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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0207444F / <i>Tactical Air Control Party-Mod</i>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	4.616	12.411	11.843	0.000	11.843	10.592	10.790	10.991	11.187	Continuing	Continuing
676013: <i>Equipment Modernization</i>	-	4.616	12.411	11.843	0.000	11.843	10.592	10.790	10.991	11.187	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Tactical Air Control Party (TACP)s 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 (TOCs), 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 (ASOCs), Division TACPs, Brigade TACPs, Battalion TACPs, and Joint Terminal Attack Controllers (JTACs) 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 Air Support Operations Centers and Army Tactical Operations Centers),(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 1.4.5 software comes in two versions: A) Dismounted version for dismounted mission operations and a B) Mounted version for ASOC, TOC, and Mobile Systems (ATM).

The Close Air Support System (CASS) software segment interfaces with all TACP-M components and provides interoperability with joint strike aircraft (F-35, A-10, F-16, F-15E, F/A-18, AV-8B, 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, Marine Tactical System (MTS), and U.S. Message Text Format (USMTF). CASS v1.4.5 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).

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This program is in Budget Activity 07, 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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	5.850	12.465	12.108	0.000	12.108
Current President's Budget	4.616	12.411	11.843	0.000	11.843
Total Adjustments	-1.234	-0.054	-0.265	0.000	-0.265
• Congressional General Reductions	0.000	-0.054			
• 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	-1.037	0.000			
• SBIR/STTR Transfer	-0.197	0.000			
• Other Adjustments	0.000	0.000	-0.265	0.000	-0.265

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017
<p>Title: Close Air Support System (CASS)</p> <p>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.</p> <p>FY 2015 Accomplishments:</p> <ul style="list-style-type: none"> - Completed the design and development of the CASS v1.4.5 Dismounted software in preparation for government testing starting in first quarter FY16. This included the completion of critical design review, Human System Interfaces (HSI) working groups, including site visits to operational TACP units. - Initiated the development and integration of a software modem capability for the Dismount software. - Initiated the development of CASS v1.4.5 tailored software for use in ASOC, TOC and Mobile Systems (ATM). - Continued development engineering efforts to incorporate capabilities such as, Call For Fires (CFF) and Small Diameter Bomb II (SDB II) interfaces. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - This includes, but is not limited to: - Continue testing and initiate training for Dismounted CASS software developed for the Operational Control System (OCS). 	4.616	12.411	11.843

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Continue testing and initiate training for CASS software developed for ASOC, TOC and Mobile Systems (ATM). - Continue developing software to operate on new TACP-M platforms such as; Mobile Communications System (MCS), TACP-M Transportable Gateway (TTG), and other TACP systems. - Continue to develop, integrate, and test Machine to Machine (MTM) interfaces with C2 Nodes, USAF aircraft, and Ground Forces as well as interoperability with the Army Tactical Network, which will enhance communication capability among TACP and Army warfighters. - Continue the integration and test of the software modem capability for the Dismounted software. - Continue Call For Fires (CFF) and Small Diameter Bomb II (SDBII)engineering builds to enhance interoperability of future CASS software. <p>FY 2017 Plans:</p> <ul style="list-style-type: none"> - This includes, but is not limited to: - Will complete fielding of the software modem capability in the Dismounted CASS v1.4.5 software. - Will continue fielding the Dismounted CASS v1.4.5 software for use with the Operational Control System (OCS). - Will continue fielding CASS 1.4.5 software for use in ASOCs, TOCs, and Mobile Systems (ATM). <p>This will include completing the preliminary and critical design reviews, initiating Human System Interface (HSI) working groups, and conducting site visits to operational TACP units to obtain operator inputs.</p> <ul style="list-style-type: none"> - Will continue design and development of CASS software version 2.0 software in preparation for government testing starting in FY18. - Will continue to integrate, and test CASS data communications interfaces with C2 Nodes, CAS aircraft, Army Tactical Networks, Soldier Radio Waveform (SRW) networks, and Mobile User Objective System (MUOS) SATCOM networks to enhance interoperability between TACPs, and other joint warfighters. - Will continue to develop Call-for-Fire (CFF) and Small Diameter Bomb II (SDB II) control messages. <p>Exhibit R-2A (PE 0207444F)</p>			
Accomplishments/Planned Programs Subtotals	4.616	12.411	11.843

D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• OPAF: BA03: Line item #837100: <i>Tactical C-E Equipment</i>	20.504	32.151	41.823	0.000	41.823	42.677	55.549	29.862	30.399	Continuing	Continuing

Remarks

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E. Acquisition Strategy
TACP-M is executing an incremental development for the TACP CASS software. TACP CASS software systems engineering, design, integration, and fielding support is being provided under a cost plus incentive fee contract. Hanscom AFB, MA is managing the contractual effort

