Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force											Date: February 2019	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0207444F / *Tactical Air Control Party-Mod*							
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	-	10.623	6.149	6.217	0.000	6.217	12.931	13.997	13.317	11.751	Continuing	Continuing
676013: *Equipment Modernizaton*	-	10.623	6.149	6.217	0.000	6.217	12.931	13.997	13.317	11.751	Continuing	Continuing

A. Mission Description and Budget Item Justification

TACPs are Air Force units manned by airmen who advise Army Ground Commanders and plan, request and control air power in support of army ground maneuver operations. These capabilities are employed at all echelons of Army organizations by: Air Support Operation Center (ASOC) TACPs, Division TACPs, Brigade TACPs, Battalion TACPs, and dismounted Joint Terminal Attack Controllers (JTAC) deployed with Army companies or scout teams on the front lines. TACPs coordinate, request, and control airlift support and intelligence, surveillance, and reconnaissance (ISR) support for Army combat operations, and they provide ground communications support for federal disaster response and Homeland Defense operations. TACPs deploy with their aligned Army units and operate in a variety of environments including fixed operations from Tactical Operations Centers (TOC), mobile operations in tactical vehicles, and dismounted (on foot) operations with Army infantry patrols

The purpose of the Tactical Air Control Party - Modernization (TACP-M) program is to provide TACPs voice, data and video communications, targeting and battlefield awareness capabilities. Improved targeting and data communications capabilities provide more accurate target coordinates, reduce Close Air Support (CAS) response times, and reduce the probability of fratricide or collateral damage through the use of networked data communication

The TACP-M program support includes addressing frequent TACP combat deployments that sometimes lead users to change equipment procurement priorities to support urgent operational needs and respond to evolving threat environments. The TACP-M program works closely with the Battlefield Airmen Office (BAO) program to procure dismounted equipment. This teaming arrangement helps standardize battlefield airmen equipment, improve efficiency by consolidating acquisition efforts, and often reduces unit costs by increasing procurement quantities.

The TACP-M program provides and modernizes capabilities in the following four major areas: (1) ASOC/TOC systems (used in fixed operations centers), (2) Vehicle Mounted Systems (used in TACP tactical vehicles), (3) Dismounted Systems (used by JTACs during dismounted infantry operations), and (4) Close Air Support System (CASS) software.

CASS software provides advanced communication, advanced targeting capability, and significant interoperability improvements for mobile computing devices used by Dismounted JTACs, for vehicle-mounted systems, and for stationary systems used in operations centers. TACP CASS software enables digital data communications with joint Command and Control (C2) nodes, other TACPs, attack aircraft, and Army C2 and Fire Support systems. It includes interfaces with TOC, ASOC, and JTAC radios, and targeting devices. It also provides battlespace awareness capabilities needed to plan, request, coordinate, and control CAS in support of ground maneuver forces. The CASS software interfaces with all TACP-M components and provides interoperability with joint strike aircraft (F-35, A-10, F-16, F-15, F/A-18, AV-8B, B-52, etc.), Remotely Piloted Aircraft (RPA), artillery fire support systems, network-enabled weapons, and C2 nodes. To enable data communications with those systems / nodes, CASS incorporates several communications protocols including Variable Message Format (VMF), Link 16, Situational Awareness Data Link (SADL), Marine Tactical System (MTS), and U.S. Message Text Format (USMTF).

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*

The software is in two versions: Dismounted and ASOC/TOC/Mounted (ATM). Both software support a wide variety of radio systems (including but not limited to AN/ PRC-117F, AN/PRC-117G, AN/ PRC-148, AN/PRC-152A, AN/PRC-154, AN/PRC-158, AN/PRC-161, AN/PRC-163, Harris RF-335M-HH, AN/PRC-150C, AN/PRC-160 and other emerging systems that are expected to be employed by TACPs in the future). Future upgrades are necessary to maintain interoperability with strike aircraft, joint fire support systems, and emerging data networking waveforms. CASS upgrades provide a modular architecture for digital communications, messaging, data handling, hardware management, and targeting, and battle space awareness capabilities. The key characteristic of the software will be the Open System, Modular architecture that will enable rapid integration with new external devices (such as laser range finders and radios) and rapid development, testing and fielding of new mission capability modules to meet future requirements

Funding increases include support for Dismount and ATM software to address interfaces with new android dismount software, changes to Army fires support systems, changes to Theater Battle Management Core Systems (TBMCS), updates for fielded versions, new joint Digitally-Aided CAS (DACAS) standards, and technical support to operators employing the software.

