Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Army											**DATE:** April 2013	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*					**R-1 ITEM NOMENCLATURE** PE 0604633A: *AIR TRAFFIC CONTROL*							
COST ($ in Millions)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	-	22.218	9.769	0.514	-	0.514	12.164	10.494	5.197	7.339	Continuing	Continuing
586: *AIR TRAFFIC CONTROL*	-	22.218	9.769	0.514	-	0.514	12.164	10.494	5.197	7.339	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012
The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

This program element funds continuous efforts in the development of modernized tactical and fixed base Air Traffic Control (ATC) systems that will enable safety of aircraft landings in both the tactical and strategic ATC domains. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international air traffic control and combat identification requirements and mandates. Funding will be utilized to develop, evaluate and integrate candidate technology mandates. Funded in this program element is the development of an ATC Tactical Network, the Tactical Airspace Integration System (TAIS) Web Based Architecture and Airspace Improvements Initiative, Advanced Surveillance, and Air Traffic Navigation Integration and Coordination System (ATNAVICS) modernization. ATNAVICS provides all weather instrument flight capabilities to include enroute, terminal, radar precision approach and landing services to all Army, Joint, and allied aircraft. TAIS develops software and required hardware for airspace management web services, to operate effectively in a dynamic net-centric interconnected environment. TAIS also integrates advanced surveillance interfaces to further enhance airspace integration and dynamic management capabilities.

Funded improvements to ATC systems, including TAIS, ATNAVICS, MOTS, and TTCS will align these programs with advanced networking, communications and interoperability goals, and provide compatibility with the Army Aviation aircraft and avionics upgrade programs including military (Global Air Traffic Management) and civil initiatives (Next Gen). This includes development of an ATC tactical network with individual data interfaces between any two ATC systems. The ATC Tactical Network is complete when TAIS, MOTS, ATNAVICS, and TTCS are all interconnected and share data and information between one another. This program element includes funding for development of each interface in a sequential manner with work allocated among four developers. In a networked battlefield, joint service systems and radars provide operational data to ATC missions assuming a communications infrastructure and data processing capability is embedded in ATC systems. ATC systems control and maintain information relevant to higher level organizations or other external systems. Advanced networks and communications allow such information to be transmitted, to include aircraft positional information, weather data, landing surface conditions, airspace density, airspace control orders, restricted airspace, and flight plan data. As the Department of Defense transitions military aircraft to positional self-reporting technologies, these various technologies will be incorporated in the Advanced Surveillance program. Advanced Surveillance allows ATC reception of aircraft self-reporting technologies which include Automatic Dependent Surveillance Broadcast (ADS-B), Mode 5 and Mode S. Initial testing and integration of these systems are foundational to Advanced Surveillance to increase ATC systems availability to detect, manage, and disseminate aircraft information. ATNAVICS will network its radar picture and advanced surveillance data (Mode 5 and Mode S) to aviation and joint network nodes through TAIS. TAIS, the Airspace Management System of the Army Mission Command System (AMCS), requires the development and testing of web-based services for Airspace Command and Control (AC2) and ATS, and integration of these new web-based services into a common Army Battle Command hardware, ATS and Airspace Integration Improvement Initiatives (AI3). This will be accomplished through advanced surveillance interfaces, mission planning interfaces, and providing TAIS dynamic airspace updates to the cockpit. TAIS efforts also include developing and testing improvements

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Army	DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604633A: *AIR TRAFFIC CONTROL*

to the air picture including the addition of Blue Force Tracker (BFT) correlation and radar fusion capability. To facilitate increased maintenance and system support, a remote maintenance capability will be developed for robust maintenance and troubleshooting.

