Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army											Date: February 2018	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604633A / *Air Traffic Control*							
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	-	3.326	3.536	12.347	-	12.347	6.992	8.526	7.835	2.568	0.000	45.130
586: *Air Traffic Control*	-	3.326	3.536	12.347	-	12.347	6.992	8.526	7.835	2.568	0.000	45.130

A. Mission Description and Budget Item Justification

This program element funds continuous efforts in the development of modernized tactical Air Traffic Control (ATC) systems that will enable safety of aircraft operations. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international ATC mandates and combat identification requirements.

Tactical Airspace Integration System (TAIS), the Army's system of record for Airspace Control (AC) and enroute Air Traffic Services (ATS) within the Army Mission Command Information System (MCIS), requires the development testing and integration of these new web-based services for AC into common MCIS hardware, while meeting the Common Operating Environment (COE) standards. Includes development and testing of improvements to the air picture to include Blue Force Tracker correlation and radar fusion capability. TAIS develops software and hardware for AC web services to operate effectively in a dynamic net-centric interconnected environment and integrates advanced surveillance capabilities to further enhance airspace integration and dynamic management capabilities.

Air Traffic Navigation Integration and Coordination System (ATNAVICS) is an Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR) system that provides ATS at Army terminal airfields and landing sites at Division, Corps, and Echelons Above Corps to include services for Joint and Allied aircraft. ATNAVICS will integrate TPX-59 capabilities to control aircraft both Outside of the Continental United States and Continental United States. ATNAVICS will network its radar picture and interrogator data to aviation and joint network nodes through TAIS. . As the Department of Defense transitions military aircraft to positional self-reporting technologies, flight information will be captured by the Advanced Surveillance program. Advanced Surveillance allows ATC reception of aircraft self-reporting data to include the Automatic Dependent Surveillance Broadcast and integrates local radar feeds and self-reporting aircraft positional data into a correlated situational awareness air picture.

Mobile Tower System (MOTS) Preplanned Product Improvement (P3I) upgrades provides the Joint Force Commander or Combatant Commander a highly mobile, self-contained, integrated and reliable information system platform for visual and procedural aircraft deconfliction and aircrew force protection in unified action terminal airspace environments. The Airfield Lighting System (ALS) is a component of the MOTS and can be operated by solar power or by generator power. The ALS improvements include a Precision Approach Path Indicator and an ALS trailer charging system.

Tactical Terminal Control System (TTCS) is a mobile ATC communications system that provides initial ATS at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft and ground stations. TTCS provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, Blue Force Tracker which provides near real time situational awareness and precision location capability. Future improvements include incorporating advance surveillance as risk mitigation by improving airspace situational awareness and providing an improved soldier interface that is common with other ATC systems.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army	Date: February 2018
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604633A *I Air Traffic Control*

ATC Tactical Networking supports the non-recurring engineering, test and evaluation tasks for integration of radios, control stations and transmitter/receivers and software that will provide all ATC tactical systems an airfield network node capability. This will enable each ATC system to send voice and data between ATC platforms including connectivity to an external network for long range flight-following and data exchange further reducing aviation operational risk by providing ATC operators a common air picture. ATC Networking is required to meet the Net Ready Key Performance Parameter for ATC tactical systems.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	3.421	3.536	12.199	-	12.199
Current President's Budget	3.326	3.536	12.347	-	12.347
Total Adjustments	-0.095	0.000	0.148	-	0.148
• Congressional General Reductions	-0.001	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.094	-			
• Adjustments to Budget Years	-	-	0.148	-	0.148

Change Summary Explanation

FY 2019 reflects HQDA realignments to other programs (+$0.830 million) and realignment of reimbursable manpower funding to direct manpower funding (-$0.682 million).

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604633A / *Air Traffic Control*	Project (Number/Name) 586 / *Air Traffic Control*	

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
586: *Air Traffic Control*	-	3.326	3.536	12.347	-	12.347	6.992	8.526	7.835	2.568	0.000	45.130
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project funds continuous efforts in the development of modernized tactical Air Traffic Control (ATC) systems that will enable safety of aircraft operations. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international ATC mandates and combat identification requirements.

