ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE
5 - System Development and Demonstration	**0604201A - AIRCRAFT AVIONICS**

COST (In Thousands)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
C97 ACFT AVIONICS	52802	71325	92977	Continuing	Continuing

A. Mission Description and Budget Item Justification: FY 2010 budget request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this PE support research, development, and test efforts in the System Development and Demonstration (SDD) phases of these systems.

Aviation Tactical Communication Systems (ATCS) is an Army Aviation Program to develop, integrate, and test the Alternative Communications (Alt Comms)(ARC-231 and ARC-201D) A-Kit (hardware and software) and the Joint Tactical Radio System (JTRS) hardware onto the CH-47F, AH-64D, and UH-60M modernized aircraft. JTRS is the transformational system that provides Army Aviation interoperability capability for Future Force and Joint Force operations.

A delay in the JTRS Cluster 1 program resulted in a lack of critical communications equipment to support modernized Army Aviation aircraft production line requirements and Alt Comms was initiated to mitigate this issue. Alt Comms provides two ARC-231 and two ARC-201D radios with power amplifiers to meet the minimum interim JTRS requirements for Military Satellite Communications, Single Channel Ground and Airborne Radio System (SINCGARS), HAVEQUICK, Very High Frequency (VHF), Air Traffic Control (ATC), and Land Mobile Radio requirements and funds the integration and test of the radios onto each platform. FY10 funds are required to complete A-Kit development, integration, and system testing for UH-60M and CH-47F.

Alt Comms will be Army Aviation's communication solution until it is supplemented by the JTRS Airborne Maritime Fixed (AMF) Small Airborne (SA) radio set, beginning in FY14. Increment 1 of the AMF SA will provide the Wideband Networking Waveform, Soldier Radio Waveform, and Link-16 required for interoperation with the Future Force. Increment 2 of the AMF SA, planned for FY20, will replace the Alt Comms suite and provide legacy waveforms allowing a single hardware solution. FY10 funds are required to continue JTRS integration onto aviation platforms. JTRS integration efforts planned for FY10 are defining standardized control and data interfaces, continuing development of reusable control software to be provided to JTRS integrators, and beginning integration into the AH-64D using engineering development models.

The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation. It performs as an internet controller and gateway to Tactical Internet (TI) and Fire Support (FS) internet for Army aircraft. With interfaces supporting a six channel transmit/receive terminal, the IDM provides radio connectivity to the ARC-201D/220/231, ARC-186, ARC-164, and the Blue Force Tracker's (BFT) MT-2011 Transceiver. The IDM also provides 1553 and Ethernet portals for rapid data transfer. IDM provides a flexible, software driven digital messaging system that is interoperable with existing Army and Joint forces battlefield operating systems. The IDM provides Situational Awareness and Variable Message Format messages capability to the cockpit. FY10 funds are required to continue development of an Open Systems Architecture (OSA) IDM solution compatible with the AH-64D, CH-47F, and HH/UH-60M. This effort provides the foundation to develop and qualify a new hardware architecture to host IDM and Future Combat System (FCS) Battle Command (BC) and System Of Systems Common Operating Environment (SOSCOE) applications to ensure interoperability on the future digital battlefield.

The Joint Precision Approach and Landing System (JPALS) is a precision approach and landing system providing joint operational capability for U.S. forces assigned to conventional and special operations missions including those operating from fixed base, ship, tactical, and special mission environments under a wide range of meteorological and

jamming conditions. The JPALS effort in this project evaluates technical approaches, develops the aircraft avionics equipment for operation with the JPALS sea-based and ground systems, and integrates the avionics equipment into the various Army Aviation platforms. Increment 1 has now been split into Increment 1A (Sea Based development and test) and Increment 1B (aircraft avionics development, integration, and test). The Army's involvement in Increment 1A is to address Army requirements, participate in program management and provide systems engineering, and participate in the Aircraft Integration Guide effort which will provide early coordination and interface requirements between the sea-based system and the air component. FY10 funds are required to continue avionics risk reduction and refine requirements and interfaces between the JPALS Sea-Based system and the air components.

ARC-220 radio improvements are required to increase operational capability and resolve emerging obsolescence issues. Software improvements will provide a quick Automatic Linking Process which will reduce the time for the radio to establish a communication link by more than 50%, improve secure voice reliability, and add automatic position reporting capability. FY10 funds will improve the ARC-220 software and test system changes.

