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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	6.135	4.117	12.906	0.000	12.906	13.976	13.292	11.728	11.943	Continuing	Continuing
676013: <i>Equipment Modernization</i>	-	6.135	4.117	12.906	0.000	12.906	13.976	13.292	11.728	11.943	Continuing	Continuing

A. Mission Description and Budget Item Justification

Tactical Air Control Party (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. 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 Strike aircraft, Joint fires, 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 ASOCs and 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/management 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 using 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 with the Special Warfare (SW) program office to procure dismounted equipment and software. 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 and mobile operations centers), (2) Vehicle Mounted Systems (used in TACP tactical vehicles) and semi-mobile operations, (3) Dismounted Systems (used by JTACs during dismounted infantry operations), and (4) Close Air Support System (CASS) software.

CASS software provides required advanced communication, advanced targeting capability, and significant interoperability improvements for mobile computing devices used by vehicle-mounted systems and stationary systems used in operations centers. TACP CASS software enables digital data communications with joint Command and Control (C2) nodes, other TACPs, strike aircraft, and Army C2 and Fire Support systems. It includes interfaces with TOC, ASOC, and JTAC radios, and targeting devices, interoperability across the Dismounted, vehicle-mounted systems, and ASOC/TOC mission sets. 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

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<p>Message Format (VMF), Link 16, Situational Awareness Data Link (SADL), Marine Tactical System (MTS), and U.S. Message Text Format (USMTF); along with emerging waveform technologies.</p> <p>ASOC provides management and integration with fires systems, utilizes Air Operations Center (AOC) inputs and archives data, provides a visual depiction of battlespace in coordination with DOD, non-governmental and international partners, house and share TACP planning documents, provides server capability for battlespace, integrates ISR management and video feeds, managing Air Tasking real time, modernizing Battle Damage Assessment (BDA) capability. The ASOC will provide C2 capabilities that will be leader-centric, network enabled, and ready to operate in complex and degraded information environments.</p> <p>Dismounted and ASOC/TOC/Mounted (ATM) software meets the technical needs of implementing TACP C2 capabilities in operational environments. Software supports 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. Software 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 end user devices (such as laser range finders and radios) and rapid development, testing and fielding of new mission capability modules to meet future requirements.</p> <p>Funding supports Dismount, ATM, and ASOC software to address: interfaces with new dismount requirements, ASOC modernization (interoperability and hardware/software interfaces), changes to Army fires support systems, changes to AOC Theater Battle Management Core Systems (TBMCS), updates for fielded versions, new joint Digitally-Aided CAS (DACAS) standards, technical support to operators employing the software, and system prototyping for required future ASOC/TOC/Mounted system capabilities.</p> <p>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 civilian pay expenses budgeted in program element 0605831F.</p> <p>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.</p> <p>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.</p>		

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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	6.149	6.217	12.931	0.000	12.931
Current President's Budget	6.135	4.117	12.906	0.000	12.906
Total Adjustments	-0.014	-2.100	-0.025	0.000	-0.025
• 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	-0.014	-2.100	-0.025	0.000	-0.025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
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>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
676013: <i>Equipment Modernizaton</i>	-	6.135	4.117	12.906	0.000	12.906	13.976	13.292	11.728	11.943	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Tactical Air Control Party (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. 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 Strike aircraft, Joint fires, 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 ASOCs and Tactical Operations Centers (TOC), mobile operations in tactical vehicles, and dismounted (on foot) operations with Army infantry patrols.

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Message Format (VMF), Link 16, Situational Awareness Data Link (SADL), Marine Tactical System (MTS), and U.S. Message Text Format (USMTF); along with emerging waveform technologies.

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Funding supports Dismount, ATM, and ASOC software to address: interfaces with new dismount requirements, ASOC modernization (interoperability and hardware/software interfaces), changes to Army fires support systems, changes to AOC Theater Battle Management Core Systems (TBMCS), updates for fielded versions, new joint Digitally-Aided CAS (DACAS) standards, technical support to operators employing the software, and system prototyping for required future ASOC/TOC/Mounted system capabilities.

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 civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Close Air Support System (CASS)	6.135	4.117	12.906
Description: Title: TACP-M Software System (TSS)			
Description: The TACP-M 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 2020 Plans: This includes, but is not limited to:			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>-Continued to support development of SW Program's Battlefield Airmen Special Warfare Assault Kit(SWAK) Dismount Android software.</p> <p>- Continued to develop and update interface with TBMCS.</p> <p>- Continued to update of CASS software for new and emerging mobile TACP vehicles.</p> <p>- Completed Risk Reduction effort for CASS 2.0 (1.45 replacement).</p> <p>- Held ASP and stand up ACAT III for CASS 2.0.</p> <p>- Established TACP common software architecture for further development to meet other battlefield airman operational needs.</p> <p>- Hosted DT for CASS Risk Reduction software.</p> <p>-Continued 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.</p> <p>-Maintained interoperability with fielded systems.</p> <p>FY 2021 Plans: This includes, but is not limited to:</p> <p>-Will continue to support development of BAO Program's Battlefield Airmen Special Warfare Assault Kit (SWAK) Dismount Android software.</p> <p>-Will establish TACP common software architecture for further development to meet other battlefield airman operational needs.</p> <p>-Will conduct investigations to provide additional feature (capabilities) for the software.</p> <p>-Will integrate CASS 2.0 with ASOC Mod software acquisition.</p> <p>-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.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: FY 20 funding was reduced for re-phasing and FY 21 and 22 increase is reimbursement for FY20.</p>			
Accomplishments/Planned Programs Subtotals	6.135	4.117	12.906

