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 0401219F: *KC-10S*							
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	35.325	56.669	30.868	-	30.868	-	-	-	-	Continuing	Continuing
675195: *Aircraft Modernization Program (AMP)*	35.325	56.669	30.868	-	30.868	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The KC-10A Extender is an aerial refueling asset built on the commercial DC-10 airframe. The aircraft creates an air bridge enabling rapid global mobility and global strike missions. There are 59 KC-10A aircraft in the USAF tanker fleet. RDT&E funds throughout the FYDP will be used to support the Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM), Boom Control Unit (BCU) and Mode 5 modification efforts.

The KC-10 Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) program provides worldwide airspace accessibility by FY2015 for the fleet of 59 KC-10 aircraft. FAA airworthiness certification following the modification is required. An upgrade of the current Flight Management System (FMS) and Inertial Navigation System (INS) is required to meet the 2015 CNS/ATM requirements and address associated INS and FMS obsolescence issues. This capability gap is well documented in both RAND KC-10 Analysis of Alternatives (AoA) and Service Life Extension Program (SLEP) Studies. Avionics components shall use either Commercial Off-The-Shelf (COTS) or Military Off-The-Shelf (MOTS) software and hardware. CNS/ATM requirements include: Required Navigation Performance (RNP-4) Oceanic/Remote for enroute Oceanic Airspace with either 50/50 Nautical Miles (NM) or 30/30 NM separations; Basic Area Navigation (BRNAV) for enroute European Airspace (9,500ft & up); RNP 2 & 1 for enroute & terminal airspace operations; Precision-RNAV (P-RNAV) for Preferred terminal area routes in Europe (1 NM Accuracy); RNP-4 & RNP-1 for reduced separations enroute, and terminal airspace; Time of Arrival Control for Refuel rendezvous (within 30 sec); Automatic Dependent Surveillance - Broadcast (ADS-B) Out for enhanced air and ground surveillance; Global Positioning System (GPS) for enhanced navigation capability; Selective Availability Anti-Spoofing Module (SAASM) for Global Positioning System (GPS) Security; Satellite Data Link for Air Traffic Systems (ATS) and Command and Control (C2) Communications for flight in Oceanic Airspace (FL310-410); Satellite Voice for Beyond Line of Sight (BLOS) Pilot - Controller Communications C2 Operations; and Very-High Frequency Data Link (VDL) Mode-2 for Line of Sight (LOS) Pilot - Controller Communications and C2 Operations.

The KC-10 Boom Control Unit (BCU), responsible for the operation of the KC-10's primary air refueling mission, will be unsupportable due to parts obsolescence as early as 2010. Once the BCU spares pool is exhausted (estimated 2012 +/- 2 years), any KC-10 requiring a BCU repair or replacement will not be capable of performing its primary air refueling mission (boom refueling) until a BCU replacement unit is fielded. This modification effort replaces the current BCU to overcome these parts obsolescence issues, to improve diagnostics, and add the capability to provide boom position information to an external recording device (planned future recording capability). The Advanced BCU (A-BCU) will also add the capability to accept inputs from the existing, or next generation Central Air Data Computer (CADC). The A-BCU will be form, fit, function, and interface identically to the existing unit so as to be fully interchangeable.

The Mode 5 modification is a DoD-mandated (JROCOM 047-07, 5 Mar 07 directs KC-10 IOC by 2014, FOC by 2020) upgrade to the KC-10's Identify Friend or Foe (IFF) system (the primary means of aircraft identification during Air Defense operations). The Mode 5 upgrade increases anti-spoofing and exploitation capabilities, and lowers the possibility of aircraft/aircrew loss due to misidentification of friendly aircraft. The modification includes a new Mode 5 crypto appliqué, new IFF control

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 0401219F: *KC-10S*

panel, a circuit card upgrade to the APX-119 transponder, support equipment upgrades and replacement/relocation of the data loader from the avionics bay to the flight deck.

The KC-10 program has associated APAF funding in Program Elements 0401219F and 0401897F.

The program funding includes reductions for Overhead Reduction efficiencies that are not intended to impact program content. The efficiency reductions total $0.117M in FY12.

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	35.325	56.669	13.791	-	13.791
Current President's Budget	35.325	56.669	30.868	-	30.868
Total Adjustments	-	-	17.077	-	17.077
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments	-	-	17.077	-	17.077

Change Summary Explanation

The program has been funded to the latest cost estimate, less efficiencies. FY12 adjustments reflect a $923K reduction for efficiencies which is not intended to impact program content, and a $17.077M Zero-Balance-Transfer (ZBT) for an Internal Air Force transfer from APAF (Procurement) funding to RDT&E from within this same KC-10 Program Code 0401219F.

