Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Air Force										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*				R-1 ITEM NOMENCLATURE PE 0305114F: *Air Traffic Control/Approach/Landing System (ATCALS)*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	12.939	33.268	63.367	-	63.367	15.667	4.853	4.961	5.076	Continuing	Continuing
673587: *Air Traffic Control Systems*	12.939	33.268	63.367	-	63.367	15.667	4.853	4.961	5.076	Continuing	Continuing

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 surveillance, positioning, and precision approach landing systems. When applicable, this includes joint efforts with the Federal Aviation Administration (FAA) and coordination with the International Civil Aviation Organization (ICAO) and the North Atlantic Treaty Organization (NATO). FY12 funding focuses on three main efforts as follows:

Deployable Instrument Landing System (D-ILS). This effort develops a deployable version of the fixed base ILS which is the standard precision approach and landing system for conducting Air Force contingency operations and humanitarian or domestic disaster restoral operations in adverse weather conditions. The current Air Force mobile precision approach radar system (PAR) used to support operations at deployed locations 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. Development and deployment of D-ILS will support increased operations in the AOR, allow phase out of the currently obsolete legacy systems and will provide interoperability with the Civil Reserve Air Fleet (CRAF). FY12 funds support contract award efforts as well as initial development of the D-ILS. Related OPAF funds are in PE 0305114F.

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 have proven to be ineffective due to diminishing manufacturing sources over the 40 years for some of the components and subsystems. The D-RAPCON will be used to provide both a terminal and enroute surveillance capability. The D-RAPCON will also be used with the D-ILS and a fixed or mobile control tower to provide a complete ATC capability. The D-RAPCON will support tactical military operations and also provide a capability to support domestic disaster relief. The new digital technology will also provide the capability to transmit and display surveillance radar data to/from other sensors and command and control nodes. 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. FY12 funds will support the post contract activities to include conduct of the preliminary and critical design reviews and the start of assembly of two pre-production units to support DT/OT. Related OPAF funds are in PE 0305114F.

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, transition from voice communications to digital data exchange, as well as advances in weather forecast delivery systems. NextGen will be built on key elements from existing programs and technologies and on new systems under development. FY12 efforts will focus on preparations leading to the implementation of new surveillance technologies including Automatic Dependent Surveillance - Broadcast (ADS-B) and multilateration systems utilizing transponder technologies. Both will improve the display of aircraft position to air traffic managers and will enhance flight safety. Early efforts will focus on analysis and demonstration of technologies to enable the seamless integration of Remotely Piloted Aircraft (RPA) into the NAS and the airspaces of other nations. Design studies and engineering analysis will be initiated to ensure ground system upgrades are coordinated and fielded concurrently with aircraft avionics capabilities that are acquired

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Air Force	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*	**R-1 ITEM NOMENCLATURE** PE 0305114F: *Air Traffic Control/Approach/Landing System (ATCALS)*

and integrated into Air Force aircraft and RPA; these efforts will run in close parallel with the Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) program in PE 0305099F.

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.

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	11.313	33.268	57.727	-	57.727
Current President's Budget	12.939	33.268	63.367	-	63.367
Total Adjustments	1.626	-	5.640	-	5.640
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	1.946	-			
• SBIR/STTR Transfer	-0.272	-			
• Other Adjustments	-0.048	-	5.640	-	5.640

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2010	FY 2011
Project: 673587: *Air Traffic Control Systems*		
Congressional Add: *TTLS*	2.400	-
Congressional Add Subtotals for Project: 673587	2.400	-
Congressional Add Totals for all Projects	2.400	-

Change Summary Explanation

FY12: Funding increased for D-ILS (fully funded development prior to Milestone C in FY13) and NextGen (increased funding to continue remotely piloted aircraft (RPA) Ground Based Sense and Avoid technology and RPA pilot/controller communications demonstrations).