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 Line item 837100: <i>Tactical C-E Equipment</i>	42.846	35.967	54.455	-	54.455	52.820	52.969	36.376	37.043	Continuing	Continuing

Remarks

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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 coordinating with the SW program office on developing SW-TAK, the replacement for BA-DASS. CASS Software 2.0's strategy is to build off pre-existing software and lessons learned in the current Risk Reduction effort and transition the results to a separate contract. The results of which will be used form the 2.0 Acquisition Strategy Panel (ASP) and start of source selection are planned for the 2nd Qtr. of FY20 with contract award in the 3rd Qtr. of FY20. CASS 2.0 will employ a Modular Open Systems Architecture (MOSA) to allow flexible development, that will compliment an Agile software effort.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
CASS System Software Dev. Dismounted	Various	GDIT : WP, OH	-	-		1.730	Mar 2020	3.165	Jun 2021	-		3.165	Continuing	Continuing	-
CASS 2.0 System Software Dev. Mounted	TBD	TBD : TBD	-	4.318		-		-		-		-	Continuing	Continuing	-
ASOC MOD	Various	Pope AFB : Pope AFB, NC	-	-		-		1.934	Jan 2021	-		1.934	Continuing	Continuing	-
MDAP Penalty and SBIR assessment	C/CPAF	Not specified. : TBD	-	-		-		0.239	Oct 2020	-		0.239	Continuing	Continuing	-
CASS 2.0 Risk Reduction Phase 1	SS/CPAF	GDIT : WP, OH	-	-		-		-		-		-	Continuing	Continuing	-
CASS 2.0 Risk Reduction Phase 2	SS/CPAF	GDIT : WP, OH	-	-		0.750	Mar 2020	5.756	Mar 2021	-		5.756	Continuing	Continuing	-
CASS 1.4.5 NSWC Crane (Naval Surface Warfare Center)	MIPR	NSWC Crane : Crane, IN	-	-		-		-		-		-	Continuing	Continuing	-
CASS 2.0 NSWC Crane (Naval Surface Warfare Center)	MIPR	NSWC Crane : Crane, MA	-	1.358	Jan 2019	0.988	Jan 2020	1.007	Jan 2021	-		1.007	Continuing	Continuing	-
CASS 2.0 JTAGGS TTP Development	MIPR	AFRL : WPAFB, IN	-	-		-		-		-		-	Continuing	Continuing	-
Subtotal			-	5.676		3.468		12.101		-		12.101	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Test Agency Support	MIPR	Various : Multiple, NV	-	0.459	Jan 2019	0.649	Apr 2020	0.805	Apr 2021	-		0.805	Continuing	Continuing	-
Subtotal			-	0.459		0.649		0.805		-		0.805	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			

Remarks
Development, operational and interoperability testing

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	6.135	4.117	12.906	-	12.906	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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 System(CASS)	
Close Air Support System (CASS) Dismount Software (v1.1) Design and Development (SWAK)	
Close Air Support System (CASS) Dismount Software (v1.2) Design and Development (SWAK)	
TACP-M Software (v1.0) Design and Development (SWAK)	
Close Air Support System (CASS) Dismount Software (v1.3) Design and Development (SWAK)	
Close Air Support System (CASS) Dismount Software Design and Development (SWAK)	
Future Close Air Support System (CASS) Dismount Software(v1.5) Design and Development (SWAK)	
Close Air Support System (CASS) ATM Software Risk Reduction (1A) -Architecture	
Close Air Support System (CASS) ATM Software Risk Reduction (1B)-capabilities, modem and apps	
Close Air Support System (CASS) ATM Software (v2..0) Design and Developmentnt	
Close Air Support System (CASS) ATM Software (v2..1 Design and Development	
Close Air Support System (CASS) ATM Software (v2..2) Design and Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Close Air Support System(CASS)				
Close Air Support System (CASS) Dismount Software (v1.1) Design and Development (SWAK)	2	2019	1	2020
Close Air Support System (CASS) Dismount Software (v1.2) Design and Development (SWAK)	2	2020	1	2021
TACP-M Software (v1.0) Design and Development (SWAK)	4	2020	4	2025
Close Air Support System (CASS) Dismount Software (v1.3) Design and Development (SWAK)	2	2021	1	2022
Close Air Support System (CASS) Dismount Software Design and Development (SWAK)	2	2022	1	2023
Future Close Air Support System (CASS) Dismount Software(v1.5) Design and Development (SWAK)	2	2023	1	2024
Close Air Support System (CASS) ATM Software Risk Reduction (1A) -Architecture	1	2019	2	2020
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) Design and Developmentnt	2	2020	1	2021
Close Air Support System (CASS) ATM Software (v2..1 Design and Development	2	2021	1	2022
Close Air Support System (CASS) ATM Software (v2..2) Design and Development	2	2022	1	2023
Close Air Support System (CASS) ATM Software (v2..3) Design and Development	2	2023	1	2024

Note

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