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 0401219F: *KC-10S*	PROJECT 675195: *Aircraft Modernization Program (AMP)*	

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
675195: *Aircraft Modernization Program (AMP)*	35.325	56.669	30.868	-	30.868	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The KC-10A Extender is an aerial refueling asset built on the commercial DC-10 airframe. The aircraft creates an air bridge enabling rapid global mobility and global strike missions. There are 59 KC-10A aircraft in the USAF tanker fleet. RDT&E funds throughout the FYDP will be used to support the Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM), Boom Control Unit (BCU) and Mode 5 modification efforts.

The KC-10 Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) program provides worldwide airspace accessibility by FY2015 for the fleet of 59 KC-10 aircraft. FAA airworthiness certification following the modification is required. An upgrade of the current Flight Management System (FMS) and Inertial Navigation System (INS) is required to meet the 2015 CNS/ATM requirements and address associated INS and FMS obsolescence issues. This capability gap is well documented in both RAND KC-10 Analysis of Alternatives (AoA) and Service Life Extension Program (SLEP) Studies. Avionics components shall use either Commercial Off-The-Shelf (COTS) or Military Off-The-Shelf (MOTS) software and hardware. CNS/ATM requirements include: Required Navigation Performance (RNP-4) Oceanic/Remote for enroute Oceanic Airspace with either 50/50 Nautical Miles (NM) or 30/30 NM separations; Basic Area Navigation (BRNAV) for enroute European Airspace (9,500ft & up); RNP 2 & 1 for enroute & terminal airspace operations; Precision-RNAV (P-RNAV) for Preferred terminal area routes in Europe (1 NM Accuracy); RNP-4 & RNP-1 for reduced separations enroute, and terminal airspace; Time of Arrival Control for Refuel rendezvous (within 30 sec); Automatic Dependent Surveillance - Broadcast (ADS-B) Out for enhanced air and ground surveillance; Global Positioning System (GPS) for enhanced navigation capability; Selective Availability Anti-Spoofing Module (SAASM) for Global Positioning System (GPS) Security; Satellite Data Link for Air Traffic Systems (ATS) and Command and Control (C2) Communications for flight in Oceanic Airspace (FL310-410); Satellite Voice for Beyond Line of Sight (BLOS) Pilot - Controller Communications C2 Operations; and Very-High Frequency Data Link (VDL) Mode-2 for Line of Sight (LOS) Pilot - Controller Communications and C2 Operations.

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The Mode 5 modification is a DoD-mandated (JROCOM 047-07, 5 Mar 07 directs KC-10 IOC by 2014, FOC by 2020) upgrade to the KC-10's Identify Friend or Foe (IFF) system (the primary means of aircraft identification during Air Defense operations). The Mode 5 upgrade increases anti-spoofing and exploitation capabilities, and lowers the possibility of aircraft/aircrew loss due to misidentification of friendly aircraft. The modification includes a new Mode 5 crypto appliqué, new IFF control

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 0401219F: *KC-10S*	PROJECT 675195: *Aircraft Modernization Program (AMP)*

panel, a circuit card upgrade to the APX-119 transponder, support equipment upgrades and replacement/relocation of the data loader from the avionics bay to the flight deck.

The KC-10 program has associated APAF funding in Program Elements 0401219F and 0401897F.

The program funding includes reductions for Overhead Reduction efficiencies that are not intended to impact program content. The efficiency reductions total $0.117M in FY12.

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: CNS-ATM Avionics Upgrade, Boom Control Unit Development and Mode 5 Engineering Design	35.325	56.669	30.868	-	30.868
Description: CNS-ATM Avionics Upgrade, Boom Control Unit Development and Mode 5 Engineering Design to fleet of 59 KC-10 aircraft ***FY 2010 Accomplishments:*** CNS/ATM: Milestone B (MS B) Document preparation is ongoing. At contract award, start Engineering, Manufacturing, Development (EMD). Conduct and approve Preliminary Design Review (PDR). A-BCU: Conduct and approve Critical Design Review (CDR); Integration and system testing of A-BCU; qualification and certification of A-BCU; tech order source data development; production/repair source qualification. ***FY 2011 Plans:*** CNS/ATM: At contract award, start Engineering, Manufacturing, Development (EMD). Conduct and approve Preliminary Design Review (PDR). Conduct and approve Critical Design Review (CDR). Test and evaluation start. ***FY 2012 Base Plans:*** Mode 5: Engineering design and analysis effort to develop new digital control panel and upgrade existing APX-100 to support Mode 5. CNS/ATM: Finish Test and Evaluation and development activities. ***FY 2012 OCO Plans:***					
Accomplishments/Planned Programs Subtotals	35.325	56.669	30.868	-	30.868