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0305114F: *Air Traffic Control/Approach/ Landing System (ATCALS)*	PROJECT 673587: *Air Traffic Control Systems*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
673587: *Air Traffic Control Systems*	12.939	33.268	63.367	-	63.367	15.667	4.853	4.961	5.076	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

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 surveillance, positioning, and precision approach landing systems. When applicable, this includes joint efforts with the Federal Aviation Administration (FAA) and coordination with the International Civil Aviation Organization (ICAO) and the North Atlantic Treaty Organization (NATO). FY12 funding focuses on three main efforts as follows:

Deployable Instrument Landing System (D-ILS). This effort develops a deployable version of the fixed base ILS which is the standard precision approach and landing system for conducting Air Force contingency operations and humanitarian or domestic disaster restoral operations in adverse weather conditions. The current Air Force mobile precision approach radar system (PAR) used to support operations at deployed locations 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. Development and deployment of D-ILS will support increased operations in the AOR, allow phase out of the currently obsolete legacy systems and will provide interoperability with the Civil Reserve Air Fleet (CRAF). FY12 funds support contract award efforts as well as initial development of the D-ILS. Related OPAF funds are in PE 0305114F.

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 have proven to be ineffective due to diminishing manufacturing sources over the 40 years for some of the components and subsystems. The D-RAPCON will be used to provide both a terminal and enroute surveillance capability. The D-RAPCON will also be used with the D-ILS and a fixed or mobile control tower to provide a complete ATC capability. The D-RAPCON will support tactical military operations and also provide a capability to support domestic disaster relief. The new digital technology will also provide the capability to transmit and display surveillance radar data to/from other sensors and command and control nodes. 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. FY12 funds will support the post contract activities to include conduct of the preliminary and critical design reviews and the start of assembly of two pre-production units to support DT/OT. Related OPAF funds are in PE 0305114F.

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, transition from voice communications to digital data exchange, as well as advances in weather forecast delivery systems. NextGen will be built on key elements from existing programs and technologies and on new systems under development. FY12 efforts will focus on preparations leading to the implementation of new surveillance technologies including Automatic Dependent Surveillance - Broadcast (ADS-B) and multilateration systems utilizing transponder technologies. Both will improve the display of aircraft position to air traffic managers and will enhance flight safety. Early efforts will focus on analysis and demonstration of technologies to enable the seamless integration of Remotely Piloted Aircraft (RPA) into the NAS and the airspaces of other nations. Design studies and engineering analysis will be initiated to ensure ground system upgrades are coordinated and fielded concurrently with aircraft avionics capabilities that are acquired

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0305114F: *Air Traffic Control/Approach/ Landing System (ATCALS)*	PROJECT 673587: *Air Traffic Control Systems*

and integrated into Air Force aircraft and RPA; these efforts will run in close parallel with the Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) program in PE 0305099F.

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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Next Gen ***Description:*** Includes efforts to implement NextGen efficiencies and capabilities. Efforts focus on integrating Remotely Piloted Aircraft (RPAs) in to the NAS, ADS-B implementation, and multlateration technology. ***FY 2010 Accomplishments:*** Began analysis of Ground Based Sense and Avoid (GBSAA) technology to support seamless integration of RPAs into civil airspace and ADS-B coverage evaluations and demonstrations. Conducted multilateration system demonstrations to evaluate system set-up times, logistics/airlift footprint, aircraft surveillance coverage area, and supportability. ***FY 2011 Plans:*** Continues GBSAA development and ADS-B analysis/demos. Begins pilot/controller RPA communications demonstrations. Completes multilateration deployment/surveillance capability demonstration. Provides resources for NextGen capability mapping and architecture development and integration efforts. ***FY 2012 Base Plans:*** Will continue FY11 efforts to implement NextGen efficiencies. Focus will be on integrating RPAs into the NAS, pilot/controller RPA communications, ADS-B integration, and continuing NextGen architecture development, capability mapping and preparation of implementation roadmaps, cost estimates and acquisition strategies. ***FY 2012 OCO Plans:***	4.544	4.874	4.822	-	4.822
Title: D-RAPCON ***Description:*** Effort leads to award of D-RAPCON engineering, manufacturing and fafrication and test of two pre-production units. ***FY 2010 Accomplishments:*** Continued market research and finalized industry Technology Readiness Assessment. ***FY 2011 Plans:***	2.689	16.053	53.484	-	53.484

