Exhibit R-2, RDT&E Budget Item Justification: PB 2020 United States Special Operations Command	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*

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	1,064.997	250.604	175.862	245.795	-	245.795	206.685	136.047	113.530	123.396	Continuing	Continuing
SF100: *Aviation Systems Advanced Development*	809.919	169.288	108.897	137.460	-	137.460	98.484	33.530	5.255	13.031	Continuing	Continuing
SF200: *CV-22*	3.644	12.292	22.344	28.081	-	28.081	10.093	9.634	17.942	18.360	Continuing	Continuing
S750: *Mission Training and Preparation Systems*	26.392	8.181	7.520	8.595	-	8.595	9.630	9.558	9.757	9.983	Continuing	Continuing
S875: *AC/MC-130J*	37.926	9.351	17.091	31.891	-	31.891	55.083	53.892	54.943	56.224	Continuing	Continuing
D615: *Rotary Wing Aviation*	187.116	51.492	20.010	39.768	-	39.768	33.395	29.433	25.633	25.798	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 212

A. Mission Description and Budget Item Justification

SF100 Aviation Systems Advanced Development:
This project provides for the development, rapid prototyping, demonstration, and integration of current and maturing technologies for Special Operations Forces (SOF)-unique aviation and training requirements. Timely application of SOF-unique technology is critical and necessary to meet requirements in such areas as: SOF common avionics; Terrain Following/Terrain Avoidance (TF/TA) radar, best known as Silent Knight radar or AN/APQ-187; Defensive Countermeasures; Electronic Warfare (EW) - Radio Frequency Countermeasures (RFCM); Precision Strike Package (PSP); PSP High Energy Laser; AC-130H/W/U and MC-130E/H/P Recapitalization, and other SOF airborne platforms; digital terrain elevation data and electronic order of battle; digital maps; Airborne Mission Networking (AbMN); near real-time Intelligence, Surveillance and Reconnaissance (ISR); data fusion; threat detection and avoidance; navigation, target detection, and identification technologies; weapons integration; digital broadcast capabilities; aerial refueling; survivability; and ISR payload technological improvements with size, weight, power and integration onto all SOF unmanned aircraft system (UAS) ISR platforms.

SF200 CV-22 Development/Test and Evaluation:
The CV-22 is a SOF variant of the V-22 vertical medium lift, multi-mission aircraft. The CV-22 project provides long range, high speed, infiltration, exfiltration, and resupply to Special Forces teams in hostile, denied, and politically sensitive areas. This is a capability not currently provided by other existing aircraft. The funding in this project supports integration, design, development, rapid prototyping, and test to provide improved capabilities to include, but not limited to, more robust performance in situational awareness, ISR, weapons, avionics, survivability, maneuverability, mission deployment and improved reliability and maintainability of the CV platform. CV-22 SOF Common TF/TA Silent Knight radar or AN/APQ-187, provides long-range, night/adverse weather, clandestine penetration of medium-to-high threat areas to infill, exfill, and resupply SOF forces. Provides more sustainable/capable replacement to obsolescing and technology limited TF/TA radar. There is a plan to develop a Forward Defensive Weapon System (FDWS), which in combination with the ramp-mounted gun, provides a ~360 degree field of fire to suppress/eliminate enemy

targets. The FDWS integrates the fielded GAU-17 belly gun system currently employed on the USMC MV-22 aircraft with the SOF peculiar color helmet mounted display (CHMD) and cockpit firing controls for pilot operation.

S750 Mission Training and Preparation Systems:
The Special Operations Mission Planning and Execution (SOMPE) project funds the definition, design, development, rapid prototyping, integration, and testing of SOMPE systems to support mission planning, rehearsal, and execution requirements to meet SOF-unique mission requirements and correct deficiencies in current mission planning, rehearsal, and execution capabilities. The Mission Training and Preparation Systems project also includes program management, systems engineering, configuration management, architecture development, risk reduction, and trade study initiatives, as well as initiatives to assure interoperability and commonality between diverse mission planning, rehearsal, and execution systems.

S875 AC/MC-130J:
The AC/MC-130J project funds core SOF-unique modifications to replace aging/retired AC-130H Spectre, AC-130W Stinger II, AC-130U Spooky, MC-130E Combat Talon I, MC-130P Combat Shadow, MC-130H Combat Talon II aircraft. The 8 AC-130H Spectre, 12 AC-130W Stinger II and 17 AC-130U Spooky airframes will be replaced with MC-130J aircraft modified with the PSP to achieve the AC-130J configuration. The AC-130J aircraft will provide close air support, air interdiction, and armed reconnaissance capability. The 14 MC-130E Combat Talon I, 23 MC-130P Combat Shadow, and 20 MC-130H Combat Talon II airframes will be replaced by MC-130J Commando II aircraft with SOF mission modifications. The MC-130J Commando II aircraft perform clandestine or low visibility, single or multi-ship low-level missions intruding politically-sensitive or hostile territories; provide air refueling for special operations helicopters and CV-22 aircraft; and airdrop of leaflets, insert small special operations teams, resupply bundles and combat rubber raiding craft. The Air Force procures and fields the basic aircraft, common support equipment, and trainers for USSOCOM. An incremental upgrade approach will be used to rapidly prototype and integrate SOF capabilities onto the aircraft. SOF capabilities include, but are not limited to, Airborne Mission Networking, data fusion, threat detection and avoidance, integrated terrain following/terrain avoidance, electronic warfare, and embedded training. Integrating and automating SOF mission systems that deliver these capabilities is critical to fielding SOF-capable AC/MC-130J aircraft to recapitalize Air Force Special Operations Command's legacy C-130 fleet.

D615 Rotary Wing Aviation:
This project provides for the development, rapid prototyping, demonstration, and integration of current and maturing technologies for Special Operations Forces (SOF)-unique rotary wing aviation and training requirements. This project also includes modifications to Aircraft Survivability Equipment (ASE) avionics and weapons systems to counter rapidly emerging threats, address cyber security, improve lethality and enhance aircraft self-protection in contested environments. Rotary wing aircraft supported by this project include: MH-60M, MH-47G, and A/MH-6M. These aircraft provide aviation support to SOF in worldwide contingency operations and low-intensity conflicts. They must be capable of rapid deployment, undetected penetration of hostile areas, and operations at extended ranges under adverse weather conditions to infiltrate, provide logistics for, reinforce, and extract SOF. The anti-access/area denial (A2/AD) threat is characterized by an extensive and sophisticated ground based air defense system and an upgraded air-to-air capability targeted against helicopters. When possible, Middle-Tier Acquisition (2016 NDAA Section 804) may also be used to accommodate rapid prototyping in the above projects to develop, demonstrate and evaluate residual operational capabilities.

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Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	259.886	184.993	137.242	-	137.242
Current President's Budget	250.604	175.862	245.795	-	245.795
Total Adjustments	-9.282	-9.131	108.553	-	108.553
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-13.000	-12.131			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.000			
• Congressional Directed Transfers	13.500	-			
• Reprogrammings	-0.257	-			
• SBIR/STTR Transfer	-9.525	-			
• Other Adjustments	-	-	108.553	-	108.553

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: SF100: *Aviation Systems Advanced Development*		
Congressional Add: *Vertical Takeoff and Landing (VTOL) Unmanned Aircraft System (UAS) Research*	-	3.000
Congressional Add Subtotals for Project: SF100	-	3.000
Congressional Add Totals for all Projects	-	3.000

Change Summary Explanation

Funding:

FY 2018: Net decrease of -$9.282 million is due to a transfer of funds to Small Business Innovative Research/Small Business Technology Transfer programs (-$9.525 million), a congressional reduction for excess product development for EW-RFCM (-$7.500 million), a congressional reduction for poor justification materials for CV-22 (-$1.500 million), a congressional reduction for ASE (-$4.000 million), a congressional transfer from Procurement for SOF Common TF/TA (Silent Knight) radar ($7.500 million), a congressional transfer from Procurement for Degraded Visual Environment ($6.000 million) and a decrease for higher command priorities (-$0.257 million).

FY 2019: Net decrease of -9.131 million is due to a congressional reduction for insufficient budget justification for EC-130J risk reduction (-1.252 million), a congressional reduction for C-130 SOF Common TF/TA training system development early to need (-$3.879 million), a congressional reduction for PSP High Energy Laser program (-$7.000 million), and a congressional add for VTOL UAS research ($3.000 million).

FY 2020: Net increase of $108.553 million is for interoperability/compatibility, consolidated testing and airworthiness release for MC-130J AbMN ($2.688 million), for interoperability/compatibility development testing for Integrated Tactical Mission System ($5.438 million), for deficiency resolution and to begin spiral

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 United States Special Operations Command	Date: March 2019
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1 development for EW-RFCM ($30.253 million), for all weather on PSP and Infrared Suppression Systems for SOF C-130s ($17.948 million), for continued development of PSP High Energy Laser ($23.227 million), interoperability/compatibility, consolidated testing and airworthiness release for C-130 SOF Common TF/TA (Silent Knight) radar ($11.363 million), Rotary Wing Aircraft Survivability increase ($11.425 million) for upgrades to RFCM to address emerging Radio Frequency threats, MH-60 Modifications increase ($4.351 million) for Upturned Exhaust System to reduce vulnerability to IR threats, MH-47 Modifications increase continue Active Parallel Actuator System development, including integration and testing with MH-47G subsystems ($1.860 million).

Schedule: Silent Knight Radar: Raytheon Tiger Team investigation of Low Rate Initial Production (LRIP) II 2A failures concluded in April 2018; LRIP Radar production resumed in June 2018. Initial Operational Test and Evaluation (IOT&E) successfully completed in November 2018. Fielding decision projected in Q2 FY 2019. Initial Operational Capability (IOC) remains in late Q2 FY 2019. EC-130J SOF-Unique 7.0/8.1 development delay was due to a delay in the 7.0/8.1 Air Force modification contract.

Technical: None.

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) SF100 / *Aviation Systems Advanced Development*	

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
SF100: *Aviation Systems Advanced Development*	809.919	169.288	108.897	137.460	-	137.460	98.484	33.530	5.255	13.031	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the development, demonstration, and integration of current and maturing technologies for Special Operations Forces (SOF)-unique aviation and training requirements. Timely application of SOF-unique technology is critical and necessary to meet requirements in such areas as: SOF common avionics; Terrain Following/Terrain Avoidance (TF/TA) radar, best known as Silent Knight radar or AN/APQ-187; Defensive Countermeasures; Electronic Warfare (EW) - Radio Frequency Countermeasures (RFCM); Precision Strike Package (PSP); PSP High Energy Laser; AC-130H/W/U and MC-130E/H/P Recapitalization, and other SOF airborne platforms; digital terrain elevation data and electronic order of battle; digital maps; Airborne Mission Networking; near real-time Intelligence, Surveillance and Reconnaissance (ISR); data fusion; threat detection and avoidance; navigation, target detection, and identification technologies; weapons integration; digital broadcast capabilities; aerial refueling; survivability; and ISR payload technological improvements with size, weight, power and integration onto all SOF unmanned aircraft system (UAS) ISR platforms.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: EC-130J Commando Solo ***Description:*** EC-130J Commando Solo supported the development, integration and testing of digital broadcast capabilities on the EC-130J Commando Solo aircraft. This program is transitioning to the Multi Mission Payload - Heavy (MMP-H) program, PE 1160431BB. ***FY 2019 Plans:*** Develop and integrate emerging digital broadcast and antenna technologies into the Military Information Support Operations (MISO) System MMP-H Program. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of $1.179 million is due to completing the development and integration of emerging digital broadcast and antenna technologies into the MMP-H program.	-	1.179	-	-	-
Title: EW – RFCM ***Description:*** EW-RFCM supports development, integration and test activities to provide EW capability against RF threats for SOF AC/MC-130J aircraft. The Defensive Countermeasures (DCM) suite is an integrated package of existing and future aircraft defensive systems which provides situational awareness and threat	49.748	9.432	44.739	-	44.739

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
response processing that includes the RFCM system, and future defensive systems. The RFCM program provides SOF-unique aircraft defensive capabilities required for SOF missions. ***FY 2019 Plans:*** Continue integration and testing. Began government developmental flight test activities to provide EW capability against RF threats for SOF AC-130J and MC-130J platforms. ***FY 2020 Base Plans:*** Continues integration and testing. Completes government developmental and operational flight test activities on AC-130J and begins development and interoperability testing on MC-130J TF/TA radar, electronic warfare systems and airborne mission networking systems. Capabilities being developed include: High Band Transmission, Adaptive Radar Countermeasures, Very Low Band Receive, Low Band Transmit, and Increased Instantaneous Bandwidth, precision direction finding and advance techniques. Begin Spiral 1 development to address updated priority threats. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $35.307 million resolves deficiencies and begins development of Spiral 1 capabilities and adaptive countermeasures.					
Title: PSP for SOF ***Description:*** PSP for SOF supports systems engineering, analysis, development, and enhancement of the baseline PSP and integration, installation, and test on host MC-130J aircraft provided by the U.S. Air Force for the AC-130H, AC-130W and AC-130U recapitalization, as well as current SOF AC-130Js and AC-130Ws, and other SOF platforms. Missions for the AC-130 aircraft include, but are not limited to, Close Air Support, Air Interdiction, and Armed Reconnaissance. PSP is modular, scalable, and platform neutral. ***FY 2019 Plans:*** Continue development, integration, test, and system improvement of the PSP, to include defensive systems, Electro-Optical/Infrared (EO/IR) sensors, adverse weather and special mission processor capabilities on SOF C-130s and other SOF aircraft. ***FY 2020 Base Plans:***	13.018	18.354	28.528	-	28.528

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continues development, integration, test, and system improvement of the PSP, to include defensive systems, EO/IR sensors, adverse weather and special mission processor capabilities on SOF C-130s and other SOF aircraft. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $10.174 million is for the development, integration, test, and system improvement of all-weather capabilities of the PSP and Infrared Suppression Systems (IRSS) on SOF C-130s.					
Title: PSP High Energy Laser (HEL) ***Description:*** The HEL effort leverages a rapid prototyping approach to demonstrate integration of a laser weapon system onto an AC-130J aircraft. Utilizing a best of breed approach, it integrates laser, beam control, power and thermal subsystems via a government lead system integrator. This provides additional flexibility for rapid prototyping and future modifications. ***FY 2019 Plans:*** Continue development of subsystems, complete purchase of beam control subsystem and laser subsystem, interface control documentation, and completes risk reduction for AC-130J aircraft. ***FY 2020 Base Plans:*** Take receipt of subsystems ordered, begin assembly of subsystems into weapon systems. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of 0.241 million continues deferred laser assembly and integration.	15.077	26.986	27.227	-	27.227
Title: C-130 SOF Common TF/TA (Silent Knight) Radar ***Description:*** C-130 SOF Common TF/TA (Silent Knight) radar supports integration and test of a TF/TA radar and on-board processor to provide a multi-mode terrain following capability on MC-130J aircraft. Crew systems integration efforts include modifications to aircraft controls and displays to automate TF/TA flight management and reduce pilot, copilot and Combat Systems Officer workload during missions previously performed by five aircrew members on legacy C-130 tankers and penetrators. ***FY 2019 Plans:***	81.830	47.476	32.524	-	32.524