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 0401219F: *KC-10S*	PROJECT 675195: *Aircraft Modernization Program (AMP)*

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 0401219F: *Boom Control Unit (BCU) Mod # 7727 APAF*	0.000	3.788	3.927	0.000	3.927	0.000	0.000	0.000	0.000	Continuing	Continuing
• PE 0401219F (1): *Mode 5 Mod # 7728 APAF*	0.000	0.000	0.000	0.000	0.000	4.568	4.275	1.190	0.680	Continuing	Continuing
• PE 0401219F (2): *CNS/ATM Mod # 7726 APAF*	0.000	0.000	17.394	0.000	17.394	68.700	67.356	34.000	0.000	Continuing	Continuing

D. Acquisition Strategy

Acquisition Approach Summary. The acquisition will be in accordance with Federal Acquisition Regulation (FAR) Part 15, Contracting by Negotiation. This acquisition will seek to award to a single integrator to accomplish design/development, test and evaluation, production, and installation and utilize Performance Price Tradeoff (PPT) source selection procedures. Sufficient competition is expected since there are several contractors with experience in CNS/ATM integration on military and commercial aircraft.

A-BCU: This program is a three (3) phased sole source RDT&E effort for a Form, Fit, Function (FFF) and replacement design followed by procurement and field install for fleet.

Mode 5: Approach will be a 1 year RDT&E effort in FY12, followed by procurement and install for fleet.

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
Studies and Analysis	Various	Boeing Corp:Oklahoma City, OK	1.496	-		-		-		-	0.000	1.496	0.000
Development Engineering, Design, and Integration (Boom Control Unit (BCU) Phase I)	SS/Various	Boeing Corp:Oklahoma City, OK	10.354	-		-		-		-	0.000	10.354	0.000
Development Engineering, Design, and Integration (BCU Phase II)	SS/CPIF	Boeing Corp:Oklahoma City, OK	2.010	-		-		-		-	0.000	2.010	0.000
Development Engineering, Design, and Integration (BCU Phase III)	SS/CPIF	Boeing Corp:Oklahoma City, OK	5.010	-		-		-		-	0.000	5.010	0.000
Development Engineering, Design, and Integration (Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM))	C/FFP	Boeing Corp:Oklahoma City, OK	25.823	54.068	May 2011	25.241	Jan 2012	-		25.241	0.000	105.132	0.000
Development Engineering, Design, and Integration (Mode 5)	Various	TBD:TBD,	-	-		1.974	Jan 2012	-		1.974	0.000	1.974	0.000
		Subtotal	44.693	54.068		27.215		-		27.215	0.000	125.976	0.000

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
		Subtotal	-	-		-		-		-	0.000	0.000	0.000

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
Gov Test and Evaluation (BCU)	TBD	TBD:TBD,	3.000	-		-		-		-	0.000	3.000	0.000
Gov Test and Evaluation (CNS/ATM)	TBD	TBD:TBD,	-	-		3.653		-		3.653	0.000	3.653	0.000
		Subtotal	3.000	-		3.653		-		3.653	0.000	6.653	0.000

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
Mission Support	Various	TBD:Tinker AFB, OK	1.492	2.601	Jun 2011	-		-		-	0.000	4.093	0.000
		Subtotal	1.492	2.601		-		-		-	0.000	4.093	0.000

	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
Project Cost Totals	49.185	56.669		30.868		-		30.868	0.000	136.722	0.000

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Air Force		DATE: February 2011
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Exhibit R-4, RDT&E Schedule Profile: PB 2012 Air Force		DATE: February 2011
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Exhibit R-4, RDT&E Schedule Profile: PB 2012 Air Force		DATE: February 2011
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Exhibit R-4A, RDT&E Schedule Details: PB 2012 Air Force		DATE: February 2011
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CNS/ATM Source Selection	1	2010	2	2011
Contract Award/Milestone B	3	2010	4	2010
CNS/ATM Engineering Manufacturing Development (EMD)	3	2011	1	2013
Milestone C	2	2013	2	2013
CNS/ATM Production/Deployment	2	2012	4	2015
BCU Phase II Contract Award	1	2010	1	2010
BCU Phase II RDT&E	1	2010	1	2011
BCU Critical Design Review	3	2010	3	2010
BCU Phase III Contract Award	4	2010	4	2010
BCU Phase II RDT&E (1)	4	2010	4	2011
Two BCU Prototypes Complete	3	2011	3	2011
BCU Production/Installs	4	2011	4	2012
Mode 5 Contract award for engineering development of Mode 5 IFF system modification	2	2012	2	2012
Mode 5 Development activities	2	2012	4	2013
Mode 5 Production	4	2013	2	2015
Mode 5 Installations	3	2014	3	2016