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

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

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	10.623	6.149	13.652	0.000	13.652
Current President's Budget	10.623	6.149	6.217	0.000	6.217
Total Adjustments	0.000	0.000	-7.435	0.000	-7.435
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-7.435	0.000	-7.435

Change Summary Explanation

FY2020 funding decreased due to Air Force rephasing reimbursement

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force											Date: February 2019	
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0207444F / *Tactical Air Control Party-Mod*				Project (Number/Name) 676013 / *Equipment Modernizaton*			
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**
676013: *Equipment Modernizaton*	-	10.623	6.149	6.217	0.000	6.217	12.931	13.997	13.317	11.751	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

TACPs are Air Force units manned by airmen who advise Army Ground Commanders and plan, request and control air power in support of army ground maneuver operations. These capabilities are employed at all echelons of Army organizations by: Air Support Operation Center (ASOC) TACPs, Division TACPs, Brigade TACPs, Battalion TACPs, and dismounted Joint Terminal Attack Controllers (JTAC) deployed with Army companies or scout teams on the front lines. TACPs coordinate, request, and control airlift support and intelligence, surveillance, and reconnaissance (ISR) support for Army combat operations, and they provide ground communications support for federal disaster response and Homeland Defense operations. TACPs deploy with their aligned Army units and operate in a variety of environments including fixed operations from Tactical Operations Centers (TOC), mobile operations in tactical vehicles, and dismounted (on foot) operations with Army infantry patrols.

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CASS software provides advanced communication, advanced targeting capability, and significant interoperability improvements for mobile computing devices used by Dismounted JTACs, for vehicle-mounted systems, and for stationary systems used in operations centers. TACP CASS software enables digital data communications with joint Command and Control (C2) nodes, other TACPs, attack aircraft, and Army C2 and Fire Support systems. It includes interfaces with TOC, ASOC, and JTAC radios, and targeting devices. It also provides battlespace awareness capabilities needed to plan, request, coordinate, and control CAS in support of ground maneuver forces. The CASS software interfaces with all TACP-M components and provides interoperability with joint strike aircraft (F-35, A-10, F-16, F-15, F/A-18, AV-8B, B-52, etc.), Remotely Piloted Aircraft (RPA), artillery fire support systems, network-enabled weapons, and C2 nodes. To enable data communications with those systems / nodes, CASS incorporates several communications protocols including Variable Message Format (VMF), Link 16, Situational Awareness Data Link (SADL), Marine Tactical System (MTS), and U.S. Message Text Format (USMTF).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

The software is in two versions: Dismounted and ASOC/TOC/Mounted (ATM). Both software support a wide variety of radio systems (including but not limited to AN/ PRC-117F, AN/PRC-117G, AN/ PRC-148, AN/PRC-152A, AN/PRC-154, AN/PRC-158, AN/PRC-161, AN/PRC-163, Harris RF-335M-HH, AN/PRC-150C, AN/PRC-160 and other emerging systems that are expected to be employed by TACPs in the future). Future upgrades are necessary to maintain interoperability with strike aircraft, joint fire support systems, and emerging data networking waveforms. CASS upgrades provide a modular architecture for digital communications, messaging, data handling, hardware management, and targeting, and battle space awareness capabilities. The key characteristic of the software will be the Open System, Modular architecture that will enable rapid integration with new external devices (such as laser range finders and radios) and rapid development, testing and fielding of new mission capability modules to meet future requirements.