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue SOF Common TF/TA (Silent Knight) radar and aircraft control and display integration efforts. Installs TF radar system kit on a third MC-130J and continues MC-130J TF/TA developmental flight test. Develop hardware and software for safety critical capabilities and integration issues on the Silent Knight radar. ***FY 2020 Base Plans:*** Completes MC-130J TF/TA developmental flight test on aircraft modified with TF/TA radar. Begins development and interoperability testing on MC-130J TF/TA radar, electronic warfare systems and airborne mission networking systems. Trains AFSOC aircrews on an MC-130J modified with a SOF Common TF/TA (Silent Knight) radar for operational testing. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of $14.952 million is due to completing SOF Common TF/TA (Silent Knight) radar and aircraft control and display integration efforts.					
Title: MH-60/MH-47 SOF Common TF/TA (Silent Knight) Radar ***Description:*** MH-60/MH-47 SOF Common TF/TA (Silent Knight) radar supports Engineering and Manufacturing Development (EMD), qualification, and operational flight testing of a SOF common TF/TA LPI/LPD radar to defeat advanced passive detection threats while maintaining ability to fly safe TF. Funding also supports design, development, integration, and testing on MH-47G and MH-60M aircraft for improved system capabilities to include, but not limited to, Aircraft Survivability Equipment (ASE) interoperability improvements and reduced TF signature management. ***FY 2019 Plans:*** Continue design, development, integration, and testing of SOF Common TF/TA (Silent Knight) radar ASE interoperability improvements and sensor fusion TF initiatives. ***FY 2020 Base Plans:*** Continues technology refresh efforts to include design, development, integration, and testing of SOF Common TF/TA (Silent Knight) radar to reduce Terrain Following signature, improve ASE interoperability, sensor fusion initiatives, and increase reliability. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $1.264 million for ASE interoperability and reduced Terrain Following signature management initiatives.	8.070	1.212	2.476	-	2.476
Title: ISR Payload	1.545	1.258	1.966	-	1.966

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: ISR Payload Sensor Technology supports development, integration, and testing of sensor miniaturization efforts to adapt large unmanned system ISR capabilities on all SOF unmanned ISR platforms. ***FY 2019 Plans:*** Continue spiral development to increase the smaller SOF ISR platforms' capabilities through incremental development, integration, and testing. ***FY 2020 Base Plans:*** Continues spiral development to increase the smaller SOF ISR platforms' capabilities through incremental development, integration, and testing. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.708 million will validate additional sensors.					
Accomplishments/Planned Programs Subtotals	169.288	105.897	137.460	-	137.460

	FY 2018	FY 2019
Congressional Add: Vertical Takeoff and Landing (VTOL) Unmanned Aircraft System (UAS) Research	-	3.000
FY 2019 Plans: Funds to be reprogrammed to the Army.		
Congressional Adds Subtotals	-	3.000

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• PROC/5000C13000: *C-130 Modifications*	31.695	80.274	15.582	-	15.582	15.627	14.076	14.353	16.817	Continuing	Continuing
• PROC/2012C130J: *AC/MC-130J*	164.837	160.681	173.419	-	173.419	187.846	234.161	302.270	322.669	Continuing	Continuing
• PROC/1202PSP: *Precision Strike Package*	219.728	226.965	232.930	-	232.930	243.111	168.520	102.038	54.542	Continuing	Continuing
• PROC0201RWUPGR: *Rotary Wing Upgrades and Sustainment*	149.747	146.526	172.020	-	172.020	181.380	198.276	229.219	230.428	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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D. Acquisition Strategy

When possible, Middle-Tier Acquisition (2016 NDAA Section 804) may also be used to accommodate rapid prototyping in the above projects to develop, demonstrate and evaluate residual operational capabilities.

• EC-130J Upgrades: Operational Flight Program Block Cycle is being developed by the Air Force program office using existing development and production contracts.

• EC-130J Commando SOLO: This program is being transitioned into the Multi Mission Payload - Heavy (MMP-H) program, PE 1160431BB. MMP-H uses a traditional acquisition development and procurement strategy with accelerated development that includes increased flight test and multiple combat evaluations.

• EW – RFCM: Awarded delivery order on cost plus incentive fee contract to integrate and test an RFCM System on AC/MC-130J platform.

• PSP for SOF: Incremental acquisition strategy to integrate and test the PSP and capability enhancements on donor MC-130J aircraft provided by the U.S. Air Force and other SOF aircraft. Multiple contract awards.

• PSP HEL: AC-130 HEL program utilizes Naval Surface Warfare Center Dahlgren Division as the government Lead System Integrator of HEL components. HEL system components purchased under Defense Ordinance Technology Consortium Other Transactional Authority. Both of these approaches provide flexibility for rapid prototyping.

• C-130 SOF Common TF/TA (Silent Knight) Radar: Awarded delivery order on Cost Plus Incentive Fee contract to integrate and test the SOF Common TF/TA (Silent Knight) radar on MC-130J aircraft and develop modifications to aircraft displays and controls.

• SOF Common TF/TA (Silent Knight) Radar: Cost Plus Fixed Fee (CPFF) awarded to Raytheon in January 2017 for development of Software Version (SW ver) 7.14 (outcome of 2017 Limited Users Test). CPFF award for development of SW ver 7.15 awarded in July 2018, with Qualification Testing expected in 4Q FY19. Continued software development to improve critical interoperability with other on-aircraft systems in FY19/20 followed by operational capability additions and move to sensor fusion TF FY20-24.

• ISR Payload Sensor Technology: Effort is being executed via a spiral development, integration and testing acquisition strategy based on leveraging existing sensor technology. The focus will be on reducing the size, weight, power and cost of state of the art ISR sensors fielded on larger ISR platforms, in order to make them usable by smaller SOF ISR platforms. This development will include the integration of the ISR capability with the platform's C2 and Communications systems as appropriate.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command		Date: March 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Vertical Takeoff and Landing (VTOL) Unmanned Aircraft System (UAS) Research Congressional Add	C/TBD	TBD : TBD	-	-		3.000	Jan 2019	-		-		-	0.000	3.000	-
EC-130J Commando Solo Multi-Mission Payload – Heavy (MMP-H)	C/CPFF	Johns Hopkins University APL : Baltimore, MD	-	-		1.179	Mar 2019	-		-		-	0.000	1.179	-
Electronic Warfare - Radio Frequency Countermeasures (EW-RFCM)	C/CPIF	BAE Systems, Inc. : Totowa, NJ	97.843	42.218	Jan 2018	9.432	Nov 2018	33.469	Dec 2019	-		33.469	Continuing	Continuing	-
EW - RFCM Spiral 1 Adaptive Countermeasures	Option/ CPIF	BAE Systems, Inc. : Totowa, NJ	-	-		-		3.000	Jul 2020	-		3.000	Continuing	Continuing	-
Precision Strike Package (PSP) for SOF - Defensive Systems	C/TBD	Various : Various	-	2.510	Jan 2018	6.001	Jan 2019	10.141	Jan 2020	-		10.141	Continuing	Continuing	-
PSP for SOF - Electro-Optical/Infrared (EO/IR) Sensor	C/TBD	Various : Various	-	0.600	Jan 2018	1.400	Jan 2019	1.521	Jan 2020	-		1.521	Continuing	Continuing	-
PSP for SOF - Adverse Weather	C/TBD	Various : Various	-	3.240	Jan 2018	4.587	Jan 2019	15.846	Jan 2020	-		15.846	Continuing	Continuing	-
PSP for SOF - Alternate Position, Navigation & Timing	C/TBD	Various : Various	-	3.708	Jun 2018	5.541	Dec 2019	-		-		-	0.000	9.249	-
PSP High Energy Laser (HEL) - High Power Beam Director	C/CPFF	MZA Associates Corporation : Albuquerque, NM	-	10.027	Jul 2018	-		-		-		-	0.000	10.027	-
PSP HEL - Risk Reduction	C/CPFF	Naval Surface Warfare Center : Dahlgren, VA	-	1.300	Mar 2018	3.400	Jan 2019	-		-		-	0.000	4.700	-
PSP HEL - High Power Laser	C/CPFF	Lockheed Martin Aculite : Bothell, WA	-	3.750	Aug 2018	13.250	Dec 2018	-		-		-	0.000	17.000	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PSP HEL - Subsystem Assembly	C/CPFF	Naval Surface Warfare Center : Dahlgren, VA	-	-		6.622	Mar 2019	10.127	Jan 2020	-		10.127	Continuing	Continuing	-
PSP HEL - Battery Development	C/CPFF	TBD : TBD	-	-		1.914	Feb 2019	3.600	Jan 2020	-		3.600	0.000	5.514	-
PSP HEL - Thermal Development	C/CPFF	Naval Surface Warfare Center : Dahlgren, VA	-	-		1.800	Jan 2019	6.500	Jan 2020	-		6.500	Continuing	Continuing	-
PSP HEL - Initial Subsystem Ground Test	C/CPFF	Naval Surface Warfare Center : Dahlgren, VA	-	-		-		7.000	Jan 2020	-		7.000	Continuing	Continuing	-
C-130 SOF Common Terrain Following/Terrain Avoidance (TF/TA) (Silent Knight) Radar	C/CPIF	Lockheed Martin Aero : Marietta, GA	100.795	65.131	Jan 2018	33.015	Jan 2019	19.407	Jan 2020	-		19.407	Continuing	Continuing	-
MH-60/MH-47 SOF Common TF/TA (Silent Knight) Radar	C/CPFF	Raytheon : McKinney, TX	3.898	5.655	Jun 2018	-		1.733	Apr 2020	-		1.733	Continuing	Continuing	-
Intelligence, Surveillance, and Reconnaissance Payload	TBD	Various : Various	2.783	1.545	Apr 2018	1.258	Apr 2019	1.966	Nov 2019	-		1.966	Continuing	Continuing	-
Prior Year Funding - Completed Efforts	Various	Various : Various	336.602	-		-		-		-		-	0.000	336.602	-
		Subtotal	541.921	139.684		92.399		114.310		-		114.310	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C-130 SOF Common TF/TA (Silent Knight) Radar	C/CPIF	Various : Various	10.307	3.923	Dec 2017	3.811	Jan 2019	3.887	Dec 2019	-		3.887	Continuing	Continuing	-
EW-RFCM	C/Various	Robins AFB : Warner Robins, GA	16.319	4.015	Jan 2018	0.000		2.470	Jan 2020	-		2.470	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) SF100 / *Aviation Systems Advanced Development*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PSP for SOF - Other Government Costs	C/TBD	Various : Various	-	2.960	Sep 2018	0.825	Sep 2019	1.020	Sep 2020	-		1.020	Continuing	Continuing	-
Prior Year Funding - Completed Efforts	Various	Various : Various	28.802	-		-		-		-		-	0.000	28.802	-
		Subtotal	55.428	10.898		4.636		7.377		-		7.377	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EW-RFCM	C/Various	Robins AFB : Warner Robins, GA	4.865	3.515	Jan 2018	-		5.800	Dec 2019	-		5.800	Continuing	Continuing	-
C-130 SOF Common TF/ TA (Silent Knight) Radar	C/CPIF	Various : Various	16.886	10.813	Dec 2017	9.372	Jan 2019	9.230	Dec 2019	-		9.230	Continuing	Continuing	-
MH-60/MH-47 SOF Common TF/TA (Silent Knight) Radar	C/Various	Various : Various	121.744	2.415	Apr 2018	1.212	Jan 2019	0.743	Jan 2020	-		0.743	Continuing	Continuing	-
Prior Year Funding - Completed Efforts	Various	Various : Various	29.130	-		-		-		-		-	0.000	29.130	-
		Subtotal	172.625	16.743		10.584		15.773		-		15.773	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C-130 SOF Common TF/ TA (Silent Knight) Radar	C/CPIF	Various : Various	8.779	1.963	Dec 2017	1.278	Jan 2019	-		-		-	Continuing	Continuing	-
Prior Year Funding - Completed Efforts	Various	Various : Various	31.166	-		-		-		-		-	0.000	31.166	-
		Subtotal	39.945	1.963		1.278		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) SF100 / *Aviation Systems Advanced Development*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	809.919	169.288		108.897		137.460		-		137.460	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