B. Program Change Summary ($ in Millions)	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	22.900	9.769	9.913	-	9.913
Current President's Budget	22.218	9.769	0.514	-	0.514
Total Adjustments	-0.682	0.000	-9.399	-	-9.399
• Congressional General Reductions	-0.014	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.668	-			
• Adjustments to Budget Years	-	-	-9.399	-	-9.399

Exhibit R-2A, **RDT&E Project Justification:** PB 2014 Army											**DATE:** April 2013	

APPROPRIATION/BUDGET ACTIVITY
2040: *Research, Development, Test & Evaluation, Army*
BA 5: *System Development & Demonstration (SDD)*

R-1 ITEM NOMENCLATURE
PE 0604633A: *AIR TRAFFIC CONTROL*

PROJECT
586: *AIR TRAFFIC CONTROL*

COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
586: *AIR TRAFFIC CONTROL*	-	22.218	9.769	0.514	-	0.514	12.164	10.494	5.197	7.339	Continuing	Continuing
Quantity of RDT&E Articles												

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012
The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

This project funds continuous efforts in the development of modernized tactical and fixed base Air Traffic Control (ATC) systems that will enable safety of aircraft landings in both the tactical and strategic ATC domains. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international air traffic control and combat identification requirements and mandates. Funding will be utilized to develop, evaluate and integrate candidate technology mandates. Funded in this program element is the development of an ATC Tactical Network, the Tactical Airspace Integration System (TAIS) Web Based Architecture and Airspace Improvements Initiative, Advanced Surveillance, and Air Traffic Navigation Integration and Coordination System (ATNAVICS) modernization. ATNAVICS provides all weather instrument flight capabilities to include enroute, terminal, radar precision approach and landing services to all Army, Joint, and allied aircraft. TAIS develops software and required hardware for airspace management web services, to operate effectively in a dynamic net-centric interconnected environment. TAIS also integrates advanced surveillance interfaces to further enhance airspace integration and dynamic management capabilities.

Funded improvements to ATC systems, including TAIS, ATNAVICS, MOTS, and TTCS will align these programs with advanced networking, communications and interoperability goals, and provide compatibility with the Army Aviation aircraft and avionics upgrade programs including military (Global Air Traffic Management) and civil initiatives (Next Gen). This includes development of an ATC tactical network with individual data interfaces between any two ATC systems. The ATC Tactical Network is complete when TAIS, MOTS, ATNAVICS, and TTCS are all interconnected and share data and information between one another. This program element includes funding for development of each interface in a sequential manner with work allocated among four developers. In a networked battlefield, joint service systems and radars provide operational data to ATC missions assuming a communications infrastructure and data processing capability is embedded in ATC systems. ATC systems control and maintain information relevant to higher level organizations or other external systems. Advanced networks and communications allow such information to be transmitted, to include aircraft positional information, weather data, landing surface conditions, airspace density, airspace control orders, restricted airspace, and flight plan data. As the Department of Defense transitions military aircraft to positional self-reporting technologies, these various technologies will be incorporated in the Advanced Surveillance program. Advanced Surveillance allows ATC reception of aircraft self-reporting technologies which include Automatic Dependent Surveillance Broadcast (ADS-B), Mode 5 and Mode S. Initial testing and integration of these systems are foundational to Advanced Surveillance to increase ATC systems availability to detect, manage, and disseminate aircraft information. ATNAVICS will network its radar picture and advanced surveillance data (Mode 5 and Mode S) to aviation and joint network nodes through TAIS. TAIS, the Airspace Management System of the Army Mission Command System (AMCS), requires the development and testing of web-based services for Airspace Command and Control (AC2) and ATS, and integration of these new web-based services into a common Army Battle Command hardware, ATS and Airspace Integration Improvement Initiatives (AI3). This will be accomplished through advanced surveillance interfaces, mission planning interfaces, and providing TAIS dynamic airspace updates to the cockpit. TAIS efforts also include developing and testing improvements