Funding increases include support for Dismount and ATM software to address interfaces with new android dismount software, changes to Army fires support systems, changes to Theater Battle Management Core Systems (TBMCS), updates for fielded versions, new joint Digitally-Aided CAS (DACAS) standards, and technical support to operators employing the software.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Close Air Support System (CASS)	10.623	6.149	6.217	0.000	6.217
Description: Title: Close Air Support System (CASS) Description: The CASS Software program will modernize software for Communications, Command and Control (C3) processing systems for multiple TACP mission areas, i.e., ASOC/TOC operations, Mounted operations,and Dismounted operations. ***FY 2019 Plans:*** - This includes, but is not limited to: - Supports development of BAO Program's BA-TAK Dismount Android software. - Continues to develop and update interface with TBMCS.. - Continues to complete update of CASS software for new and emerging mobile TACP vehicles. - Establish TACP common software architecture for further development to meet other battlefield airman operational needs. - Completes upgrades and fixes to Dismounted CASS v1.4.5 software. - Conducts source selection activities to provide additional feature (capabilities) for the CASS software. - Continues with risk reduction,design and development of CASS software v2.0 architecture and software in preparation for government testing. - Continues to integrate, and test CASS data communications interfaces with C2 Nodes, CAS aircraft, ATN, SRW networks, and MUOS SATCOM networks to enhance interoperability between TACPs, and other joint warfighters.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Completes development of training and simulation capabilities to integrate and test CASS data communications interfaces. ***FY 2020 Base Plans:*** -This includes, but is not limited to: -Will continue to support development of BAO Program's Battlefield Airmen Tactical Assault Kit (BA-TAK) Dismount Android software. -Will continue to develop and update interface with TBMCS. -Will continue to complete update of CASS software for new and emerging mobile TACP vehicles. -Will establish TACP common software architecture for further development to meet other battlefield airman operational needs. -Will conduct investigations to provide additional feature (capabilities) for the CASS software -Will continue with risk reduction, design and development of CASS ATM software v2.0 architecture and software in preparation for government testing -Will complete risk reduction of CASS software v2.0 architecture and software; complete government testing of risk reduction software. -Will continue to integrate, and test CASS data communications interfaces with C2 Nodes, CAS aircraft, Army Tactical Network (ATN), Soldier Radios Waveform (SRW) networks, TBMCS, and Mobile User Objective System (MUOS) Satellite Communications (SATCOM) networks to enhance interoperability between TACPs, and other joint warfighters. -Will complete development of training and simulation capabilities to integrate and test CASS data communications interfaces. ***FY 2020 OCO Plans:*** 0.00 ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding increase due to rephasing reimbursement from FY19					
Accomplishments/Planned Programs Subtotals	10.623	6.149	6.217	0.000	6.217

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

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
• OPAF 03 Line item 837100: *Tactical C-E Equipment*	43.084	42.846	35.967	-	35.967	54.473	52.820	52.986	36.388	Continuing	Continuing

Remarks

D. Acquisition Strategy

TACP-M is executing an incremental development for the TACP-M CASS software. CASS Dismount and ATM software strategy continues the incremental development through risk reduction efforts and use of Other Transactional Authority (OTA) for ATM software; and coordinating with the BAO program office on developing the next Dismount solution. CASS ATM Software v2.0 strategy is to build of the results v1A OTA (Defense Innovation Unit Experimental (DIUx)) to develop continue risk reduction with v1B. The results of v1B will be used form the v2.0 Acquisition Strategy Panel (ASP) and start of source selection are planned for the 1st Qtr. of FY20 with contract award in the 2nd Qtr. of FY20. CASS v2.0 contract will provide new open-system, modular software to support Android and/or Windows Operating System platforms, with additional capabilities interfacing with the ATN as well.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