EC-130J CSOLO Multi-Mission Payload – Heavy (MMP-H) Schedule

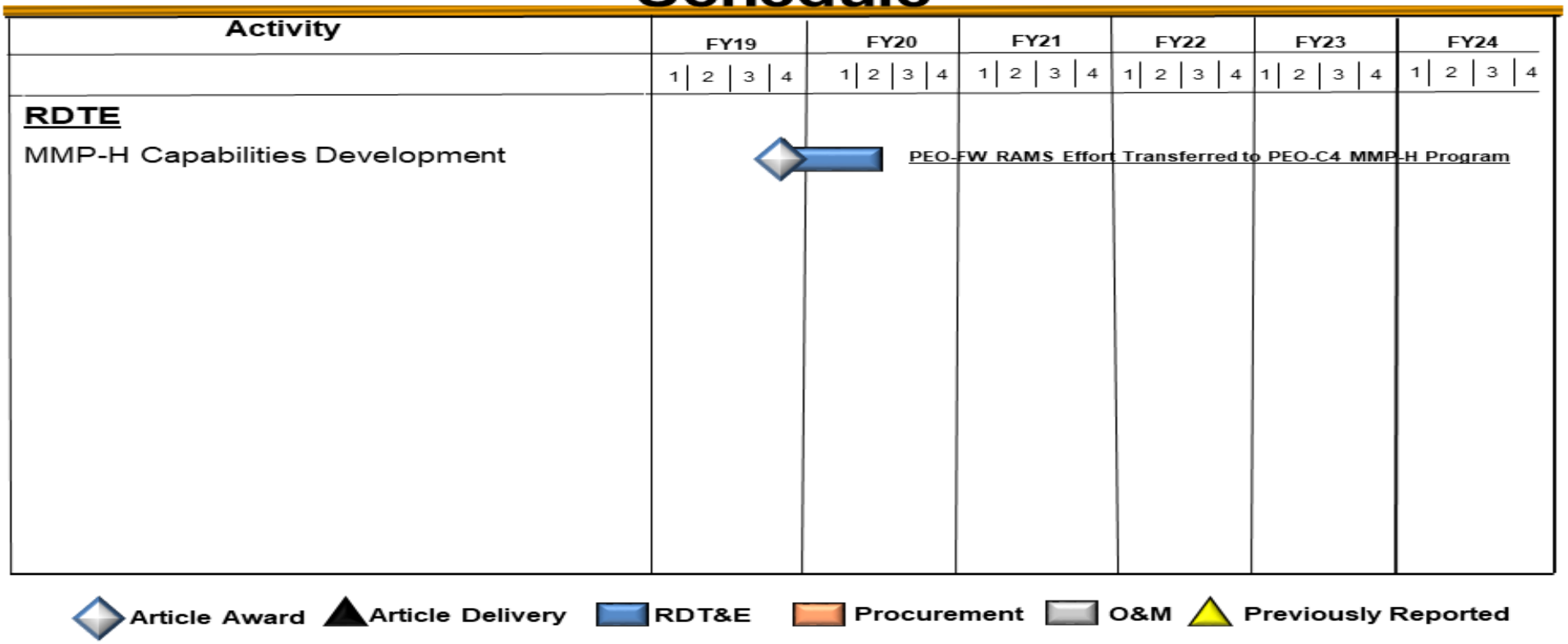

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

AC/MC-130J RFCM Schedule

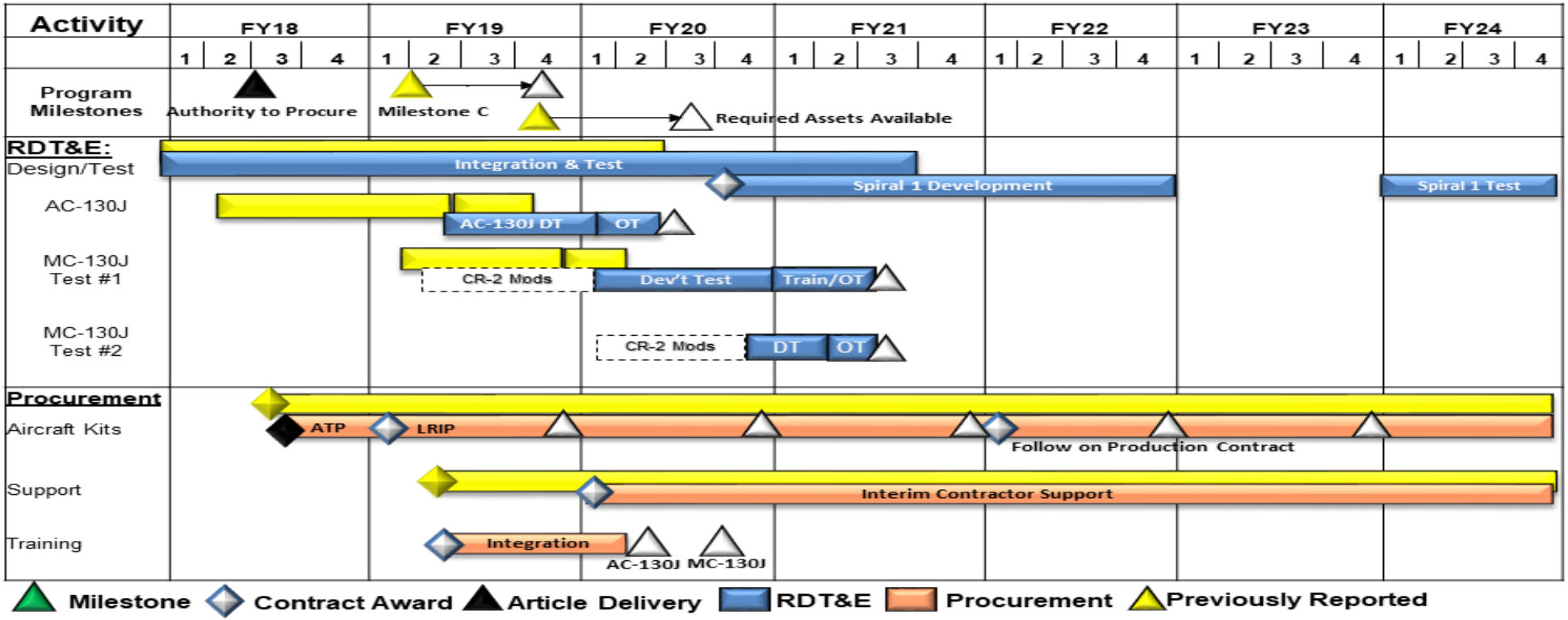

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

AC-130J/PSP Schedule

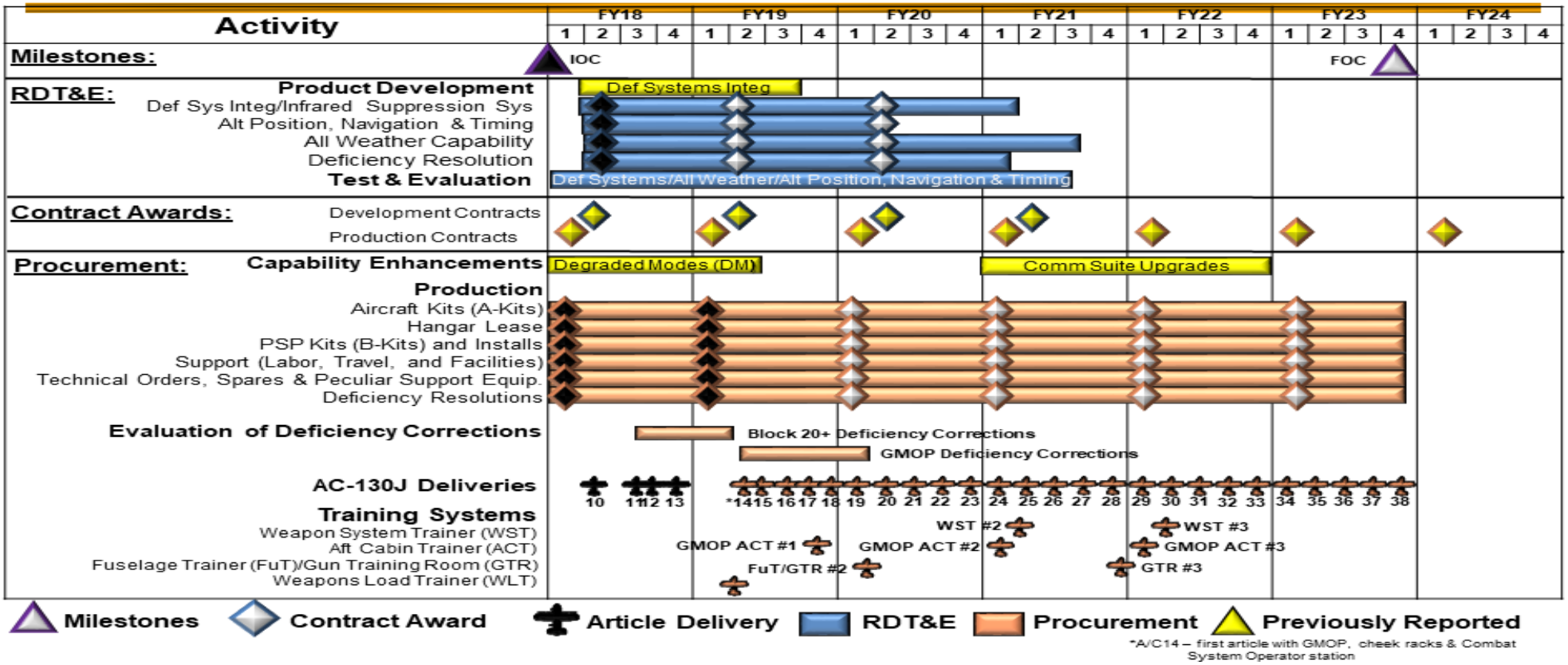

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

AC-130 High Energy Laser Schedule

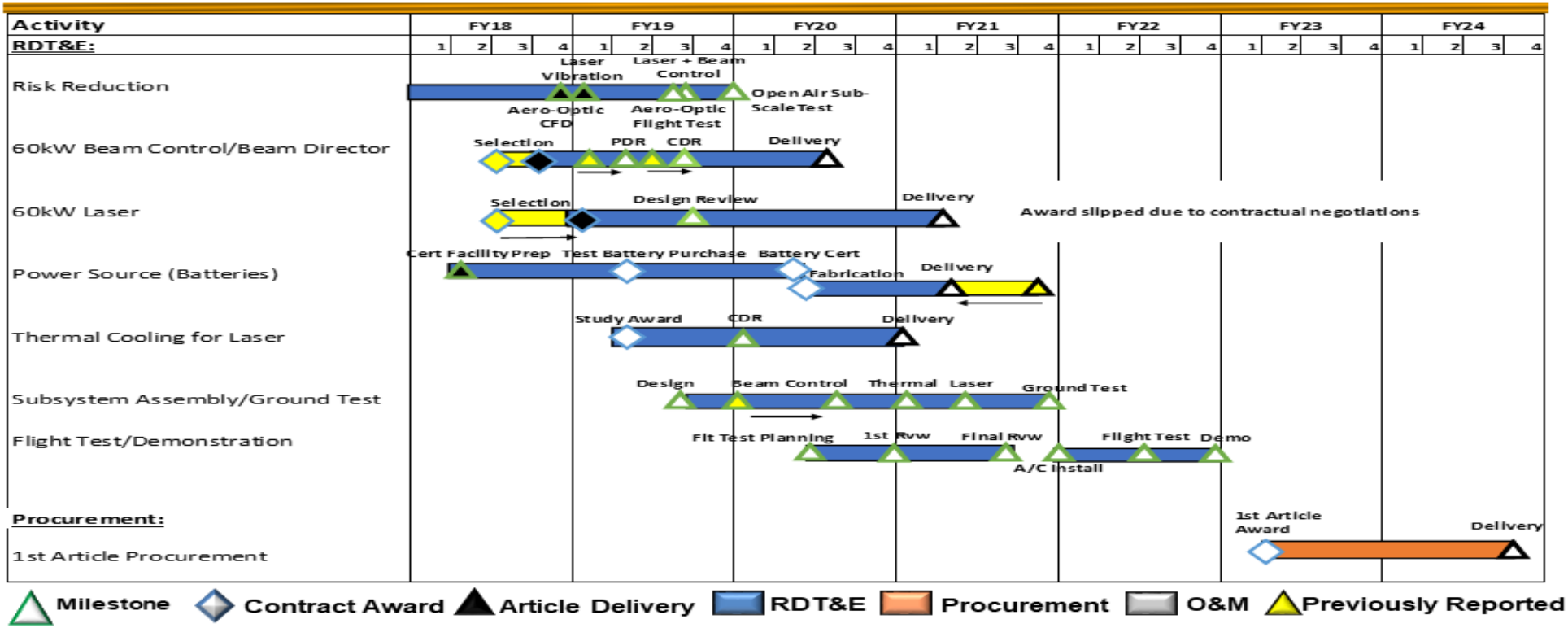

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

C-130 SOF Common TF/TA Radar Schedule

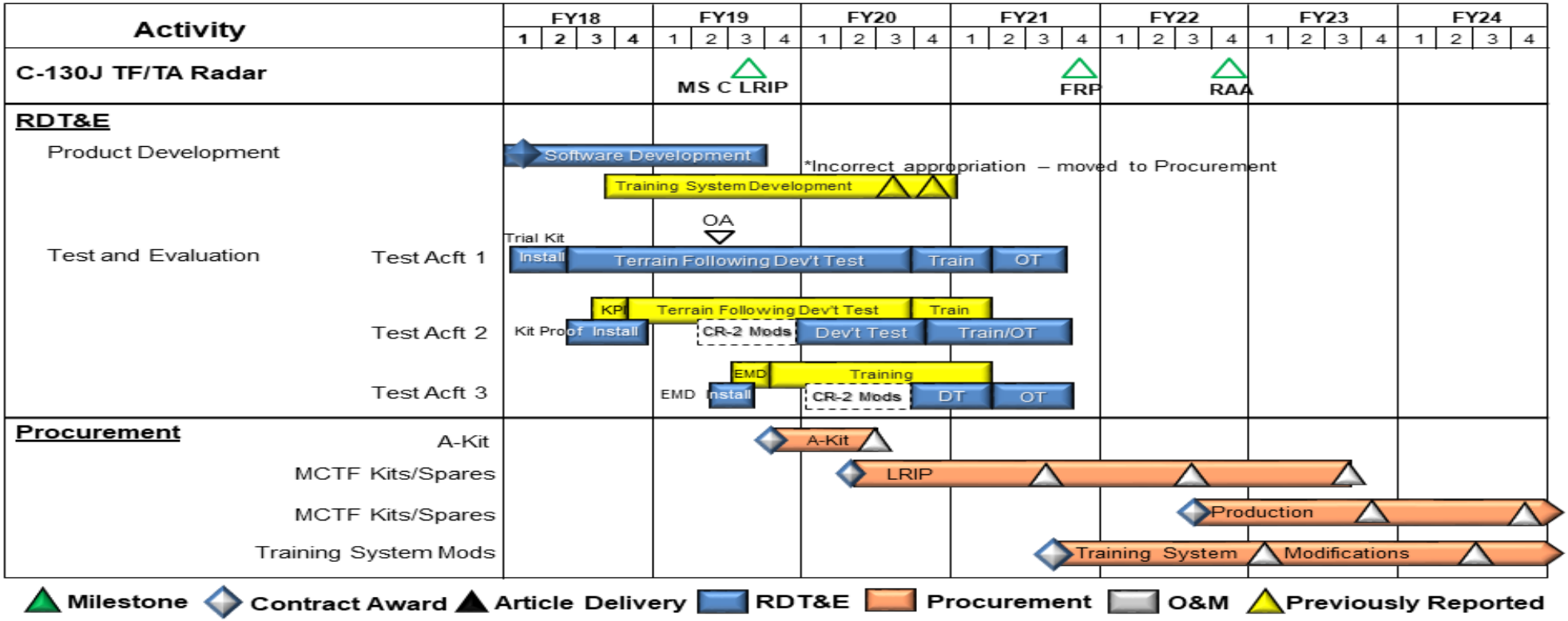

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

SOF Common TF/TA (Silent Knight) Radar Schedule

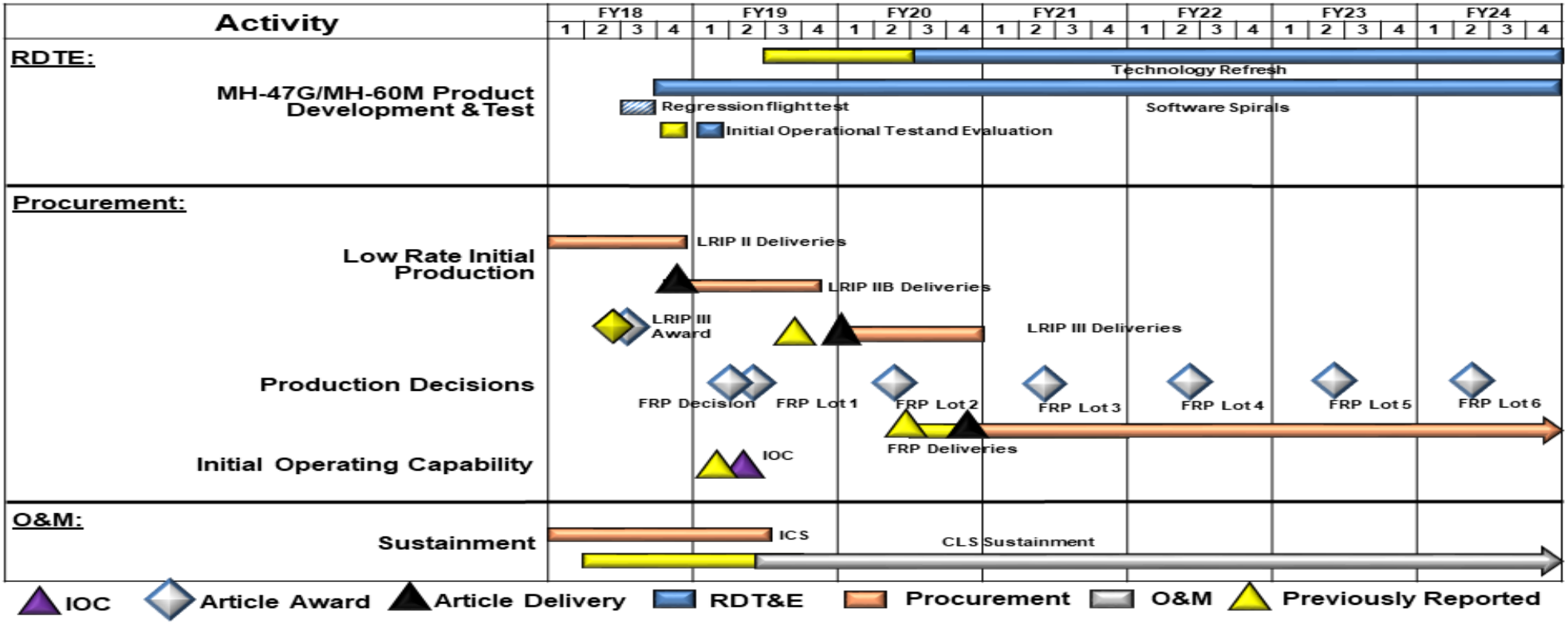

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

ISR Payload Sub-Project Schedule

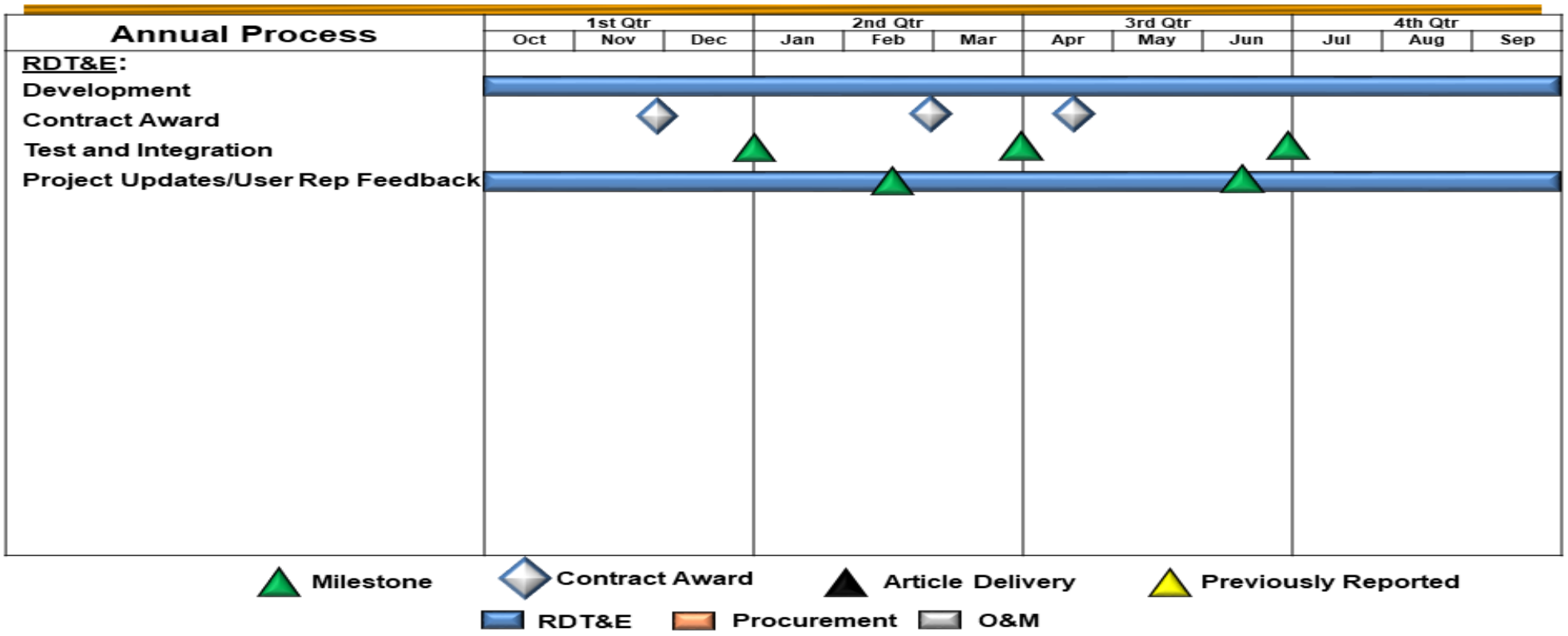

Exhibit R-4A, RDT&E Schedule Details: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EC-130J Commando Solo Multi-Mission Payload – Heavy (MMP-H)				
Capabilities Development	4	2019	2	2020
Electronic Warfare - Radio Frequency Countermeasures (EW-RFCM)				
Product Development, Integration and Test	1	2018	3	2021
Spiral 1 Development	4	2020	4	2022
Spiral 1 Test	1	2024	4	2024
Development Test and Operational Test (DT/OT) AC-130J	2	2019	3	2020
Development Test and Operational Test #1 (DT/OT) MC-130J	1	2020	3	2021
Development Test and Operational Test #2 (DT/OT) MC-130J	4	2020	3	2021
Precision Strike Package (PSP) for SOF				
Capability Enhancements Product Development	1	2018	3	2021
Capability Enhancements Test and Evaluation	1	2018	4	2021
PSP High Energy Laser (HEL)				
PSP HEL Risk Reduction Demonstration	1	2018	4	2019
PSP HEL 60kw Beam Control/Beam Director	4	2018	3	2020
PSP HEL 60kW Laser	1	2019	2	2021
PSP HEL Power Source (Batteries)	2	2018	2	2021
PSP HEL Thermal Cooling for Laser	2	2019	1	2021
PSP HEL Subsystem Assembly/Ground Test	3	2019	4	2021
PSP HEL Flight Test/Demonstration	3	2020	4	2022
C-130 SOF Common Terrain Following/Terrain Avoidance (TF/TA) (Silent Knight) Radar				

Exhibit R-4A, RDT&E Schedule Details: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF100 / *Aviation Systems Advanced Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Software Development	1	2018	3	2019
Development/Flight Testing	1	2018	2	2021
Operational Testing	2	2021	4	2021
MH-60/MH-47 SOF Common (TF/TA) (Silent Knight) Radar				
MH-47G/MH-60M Product Development & Test	3	2018	4	2024
Initial Operation Test and Evaluation	1	2019	1	2019
Technology Refresh	3	2020	4	2024
Intelligence, Surveillance, and Reconnaissance (ISR) Payload				
Payload Development	1	2020	4	2020
Testing and Integration	1	2020	3	2020
Project Update/User Rep Feedback	1	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) SF200 / *CV-22*	

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
SF200: *CV-22*	3.644	12.292	22.344	28.081	-	28.081	10.093	9.634	17.942	18.360	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 212

A. Mission Description and Budget Item Justification

The CV-22 is a SOF variant of the Joint V-22 vertical medium lift, multi-mission aircraft. The CV-22 project provides long range, high speed, infiltration, exfiltration, and resupply to Special Forces teams in hostile, denied, and politically sensitive areas. This is a capability not currently provided by other existing aircraft. The funding in this project supports integration, design, development, rapid prototyping, and test to provide improved capabilities to include, but not limited to, more robust performance in situational awareness, intelligence, surveillance, and reconnaissance, weapons, avionics, survivability, maneuverability, mission deployment and improved reliability and maintainability of the CV-22 platform.

CV-22 SOF Common Terrain Following Terrain Avoidance (TF/TA) (Silent Knight) Radar: Provides long-range, night/adverse weather, clandestine penetration of medium-to-high threat areas for infiltration, exfiltration, and resupply of SOF forces. This more sustainable and capable radar replaces the obsolescing APQ-186 terrain following/avoidance radar currently integrated on CV-22 aircraft.

Block 20: Design, integrate, test, and validate enhancements required to meet SOF-unique mission requirements and correct deficiencies identified in previous testing. This incremental development will provide improved capabilities to include, but not limited to, robust performance in situational awareness, weapons, avionics, survivability, maneuverability, mission deployment, improved reliability and maintainability of the CV platform.
Included within Block 20, but not limited to, is the Forward Defensive Weapon System (FDWS). FDWS provides the CV-22 with the capability to suppress threats in the forward hemisphere while the aircraft is in the critical phase of landing and takeoff at the mission objective. The FDWS integrates the fielded GAU-17 belly gun system currently employed on the USMC MV-22 aircraft with the SOF peculiar color helmet mounted display (CHMD) and cockpit firing controls for pilot operation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: CV-22 SOF Common TF/TA (Silent Knight) Radar	12.292	22.344	27.587	-	27.587
Description: Provides long-range, night/adverse weather, clandestine penetration of medium-to-high threat areas for infiltration, exfiltration, and resupply of SOF forces. This more sustainable and capable radar replaces the obsolescing APQ-186 terrain following/avoidance radar currently integrated on CV-22 aircraft.					