Exhibit R-2A, **RDT&E Project Justification:** PB 2014 Army		**DATE:** April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604633A: *AIR TRAFFIC CONTROL*	**PROJECT** 586: *AIR TRAFFIC CONTROL*

to the air picture including the addition of Blue Force Tracker (BFT) correlation and radar fusion capability. To facilitate increased maintenance and system support, a remote maintenance capability will be developed for robust maintenance and troubleshooting.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2012**	**FY 2013**	**FY 2014**
Title: Tactical Airspace Integration System (TAIS)	8.099	6.758	0.000
Articles:	0	0	
Description: TAIS Block Upgrade: Airspace Information Center (AIC) and Airspace Integration Improvements Initiative (AI3) enhancements will be addressed through upgrades to the communications suite through new components such as 117G radios, BFT2/KGV-72, and ADS-B. TAIS Software Enhancements: TAIS develops software and required hardware for airspace management web services to operate effectively in a dynamic net-centric interconnected environment. TAIS also integrates advanced surveillance interfaces to further enhance a dynamic airspace management capability. *FY 2012 Accomplishments:* Designed and developed TAIS service oriented architecture and web services in support of Airspace Command and Control (AC2) and AIC missions. Continued development of airspace deconfliction, flight information/advisory, situational awareness, and rapid clearance of fires capabilities. Continued development of AI3 initiatives to support dynamic AC2 capabilities and real-time situational awareness. Continued development of TAIS system interfaces to external data sources. Productized Phase III of Air Ground Modernization web services. Developed improvements to TAIS air picture by adding the capability to view Blue Force Tracker-Aviation (BFT-A) air tracks that are integrated into the TAIS display. Continued development of situational awareness to the cockpit capabilities. Continued spiral development activities with coalition partners to enhance TAIS capability to deconflict airspace in a NATO/coalition environment. *FY 2013 Plans:* Continue to design and develop TAIS service oriented architecture and web services in support of AC2 and AIC missions. Specifically, provide services to generate, display, and disseminate flight advisories. Display and disseminate High and Low altitude Instrument Flight Rules (IFR) route structures, helicopter route structures, navigation information, communications information, refueling information, and terminal area information. Continue development of airspace deconfliction, flight information/advisory, situational awareness, and rapid clearance of fires capabilities. Continue development of AI3 initiatives to support dynamic AC2 capabilities and real-time situational awareness. Continue development of TAIS system interfaces to external data sources.			
Title: Air Traffic Navigation Integration and Coordination System (ATNAVICS) Modernization	11.500	0.000	0.000
Articles:	0		
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			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Army		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604633A: *AIR TRAFFIC CONTROL*	PROJECT 586: *AIR TRAFFIC CONTROL*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Radar, Precision Approach Radar, and a Secondary Surveillance Radar capability. Product modernizations include radar interrogator modernization and radio upgrades. *FY 2012 Accomplishments:* Began integration of the TPX-57 transponder permitting international standard Mode 5 and Mode S compatibility of the ATNAVICS system.			
Title: Advanced Surveillance Articles: *Description:* Advanced Surveillance technologies integration supports the non-recurring engineering, integration and test tasks required to incorporate the passive reception of self reporting technologies into Air Traffic Control programs. These Advanced Surveillance technologies include Automatic Dependent Surveillance-Broadcast (ADS-B), Mode 5 Level 2, Mode S and similar aircraft self reporting technologies. *FY 2012 Accomplishments:* Supported continuing non-recurring engineering, integration and test tasks required to incorporate the passive reception of self reporting technologies in PM ATC programs of record. These technologies include ADS-B, Mode 5 Level 2, Mode S and similar self reporting technologies. Supported the continued software development to utilize these technologies. Tested these related technologies in a live fly field experiment and developed the associated documentation, analysis and integration data in order to accelerate the technology maturization process leveraged to support future block upgrade activities. *FY 2013 Plans:* Supports continued evaluation and down-select of commercially available Advanced Surveillance receivers, and integration of receivers into PM Air Traffic Control programs of record, to allow reception of aircraft self-reported positional data. Formal testing, including Bold Quest 13 and Network Integration Experimentation (NIE) will include ATC systems where the technology will be proven.	0.806 0	1.750 0	0.000
Title: Common Tactical Simulator Articles: *Description:* The ATC simulator can simulate a start to finish ATC scenario, meaning MOTS simulation at the airfield for take-off/landing under Visual Flight Rules, radar simulation for surveillance and precision approach (ATNAVICS), and flight following and airspace deconfliction (TAIS). This will address the 3 primary tactical ATC systems. The system will respond to voice commands and allow for controller error that can be captured and provide corrective actions to the operator. Position of the virtual aircraft must be consistent across each platform. The simulator will support aircraft at slow and fast approaches, hovering aircraft, fast climbing and slow climbing aircraft and even some commercial aircraft.	0.791 0	0.000	0.000

