Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force											Date: February 2018	
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 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	-	11.437	10.623	6.149	0.000	6.149	13.652	12.931	11.336	11.543	Continuing	Continuing
674934: *Tactical Air Control Party (TACP)**	-	0.000	0.000	0.000	0.000	0.000	2.738	1.826	0.000	0.000	Continuing	Continuing
676013: *Equipment Modernizaton*	-	11.437	10.623	6.149	0.000	6.149	10.914	11.105	11.336	11.543	Continuing	Continuing

*This project's R-2a exhibit has been suppressed due to funding not beginning until after FY 2019

A. Mission Description and Budget Item Justification

Tactical Air Control Partys (TACP) 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. TACPs also 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 TACP-Modernization program is to upgrade TACP voice, data and video communications capabilities, upgrade targeting capabilities, and improve TACP battlefield awareness capabilities. These capabilities are employed at all echelons of Army organizations by: Air Support Operation Centers (ASOC), Division TACPs, Brigade TACPs, Battalion TACPs, and Joint Terminal Attack Controllers (JTAC) deployed with Army companies or scout teams on the front lines. 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 communications.

The TACP-M program provides and modernizes capabilities in three major categories/areas:(1) ASCOC/TOC Systems (used in fixed ASOCs and Army TOCs), (2) Dismounted and Mobile Systems (used by JTACs during infantry operations and vehicle-mounted mobile operations), and (3) Close Air Support System (CASS) software. CASS v1.4.5 software comes in two versions: A) Dismounted version for dismounted mission operations and a B) ASOC, TOC, and Mounted (ATM) version for ASOC, TOC, and Mobile systems.

CASS software segment 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). CASS software will provide 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. Future upgrades necessary to maintain interoperability with strike aircraft, joint fire support systems, and emerging data networking waveforms will be guided by

the TACP CASS Information System Initial Capabilities Document (IS ICD) approved by the Air Force Requirement Oversight Council (AFROC), Functional Capabilities Board (FCB), and Joint Capabilities Board (JCB).

CASS v2.0 provides a modular architecture for digital communications, messaging, data handling, hardware management, and targeting, and battle space awareness capabilities. The architecture includes a Core Module, an HMI module, and an Application Logic module with multiple mission plug-in features. The software is being developed in two versions ASOC/TOC (A/T) and Dismounted/Mounted (D/M) to 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, Harris RF-335M-HH, AN/PRC-150C, and other emerging systems that are expected to be employed by TACPs in the future). 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.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development effort to upgrade systems that have 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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	11.843	10.623	10.794	0.000	10.794
Current President's Budget	11.437	10.623	6.149	0.000	6.149
Total Adjustments	-0.406	0.000	-4.645	0.000	-4.645
• 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	-0.406	0.000			
• Other Adjustments	0.000	0.000	-4.645	0.000	-4.645

Change Summary Explanation

FY2019 funding decreased due to higher Air Force priorities

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force											Date: February 2018	
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 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
676013: *Equipment Modernizaton*	-	11.437	10.623	6.149	0.000	6.149	10.914	11.105	11.336	11.543	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Tactical Air Control Party(s) (TACP) 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. TACPs also 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 operations with Army infantry patrols.

The purpose of the TACP-Modernization program is to upgrade TACP voice, data and video communications, targeting, and battlefield awareness capabilities. These capabilities are employed at all echelons of Army organizations by: Air Support Operation Centers (ASOC), Division TACPs, Brigade TACPs, Battalion TACPs, and Joint Terminal Attack Controllers (JTAC) deployed with Army companies or scout teams on the front lines. 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 communications.

The TACP-M program provides and modernizes capabilities in four major categories/areas: (1) ASOC/TOC Systems (used in fixed ASOCs and Army TOCs), (2) Dismounted,(3) Mobile Systems (used by JTACs during infantry operations and vehicle-mounted mobile operations), and (4) the Close Air Support System (CASS) software that resides on and interfaces with the TACP-M hardware systems. CASS software is a Fires centric solution which consists of Close Air Support (CAS) and artillery fire support on the battlefield where digitally aided CASS enables efficient execution of a Joint Terminal Attack Controllers mission tasks utilized on all TACP-M systems.

The CASS software 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), Unmanned Aircraft System (UAS), 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). CASS software will provide 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. Future upgrades necessary to maintain interoperability with strike aircraft, joint fire support systems, and emerging data networking waveforms will be guided by the TACP CASS Information System Initial Capabilities Document (IS ICD) approved by the Air Force Requirement Oversight Council (AFROC), Functional Capabilities Board (FCB), and Joint Capabilities Board (JCB).