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*	**R-1 ITEM NOMENCLATURE** PE 0305114F: *Air Traffic Control/Approach/ Landing System (ATCALS)*	**PROJECT** 673587: *Air Traffic Control Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Continues Milestone (MS) B documentation preparation and completes the Request for Proposal (RFP) package to include conducting the appropriate Multi-Independent Review Teams (MIRTs). Conduct Source Selection, brief Source Selection Authority and select winning bidder and prior to contract award, successfully conduct a Milestone B decision with the Milestone Decision Authority (MDA). ***FY 2012 Base Plans:*** Tasks will include award of the Engineering, Manufacturing and Development contract, conduct of the preliminary and critical design reviews, and the start of fabrication to two D-RAPCON pre-production systems to support DT/OT. ***FY 2012 OCO Plans:***					
Title: D-ILS ***Description:*** Includes preparation of acquisition documentation and conduct of associated contract award tasks leading to a new Deployable Instrument Landing System (D-ILS). ***FY 2010 Accomplishments:*** Finalized industry Technology Readiness Assessment. Completed the Request for Proposal (RFP) package to include conducting the appropriate Multi-Independent Review Teams (MIRTs). Began source selection. ***FY 2011 Plans:*** Efforts include completion of source selection and briefings to the Source Selection Authority. obtaining Milestone B approval from the Milestone Decision Authority (MDA), awarding the Engineering Manufacturing Development (EMD) contract, and executing the EMD phase to include a completion of the Initial Baseline and System Function Reviews and preparations for the Preliminary and Critical Design Reviews. ***FY 2012 Base Plans:*** Tasks will include conduct of preliminary and critical design reviews and support development of demonstration units for contractor and developmental testing. ***FY 2012 OCO Plans:***	3.306	12.341	5.061	-	5.061
Accomplishments/Planned Programs Subtotals	10.539	33.268	63.367	-	63.367

	FY 2010	FY 2011
Congressional Add: TTLS	2.400	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0305114F: *Air Traffic Control/Approach/ Landing System (ATCALS)*	PROJECT 673587: *Air Traffic Control Systems*

	FY 2010	FY 2011
FY 2010 Accomplishments: Continued development and test of the Transportable Transponder Landing System (TTLS) to increase its landing capacitiy (number of aircraft on final approach) and demonstrate its psuedo precision approach radar capability.		
FY 2011 Plans:		
Congressional Adds Subtotals	2.400	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• PE 0305114F: *Air Traffic Control and Landing Systems (OPAF)*	30.327	10.830	44.634	0.000	44.634	55.777	137.425	134.634	120.476	Continuing	Continuing

D. Acquisition Strategy

Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs).

E. 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-3, RDT&E Project Cost Analysis: PB 2012 Air Force		DATE: February 2011
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TTLS	SS/CPFF	Advanced Navigation & Positioning Corp:Hood River, OR	16.887	-		-		-		-	Continuing	Continuing	TBD
D-RAPCON	C/TBD	TBD:TBD,	-	10.086	May 2011	41.984	Mar 2012	-		41.984	Continuing	Continuing	TBD
D-ILS	C/TBD	TBD:TBD,	-	9.743	May 2011	1.639	Nov 2011	-		1.639	Continuing	Continuing	TBD
		Subtotal	16.887	19.829		43.623		-		43.623			