The Aviation Mission Planning System (AMPS) is a mission planning/battle synchronization tool that automates aviation mission planning tasks, including tactical command and control, mission planning, and flight planning. It interfaces with Army Battle Command Systems (ABCS) and associated networks which furnish the aviation commander with continuous situational awareness, allowing the commander to rapidly adjust mission plans. The electronic formats are loaded onto the aircraft platforms, initializing the communication, navigation, situational awareness, and weapons systems on modernized fleet aircraft including the AH-64A Mod, AH-64D, CH-47D/F, Kiowa Warrior (OH-58D), UH-60A/L/M/Q, HH-60L, and Unmanned Aerial Systems (UAS). This effort will allow for the integration of the Joint Mission Planning Software (JMPS) route server and calculation engine components into the AMPS configuration and Aircraft Weapons Electronics (AWE) modifications. FY10 funds are required for software development and testing.

A requirement exists for Apache Block III to be interoperable through the future force network. Funds are included in this project for the integration of the FCS SOSCOE middleware into the Apache Block III. This includes the non-recurring engineering for integration, test, and air worthiness qualification. As part of the Army's migration to a net-centric fighting force, it is necessary for aircraft to access certain critical services that enable seamless access and operation on the future force network. At the tactical level, the FCS SOSCOE provides these services for proper functioning on the FCS Brigade Combat Team network. Examples of services include information assurance, communications services, interoperability services, data store services, and operating system extraction services. FY10 funds are to begin integration of FCS SOSCOE onto the Apache Block III.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE
5 - System Development and Demonstration	**0604201A - AIRCRAFT AVIONICS**

B. Program Change Summary	FY 2008	FY 2009	FY 2010
Previous President's Budget (FY 2009)	57420	71562	77630
Current BES/President's Budget (FY 2010)	52802	71325	92977
Total Adjustments	-4618	-237	15347
Congressional Program Reductions		-237	
Congressional Recissions			
Congressional Increases			
Reprogrammings	-3040		
SBIR/STTR Transfer	-1578		
Adjustments to Budget Years			15347

Change Summary Explanation:
Funding Changes: FY10 JPALS funds realigned to other higher priority requirements (-$11,379 thousand); JTRS integration (+$75 thousand); IDM OSA (+$9,569 thousand); ARC-220 radio improvements (+$3,288 thousand); AMPS to JMPS transition (+$2,354 thousand); FCS SOSCOE on Apache Block III (+$11,440 thousand).

Schedule Changes: The JPALS Increment 1 program was broken into Increment 1A (Sea Based) and Increment 1B (Avionics). The Increment 1A Milestone B was delayed to 4th Quarter FY08 due to scheduling conflicts and extended source selection activities. Milestone B for Increment 1B is planned for the 1st Quarter of FY11. New initiatives for: ARC-220 radio improvements, JMPS component improvements to AMPS, and FCS SOSCOE on Apache Block III.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - System Development and Demonstration	**0604201A - AIRCRAFT AVIONICS**	**C97**

COST (In Thousands)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
C97 ACFT AVIONICS	52802	71325	92977	Continuing	Continuing

A. Mission Description and Budget Item Justification: FY 2010 budget request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this PE support research, development, and test efforts in the System Development and Demonstration (SDD) phases of these systems.

Aviation Tactical Communication Systems (ATCS) is an Army Aviation Program to develop, integrate, and test the Alternative Communications (Alt Comms)(ARC-231 and ARC-201D) A-Kit (hardware and software) and the Joint Tactical Radio System (JTRS) hardware onto the CH-47F, AH-64D, and UH-60M modernized aircraft. JTRS is the transformational system that provides Army Aviation interoperability capability for Future Force and Joint Force operations.

A delay in the JTRS Cluster 1 program resulted in a lack of critical communications equipment to support modernized Army Aviation aircraft production line requirements and Alt Comms was initiated to mitigate this issue. Alt Comms provides two ARC-231 and two ARC-201D radios with power amplifiers to meet the minimum interim JTRS requirements for Military Satellite Communications, Single Channel Ground and Airborne Radio System (SINCGARS), HAVEQUICK, Very High Frequency (VHF), Air Traffic Control (ATC), and Land Mobile Radio requirements and funds the integration and test of the radios onto each platform. FY10 funds are required to complete A-Kit development, integration, and system testing for UH-60M and CH-47F.