FY 2019 Plans: Continue integration/testing of CV-22 SF Common TF/TA (Silent Knight) radar.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF200 / *CV-22*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continues integration/testing of CV-22 SOF Common TF/TA (Silent Knight) radar. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $5.243 million is to support Operational Flight Program (OFP) Software development and continues integration/testing of the CV-22 SOF Common TF/TA (Silent Knight) radar.					
Title: CV-22 Block 20 Systems ***Description:*** Provides the CV-22 with the improved capabilities to include, but not limited to, robust performance in situational awareness, weapons, avionics, survivability, maneuverability, mission deployment, improved reliability and maintainability of the CV platform. Included within Block 20, but not limited to, is the FDWS. FDWS provides the CV-22 with the capability to suppress threats in the forward hemisphere while the aircraft is in the critical phase of landing and takeoff at the mission objective. The FDWS integrates the fielded GAU-17 belly gun system currently employed on the USMC MV-22 aircraft with the SOF peculiar color helmet mounted display (CHMD) and cockpit firing controls for pilot operation. ***FY 2020 Base Plans:*** Continue integration/testing of Block 20 FDWS onto CV-22. Previous efforts leading up to FY20 were MFP-4 funded. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.494 million to continue integration/testing of Block 20 FDWS onto CV-22. Previous efforts leading up to FY20 were MFP-4 funded.	-	-	0.494	-	0.494
Accomplishments/Planned Programs Subtotals	12.292	22.344	28.081	-	28.081

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• PROC/1000CV22: *CV-22 SOF Modification*	42.178	32.529	17.256	-	17.256	21.509	38.770	45.569	70.188	Continuing	Continuing
• PROC/V022A0: *Aircraft Procurement CV-22 (MYP)*	-	-	-	-	-	-	-	-	-	0.000	4,415.234
• RDT&E1/0401318F: *RDT&E, USAF*	22.519	18.502	16.606	-	16.606	14.873	15.183	15.459	-	64.350	225.577

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF200 / *CV-22*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• RDT&E/0604262N: *V-22 RDT&E, N BA-05*	182.916	143.079	184.705	-	184.705	133.425	110.559	125.764	111.218	184.398	1,105.301

Remarks

D. Acquisition Strategy

When possible, rapid prototyping will be incorporated in the acquisition strategies below to develop, demonstrate and evaluate residual operational capabilities.

The (Silent Knight) radar was developed by USSOCOM to provide a common TF/TA capability for SOF aircraft. The (Silent Knight) radar replaces the obsolescing APQ-186 TF/TA multimode radar on the CV-22. The acquisition strategy for the CV-22 SF Common TF/TA (Silent Knight) radar program is to procure radar units and radar software modifications through the USSOCOM (Silent Knight) radar Program Management Office, integrate (Silent Knight) radar into CV-22 aircraft, and buy aircraft modification kits, using a mixture of both sole source and competitive contracts.

The Block 20 Forward Defensive Weapon System (FDWS) will be based on modifications to the DWS currently fielded on USMC MV-22 aircraft and previously tested on a CV-22. These modifications will integrate the DWS with the CV-22 pilots' helmet mounted displays and cockpit controls to correct deficiencies/improve system effectiveness and will award a competitive EMD contract for development.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) SF200 / *CV-22*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 SF Common TF/ TA (Silent Knight) Rradar - Operational Flight Program (OFP) Development	TBD	Various : Various	-	5.417	Jan 2018	7.910	Nov 2018	16.123	Nov 2019	-		16.123	Continuing	Continuing	-
CV-22 SF Common TF/ TA (Silent Knight) Radar - Integration	TBD	Various : Various	-	5.774	Feb 2018	12.099	Feb 2019	9.082	Feb 2020	-		9.082	Continuing	Continuing	-
CV-22 Block 20 Forward Defensive Weapon System (FDWS)	Various	Various : Various	1.057	-		-		0.494	Feb 2020	-		0.494	Continuing	Continuing	-
		Subtotal	1.057	11.191		20.009		25.699		-		25.699	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 SF Common TF/ TA (Silent Knight) Radar - OFP	TBD	Various : Various	0.651	0.590	Jan 2018	1.110	Nov 2018	1.132	Nov 2019	-		1.132	Continuing	Continuing	-
CV-22 SF Common TF/ TA (Silent Knight) Radar - Integration	TBD	Various : Various	-	0.511	Feb 2018	1.225	Feb 2019	1.250	Feb 2020	-		1.250	Continuing	Continuing	-
Prior Year	Various	Various : Various	1.936	-		-		-		-		-	0.000	1.936	-
		Subtotal	2.587	1.101		2.335		2.382		-		2.382	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.644	12.292		22.344		28.081		-		28.081	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF200 / *CV-22*

CV-22 Schedule

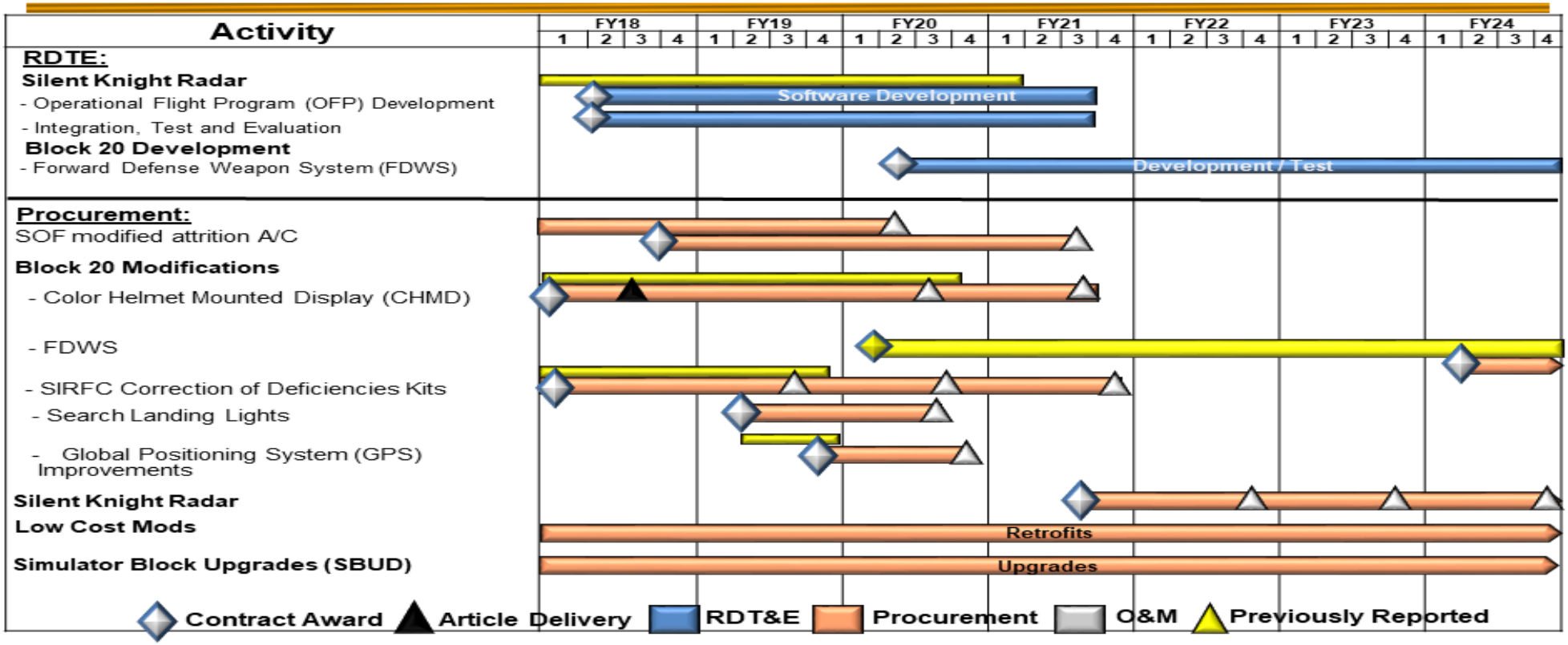

Exhibit R-4A, RDT&E Schedule Details: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** SF200 / *CV-22*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CV-22				
SOF Common TF/TA (Silent Knight) Radar - OFP Development	2	2018	4	2021
SOF Common TF/TA (Silent Knight) Radar - Radar Integration, Test & Evaluation	2	2018	4	2021
Block 20 Forward Defensive Weapon System (FDWS) Development/Test	2	2020	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) S750 / *Mission Training and Preparation Systems*	

