospace Systems Command and Control Standard Initiative (OMS/UCI) standards compliance, GPS technical refresh, helmet and Full Pressure Suit technical refresh, and tactical data-link (L-16, IBS, IFDL, MADL, etc.) design and integration.</p> <p>FY 2020 Plans: Aircraft sustainment and/or enhancement development includes activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, avionics system upgrades, emergency egress system sustainability and suitability effort, airframe Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation, mission planning system software and infrastructure migration, navigation system and stellar tracker initiatives, advanced and agile systems, Open Mission Systems and Unmanned Aerospace Systems Command and Control Standard Initiative (OMS/UCI) standards compliance, GPS technical refresh, helmet and Full Pressure Suit technical refresh, quick reaction capability (QRC) development, enhanced communications/SIGINT system demo and development, and tactical data-link (L-16, IBS, IFDL, MADL, etc.) design and integration.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: FY20 funding continues to address sustainment issues in the platform, while maximizing RDT&E within the aircraft mod categories. FY20 base plans are being addressed with reduction from FY19 to FY20 base.</p>				
<p>Title: U-2 Payload Update Block 20.1</p> <p>Description: Aircraft payload development supports sustainment and/or enhancement development includes activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, Advanced Synthetic Aperture Radar System (ASARS) development and test, SIGINT and multi-spectral sensor technical refresh integration and test, defensive systems, sensor range improvements, strategic and tactical data link (L-16, IBS, IFDL, MADL, etc.) design and integration.</p> <p>FY 2019 Plans: FY19 will continue to support payload sustainment and/or enhancement activities such as, but not limited to, ASARS development, integration and test, defensive systems, datalinks, avionics technical refresh, SIGINT and multi-spectral sensor technical refresh, advanced and agile payloads, Optical Bar Camera technical refresh, sensor range improvements, and associated ground support equipment.</p>		10.998	47.120	0.550

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
--	----------------------------

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>
--	---

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019	FY 2020
<p>Counters emergent threats in the low band spectrum for detection, display and defeat by the AN/ALQ-221 Low Band (LB) subsystem in order to allow U-2 flight ops in moderately contested environments. Requirements will be met with two system modifications: an Advanced Threat Systems modification and a Continuous Power wave Amplifier (CWPA) modification.</p> <p>This is the development work for follow on FY19 procurement of 15 kits + spares. Additional information is available via classified means.</p> <p>FY 2020 Plans: In FY20, the majority of planned RDT&E base funding will fall under that aircraft mod category. ACQ manager and HAF U-2 PEM have the authority to adjust funding between categories as mission and threat environment evolves.</p> <p>Payload mod funding will be used to integrate ASARS-2B radar onto the platform.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: FY20 funding reflects a shift in RDT&E focus toward the aircraft mod category.</p>			
Accomplishments/Planned Programs Subtotals	34.486	87.618	38.939

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
N/A

F. 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.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force **Date:** February 2019

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>
--	---	--

Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ASARS Phase 1 Enhancements Design	SS/CPFF	Raytheon/Lockheed Martin : El Segundo, CA	-	-		-		-		-		-	Continuing	Continuing	-
ASARS Phase 2 Integration & Demonstration	SS/CPIF	Raytheon/Lockheed Martin Aeronautics : El Segundo, CA	-	-		0.520	Mar 2019	0.550	Dec 2018	-		0.550	Continuing	Continuing	-
Flight Test Support	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	-		-		-		-		-	Continuing	Continuing	-
Ground Support Equipment	SS/CPFF	L3 Communications : Salt Lake City, UT	-	10.998	Nov 2017	-		-		-		-	Continuing	Continuing	-
Navigation System	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	4.734	Dec 2017	6.000	Mar 2019	-		-		-	Continuing	Continuing	-
Emergency Egress System Sustainability and Suitability Effort	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	10.111	Jul 2018	16.665	Apr 2019	5.738	Feb 2020	-		5.738	Continuing	Continuing	-
Avionics Technical Refresh	SS/CPFF	LMA : Palmdale, CA	-	-		11.234	Apr 2019	16.500	Jan 2020	-		16.500	Continuing	Continuing	-
Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation	SS/CPFF	LMA : Palmdale, CA	-	8.643	Jan 2018	7.500	Jun 2019	6.000	Dec 2019	-		6.000	Continuing	Continuing	-
Electro-Optical/Infrared Sensor Technical Refresh	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	-		24.500	Apr 2019	-		-		-	Continuing	Continuing	-
Mission Planning Software Technical Refresh	TBD	TBD : TBD	-	-		7.099	Apr 2019	6.096	Dec 2019	-		6.096	Continuing	Continuing	-
Electronic Warfare Suite (EWS) Advanced Threat	SS/CPFF	BAE : Nashua, NY	-	-		14.100		4.055	Jan 2020	-		4.055	0.000	18.155	22.100
Subtotal			-	34.486		87.618		38.939		-		38.939	Continuing	Continuing	N/A

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force **Date:** February 2019

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>
--	---	--

FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<i>U-2 Dragon Lady</i>	
Advanced Synthetic Aperture Radars System (ASARS)	
Ground Support Equipment	
Navigation System	
Emergency Egress System Sustainability and Suitability Effort	
Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation	

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force **Date:** February 2019

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>
--	---	--

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>U-2 Dragon Lady</i>				
Advanced Synthetic Aperture Radars System (ASARS)	1	2018	4	2023
Ground Support Equipment	1	2018	2	2020
Navigation System	1	2018	4	2020
Emergency Egress System Sustainability and Suitability Effort	3	2018	4	2021
Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation	1	2018	3	2019