Tactical Airspace Integration System (TAIS), the Army's system of record for Airspace Control (AC) and enroute Air Traffic Services (ATS) within the Army Mission Command Information System (MCIS), requires the development testing and integration of these new web-based services for AC into common MCIS hardware, while meeting the Common Operating Environment (COE) standards. Includes development and testing of improvements to the air picture to include Blue Force Tracker correlation and radar fusion capability. TAIS develops software and hardware for AC web services to operate effectively in a dynamic net-centric interconnected environment and integrates advanced surveillance capabilities to further enhance airspace integration and dynamic management capabilities.

Air Traffic Navigation Integration and Coordination System (ATNAVICS) is an Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR) system that provides ATS at Army terminal airfields and landing sites at Division, Corps, and Echelons Above Corps to include services for Joint and Allied aircraft. ATNAVICS will integrate TPX-59 capabilities to control aircraft both Outside of the Continental United States and Continental United States. ATNAVICS will network its radar picture and interrogator data to aviation and joint network nodes through TAIS. As the Department of Defense transitions military aircraft to positional self-reporting technologies, flight information will be captured by the Advanced Surveillance program. Advanced Surveillance allows ATC reception of aircraft self-reporting data to include the Automatic Dependent Surveillance Broadcast and integrates local radar feeds and self-reporting aircraft positional data into a correlated situational awareness air picture.

Mobile Tower System (MOTS) Preplanned Product Improvement (P3I) upgrades provides the Joint Force Commander or Combatant Commander a highly mobile, self-contained, integrated and reliable information system platform for visual and procedural aircraft deconfliction and aircrew force protection in unified action terminal airspace environments. The Airfield Lighting System (ALS) is a component of the MOTS and can be operated by solar power or by generator power. The ALS improvements include a Precision Approach Path Indicator and an ALS trailer charging system.

Tactical Terminal Control System (TTCS) is a mobile ATC communications system that provides initial ATS at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft and ground stations. TTCS provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, Blue Force Tracker which provides near real time situational awareness and precision location capability. Future improvements include incorporating advance surveillance as risk mitigation by improving airspace situational awareness and providing an improved soldier interface that is common with other ATC systems.

ATC Tactical Networking supports the non-recurring engineering, test and evaluation tasks for integration of radios, control stations and transmitter/receivers and software that will provide all ATC tactical systems an airfield network node capability. This will enable each ATC system to send voice and data between ATC platforms