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
S750: *Mission Training and Preparation Systems*	26.392	8.181	7.520	8.595	-	8.595	9.630	9.558	9.757	9.983	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds the definition, design, development, prototyping, integration, and testing of Mission Training and Preparation Systems (MTPS) to support training, avoid obsolescence, and maintain simulator concurrency with weapon system configurations; support mission planning and rehearsal systems enhancements required to meet Special Operations Force (SOF)-unique mission requirements and correct deficiencies identified in previous testing; and support mission planning and rehearsal capabilities in current MTPS. The MTPS project also includes program management, systems engineering, configuration management, architecture development, risk reduction, and trade study initiatives, as well as initiatives to assure interoperability and commonality between diverse SOF training systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: SOMPE	8.181	7.520	8.595	-	8.595
Description: Special Operations Mission Planning and Execution (SOMPE) develops, integrates, tests, and validates software enhancements required to meet SOF-unique requirements for, and correct deficiencies to, mission planning, preview, and execution software tools to support all phases of SOF operations from deliberate to time-critical. The SOMPE project automates time-sensitive planning activities and provides enhanced situational awareness during mission execution. SOMPE provides the interoperable environment for SOF adaptive planning to integrate global operations including, but not limited to, precision strike software, digital navigation, and unmanned aerial systems command and control. This project also provides the integration of SOMPE with multi-dimensional visualization systems, providing immersive mission rehearsal in minimal timeframes from the SOMPE mission plan. SOMPE is embedded in the USSOCOM Headquarters, Theater Special Operations Commands, Joint Special Operations Task Forces, Joint Special Operations Aviation Components, SOF warfighters, and SOF warfighter platforms.					
FY 2019 Plans: Continue development of software applications to address SOF-unique aviation, ground and maritime mission planning requirements, data transfer software from mission planning systems to SOF helicopters, airplanes, and simulator/rehearsal systems, and automated performance models and performance prediction software.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S750 / *Mission Training and Preparation Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continues updating of mission planning, data transfer and performance software. Continue development of software applications for smaller mobile computer devices (tablets, smart phones, etc). ***FY 2020 Base Plans:*** Continues development of software applications to address increased SOF-unique aviation, ground and maritime mission planning requirements, data transfer software from mission planning systems to SOF helicopters, airplanes, and simulator/rehearsal systems, and automated performance models and performance prediction software. Continues updating of mission planning, data transfer and performance software. Continues development of software applications for smaller mobile computer devices (tablets, smart phones, etc). ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $1.075 million is to support substantial growth of mobile computing tactical applications of both Ground and Air operational requirements for Mission Networking and situational awareness.					
Accomplishments/Planned Programs Subtotals	8.181	7.520	8.595	-	8.595

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

SOMPE comprises multiple mission planning software development contracts awarded to developers for each project effort. Acquisition strategies depend on the type of development effort. For minor software development projects, contracts may be awarded as sole source acquisitions from existing contract vehicles. For major software development projects, contracts may be awarded as limited or full and open competition acquisitions. Individual acquisition strategies are developed as the scope of software development projects are identified and defined.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S750 / *Mission Training and Preparation Systems*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Special Operations Mission Planning and Execution (SOMPE) Software Development and Integration	MIPR	Various : Various	20.632	6.682	Jan 2018	6.073	Jan 2019	7.032	Jan 2020	-		7.032	Continuing	Continuing	-
		Subtotal	20.632	6.682		6.073		7.032		-		7.032	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SOMPE Software	MIPR	Special Operations Mission Planning Office : Fort Eustis, VA	1.941	0.385	Feb 2018	0.371	Feb 2019	0.388	Feb 2020	-		0.388	Continuing	Continuing	-
		Subtotal	1.941	0.385		0.371		0.388		-		0.388	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SOMPE Software	C/CPFF	Wyle-CAS : Huntsville, AL	3.819	1.114	Jan 2018	1.076	Jan 2019	1.175	Jan 2020	-		1.175	Continuing	Continuing	-
		Subtotal	3.819	1.114		1.076		1.175		-		1.175	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	26.392	8.181		7.520		8.595		-		8.595	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S750 / *Mission Training and Preparation Systems*

Special Operations Mission Planning and Execution (SOMPE) Schedule

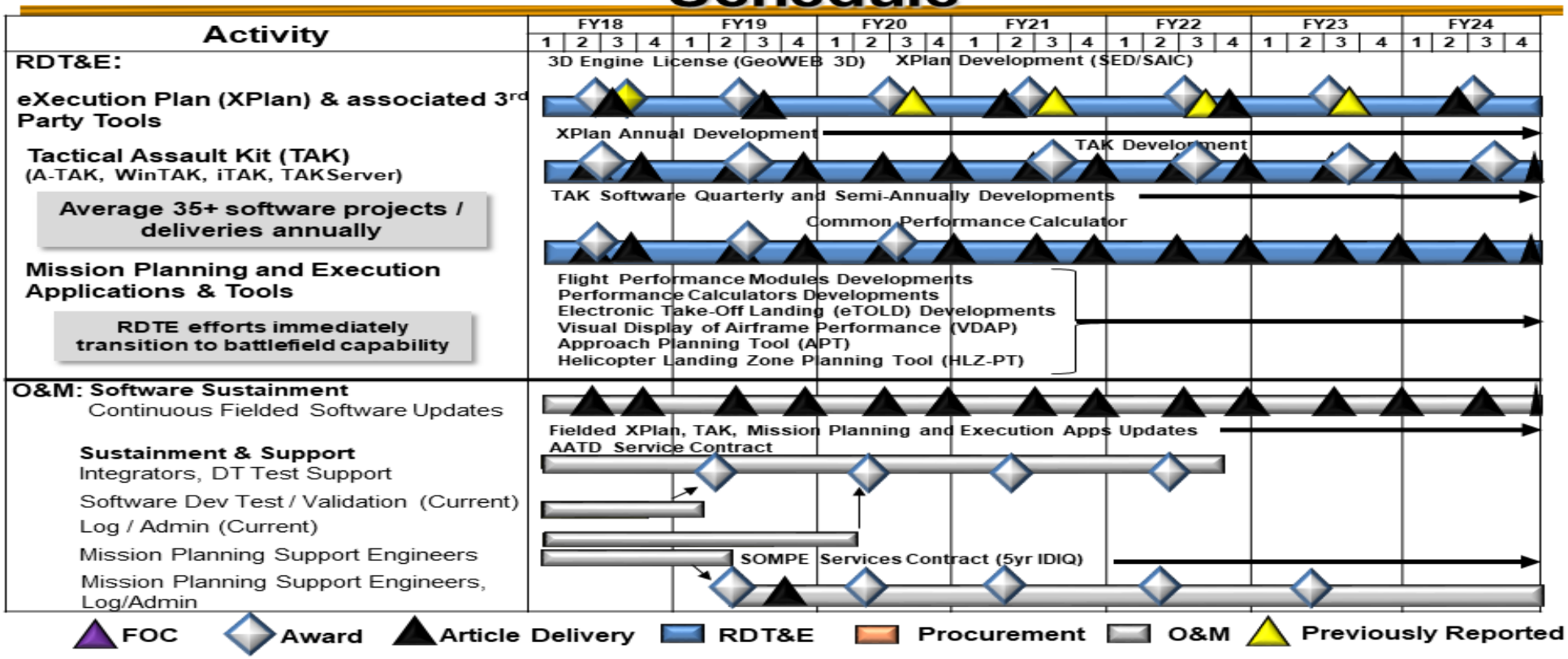

Exhibit R-4A, RDT&E Schedule Details: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S750 / *Mission Training and Preparation Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Special Operations Mission Planning and Execution (SOMPE)				
eXecution Plan (XPlan) & Associated 3rd Part Tools	2	2018	4	2024
Tactical Assault Kit (TAK)	2	2018	4	2024
Mission Planning and Execution Applications & Tools	2	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S875 / *AC/MC-130J*	

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
S875: *AC/MC-130J*	37.926	9.351	17.091	31.891	-	31.891	55.083	53.892	54.943	56.224	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The AC/MC-130J project funds core SOF-unique modifications to replace aging/retired AC-130H Spectre, AC-130W Stinger II, AC-130U Spooky, MC-130E Combat Talon I, MC-130P Combat Shadow, MC-130H Combat Talon II aircraft. The 8 AC-130H Spectre, 12 AC-130W Stinger II and 17 AC-130U Spooky airframes will be replaced with MC-130J aircraft modified with the Precision Strike Package (PSP) to achieve the AC-130J configuration. The AC-130J aircraft will provide close air support, air interdiction, and armed reconnaissance capability. The 14 MC-130E Talon I, 23 MC-130P Combat Shadow, and 20 MC-130H Talon II airframes will be replaced by MC-130J Commando II aircraft with SOF mission modifications. The MC-130J Commando II aircraft with SOF mission modifications perform clandestine or low visibility, single or multi-ship low-level missions intruding politically-sensitive or hostile territories; provide air refueling for special operations helicopters and CV-22 aircraft; and airdrop of leaflets, insert small special operations teams, resupply bundles and combat rubber raiding craft. The Air Force procures and fields the basic aircraft, common support equipment, and trainers for USSOCOM. An incremental upgrade approach will be used to integrate SOF capabilities onto the aircraft and training systems. SOF capabilities include, but are not limited to, Airborne Mission Networking, data fusion, threat detection and avoidance, integrated terrain following/ terrain avoidance, electronic warfare, and embedded training. Integrating and automating SOF mission systems that deliver these capabilities is critical to fielding SOF-capable AC/MC-130J aircraft to recapitalize Air Force Special Operations Command's legacy C-130 fleet.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MC-130J Airborne Mission Networking (AbMN)	8.936	4.324	2.688	-	2.688
Description: AbMN provides aircrew and mission personnel aboard MC-130J aircraft with the ability to send and receive mission-critical data to/from tactical and operational nodes in the battlespace. Capabilities include, but are not limited to, secure Line-of-Sight/Beyond Line-of-Sight voice/data communications, friendly force identification, mission tracking, threat identification, full-motion video, collaboration, chat, e-mail, and data links. AbMN enables SOF ability to streamline command and control, improve situational awareness, and reduce operational risk through real time exchange of digital information among aircraft, SOF components, and other tactical and operational nodes.					
FY 2019 Plans: Complete design phase with critical design review. Delivers trial installation and begins ground and flight testing. Develops technical data package.					
FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S875 / *AC/MC-130J*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Completes ground flight testing. Begins development and interoperability testing on MC-130J Terrain Following/ Terrain Avoidance (TF/TA) radar, electronic warfare systems and airborne mission networking systems. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of $1.636 million is due to completion of trial installation in FY 2019.					
Title: AC-130J ***Description:*** Develops, integrates, and tests aircraft enhancements to meet SOF-unique mission requirements. Enhancements include providing PSP aircraft infrastructure development.	0.415	-	-	-	-
Title: Integrated Tactical Mission Systems (ITMS) ***Description:*** ITMS resolves aircrew workload by merging SOF mission systems data with green aircraft flight information and automating displays and controls. Capabilities include, but are not limited to, automated route replanning, tactical flight management, integrated aircraft defensive systems, defensive countermeasures, and embedded training. ITMS provides reduced aircrews with integrated real-time information and decision-making data for safe terrain following/terrain avoidance flight and mission completion (MC-130J aircraft) and seamless employment of the Precision Strike Package (AC-130J aircraft). ***FY 2019 Plans:*** Began integration, interoperability risk reduction and test of SOF tactical mission systems, including but not limited to; terrain following/terrain avoidance capabilities, situational awareness capabilities, electronic warfare capabilities, and special mission systems (SMS). Began development of SMS capabilities required to automate tactical mission systems (TMS) (including, but not limited to; mission planning, data fusion, & threat correlation). ***FY 2020 Base Plans:*** Continues integration, interoperability risk reduction and test of SOF tactical mission systems, including but not limited to terrain following/terrain avoidance capabilities, situational awareness capabilities, electronic warfare capabilities, and SMS. Continues development of SMS capabilities required to automate TMS (including, but not limited to, data fusion, threat correlation, and applications of machine learning and artificial intelligence). ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $16.436 million supports open mission systems architecture development and software, integration, and evaluation required to automate TMS. SMS will provide the enabling architecture and capabilities.	-	12.767	29.203	-	29.203
Accomplishments/Planned Programs Subtotals	9.351	17.091	31.891	-	31.891

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S875 / *AC/MC-130J*	

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• PROC/2012C130J: *AC/MC-130J*	164.837	160.681	173.419	-	173.419	187.846	234.161	302.270	322.669	Continuing	Continuing
• PROC/1202PSP: *Precision Strike Package*	219.728	226.965	232.930	-	232.930	243.111	168.520	142.038	135.542	Continuing	Continuing

Remarks

D. Acquisition Strategy

When possible, rapid prototyping will be incorporated in the acquisition strategies below to develop, demonstrate and evaluate residual operational capabilities.

MC-130J AbMN: Award sole source Cost-Plus-Fixed-Fee contract to develop a battlespace information exchange system for the MC-130J consisting of Government/ Commercial-off-the-shelf communications and computing hardware and Government/developmental software. This approach leverages portions of the AC-130J gunship infrastructure design applicable to the MC-130J. After completing developmental and operational flight testing, award a sole source contract for Low Rate Initial Production followed by a competitive Firm-Fixed Price contract for production, aircraft integration, and fielding.

ITMS: Develop virtual environment to enable collaborative integration of software services procured through competitive and sole source contracts. Use of open mission system compliant standards for hardware and software architecture, software, services and future subsystems.

The U.S. Air Force procures the basic AC-130J aircraft under the HC/MC-130J Recapitalization procurement program. USSOCOM will fund development, integration, and testing of capability enhancements for SOF-unique mission equipment using an incremental acquisition strategy. Multiple contract awards.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) S875 / *AC/MC-130J*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MC-130J Airborne Mission Networking (AbMN)	C/CPFF	Sierra Nevada Corporation : Centennial, CO	7.486	8.436	Dec 2017	3.596	Dec 2018	1.708	Dec 2019	-		1.708	Continuing	Continuing	-
Integrated Tactical Mission System (ITMS) - Tactical Flight Management System Development	C/Various	TBD : TBD	-	-		10.567	Jan 2019	22.675	Jan 2020	-		22.675	Continuing	Continuing	-
Prior Year	C/Various	Various : Various	29.906	-		-		-		-		-	Continuing	Continuing	-
		Subtotal	37.392	8.436		14.163		24.383		-		24.383	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ITMS - Support	C/Various	Various : Various	-	-		1.200	Mar 2019	1.225	Mar 2020	-		1.225	Continuing	Continuing	-
		Subtotal	-	-		1.200		1.225		-		1.225	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AC-130J	C/Various	Lockheed Martin : Atlanta, GA	0.393	0.415	Jan 2018	-		-		-		-	0.000	0.808	-
MC-130J AbMN Integration and Test	MIPR	USSOCOM Detachment 1 Joint Test Interoperability Command : Eglin AFB, FL	0.141	0.500	Dec 2017	0.728	Dec 2018	0.980	Dec 2019	-		0.980	Continuing	Continuing	-
ITMS - Integration and Test	Sub Allot	USSOCOM Detachment 1 : Eglin AFB, FL	-	-		1.000	Jan 2019	5.303	Jan 2020	-		5.303	Continuing	Continuing	-
		Subtotal	0.534	0.915		1.728		6.283		-		6.283	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) S875 / *AC/MC-130J*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	37.926	9.351		17.091		31.891		-		31.891	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S875 / *AC/MC-130J*

