Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force											Date: March 2014	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	36.427	32.894	23.516	-	23.516	6.654	5.111	5.211	5.311	Continuing	Continuing
673587: *Air Traffic Control Systems*	-	36.427	32.894	23.516	-	23.516	6.654	5.111	5.211	5.311	Continuing	Continuing
Quantity of RDT&E Articles	-	2.000	-	1.000	-	1.000	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

Note

RDT&E articles are shown in year completed. In FY15, one Deployable Radar Approach Control (D-RAPCON) pre-produciton unit (PPU) is completed to support developmental and operational testing. The D-RAPCON PPU is incrementally funded in FY14 and FY15.

A. Mission Description and Budget Item Justification

To support the Air Force worldwide flying mission, this program element funds research, development and management of new air traffic control communications, surveillance, positioning, and precision approach and landing systems. When applicable, this includes joint efforts with the Federal Aviation Administration (FAA) and coordination with the International Civil Aviation Organization and the North Atlantic Treaty Organization (NATO). ATCALS funding focuses on three main efforts as follows:

Deployable Instrument Landing System (D-ILS). D-ILS is a deployable Category I (200ft decision height/2400ft runway visual range) ILS with remote monitoring and maintenance capabilities. D-ILS will provide precision approach capability in adverse weather conditions for contingency operations and humanitarian or disaster relief operations. D-ILS will replace the current Air Force mobile Precision Approach Radar (PAR) system used to support operations at deployed locations which were procured in the 1970s, are manpower intensive, and logistically unsupportable. On average, only 18% (three of 17 systems) of the mobile PAR systems are operational on a daily basis. D-ILS will support increased operations in the area of responsibility, allow phase out of the currently obsolete legacy systems and provide interoperability with the Civil Reserve Air Fleet (CRAF). The D-ILS Capability Development Document (CDD) was approved by the Air Force Requirements Oversight Council (AFROC) on 16 Sep 08. No development funds are requested in FY15.

As discussed under D-ILS accomplishments/plans in Section C, the D-ILS development contract was terminated on 6 Nov 13. Using an updated Systems Requirements Document and lessons learned from the terminated effort, a restructured program is now planned and evaluation of responses to an industry request for information is on-going. At least one production ready deployable system is available for evaluation. Related OPAF funds are in program element (PE) 0305114F (Weapon System Code 833010).

Deployable Radar Approach Control (D-RAPCON). D-RAPCON will replace the 40 year old AN/MPN-14K and AN/TPN-19 Airport Surveillance Radar (ASR) and Operations Shelter (OPS) subsystems with state of the art digital systems. Modification and overhaul of the existing systems has proven to be ineffective due to diminishing manufacturing sources. The D-RAPCON will be used to provide both a terminal and enroute surveillance capability. The D-RAPCON will also be used with

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Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

the D-ILS and a fixed or mobile control tower to provide a complete air traffic control capability. The D-RAPCON will support tactical military and worldwide humanitarian operations and also provide a capability to support domestic disaster relief. The primary surveillance radar coverage (non-cooperative targets) is out to 60 nautical miles (nm) and the secondary surveillance radar coverage (cooperative targets) is out to 120 nm. The D-RAPCON CDD was approved by the AFROC on 8 Feb 11. FY15 funds continue engineering, manufacturing and development (EMD) efforts which include the contractor testing of the preproduction system and the start of developmental testing. Related OPAF funds are in the PE 0305114F Weapon System Code 833010.