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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including connectivity to an external network for long range flight-following and data exchange further reducing aviation operational risk by providing ATC operators a common air picture. ATC Networking is required to meet the Net Ready Key Performance Parameter for ATC tactical systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Tactical Airspace Integration System (TAIS)	1.715	0.679	10.285
Description: TAIS Airspace Information Center (AIC), Common Operating Environment (COE) and Airspace Integration Improvements Initiative enhancements will be addressed through upgrades to the communications suite through new components such as 117G radios, BFT2/KGV-72, and ADS-B. TAIS develops software and required hardware for airspace management web services to operate effectively in a dynamic net-centric interconnected COE environment. TAIS will also integrate advanced surveillance interfaces and passive receiver to further enhance a dynamic airspace management capability. ***FY 2018 Plans:*** Continue ongoing COE, Joint Interoperability Testing and Network Integration Event test and certification in support of the interoperability within the Army's Mission Command Information System (MCIS). Incorporate emerging Federal Aviation Administration (FAA) requirements. Develop software solutions to provide FAA Notice to Airman, Pilot Reports and Temporary Flight Restrictions. Develop system and user defined quality of service and performance tools to monitor and adjust critical performance and loading of software. Develop real time retrieval of AMPS mission data using a web-service and end points. Continue System Modification 2 testing including transportability, mobility and Electro Magnetic Environmental Effects (E3) tests. ***FY 2019 Plans:*** Continue COE and Airspace Integration Improvements, Joint Interoperability Testing and Network Integration Event test and certification in support of the interoperability within the Army's Mission Command Information System (MCIS). Incorporate emerging Federal Aviation Administration (FAA) requirements. Develop software solutions to provide FAA Notice to Airman, Pilot Reports and Temporary Flight Restrictions. Develop system and user defined quality of service and performance tools to monitor and adjust critical performance and loading of software. Continue System Modification 2 testing which includes reliability and maintainability, communications range testing, transportability, and mobility tests. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Battery of testing that will be performed in FY19 is more extensive than testing being performed in FY18. Additional funds are required to support post testing non-recurring engineering (NRE) and software development activities.			
Title: Air Traffic Navigation Integration and Coordination System (ATNAVICS) Modernization	0.445	1.462	2.062
Description: ATNAVICS is a highly mobile tactical area surveillance and precision approach air traffic control radar system. It provides the Joint Force Commander or Combatant Commander, with a mobile, self-contained and reliable Airport Surveillance Radar, Precision Approach Radar and a Secondary Surveillance Radar capability. System modernization includes radar interrogation enhancements. ***FY 2018 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Provide Risk Management Framework to comply with Cyber Security requirements and Army Test and Evaluation Command testing required for Full Material Release. ***FY 2019 Plans:*** Complete NRE to ensure ATNAVICS compliance with Risk Management Framework (RMF) to comply with Cyber Security requirements. Complete system Army Test Evaluation Command (ATEC) testing required for Full Material Release. Continue modernization for TPX-59 and Range Extension. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** There is a greater level of effort in FY19 in order to complete testing and RMF compliance than is scheduled in FY18.			
Title: Tactical Terminal Control System (TTCS) ***Description:*** The TTCS is a mobile ATC communications system that provides initial ATS at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft and ground stations. TTCS also provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, and Blue Force Tracker which provides near real time situational awareness and precision location capability. ***FY 2018 Plans:*** Complete nonrecurring engineering test and evaluation tasks necessary for the development and integration of the ATC Tactical Network. The ATC Tactical Network effort will enable the TTCS to share air traffic control data with the other tactical PM ATC platforms. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 has been decreased to zero due to TTCS RDTE effort planned completion in FY18.	0.441	0.883	-
Title: Program Management (PM) Support ***Description:*** PM support of PM ATC ***FY 2018 Plans:*** Continue program management support of PM ATC. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 decrease reflects transition of manpower funding to Direct OMA funding.	0.725	0.512	-
Accomplishments/Planned Programs Subtotals	3.326	3.536	12.347

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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
• AA0050: *Air Traffic Control*	50.405	83.790	63.872	-	63.872	47.695	54.320	49.562	50.267	0.000	399.911

Remarks

D. Acquisition Strategy

This project is comprised of multiple systems supporting ATC development and test efforts. While the detailed acquisition strategy varies by program, the general strategy for each program is to complete development and testing efforts through contract modifications, engineering service tasks, and new/follow-on contracts. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international air traffic control and upcoming Next Gen requirements and mandates as well as current aircraft self-reporting transponders.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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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
PM Support	Various	PM ATC : Redstone Arsenal, AL	1.032	0.725	Oct 2016	0.512	Jul 2018	-		-		-	0.000	2.269	-
		Subtotal	1.032	0.725		0.512		-		-		-	0.000	2.269	N/A

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
TAIS (Web Based Services Dev)	SS/T&M	General Dynamics C4S : Huntsville, AL	27.922	1.715	Jan 2017	0.679	May 2018	10.285	Jun 2019	-		10.285	Continuing	Continuing	Continuing
ATNAVICS Modernization, TPX-59 and Range Extension	Various	Various : Various	19.561	0.445	Sep 2017	1.462	Feb 2018	2.062	Jan 2019	-		2.062	0.000	23.530	-
Mobile Tower System (MOTS) P3I Threshold	Various	Various : Various	2.200	-		-		-		-		-	0.000	2.200	-
Tactical Terminal Control System (TTCS)	Various	Various : Various	2.340	0.441	Sep 2017	0.883	Mar 2018	-		-		-	0.000	3.664	-
		Subtotal	52.023	2.601		3.024		12.347		-		12.347	Continuing	Continuing	N/A

	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	53.055	3.326		3.536		12.347		-		12.347	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604633A / *Air Traffic Control*	**Project (Number/Name)** 586 / *Air Traffic Control*