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

CASS v1.4.5 fields critical updates for communicating with CAS aircraft, improves the interface with the Army Tactical Network (ATN), and provides a new Dismounted version for dismounted mission operations. CASS v2.0 provides a modular architecture for digital communications, messaging, data handling, hardware management, targeting, and battle space awareness capabilities. The new architecture will utilize Windows and Android equipment to provide Data Management, Human-Machine Interface (HMI), and Application Logic software modules with multiple mission plug-in features. The software is being developed in two versions ASOC/TOC (A/T) and Dismounted/Mounted (D/M) to 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, Harris RF-335M-HH, AN/PRC-150C, and other emerging systems that are expected to be employed by TACPs in the future). 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.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CASS weapon system capability.The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Close Air Support System (CASS)	11.437	10.623	6.149	0.000	6.149
Description: The CASS Software program will modernize software for Communications, Command and Control (C3) processing systems for multiple TACP mission areas, i.e., the Air Support Operations Centers (ASOC), Tactical Operation Centers (TOC), Mounted operations, and Dismounted operations. ***FY 2018 Plans:*** - This includes, but is not limited to: - Complete fielding of Dismount software, including the software modem, for use with the Dismounted OCS kits. - Complete fielding of ATM software. - Continue risk reduction, prototyping and initiate test activities for developing of the initial CASS v2.0 software. - Initiate migration from Theater Battle Management Core Systems (TBMCS) to Command and Control Air Operations Suite and Command and Control Information Services (C2AOS-C2IS). - Establish TACP common software architecture for further development to meet other battlefield airman operational needs. - Continue upgrades and fixes to Dismounted CASS v1.4.5 software. - Continue design and development of CASS software v2.0 architecture and software in preparation for government testing. - Continue 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 2019 Air Force		Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue to develop training and simulation integration capabilities and develop Tactics, Training, and Protocols (TTPs). - Continue to develop CFF and SDBII control messages. ***FY 2019 Base Plans:*** - This includes, but is not limited to: - Will support development of BAO Program's BA-TAK Dismount Android software. - Will complete migration from TBMCS to C2AOS-C2IS. - 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 complete upgrades and fixes to Dismounted CASS v1.4.5 software. - Will conduct source selection activities to provide additional feature (capabilities) for the CASS software. - Will complete design and development of CASS software v2.0 architecture and software in preparation for government testing. - Will continue 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. - Will complete development of training and simulation capabilities to integrate and test CASS data communications interfaces. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to higher AF priorities					
Accomplishments/Planned Programs Subtotals	11.437	10.623	6.149	0.000	6.149

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line item 837100: *Tactical C-E Equipment*	41.823	43.084	48.252	-	48.252	34.983	32.873	31.020	31.570	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

TACP-M is executing an incremental development for the TACP-M CASS software. CASS v2.0 strategy continues the incremental development through risk reduction efforts with DoD's Defense Innovation Unit Experimental (DIUx) and coordinating with the BAO program office on developing the next Dismount solution. CASS v2.0 Acquisition Strategy Panel (ASP) and start of source selection are planned for the 3rd Qtr.of FY18 with contract award in the 2nd Qtr of FY19. 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. PEO for Special Operations Forces/ISR will be exercising management control.

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 2019 Air Force			Date: February 2018
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 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CASS 2.0 Sys INT Software Dev't	TBD	TBD : TBD	-	6.109	Jul 2017	6.197	Jun 2018	2.204	Feb 2019	-		2.204	Continuing	Continuing	-
CASS 1.4.5 NSWC Crane (Naval Surface Warefare Center)	MIPR	NSWC Crane : Crane, IN	-	1.686	Jun 2017	1.844	Jan 2018	1.823	Jan 2019	-		1.823	Continuing	Continuing	-
CASS 2.0 JTAGGS TTP Development	MIPR	AFRL : WPAFB, OH	-	0.740	Aug 2017	0.500	Mar 2018	-		-		-	Continuing	Continuing	-
CASS 1.4.5 Risk Reduction (DIUx)	MIPR	Rockwell Collins : Richardson, TX	-	1.190	Dec 2016	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	9.725		8.541		4.027		-		4.027	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Agency Support	MIPR	Various : Multiple, NV	-	0.249	Jan 2017	0.896	Jan 2018	0.915	Apr 2019	-		0.915	Continuing	Continuing	-
		Subtotal	-	0.249		0.896		0.915		-		0.915	Continuing	Continuing	N/A

Remarks

Development, operational and interoperability testing

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	C/CPFF	PMO : Bedford, MA	-	1.463	Jan 2017	1.186	Oct 2017	1.207	Oct 2018	-		1.207	Continuing	Continuing	-
		Subtotal	-	1.463		1.186		1.207		-		1.207	Continuing	Continuing	N/A

Remarks

PMA funds MITRE, ETASS, PASS, SCS, all

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
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 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
mulitple contractors.															