Next Generation Air Transportation System (NextGen). This is an interagency effort designed to enable the transition from a ground infrastructure dominated Air Traffic Management capability for the U.S. National Airspace System (NAS) to a capability that leverages advances in Performance Based Navigation (PBN), non-radar based surveillance services, and transition from solid-state analogue voice communications to networked digital voice and data exchange. Per Deputy Secretary of Defense direction (28 Dec 07 Memo), the Air Force is the DoD lead Service for NextGen implementation and architecture development. NextGen will be built on key elements from existing programs and technologies and on new systems under development. As these technologies and architectures mature, ground system upgrades will be coordinated and fielded concurrently with aircraft avionics capabilities that are acquired and integrated into Air Force aircraft (manned and unmanned). These efforts will also run in close parallel with the Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) program in PE 0305099F. FY15 efforts continue proof of concept demonstrations and analysis leading to Remotely Piloted Aircraft (RPA) Ground Based Sense and Avoid (GBSAA). The concept demonstration will explore development of a transportable/scalable sensor agnostic configuration to provide GBSAA Pilot-in-the-loop display services using fixed or deployable radar system inputs. FY15 funding also continues development/test of new Instrument Procedures Development System (IPDS) software (joint effort with FAA and Services), NextGen Lead Service Office tasks which include preparation of NextGen Concept of Operations and Implementation Plans, PBN and ADS-B Benefits/Business Cases, a DoD Integrated Work Plan, RPA GBSAA Engagement Plan, and a DoD NextGen Enterprise Architecture Strategic Roadmap. Other NextGen efforts include upgrade of surveillance radar and automation systems with new capabilities such as Mode 5 Identification Friend or Foe, and evaluation of NAS Networked Digital Voice Switch and Next Generation Ground Communications (NEXCOMM) radios in USAF air traffic control facilities and RPA pilot control stations. In total, these efforts will support the seamless integration of RPAs into the National Airspace System and the airspaces of other nations, improve the display of aircraft position to air traffic controllers, determine future requirements for digital communications with manned and unmanned aircraft, and enhance flight safety.

Activities also include studies and analysis to support both current program planning and execution and future program planning.

This program is in Budget Activity 7, Operational System Development, these budget activities include development efforts to upgrade systems currently fielded or has approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force	Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	43.187	35.674	26.811	-	26.811
Current President's Budget	36.427	32.894	23.516	-	23.516
Total Adjustments	-6.760	-2.780	-3.295	-	-3.295
• Congressional General Reductions	-0.053	-0.280			
• Congressional Directed Reductions	-3.500	-6.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments	-3.207	-	-3.295	-	-3.295

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2013	FY 2014
Project: 673587: *Air Traffic Control Systems*		
Congressional Add: *NextGen (1)*	-	3.500
Congressional Add Subtotals for Project: 673587	-	3.500
Congressional Add Totals for all Projects	-	3.500

Change Summary Explanation

FY13 reductions due to D-RAPCON for sequestration ($3.207M) and Congressional reduction ($3.5M) to Next Generation (NextGen) Air Transportation System (forward financing).

FY14 Congressional directed reduction ($6.0M): D-RAPCON Engineering and Manufacturing Development Contract Delay

FY14 Congressional Add ($3.5M): Air National Guard Shortfall: Remotely Piloted Aircraft Ground Based Sense and Avoid

FY15 reduction due to higher Air Force priorities ($3.0M) and inflation adjustment $295K).

C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: NextGen	1.430	4.035	3.346
Description: Includes efforts to implement NextGen efficiencies and capabilities. Focus is on ADS-B implementation, seamlessly integrating Remotely Piloted Aircraft (RPAs) into civil airspace, Instrument Procedures Development System software			

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Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
development, Lead Service Office technical support/architecture development, surveillance radar/automation system upgrades, and networked Internet Protocol (IP) voice switch, IP-enabled ground-based radios demonstrations. ***FY 2013 Accomplishments:*** Continued efforts to implement NextGen efficiencies. Tasks included installation of ADS-B equip for capability assessment at McGuire/Nellis, RPA GBSAA demo at Cannon AFB, continuation of CNS/ATM ICD preparation, NextGen architecture development, capability mapping, preparation of implementation roadmaps, Concept of Operations, Implementation Plans, and Performance Based Navigation and ADS-B benefits/business case development, and radar windfarm clutter mitigation flight tests, ***FY 2014 Plans:*** Continues efforts to implement NextGen efficiencies. Tasks include a capability assessment of ADS-B equip at McGuire/Nellis, approval of an operational RPA GBSAA capability at Cannon AFB, the start of Instrument procedures Software Development, continuation of CNS/ATM ICD preparation, capability mapping, preparation of implementation roadmaps, Concept of Operations, Implementation Plans, and Performance Based Navigation and ADS-B benefits/business case development, and engineering analysis to integrate Mode 5 Identification Friend or Foe capability into D-RAPCON. ***FY 2015 Plans:*** Will continue development of the Instrument Procedures Development System (IPDS) with the other Services and FAA. Will complete GBSAA transprotable/scalable efforts at Syracuse, NY ANGB. Will continue, through the Lead Service Office, refinement of NextGen implementation roadmaps, Concept of Operations and Implementation Plans, and NextGen benefits/ business cases focusing on integrating remotely piloted aircraft into civil airspace. Will also continue integration of Mode 5 IFF into legacy surveillance radars (D-RAPCON) and automation systems and conduct demonstrations and evaluations to transition to networked IP Voice Switch and IP-enabled ground-based radio technology and improve RPA pilot controller communications.			
Title: D-RAPCON ***Description:*** Effort supports D-RAPCON engineering, manufacturing and development (EMD) effort and government developmental and operational testing of one pre-production and two automation system units leading to a production decision in FY16. ***FY 2013 Accomplishments:*** Efforts included EMD contract award in Apr 13, and completion of the System Requirements Review in Jun 13 and the System Functional Review in Aug 13. ***FY 2014 Plans:***	29.458	23.691	20.170