MC-130J AbMN Schedule

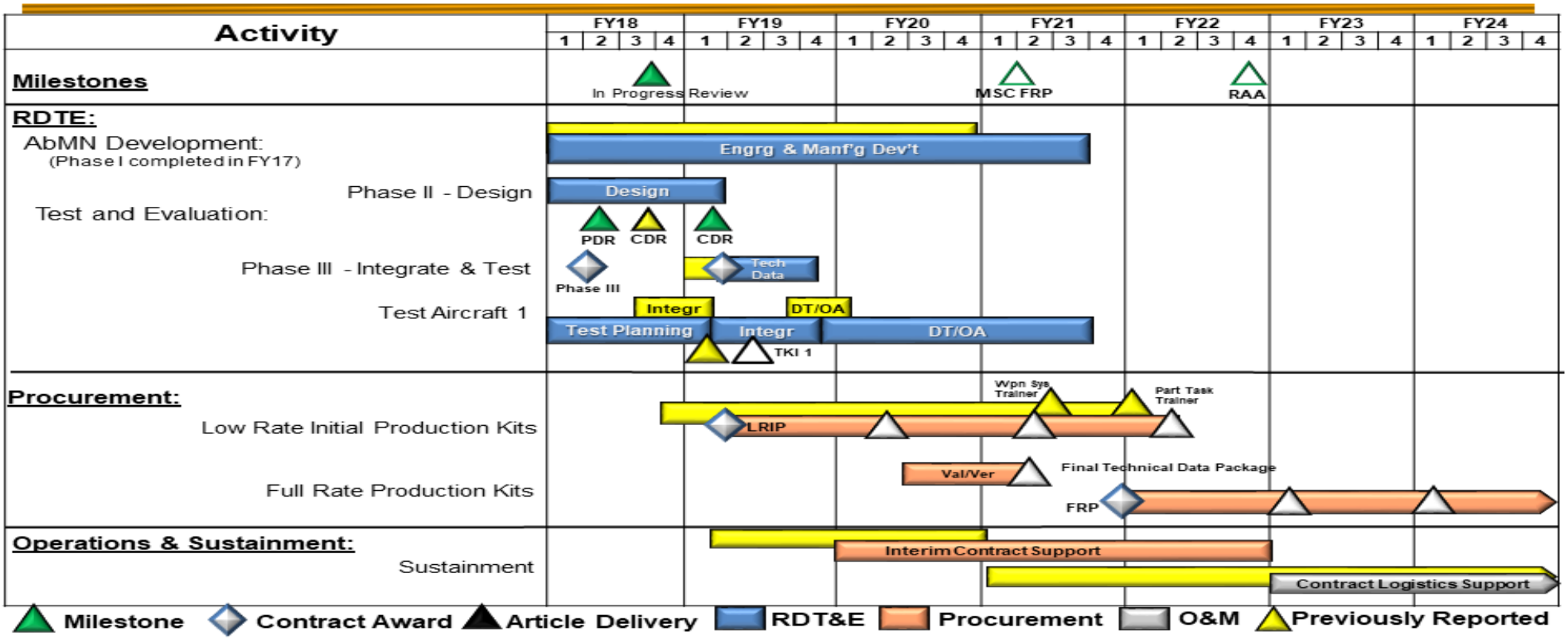

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S875 / *AC/MC-130J*

Common AC/MC-130J Mission Systems

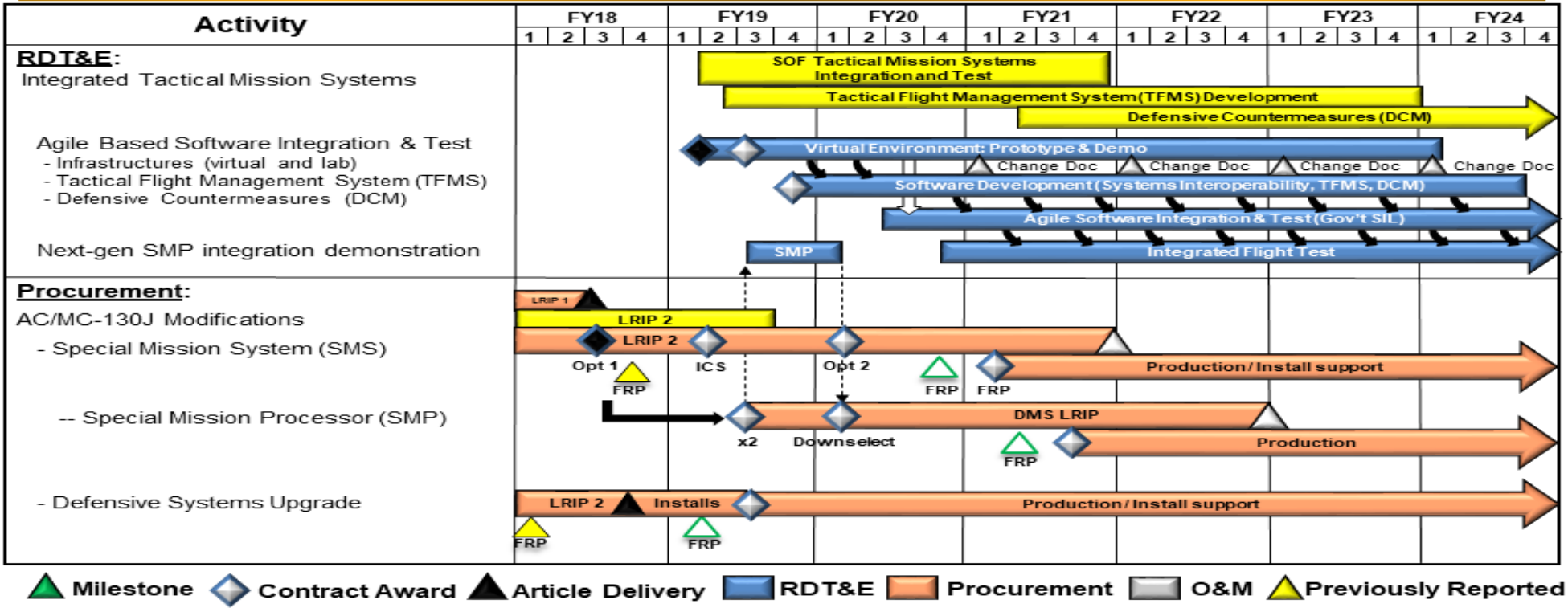

Exhibit R-4A, RDT&E Schedule Details: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** S875 / *AC/MC-130J*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MC-130J Airborne Mission Networking (AbMN)				
Engineering and Manufacturing Develpment	1	2018	3	2021
Phase II Design	1	2018	1	2019
Phase III Integration & Test (Includes Tech Data, Aircraft Integration, & Testing)	2	2018	4	2021
Integrated Tactical Mission Systems (ITMS) Agile Based Software Integration & Test				
Virtual Environment Prototype and Demonstration	1	2019	1	2024
Software Development (Systems interoperability, Tactical Flight Management System, Defensive Countermeasures)	4	2019	4	2024
Integration Demo of Next Generation Special Mission Systems	3	2019	1	2020
Agile Software Integration and Test	2	2020	4	2024
Integrated Flight Test	4	2020	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command			Date: March 2019
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 1160403BB / *Aviation Systems*	Project (Number/Name) D615 / *Rotary Wing Aviation*	

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
D615: *Rotary Wing Aviation*	187.116	51.492	20.010	39.768	-	39.768	33.395	29.433	25.633	25.798	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the development, rapid prototyping, demonstration, and integration of current and maturing technologies for Special Operations Forces (SOF)-unique rotary wing aviation and training requirements. This project includes modifications to Aircraft Survivability Equipment (ASE) avionics and weapons systems to counter rapidly emerging threats, address cyber security, improve lethality and enhance aircraft self-protection in contested environments. Rotary wing aircraft supported by this project include: MH-60M, MH-47G, and A/MH-6M. These aircraft provide aviation support to SOF in worldwide contingency operations and low-intensity conflicts. They must be capable of rapid deployment, undetected penetration of hostile areas, and operations at extended ranges under adverse weather conditions to infiltrate, provide logistics for, reinforce, and extract SOF. The anti-access/area denial (A2/AD) threat is characterized by an extensive and sophisticated ground based air defense system and an upgraded air-to-air capability targeted against helicopters. When possible, Middle-Tier Acquisition (2016 NDAA Section 804) may be used to accommodate rapid prototyping in the above projects to develop, demonstrate and evaluate residual operational capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: A/MH-6M Block 3.0 Upgrade	15.608	3.120	2.688	-	2.688
Description: This upgrade is necessary to restore structural safety margins and performance margins for the aircrews. A new integrated airframe shell will address recurring structural failures due to high intensity, high gross weight operations and a decade of battle damage. A main/tail rotor drive train and engine control improvement effort will reduce airframe loads and restore sufficient safety and performance margins. An avionics upgrade will replace obsolescent components and provide improved battlefield situational awareness to the aircrew and operators necessary to support time-sensitive mission requirements. This upgrade is critical to keeping the A/MH-6M aircraft operational beyond FY 2020 and until a suitable replacement aircraft is available. The non-recurring effort provides development, fabrication of test hardware, qualification of components and systems, and data collection to support issuance of government airworthiness releases for structural and software modifications. ***FY 2019 Plans:*** Complete software qualification and initiates Airworthiness and Flight Characteristics (A&FC) testing efforts. ***FY 2020 Base Plans:*** Complete A&FC testing efforts, Electromagnetic Environmental Effects (E3) testing, and radio communications performance testing. ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** D615 / *Rotary Wing Aviation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Decrease of $0.432 million is due to higher command priorities.					
Title: MH-60M Modifications and Upgrades ***Description:*** Develops technologies to improve safety of the MH-60 and decrease operational costs. Efforts include, but are not limited to, DOD MH-60 engineering changes and product improvements to SOF-unique equipment, munitions utilized for testing, modifications to ASE and weapons systems designed to counter rapidly emerging threats, improve lethality, and enhance aircraft self-protection. The MH-60 Block Upgrades provide the development, integrations, and qualification efforts for the MH-60 helicopter to include flight test support, engineering analysis, documentation, and airworthiness substantiation. ***FY 2019 Plans:*** Continue integration and testing of Upturned Exhaust System (UES) II and other technologies to improve safety and decrease operational costs to include ASE, weapons systems improvement and munitions during testing. ***FY 2020 Base Plans:*** Continues integration and testing of UES II and other technologies to improve safety and decrease operational costs to include aircraft survivability equipment, weapons systems improvement and munitions during testing, such as the Joint Air-to-Ground Missile. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $4.351 million to support aircraft survivability and integration efforts. Increased funding will support UES II efforts and future munition modifications, such as the Joint Air-to-Ground Missile.	3.479	2.182	6.533	-	6.533
Title: Degraded Visual Environment (DVE) ***Description:*** Solution will fuse information from aircraft sensors to display real-time reference points, obstacles, and landing zone information to the aircrew. The DVE solution will provide MH-47/60 aircrews with visual cues for obstacle avoidance and aircraft control during all phases of flight and significantly increase crew and passenger survivability in DVE. This program addresses SOF-unique requirements for rapid fielding and weight limitations, and capitalizes integration of SOF-unique avionics with the unique skills of the SOF aviator. ***FY 2019 Plans:*** Complete aircraft integration and testing of the DVE two sensor solution on SOF MH-47 and MH-60. ***FY 2020 Base Plans:*** Begins airworthiness release support efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:***	7.000	1.672	0.871	-	0.871

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** D615 / *Rotary Wing Aviation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Decrease of $0.801 million due to completion of planned flight testing.					
Title: Future Vertical Lift (FVL) ***Description:*** Provides for the long-term replacement of an aging fleet of aircraft and provides a significant increase in range, speed, payload, survivability, reliability, and maintainability of vertical lift aircraft to meet emerging mission requirements. USSOCOM will participate in the service-common development of a joint FVL aircraft by injecting USSOCOM requirements and equities into the initial development and design efforts to minimize SOF-unique modifications to the common aircraft. ***FY 2019 Plans:*** Continue to participate in providing guidance and infrastructure necessary for FVL to implement a mission systems architecture that enables the integration of SOF capabilities into the aircraft. ***FY 2020 Base Plans:*** Continues to participate in providing guidance and infrastructure necessary for FVL to implement a mission systems architecture that enables the integration of SOF capabilities into the aircraft. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.408 million is due to increased engineering and development analysis requirements.	1.012	0.800	1.208	-	1.208
Title: Infrared Countermeasures (IRCM) ***Description:*** Provides a low Size, Weight, and Power (SWaP) IRCM capability suitable for the A/MH-6 Mission Enhanced Little Bird with potential use on the MH-60 and MH-47 aircraft. The IRCM program will leverage the Department of Navy developed Distributed Aperture Infrared Countermeasure System by integrating and testing a complete lightweight IRCM systems to include a missile warning system and countermeasure capability. The IRCM program includes development of an infrared exhaust suppressor for the A/MH-6. The A/MH-6 is the only tactical aircraft in the SOF inventory without protection from infrared guided and other advanced Man Portable Air Defense missiles. ***FY 2019 Plans:*** Continue qualification testing of missile warning and lightweight IRCM systems for the A/MH-6 aircraft. ***FY 2020 Base Plans:*** Completes development and begins qualification testing of infrared exhaust suppressor for the A/MH-6 aircraft. Continues qualification testing of missile warning and lightweight IRCM systems. ***FY 2019 to FY 2020 Increase/Decrease Statement:***	2.277	2.461	3.425	-	3.425

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 1160403BB / *Aviation Systems*	**Project (Number/Name)** D615 / *Rotary Wing Aviation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Increase of $0.964 million in support of development efforts for infrared exhaust suppressor for the A/MH-6 aircraft.					
Title: MH-47 Modifications and Upgrades ***Description:*** Develops technologies to improve performance and safety of the MH-47G and decrease operational costs. Efforts include, but are not limited to, the Active Parallel Actuator Subsystem (APAS) and Engine Barrier Filter. This sub-project also includes modifications to ASE and weapons systems to counter rapidly emerging threats and enhance aircraft self-protection. ***FY 2019 Plans:*** Continue APAS development and testing, including integration with MH-47G subsystems. ***FY 2020 Base Plans:*** Continues APAS development, including integration with MH-47G subsystems, such as Common Avionics Architecture System and torque measurement development efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $3.601 million is to support system integration, qualification, and flight testing.	9.736	5.305	8.906	-	8.906
Title: Mission Processor Upgrades (MPU) ***Description:*** Provides for non-recurring engineering (NRE), systems engineering/testing, and future aircraft architecture studies that support replacement and upgrade of the current mission and video processors for all Army Special Operations Aviation (ARSOA) rotary wing aircraft. Upgrading all internal processors increases the processing power to support critical functionality and emerging technologies that will be integrated into the Common Avionics Architecture System (CAAS). This MPU provides the processing and memory resources required to incorporate the following functions into the General Purpose Processing Unit (GPPU): (1) Global Air Traffic Management replaces ground-based navigation aids with a capability that meets the international requirement that all aircraft be compliant with digital and space-based navigation systems; (2) Cognitive Decision Aiding System fuses information on threat, route, weather, terrain, and friendly forces, instantaneously adjusting an aircraft's route to protect the flight crew in hazardous weather, low levels, and night conditions. ***FY 2019 Plans:*** Continue exploration of the next generation ARSOA cockpit, to include video processing module (VPM) development and testing. ***FY 2020 Base Plans:***	0.500	0.362	0.604	-	0.604

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continues exploration of the next generation ARSOA cockpit, to include VPM development and testing. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.242 million supports exploration of next generation cockpit technology.					
Title: Aircraft Survivability Equipment (ASE) Upgrades ***Description:*** Develops, integrates, and tests critical active and passive SOF-unique aircraft survivability equipment to counter the acknowledged high proliferation of advanced surface-to-air threat systems for the A/MH-6, MH-60, and MH-47. These threat systems are technically evolving at an unprecedented rate, requiring rapid counter measure system development and immediate spiraled improvements that will reduce the probability of successful engagement, increase the probability of detecting and countering threat systems, and improve the aircraft's ability to continue operating after sustained battle damage. This program includes development and testing of both new systems and pre-planned product improvements (P3I)/upgrades of fielded survivability equipment, flares, and associated qualification testing. P3I upgrades may include, but are not limited to, expansion of frequency ranges on existing systems, modernization of legacy components, and studies directed at potential "collaborative off-boarding/on-boarding" detect/countermeasure capabilities to provide expanded coverage for aircrews in a high threat environment. ***FY 2019 Plans:*** Continue development of new systems, P3I/upgrades of fielded survivability equipment, and continues development of flare countermeasures. ***FY 2020 Base Plans:*** Continues development of new systems, P3I/upgrades of fielded survivability equipment, and continues development of flare countermeasures. Additional detail can be provided under separate cover. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $11.425 million supports development of increased capability into the current SOF Radio Frequency Countermeasures system to address emerging threats. Additional detail can be provided under separate cover.	11.880	4.108	15.533	-	15.533
Accomplishments/Planned Programs Subtotals	51.492	20.010	39.768	-	39.768

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• PROC/0201RWUPGR: *Rotary Wing Upgrades and Sustainment*	149.747	146.526	172.020	-	172.020	181.380	198.276	229.219	230.428	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 0201MH60: *MH-60 Blackhawk*	-	27.600	0.000	28.100	28.100	-	-	-	-	981.513	981.513
• 0601MH47: *MH-47 Chinook*	244.115	167.533	173.812	37.500	211.312	174.482	178.074	181.755	185.993	Continuing	Continuing

Remarks

D. Acquisition Strategy

• A/MH-6M Block 3.0 Upgrade comprises three distinct efforts: integrated airframe, Block 3 performance kits and avionics upgrades. The airframe efforts (new rotor blades/flight control kits and new shells) will be a sole-source contract to Boeing, owner of the technical data associated with the A/MH-6 airframes. The cockpit avionics architecture will be developed by Rockwell-Collins. Any new hardware components will be Non Developmental Item/Commercial-Off-The-Shelf to the extent possible and will be competitively selected. Airframe modification and integration work will be conducted at the Special Operations Forces Support Activity (SOFSA) by the incumbent contractor.