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
CASS 2.0 System Software Dev. Dismounted	Various	GDIT : WP, OH	-	0.983	Jun 2018	-		-		-		-	Continuing	Continuing	-
CASS 2.0 System Software Dev. Mounted	TBD	TBD : TBD	-	-		2.823		3.048	Jan 2020	-		3.048	Continuing	Continuing	-
MDAP Penalty and SBIR assessment	C/CPAF	Not specified. : TBD	-	-		0.027		-		-		-	Continuing	Continuing	-
CASS 2.0 Risk Reduction Phase 1	SS/CPAF	GDIT : WP, OH	-	0.300	Dec 2018	-		-		-		-	Continuing	Continuing	-
CASS 2.0 Risk Reduction Phase 2	SS/CPAF	GDIT : WP, OH	-	7.286	Mar 2019	-		-		-		-	Continuing	Continuing	-
CASS 1.4.5 NSWC Crane (Naval Surface Warefare Center)	MIPR	NSWC Crane : Crane, IN	-	0.500	Jan 2018	-		-		-		-	Continuing	Continuing	-
CASS 2.0 NSWC Crane (Naval Surface Ware Center)	MIPR	NSWC Crane : Crane, MA	-	-		1.120	Jan 2019	0.984	Jan 2020	-		0.984	Continuing	Continuing	-
CASS 2.0 JTAGGS TTP Development	MIPR	AFRL : WPAFB, IN	-	0.500	Dec 2018	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	9.569		3.970		4.032		-		4.032	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
Test Agency Support	MIPR	Various : Multiple, NV	-	0.415	Jan 2018	0.670	Jan 2019	0.801	Apr 2020	-		0.801	Continuing	Continuing	-
		Subtotal	-	0.415		0.670		0.801		-		0.801	Continuing	Continuing	N/A

Remarks

Development, operational and interoperability testing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207444F / *Tactical Air Control Party-Mod*	Project (Number/Name) 676013 / *Equipment Modernizaton*	

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
Program Management Administration	C/CPFF	PMO : Bedford, MA	-	0.639	Oct 2017	1.509	Oct 2018	1.384	Oct 2020	-		1.384	Continuing	Continuing	-
		Subtotal	-	0.639		1.509		1.384		-		1.384	Continuing	Continuing	N/A

Remarks

PMA funds MITRE, ETASS, PASS, SCS, all mulitple contractors.

	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	-	10.623		6.149		6.217		-		6.217	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