Alt Comms will be Army Aviation's communication solution until it is supplemented by the JTRS Airborne Maritime Fixed (AMF) Small Airborne (SA) radio set, beginning in FY14. Increment 1 of the AMF SA will provide the Wideband Networking Waveform, Soldier Radio Waveform, and Link-16 required for interoperation with the Future Force. Increment 2 of the AMF SA, planned for FY20, will replace the Alt Comms suite and provide legacy waveforms allowing a single hardware solution. FY10 funds are required to continue JTRS integration onto aviation platforms. JTRS integration efforts planned for FY10 are defining standardized control and data interfaces, continuing development of reusable control software to be provided to JTRS integrators, and beginning integration into the AH-64D using engineering development models.

The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation. It performs as an internet controller and gateway to Tactical Internet (TI) and Fire Support (FS) internet for Army aircraft. With interfaces supporting a six channel transmit/receive terminal, the IDM provides radio connectivity to the ARC-201D/220/231, ARC-186, ARC-164, and the Blue Force Tracker's (BFT) MT-2011 Transceiver. The IDM also provides 1553 and Ethernet portals for rapid data transfer. IDM provides a flexible, software driven digital messaging system that is interoperable with existing Army and Joint forces battlefield operating systems. The IDM provides Situational Awareness and Variable Message Format messages capability to the cockpit. FY10 funds are required to continue development of an Open Systems Architecture (OSA) IDM solution compatible with the AH-64D, CH-47F, and HH/UH-60M. This effort provides the foundation to develop and qualify a new hardware architecture to host IDM and Future Combat System (FCS) Battle Command (BC) and System Of Systems Common Operating Environment (SOSCOE) applications to ensure interoperability on the future digital battlefield.

The Joint Precision Approach and Landing System (JPALS) is a precision approach and landing system providing joint operational capability for U.S. forces assigned to conventional and special operations missions including those operating from fixed base, ship, tactical, and special mission environments under a wide range of meteorological and

jamming conditions. The JPALS effort in this project evaluates technical approaches, develops the aircraft avionics equipment for operation with the JPALS sea-based and ground systems, and integrates the avionics equipment into the various Army Aviation platforms. Increment 1 has now been split into Increment 1A (Sea Based development and test) and Increment 1B (aircraft avionics development, integration, and test). The Army's involvement in Increment 1A is to address Army requirements, participate in program management and provide systems engineering, and participate in the Aircraft Integration Guide effort which will provide early coordination and interface requirements between the sea-based system and the air component. FY10 funds are required to continue avionics risk reduction and refine requirements and interfaces between the JPALS Sea-Based system and the air components.

ARC-220 radio improvements are required to increase operational capability and resolve emerging obsolescence issues. Software improvements will provide a quick Automatic Linking Process which will reduce the time for the radio to establish a communication link by more than 50%, improve secure voice reliability, and add automatic position reporting capability. FY10 funds will improve the ARC-220 software and test system changes.

The Aviation Mission Planning System (AMPS) is a mission planning/battle synchronization tool that automates aviation mission planning tasks, including tactical command and control, mission planning, and flight planning. It interfaces with Army Battle Command Systems (ABCS) and associated networks which furnish the aviation commander with continuous situational awareness, allowing the commander to rapidly adjust mission plans. The electronic formats are loaded onto the aircraft platforms, initializing the communication, navigation, situational awareness, and weapons systems on modernized fleet aircraft including the AH-64A Mod, AH-64D, CH-47D/F, Kiowa Warrior (OH-58D), UH-60A/L/M/Q, HH-60L, and Unmanned Aerial Systems (UAS). This effort will allow for the integration of the Joint Mission Planning Software (JMPS) route server and calculation engine components into the AMPS configuration and Aircraft Weapons Electronics (AWE) modifications. FY10 funds are required for software development and testing.

A requirement exists for Apache Block III to be interoperable through the future force network. Funds are included in this project for the integration of the FCS SOSCOE middleware into the Apache Block III. This includes the non-recurring engineering for integration, test, and air worthiness qualification. As part of the Army's migration to a net-centric fighting force, it is necessary for aircraft to access certain critical services that enable seamless access and operation on the future force network. At the tactical level, the FCS SOSCOE provides these services for proper functioning on the FCS Brigade Combat Team network. Examples of services include information assurance, communications services, interoperability services, data store services, and operating system extraction services. FY10 funds are to begin integration of FCS SOSCOE onto the Apache Block III.