Exhibit R-2A, **RDT&E Project Justification:** PB 2014 Army		**DATE:** April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604633A: *AIR TRAFFIC CONTROL*	**PROJECT** 586: *AIR TRAFFIC CONTROL*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
FY 2012 Accomplishments: Completed the System Specification for the ATC Common Simulator.			
Title: Tech and Log Support <div align=right>**Articles:**</div>	0.912 0	1.154 0	0.394
Description: Technical and logistics services in support of PM ATC. **FY 2012 Accomplishments:** Continued technical and logistic services in support of PM ATC.			
FY 2013 Plans: Continue technical and logistics services in support of PM ATC.			
FY 2014 Plans: Continue technical and logistic services in support of PM ATC.			
Title: Program Management Support <div align=right>**Articles:**</div>	0.110 0	0.107 0	0.120
Description: Program Management Support of PM ATC. **FY 2012 Accomplishments:** Continued program management in support of PM ATC.			
FY 2013 Plans: Continue program management in support of PM ATC.			
FY 2014 Plans: Continue program management in support of PM ATC.			
<div align=right>Accomplishments/Planned Programs Subtotals</div>	22.218	9.769	0.514

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
• Air Traffic Control (AA0050): *Air Traffic Control*	114.844	47.235	79.692		79.692	116.026	100.999	101.629	114.227	Continuing	Continuing

Exhibit R-2A, **RDT&E Project Justification:** PB 2014 Army		**DATE:** April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604633A: *AIR TRAFFIC CONTROL*	**PROJECT** 586: *AIR TRAFFIC CONTROL*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost

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

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Army													DATE: April 2013	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*								**R-1 ITEM NOMENCLATURE** PE 0604633A: *AIR TRAFFIC CONTROL*					**PROJECT** 586: *AIR TRAFFIC CONTROL*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Support	Various	PM ATC:Redstone Arsenal, AL	0.116	0.110	Dec 2011	0.107	Dec 2012	0.120	Dec 2013	-		0.120	Continuing	Continuing	Continuing
Subtotal			0.116	0.110		0.107		0.120		0.000		0.120			

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TAIS (Includes P3I/Native New Web Services Dev)	SS/T&M	General Dynamics C4S:Huntsville, AL	0.000	8.099	Dec 2011	6.758	Dec 2012	-		-		-	Continuing	Continuing	Continuing
ATNAVICS Modernization	SS/CPFF	Raytheon:Marlboro, Mass	0.500	11.500	Dec 2011	-		-		-		-	0.000	12.000	0.000
Advanced Surveillance	Various	Various:Various	0.621	0.806	Dec 2011	1.750	Feb 2013	-		-		-	Continuing	Continuing	Continuing
Common Tactical Simulator	Various	RDEC and:Various	0.000	0.791	Dec 2011	-		-		-		-	0.000	0.791	0.000
Tech and Log Development Support	Various	PM ATC:Huntsville, AL	0.763	0.912	Dec 2011	1.154	Dec 2012	0.394	Dec 2013	-		0.394	Continuing	Continuing	Continuing
Subtotal			1.884	22.108		9.662		0.394		0.000		0.394			

			All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			2.000	22.218		9.769		0.514		0.000		0.514			

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2014 Army		**DATE:** April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604633A: *AIR TRAFFIC CONTROL*	**PROJECT** 586: *AIR TRAFFIC CONTROL*

	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	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
TAIS Continued Development													███															
Adv Surv Continuation													███															
Common Tactical Simulator		███																										

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Army		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 5: *System Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604633A: *AIR TRAFFIC CONTROL*	**PROJECT** 586: *AIR TRAFFIC CONTROL*

Schedule Details

Events	Start		End	
	Quarter	**Year**	**Quarter**	**Year**
TAIS Continued Development	1	2015	4	2018
Adv Surv Continuation	1	2015	4	2017
Common Tactical Simulator	2	2012	4	2012