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

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207444F / <i>Tactical Air Control Party-Mod</i>	Project (Number/Name) 676013 / <i>Equipment Modernizaton</i>
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CASS Sys Int Software Dev't (CASS 1.4.5)	C/CPIF	Rockwell Collins : Poway, CA	-	0.821	May 2015	8.280	Feb 2016	1.471	Jan 2017	0.000		1.471	Continuing	Continuing	-
CASS Sys Int Software Dev't (CASS 2.0)	C/TBD	TBD : TBD	-	0.000		0.000		6.278	Jun 2017	0.000		6.278	Continuing	Continuing	-
NSWC Crane (Naval Surface Warefare Center)	MIPR	NSWC Crane : Crane, IN	-	0.950	Jan 2015	1.000	Feb 2016	1.007	Jan 2017	0.000		1.007	Continuing	Continuing	-
Subtotal			-	1.771		9.280		8.756		0.000		8.756	-	-	-

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CASS 1.4.5 Equipment Hardware	MIPR	ARMY : Aberdeen, MD	-	0.099	Apr 2015	0.000		0.000		0.000		0.000	Continuing	Continuing	-
Subtotal			-	0.099		0.000		0.000		0.000		0.000	-	-	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Agency Support	Various	Various : TBD	-	0.574	Dec 2014	0.818	Dec 2015	0.874	Dec 2016	0.000		0.874	Continuing	Continuing	-
Subtotal			-	0.574		0.818		0.874		0.000		0.874	-	-	-

Remarks
Development, operational and interoperability testing

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force		Date: February 2016
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FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Close Air Support (CASS) v1.4.5 Dismounted SW Dev (July - Dec 2015)																												
Close Air Support System (CASS) v1.4.5 Qualification Testing (QT) (Feb - May 2016)																												
Close Air Support System (CASS) v1.4.5 Force Dev Eval (FDE) (Jun - Aug 2016)																												
Close Air Support System (CASS) v1.4.5 Release 1 IOC (Dec 2016)																												
Close Air Support System (CASS) v1.4.5 Release 2 FOC (Aug 2017)																												
Close Air Support System (CASS) v2.0 Contract Award (Jun 2017)																												
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 1 IOC (Nov 2019)																												
Close Air Support System (CASS) v2.0 Dismount/Mount FOC all Rels																												
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 2 (Dec 2018)																												
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 2 Gov Testing (Oct 2019)																												
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 2 IOC (Jun 2020)																												
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 3 Design and Dev (Oct 2019)																												
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 3 Gov Testing (June 2020)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Close Air Support (CASS) v1.4.5 Dismounted SW Dev (July - Dec 2015)	4	2015	1	2016
Close Air Support System (CASS) v1.4.5 Qualification Testing (QT) (Feb - May 2016)	2	2016	3	2016
Close Air Support System (CASS) v1.4.5 Force Dev Eval (FDE) (Jun - Aug 2016)	3	2016	4	2016
Close Air Support System (CASS) v1.4.5 Release 1 IOC (Dec 2016)	2	2017	2	2017
Close Air Support System (CASS) v1.4.5 Release 2 FOC (Aug 2017)	4	2017	4	2017
Close Air Support System (CASS) v2.0 Contract Award (Jun 2017)	3	2017	3	2017
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 1 IOC (Nov 2019)	1	2020	1	2020
Close Air Support System (CASS) v2.0 Dismount/Mount FOC all Rels	2	2021	2	2021
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 2 (Dec 2018)	1	2019	1	2020
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 2 Gov Testing (Oct 2019)	1	2020	2	2020
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 2 IOC (Jun 2020)	2	2020	3	2020
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 3 Design and Dev (Oct 2019)	1	2020	3	2020
Close Air Support System (CASS) v2.0 Dismount/Mount Rel 3 Gov Testing (June 2020)	3	2020	1	2021
Close Air Support System (CASS) v2.0 Dismount/Mount FOC all Rels (March 2021)	2	2021	2	2021
Close Air Support System (CASS) v2.1 ASOC/TOC Contract Award (June 2018)	3	2018	3	2018
Close Air Support System (CASS) v2.1 ASOC/TOC Rel 1 Design and Dev (June 2018)	3	2018	4	2018
Close Air Support System (CASS) v2.1 ASOC/TOC Rel 1 Gov Testing (Dec 2019)	1	2020	1	2020
Close Air Support System (CASS) v2.1 ASOC/TOC Rel 1 IOC (Oct 2020)	1	2021	1	2021
Close Air Support System (CASS) v2.1 ASOC/TOC Rel 2 Design and Dev (Feb 2020)	2	2020	1	2021
Close Air Support System (CASS) v2.1 ASOC/TOC Rel 2 Gov Testing (Nov 2020)	1	2021	2	2021
Close Air Support System (CASS) v2.1 ASOC/TOC Rel 2 IOC (Mar 2021)	2	2021	2	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
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Events	Start		End	
	Quarter	Year	Quarter	Year
Close Air Support System (CASS) v2.1 ASOC/TOC All Rels FOC (July 2021)	4	2021	4	2021