• MH-60M Modifications and Upgrades supports systems integration and qualification efforts on MH-60M helicopters. This includes, but is not limited to, government and contractor flight test support, engineering analysis, documentation, and airworthiness substantiation. Airframe modification and integration work will be conducted at SOFSA by the incumbent contractor.

• DVE integrates and qualifies a solution to address a safety of flight issue while flying in DVE. A competitive source selection process was conducted, resulting in down-selection of one vendor for the DVE solution which will procure, integrate, and install components to provide real-time “see through” imagery and visual cues for obstacle avoidance and landing zone information during all phases of flight.

• FVL is the SOF aviation participation in the Joint FVL effort to develop the next generation of vertical takeoff and landing aircraft and establishes the foundation for the transformation of DOD vertical lift aviation capabilities over the next forty years.

• IRCM integrates a mission configurable Missile Warning System and IRCM capability at a weight suitable for the A/MH-6 aircraft. Procurement of systems for integration and test will leverage Department of Navy IRCM development efforts and contracts. The government will integrate the systems onto the A/MH-6 utilizing existing aircraft modification contracts. Will begin evaluation and qualification of an infrared exhaust suppressor for the A/MH-6M aircraft.

• MH-47 Modifications and Upgrades will develop technologies to improve performance and safety of the MH-47G and decrease operational costs. Efforts include the APAS and Engine Barrier Filter. The upgrades and modifications consist mostly of government and contractor executed integration, testing, and qualification efforts with some analytical engineering services to be completed.

• MPU provides for future cockpit architecture studies that will help define the replacement of current mission and video processors for all ARSOA platforms. Additionally it will address near term required upgrades to existing components. Potential upgrades will be through existing Original Equipment Manufacturers (OEM), while the future cockpit architecture studies will be competitively awarded.

Exhibit R-2A, RDT&E Project Justification: PB 2020 United States Special Operations Command		Date: March 2019
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• The ASE Upgrades program develops and tests both new systems and pre-planned product improvements/upgrades of fielded survivability equipment and flares. For new systems, other services' development and testing contracts are leveraged to the maximum extent possible. Upgrades of fielded equipment are typically accomplished by the OEM.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Degraded Visual Environment (DVE)	C/Various	PM TAPO : Fort Eustis, VA	46.418	7.000	May 2018	1.672	Jan 2019	0.871	Apr 2020	-		0.871	Continuing	Continuing	-
MH-47 Modifications and Upgrades	C/Various	PM TAPO : Fort Eustis, VA	29.017	9.736	Nov 2017	5.305	Nov 2018	8.906	Nov 2019	-		8.906	Continuing	Continuing	-
Aircraft Survivability Equipment (ASE) Radio Frequency Countermeasures (RFCM) Upgrades	C/Various	PM TAPO : Fort Eustis, VA	1.573	11.880	Jan 2019	4.108	Apr 2019	15.533	Mar 2020	-		15.533	Continuing	Continuing	-
Prior Years Funding	C/Various	PM MELB : Fort Eustis, VA	59.820	-		-		-		-		-	0.000	59.820	-
		Subtotal	136.828	28.616		11.085		25.310		-		25.310	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Future Vertical Lift	C/Various	PEO-RW : MacDill AFB, FL	2.119	1.012	Feb 2018	0.800	Feb 2019	1.208	Feb 2020	-		1.208	Continuing	Continuing	-
		Subtotal	2.119	1.012		0.800		1.208		-		1.208	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A/MH-6M Block 3.0 Upgrades	C/Various	PM MELB : Fort Eustis, VA	13.420	15.608	Nov 2018	3.120	Jan 2019	2.688	Jan 2020	-		2.688	Continuing	Continuing	-
MH-60M Modification and Upgrades	C/Various	Various : Various	0.952	3.479	May 2018	2.182	Jan 2019	6.533	Jul 2020	-		6.533	Continuing	Continuing	-
IRCM Integration and Testing	C/Various	PM TAPO : Fort Eustis, VA	8.950	2.277	Jun 2018	2.461	Apr 2019	3.425	Feb 2020	-		3.425	Continuing	Continuing	-
MPU	C/Various	PM TAPO : Fort Eustis, VA	-	0.500	Apr 2018	0.362	Jun 2019	0.604	Apr 2020	-		0.604	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 United States Special Operations Command			Date: March 2019
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Funding	C/Various	Various : Various	24.847	-		-		-		-		-	0.000	24.847	-
		Subtotal	48.169	21.864		8.125		13.250		-		13.250	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	187.116	51.492		20.010		39.768		-		39.768	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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A/MH-6 Program Schedule

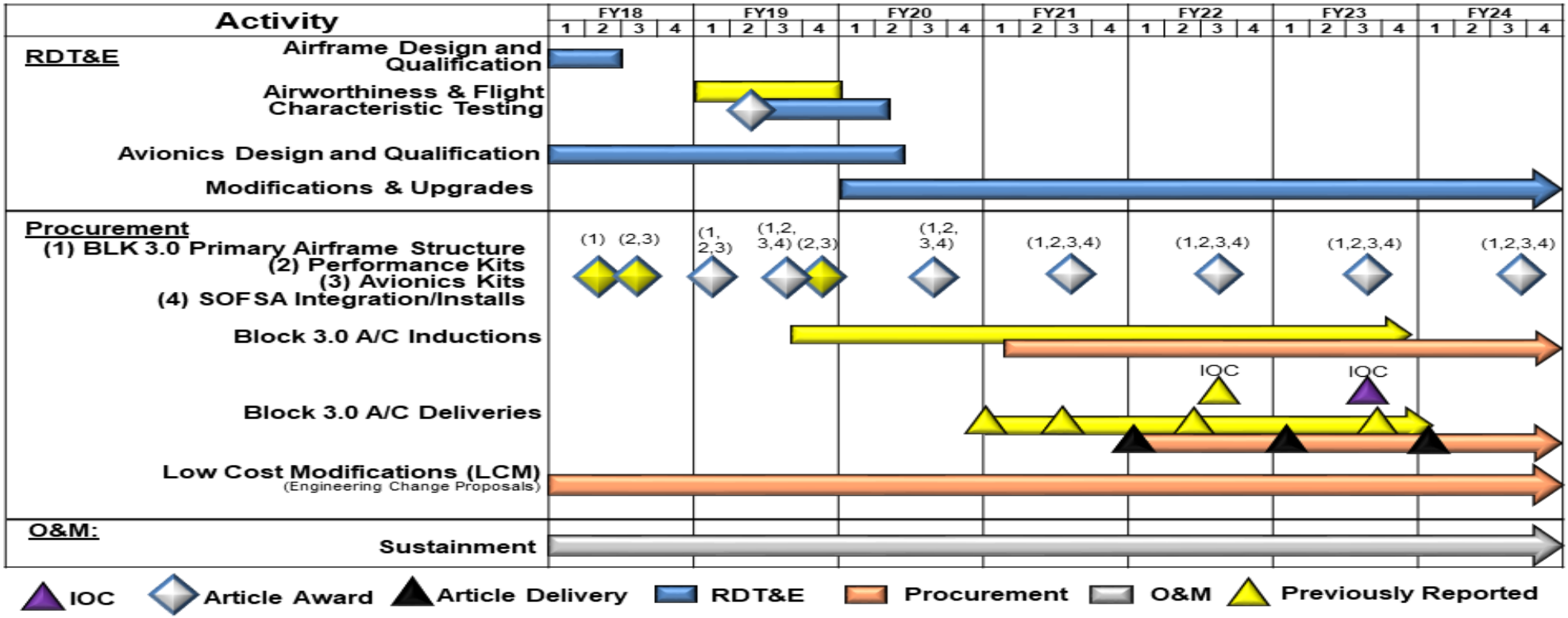

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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MH-60M Program Schedule

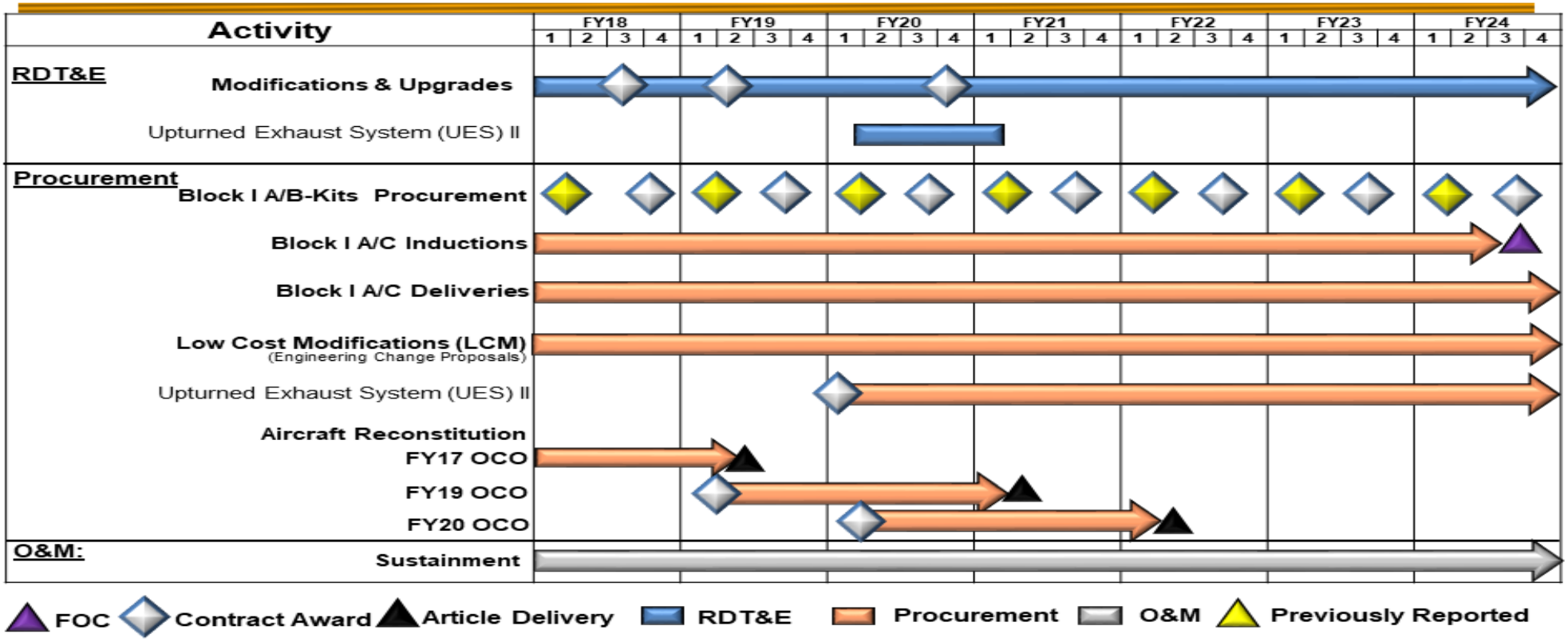

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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Degraded Visual Environment Schedule

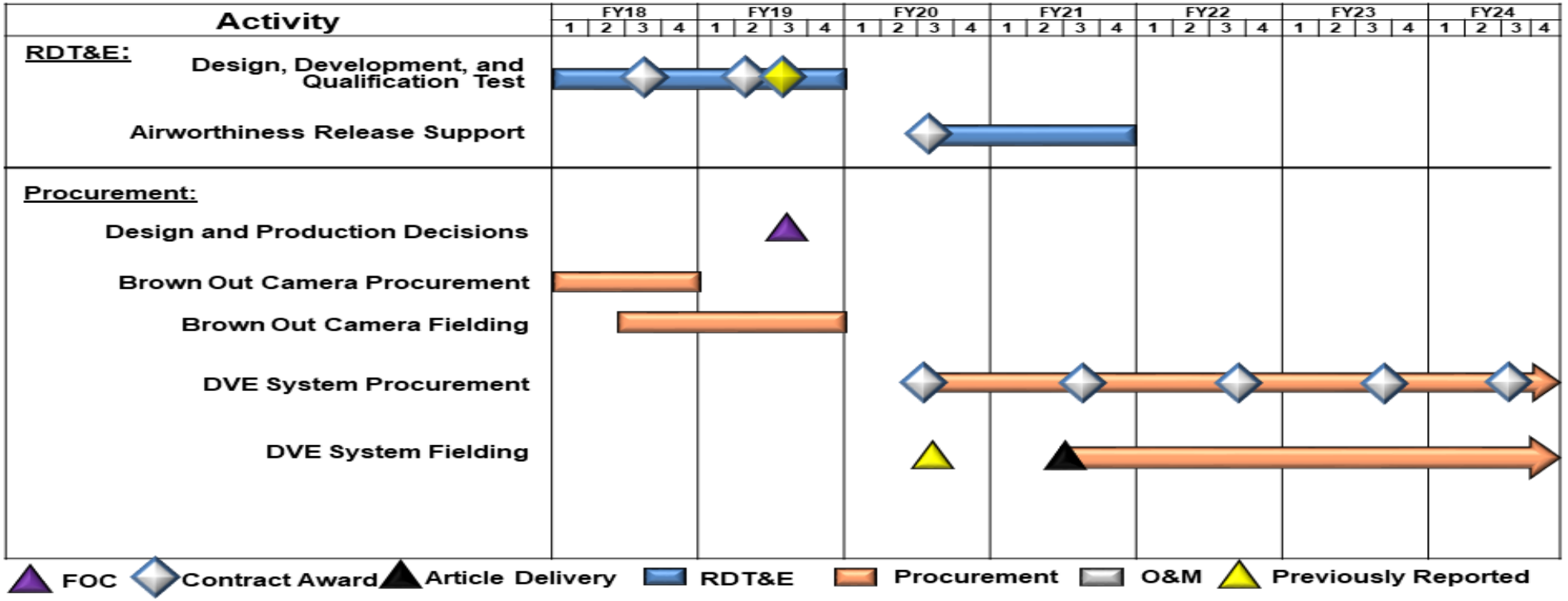

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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Future Vertical Lift Schedule