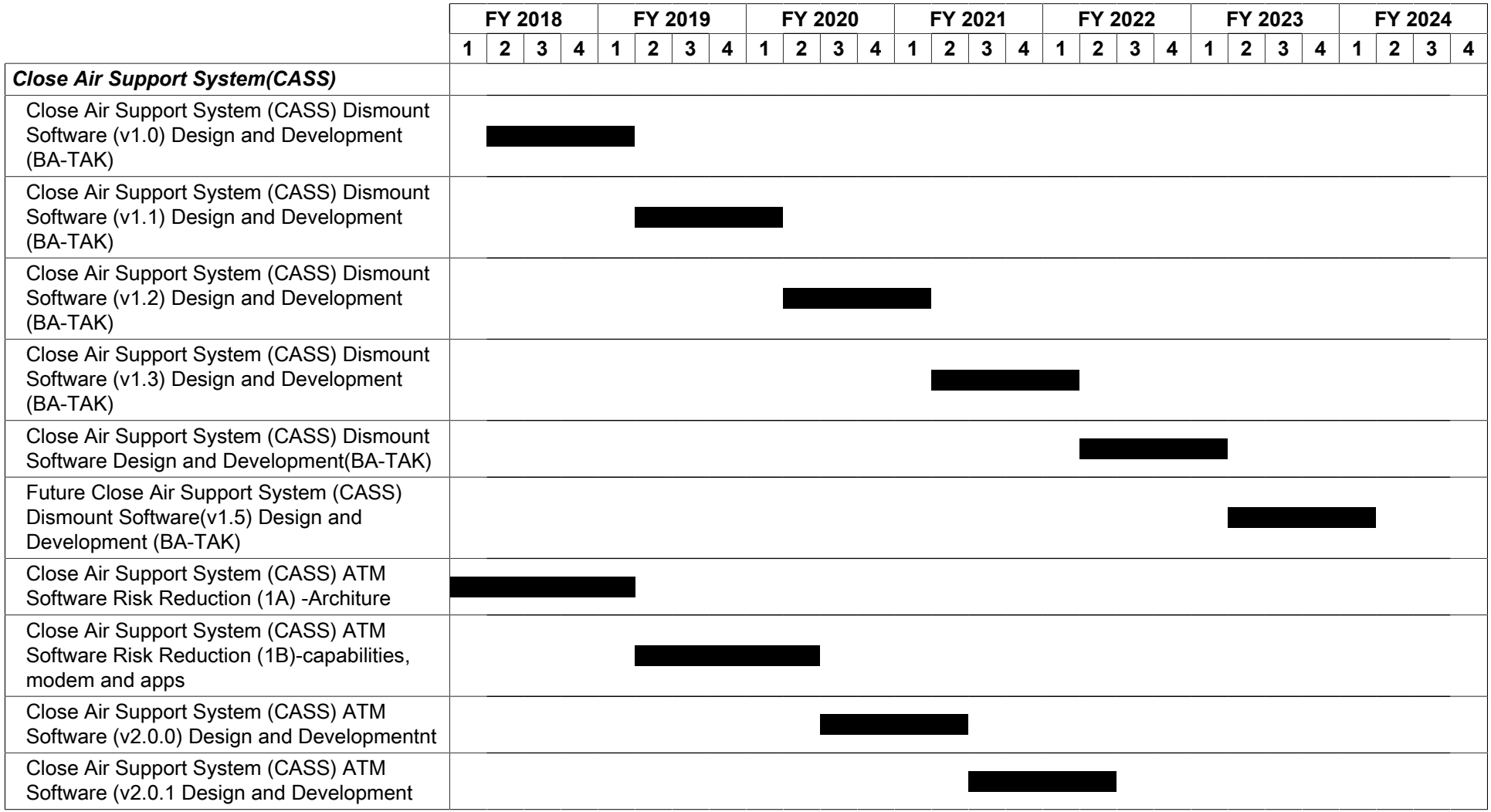

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

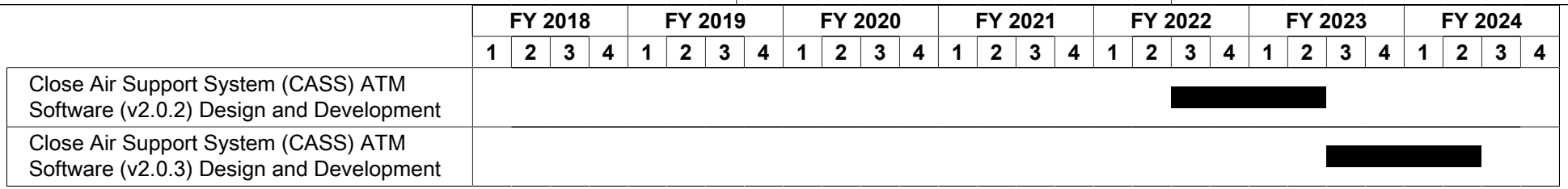

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Close Air Support System(CASS)				
Close Air Support System (CASS) Dismount Software (v1.0) Design and Development (BA-TAK)	2	2018	1	2019
Close Air Support System (CASS) Dismount Software (v1.1) Design and Development (BA-TAK)	2	2019	1	2020
Close Air Support System (CASS) Dismount Software (v1.2) Design and Development (BA-TAK)	2	2020	1	2021
Close Air Support System (CASS) Dismount Software (v1.3) Design and Development (BA-TAK)	2	2021	1	2022
Close Air Support System (CASS) Dismount Software Design and Development(BA-TAK)	2	2022	1	2023
Future Close Air Support System (CASS) Dismount Software(v1.5) Design and Development (BA-TAK)	2	2023	1	2024
Close Air Support System (CASS) ATM Software Risk Reduction (1A) -Architure	1	2018	1	2019
Close Air Support System (CASS) ATM Software Risk Reduction (1B)-capabilities, modem and apps	2	2019	2	2020
Close Air Support System (CASS) ATM Software (v2.0.0) Design and Developmentnt	3	2020	2	2021
Close Air Support System (CASS) ATM Software (v2.0.1 Design and Development	3	2021	2	2022
Close Air Support System (CASS) ATM Software (v2.0.2) Design and Development	3	2022	2	2023
Close Air Support System (CASS) ATM Software (v2.0.3) Design and Development	3	2023	2	2024

Note

IOC & FOC dates are based on Objective and not Threshold dates.