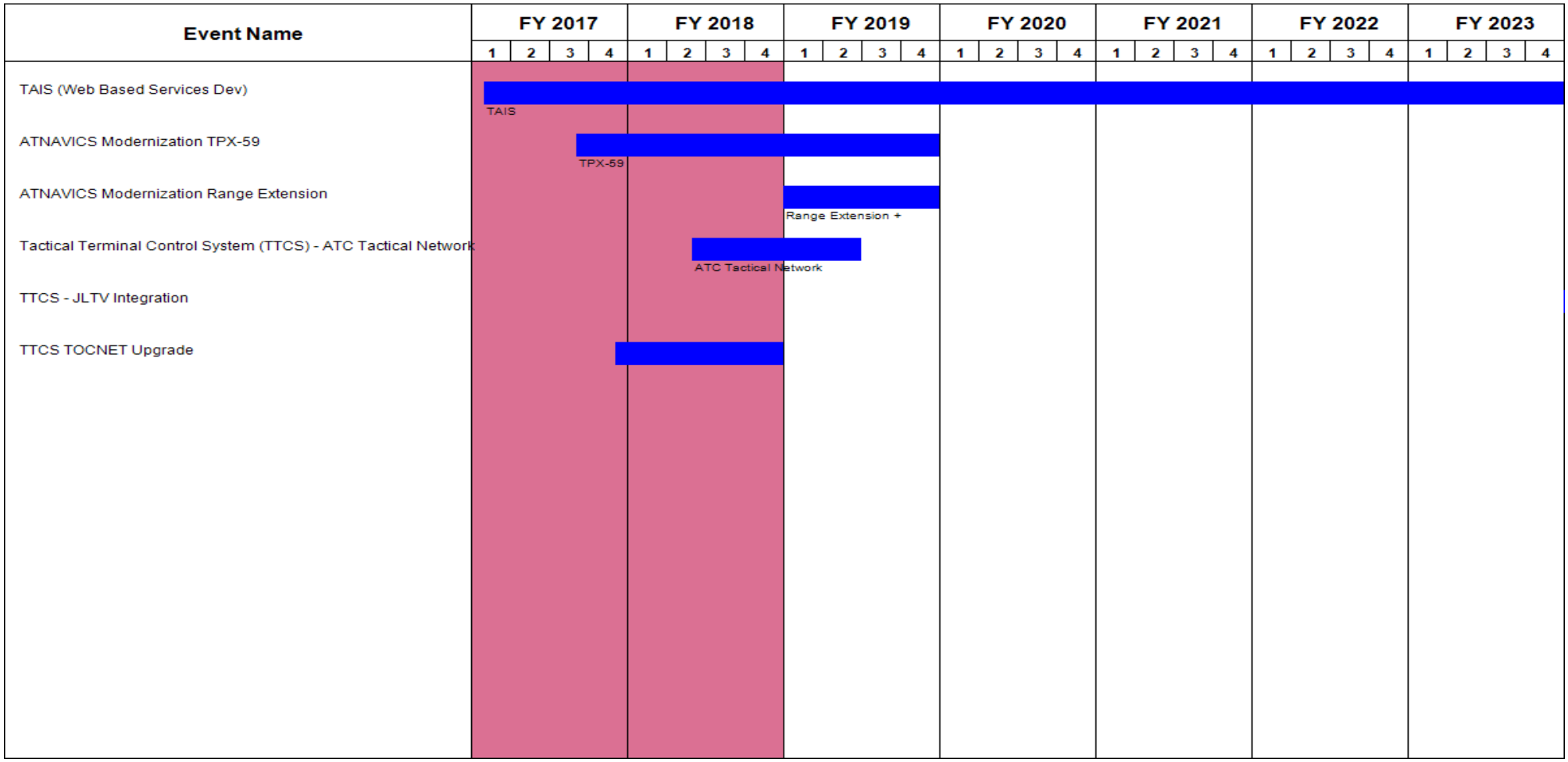

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army		Date: February 2018
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
TAIS (Web Based Services Dev)	1	2015	4	2023
ATNAVICS Modernization TPX-59	3	2017	4	2019
ATNAVICS Modernization Range Extension	1	2019	4	2019
Tactical Terminal Control System (TTCS) - ATC Tactical Network	2	2018	2	2019
TTCS - JLTV Integration	1	2024	4	2024
TTCS TOCNET Upgrade	4	2017	4	2018