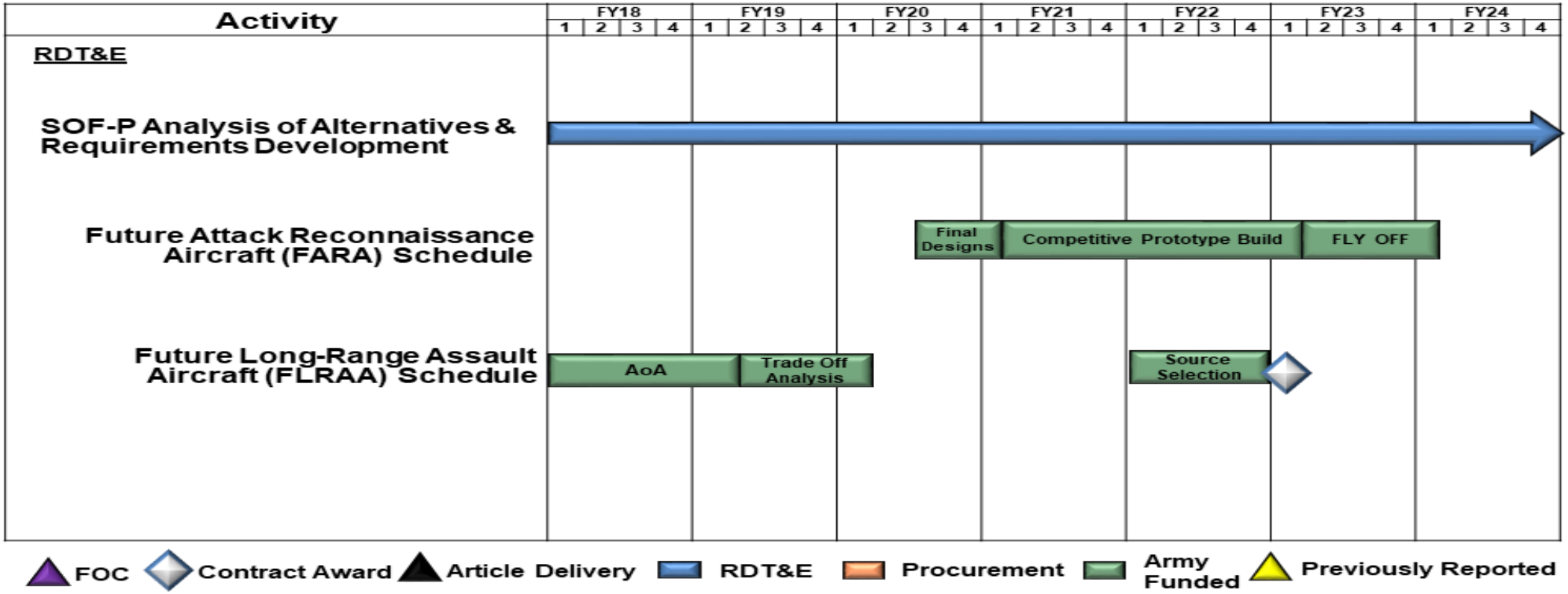

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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MH-47 Program Schedule

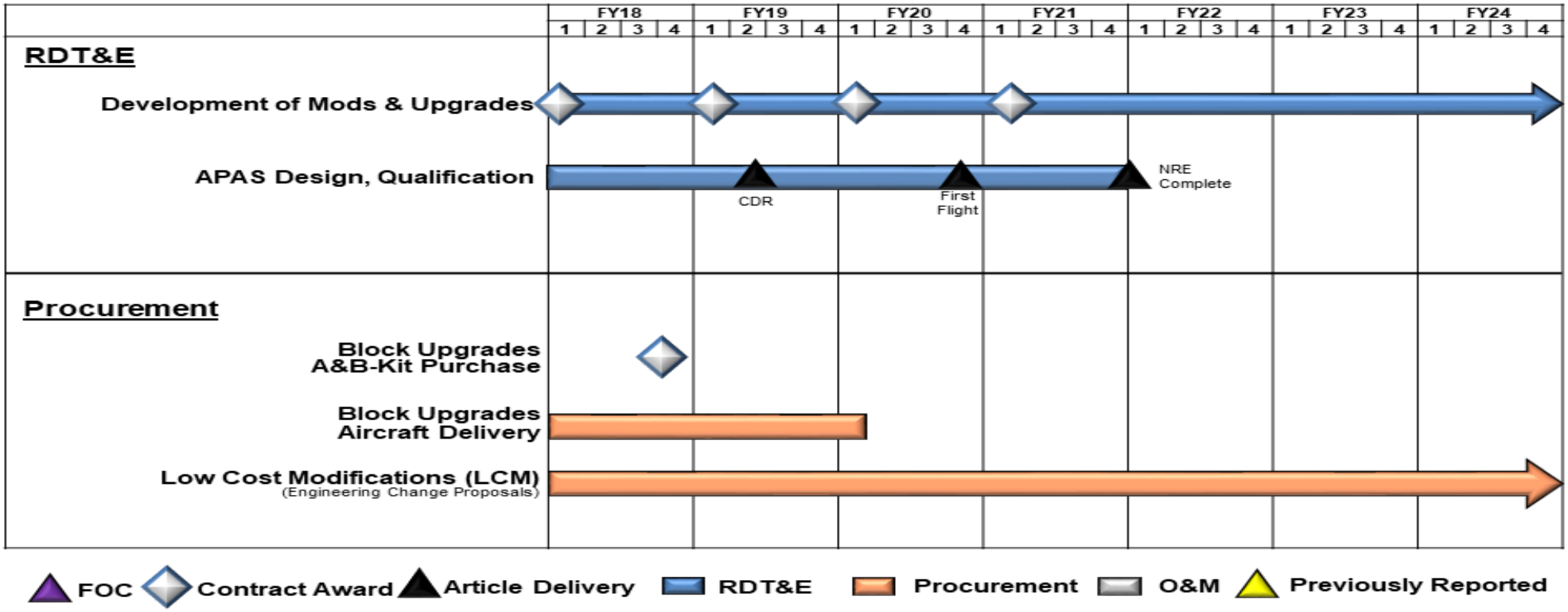

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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Mission Processor Upgrades Schedule

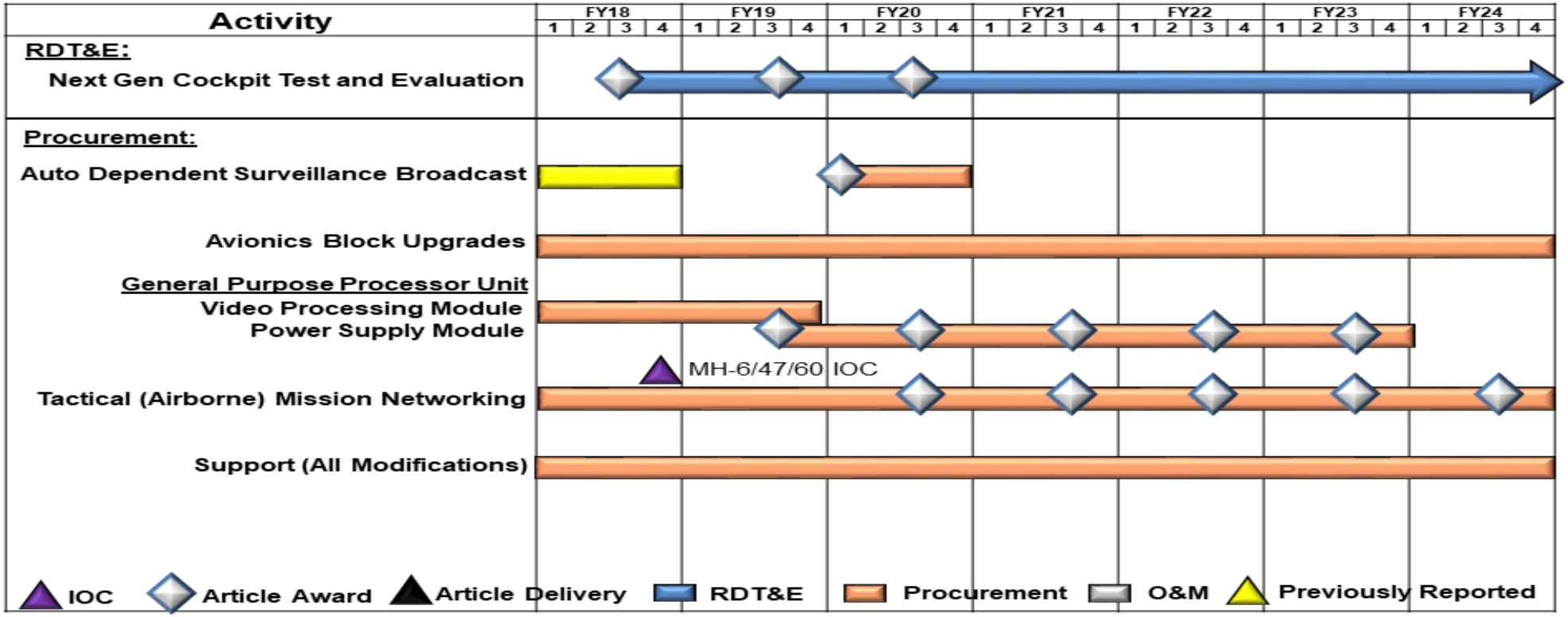

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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Aircraft Survivability Equipment
IRCM Schedule

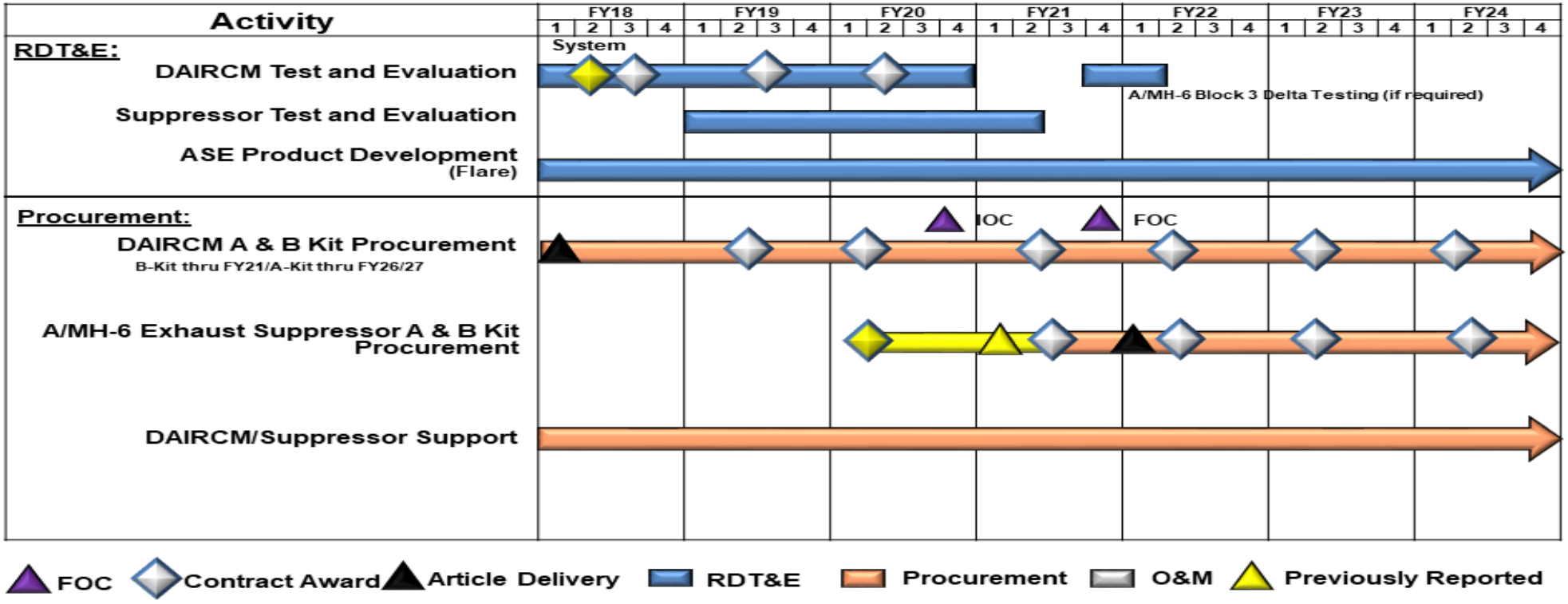

Exhibit R-4, RDT&E Schedule Profile: PB 2020 United States Special Operations Command		Date: March 2019
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Aircraft Survivability Equipment
RFCM Schedule

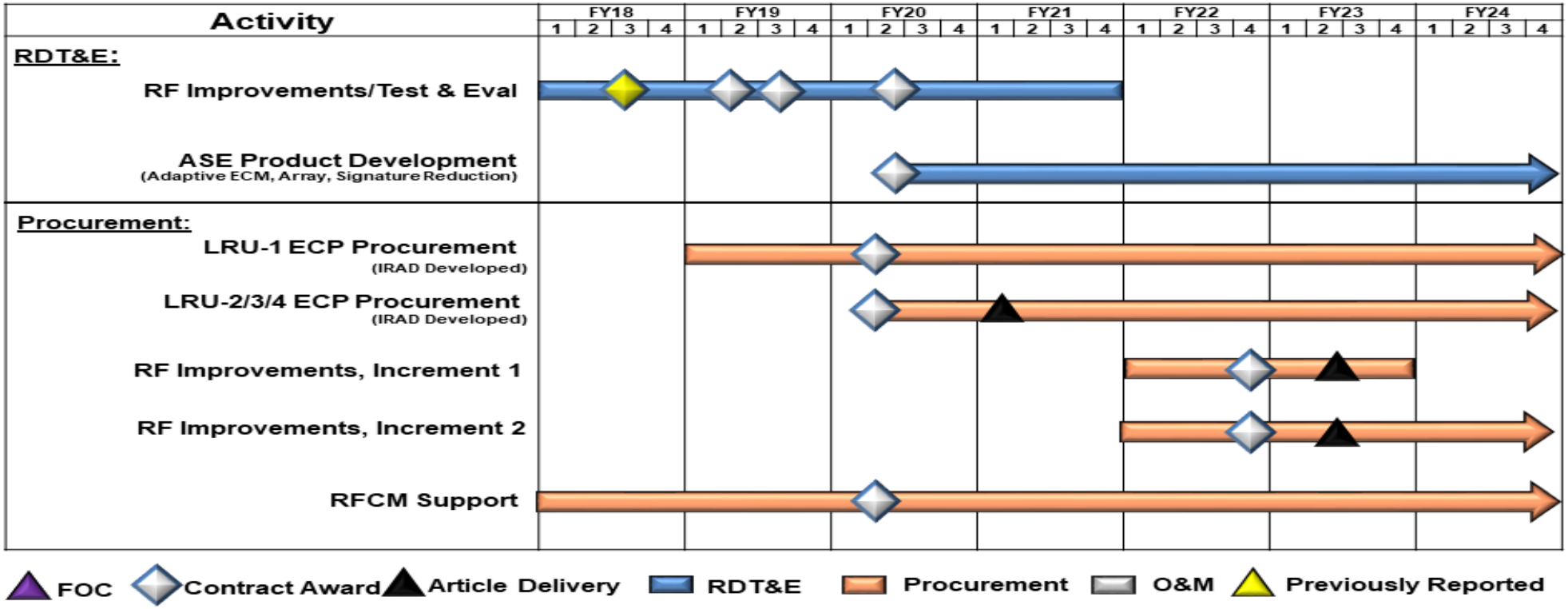

Exhibit R-4A, RDT&E Schedule Details: PB 2020 United States Special Operations Command		Date: March 2019
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
A/MH-6M Block 3.0 and Modifications				
Airframe Design and Qualification	1	2018	2	2018
Airworthiness and Flight Characteristics Testing	2	2019	2	2020
Avionics Design and Qualification	1	2018	2	2020
Modifications and Upgrades	1	2020	4	2024
MH-60M Modifications and Block Upgrades				
Modifications and Upgrades	1	2018	4	2024
Upturned Exhaust System (UES) II Development	1	2020	4	2020
Degraded Visual Environment				
Design, Development, and Qualification Test	1	2018	4	2019
Airworthiness Release Support	1	2020	4	2021
Future Vertical Lift				
SOF-P Analysis of Alternatives/Requirements Development	1	2018	4	2024
MH-47 Modifications and Block Upgrades				
Development of Modifications and Upgrades	1	2018	4	2024
Active Parallel Actuator Subsystem (APAS) Design, Qualification	1	2018	4	2021
Mission Processor Upgrades				
Next Gen Cockpit Exploration	3	2018	4	2024
Aircraft Survivability Equipment (ASE) Infrared Countermeasures (IRCM)				
DAIRCM Test and Evaluation	1	2018	4	2020
Suppressor Test and Evaluation	1	2019	2	2021
Product Development (Flare)	1	2018	4	2024
ASE Radio Freqency Countermeasures (RFCM)				

Exhibit R-4A, RDT&E Schedule Details: PB 2020 United States Special Operations Command		Date: March 2019
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
RF Imrovements, Increment 1	1	2018	4	2021
RF Imrovements, Increment 2	1	2018	4	2021
Product Development (Adaptive ECM, Array, Signature Reduction)	2	2020	4	2024