Accomplishments/Planned Program:	FY 2008	FY 2009	FY 2010
Continue A-Kit Development, Integration and System Testing of Alt Comms for AH-64D, CH-47F, and UH-60M and integration of JTRS AMF-SA onto aviation platforms (ATCS)	38190	44572	40495
Continue System Engineering, Antenna Support and Logistics Effort (ATCS)	1992	2050	2093
Program Management Support for A-Kit Development (ATCS)	2390	2609	2307
Continue Test and Evaluation Support (ATCS)	2207	2900	1313
Continue development and qualification of an Open Systems Architecture IDM solution that supports FCS SOSCOE and FCS BC (IDM).	2337	3300	9072
Program Management Support (IDM)	191	173	497

Continue to provide system engineering, product support, and programmatic, cost, test, and technical documentation for JPALS development efforts. (JPALS)	628	1307	1153
Continue JPALS Avionics Risk Reduction (JARR) and develop/define requirements and interfaces between the JPALS Sea-Based system and the air components (Air Integration Guides). (JPALS)	4446	11763	17884
Continue JPALS Test and Evaluation planning. (JPALS)		140	511
Program Management Support (JPALS)	421	543	570
Develop and test software and hardware improvements to the ARC-220 radio.			3288
JMPS component integration and AWE modification (AMPS)			2354
Begin FCS SOSCOE development and integration onto Apache Block III.			11440
Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) Reduction		1968	
Total	52802	71325	92977

B. Other Program Funding Summary	FY 2008	FY 2009	FY 2010	To Compl	Total Cost
Airborne Avionics SSN AA0700	169107	174462	241287	Continuing	Continuing

Comment:

C. Acquisition Strategy This project is comprised of multiple systems:

1) ATCS - Alt Comms is required to meet minimum acceptable near-term communications requirements as defined by the U.S. Army Aviation Center of Excellence (USAACE) to mitigate production line communications equipment gaps for modernized Army aircraft (UH-60M, CH-47F, and AH-64D). The Alt Comms acquisition strategy is to use currently available communications equipment to fill these gaps. However, this equipment must be incorporated onto the modernized aviation platforms through A-Kit development, platform hardware and software development/integration, and platform testing of the Alt Comms suite.

JTRS is a software programmable radio system that enables net-centric communications capabilities. Army Aviation is now aligned with the Airborne Maritime Fixed (AMF) JTRS program and is planning to initiate JTRS Increment 1 fielding on Apache Block III as the lead aircraft. The CH-47F and UH-60M integration of the Increment 1 capabilities will be delayed, with initial fielding on those platforms beyond FY15. Increment 1 of the AMF JTRS program will provide the Wideband Networking Waveform, Soldier Radio Waveform, and LINK-16 required for interoperation with the Future Force. Increment 2, planned for FY20, replaces Alt Comms and will provide all legacy waveforms. These efforts will be accomplished using host platform development contracts, integration labs, and Airworthiness testing and certification.

2) IDM - Develop and qualify a new hardware architecture and integrate IDM OSA applications onto the new hardware. This development effort will be accomplished by a competitive cost-plus-fixed fee contract.

3) JPALS - The Navy is the lead service for this joint program. An updated JPALS acquisition strategy separates Increment 1 into two increments (1A and 1B). Increment 1A provides for development, integration, and test of the shipboard system. Increment 1B provides for development, integration, and testing of the aircraft avionics system. The Army activity in the budget years, focused on the aircraft component, is to complete the current risk reduction effort and Technology Development (TD) phase. Army Aviation avionics TD includes a series of JPALS Avionics Risk Reduction (JARR) sole source, cost-plus fixed fee, firm fixed price, and time and materials contracts to reduce technical risk on critical components. Army will also participate in the Aircraft Integration Guide (AIG) effort which is part of the JPALS Increment 1A SDD contract. The output of the JARR and AIG contracts will be used to evaluate potential technical approaches and define the best solution. Based on that evaluation, contracts will be awarded for development, integration, and test of JPALS avionics beginning in FY12. Development will be done through either a Cost-Plus or Fixed Price Incentive contract. Aircraft platform integration and test will be accomplished using host platform contracts beginning with UH-60M.

4) ARC-220 - The ARC-220 box level software improvements will be done through a sole-source cost-plus fixed fee contract with Rockwell Collins.