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NextGen Studies and Analysis, Capabililty Mapping, and Architecture Development	C/TBD	Massachusetts Institute of Technology Lincoln Labs:Bedford, MA	3.000	1.800	Apr 2011	0.950	May 2012	-		0.950	Continuing	Continuing	TBD
D-ILS	C/TBD	TBD:TBD,	-	-		0.500	May 2012	-		0.500	Continuing	Continuing	TBD
		Subtotal	3.000	1.800		1.450		-		1.450			

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NextGen ADS-B Integration/ Demo	C/TBD	TBD:TBD,	-	0.633	Apr 2011	0.250	Jan 2012	-		0.250	Continuing	Continuing	TBD
NextGen RPA Pilot/Controller Comm Demo	C/TBD	TBD:TBD,	-	0.700	Apr 2011	0.750	Jan 2012	-		0.750	Continuing	Continuing	TBD
NextGen RPA GBSAA Demo	SS/TBD	Volpe Ctr:Cambridge, MA	0.175	0.630	Apr 2011	1.478	Jan 2012	-		1.478	Continuing	Continuing	TBD
Next Gen RPA GBSAA Demo	SS/TBD	DTIC:Ft Belvoir, VA	0.294	-		-		-		-	0.000	0.294	0.000
NextGen Multilateration Demo	TBD	TBD:TBD,	-	0.050	Apr 2011	-		-		-	0.000	0.050	0.050
D-RAPCON	SS/TBD	DISA:Ft Huachuca, AZ	0.020	0.500	Jul 2011	2.900	Feb 2012	-		2.900	Continuing	Continuing	TBD

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Air Force		DATE: February 2011
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
D-ILS	SS/TBD	46 Test Wing:Eglin, FL	0.215	0.071	Jul 2011	1.500	Jul 2012	-		1.500	Continuing	Continuing	TBD
		Subtotal	0.704	2.584		6.878		-		6.878			

Remarks

In FY10 Multilateration Demonstration/Implementation analysis funded in PE0305099F Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM).

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next Gen	C/TBD	Quantech, Jacobs Engineering, MITRE, Telecote Services:Bedford, MA	1.075	1.061	Apr 2011	1.394	Oct 2011	-		1.394	Continuing	Continuing	TBD
D-RAPCON	C/TBD	Quantech, Jacobs Engineering. MITRE, Telecote Services:Bedford, MA	2.669	5.467	Apr 2011	8.600	Oct 2011	-		8.600	Continuing	Continuing	TBD
D-ILS	C/TBD	Quantech, Jacobs Engineering, MITRE, Telecote Services:Bedford, MA	3.091	2.527	Apr 2011	1.422	Oct 2011	-		1.422	Continuing	Continuing	TBD
		Subtotal	6.835	9.055		11.416		-		11.416			

	Total Prior Years Cost	FY 2011		FY 2012 Base		FY 2012 OCO		FY 2012 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	27.426	33.268		63.367		-		63.367			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*	**R-1 ITEM NOMENCLATURE** PE 0305114F: *Air Traffic Control/Approach/ Landing System (ATCALS)*	**PROJECT** 673587: *Air Traffic Control Systems*

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 7: *Operational Systems Development*	**R-1 ITEM NOMENCLATURE** PE 0305114F: *Air Traffic Control/Approach/ Landing System (ATCALS)*	**PROJECT** 673587: *Air Traffic Control Systems*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Next Generation Air Transportation System (NextGen)	2	2010	4	2016
ADS-B Integration Study/Demo	3	2010	3	2012
Ground Based Sense and Avoid Technology (GBSAA) Tech Dev	2	2010	4	2014
Capability Mapping and Architecture Development	2	2010	4	2013
Pilot/Controller Communications Demo	2	2011	2	2014
Multilateration Demo/Implementation Analysis	2	2010	3	2011
Surveillance Radar and Automation System Upgrade	1	2014	4	2016
Tactical Transponder Landing System (TTLS)	1	2010	4	2011
D-RAPCON	1	2010	4	2016
D-ILS	1	2010	3	2015