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	11.437		10.623		6.149		-		6.149	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

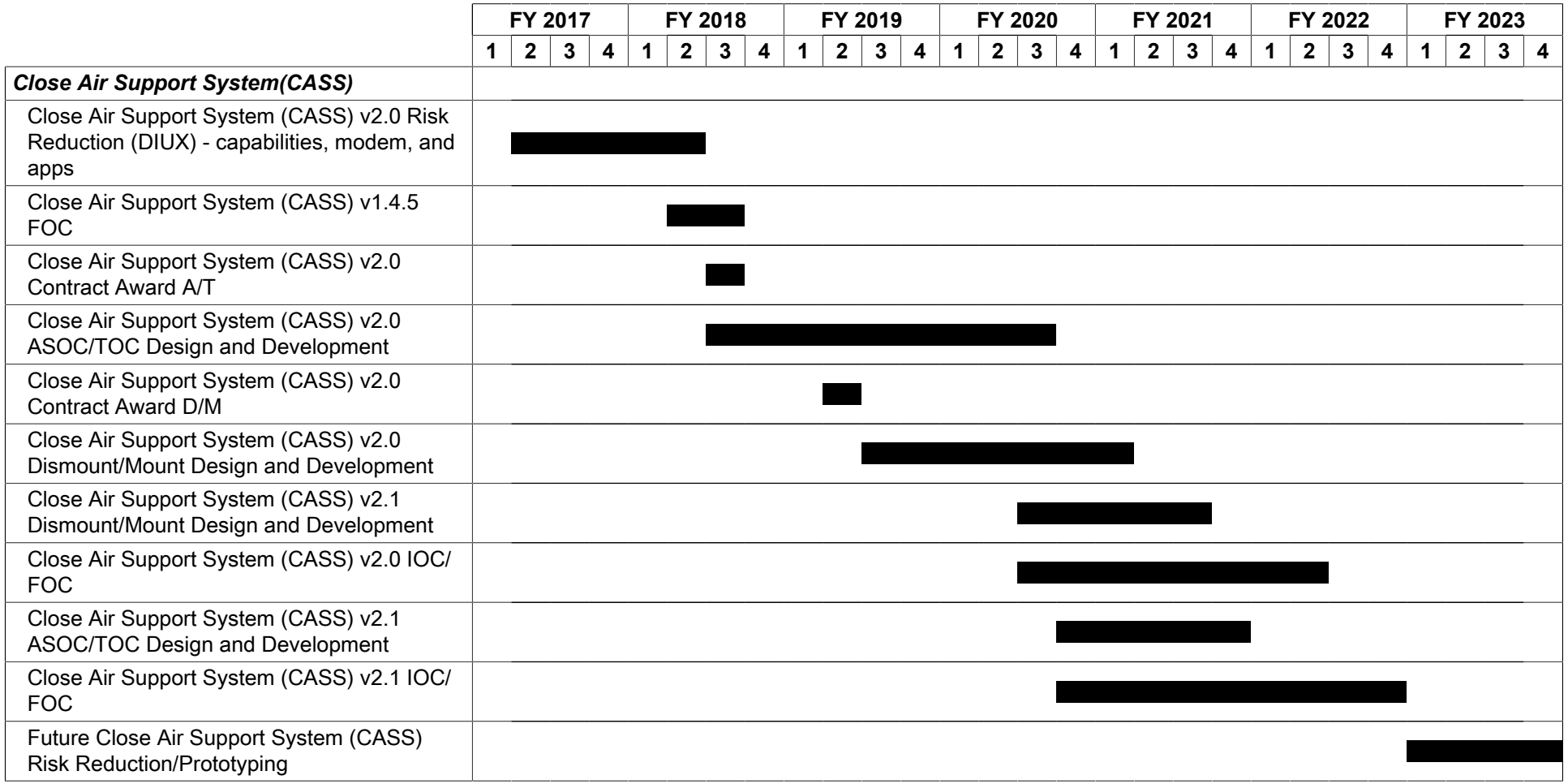

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0207444F / *Tactical Air Control Party-Mod*	**Project (Number/Name)** 676013 / *Equipment Modernizaton*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Close Air Support System(CASS)				
Close Air Support System (CASS) v2.0 Risk Reduction (DIUX) - capabilities, modem, and apps	2	2017	2	2018
Close Air Support System (CASS) v1.4.5 FOC	2	2018	3	2018
Close Air Support System (CASS) v2.0 Contract Award A/T	3	2018	3	2018
Close Air Support System (CASS) v2.0 ASOC/TOC Design and Development	3	2018	3	2020
Close Air Support System (CASS) v2.0 Contract Award D/M	2	2019	2	2019
Close Air Support System (CASS) v2.0 Dismount/Mount Design and Development	3	2019	1	2021
Close Air Support System (CASS) v2.1 Dismount/Mount Design and Development	3	2020	3	2021
Close Air Support System (CASS) v2.0 IOC/FOC	3	2020	2	2022
Close Air Support System (CASS) v2.1 ASOC/TOC Design and Development	4	2020	4	2021
Close Air Support System (CASS) v2.1 IOC/FOC	4	2020	4	2022
Future Close Air Support System (CASS) Risk Reduction/Prototyping	1	2023	4	2023

Note

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