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force	Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continues EMD effort. Tasks include conduct of the Preliminary Design Review in Nov 13, conduct of the Critical Design Review in Feb 14, fabrication of the pre-production and automation units, start of contractor testing in Jul 14, and preparation of government test plans, procedures and certifications. ***FY 2015 Plans:*** Will complete PPU assembly and continue contractor testing and support of the government test plans, procedures and certifications in preparation for developmental testing Test Readiness Review in late FY15.			
Title: D-ILS ***Description:*** Supports restructure of program after termination of EMD contract on 6 Nov 13. Using an updated System Requirements Document developed from the terminated EMD contract, program now based on a Foreign Comparative Test of a production ready system. ***FY 2013 Accomplishments:*** Supported D-ILS critical design review and contractor testing thru Jun 13 when work was stopped. Began EMD contract termination after contractor was unable to resolve thermal, structural, sustainability and transportability deficiencies and complete contractor testing under a fixed price contract. Request from contractor for a no cost settlement was received on 13 Sep 13. ***FY 2014 Plans:*** Effort focused on proceeding with procurement under a Foreign Comparative Test program. Tasks include update of the System Requirements Document to capture lessons learned, issuance of an industry request for information, evaluation of responses, and conduct of FCT evaluation of a production ready system. ***FY 2015 Plans:*** N/A	5.539	1.668	-
Accomplishments/Planned Programs Subtotals	36.427	29.394	23.516

	FY 2013	FY 2014
Congressional Add: NextGen (1) ***FY 2013 Accomplishments:*** N/A ***FY 2014 Plans:*** Develops transportable/scalable Ground Based Sense and Avoid capability for ANG (174th Attack Wing, Syracuse, NY) that incorporates a transportable 3D radar. Includes a mature sensor fusion/pilot-in-the-loop interface that is suitable for an instrument rated RPA pilot. Efforts will leverage existing GBSAA	-	3.500

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Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

	FY 2013	FY 2014
development, certification and off-the-shelf technology including software, algorithms and pilot system control center interface.		
Congressional Adds Subtotals	-	3.500

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• OPAF: BA03: 833010: *Air Traffic Control and Landing Systems*	19.166	32.118	42.200	-	42.200	57.893	96.339	85.802	98.587	Continuing	Continuing
• OPAF: BA 05: 861900: *Spares and Repair Parts*	1.995	2.753	5.987	-	5.987	5.756	6.476	4.443	4.130	Continuing	Continuing

Remarks

E. Acquisition Strategy

The acquisition strategy for the D-ILS and D-RAPCON acquisitions included the award of competitive fixed price incentive firm contracts emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs). Both contracts include a development phase with production options. Note, the D-ILS development contract was terminated on 6 Nov 13.

A restructured program to acquire D-ILS equipment is being developed based on procurement of an off-the-shelf system under a Foreign Comparative Test effort.

Procurement of a transportable 3D radar for ANG will be thru an existing Army contract.

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.

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*	**Project (Number/Name)** 673587 / *Air Traffic Control Systems*