5) AMPS - The core Portable Flight Planning Software (PFPS) will be improved using components provided by the Joint Mission Planning System (JMPS). Army-specific components and aircraft platform-specific Aircraft Weapons Electronics modules (AWEs) will be upgraded to work with the JMPS components. This contracted effort will be executed through the Army Research and Development Command's (RDECOM) Software Engineering Directorate and coordinated with Air Force Intelligence, Surveillance, and Reconnaissance Innovations Directorate and Unmanned Aerial Systems Task Force (AF/A2U) and the Special Operations Forces Mission Planning Office (SOFMPO) to ensure continued interoperability with other DoD components.

6) FCS Interoperability - OSA interoperability studies were completed in FY08 which provides analysis required to determine the best technical approach to implementing FCS SOSCOE capability onto the Apache Block III. Once the technical approach is selected in FY09, an acquisition strategy will be developed to begin development and integration in mid-FY10.

ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604201A - AIRCRAFT AVIONICS

PROJECT
C97

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Develop A-kits, integrate, and test Alt Comms. Integrate JTRS AMF-SA onto aviation platforms (ATCS)	Various	Boeing, AZ, PA, and CA; Rockwell Collins, Cedar Rapids, IA; Sikorsky, Stratford, CT; Raytheon, IN	142438	38190	1-3Q	44572	1-3Q	40495	1-2Q	Cont.	Cont.	Cont.
Develop and qualify OSA hardware to host IDM and FCS SOSCOE and FCS BC (IDM)	SS/CPFF	ICI, McLean, VA	11883	2337	2Q						14220	
Develop and qualify OSA hardware to host IDM and FCS SOSCOE and FCS BC (IDM)	C/CPFF	TBD				3300	3Q	9072	2Q	Cont.	Cont.	Cont.
JPALS Avionics Risk Reduction and Air Integration Guides (JPALS)	Various	Various	2338	4446	4Q	11763	3Q	17884	1-4Q	Cont.	Cont.	Cont.
ARC-220 operational capability improvements	SS/CPFF	Rockwell Collins, Cedar Rapids, IA						1600	1Q		1600	
FCS SOSCOE development and integration onto Apache Block III	TBD	TBD						11440	2Q	Cont.	Cont.	Cont.
JMPS component integration/AWE modifications (AMPS)	SS/FP	TBD						2354	2Q	Cont.	Cont.	Cont.
Subtotal:			156659	44973		59635		82845		Cont.	Cont.	Cont.

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
System Engineering, Antenna Integration Support and Logistics Efforts (ATCS)	Various	Westar, Quantum, Tecolote, AL; ARINC, CSC, NJ	4970	1992	1-3Q	2050	1-3Q	2093	1-3Q	Cont.	Cont.	Cont.
System Engineering, Logistics, and Technical Support (JPALS)	Various	Various	3589	628	1-3Q	1307	1-3Q	1153	2-3Q	Cont.	Cont.	Cont.

Subtotal:			8559	2620		3357		3246		Cont.	Cont.	Cont.

III. Test And Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation (ATCS)	MIPR	Various	2878	2207	1-3Q	2900	1-3Q	1313	1-3Q	Cont.	Cont.	Cont.
Test and Evaluation (JPALS)	MIPR	Various				140	2-3Q	511	2-3Q	Cont.	Cont.	Cont.
Test and Evaluation (ARC-220)	MIPR	Various						1688	3Q	Cont.	Cont.	Cont.
Subtotal:			2878	2207		3040		3512		Cont.	Cont.	Cont.

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	FY 2010 Cost	FY 2010 Award Date	Cost To Complete	Total Cost	Target Value of Contract
PM Spt (ATCS)	In-House	AMCOM, Redstone Arsenal, AL/PM AME	6170	2390	1-4Q	2609	1-4Q	2307	1-4Q	Cont.	Cont.	Cont.
PM Spt (IDM)	In-House	AMCOM, Redstone Arsenal, AL/PM AME	1480	191	1-4Q	173	1-4Q	497	1-4Q	Cont.	Cont.	Cont.
PM Spt (JPALS)	In-House	AMCOM, Redstone Arsenal, AL/PM AME	246	421	1-4Q	543	1-4Q	570	1-4Q	Cont.	Cont.	Cont.
SBIR/STTR						1968					1968	
Subtotal:			7896	3002		5293		3374		Cont.	Cont.	Cont.

Project Total Cost:			**175992**	**52802**		**71325**		**92977**		**Cont.**	**Cont.**	**Cont.**

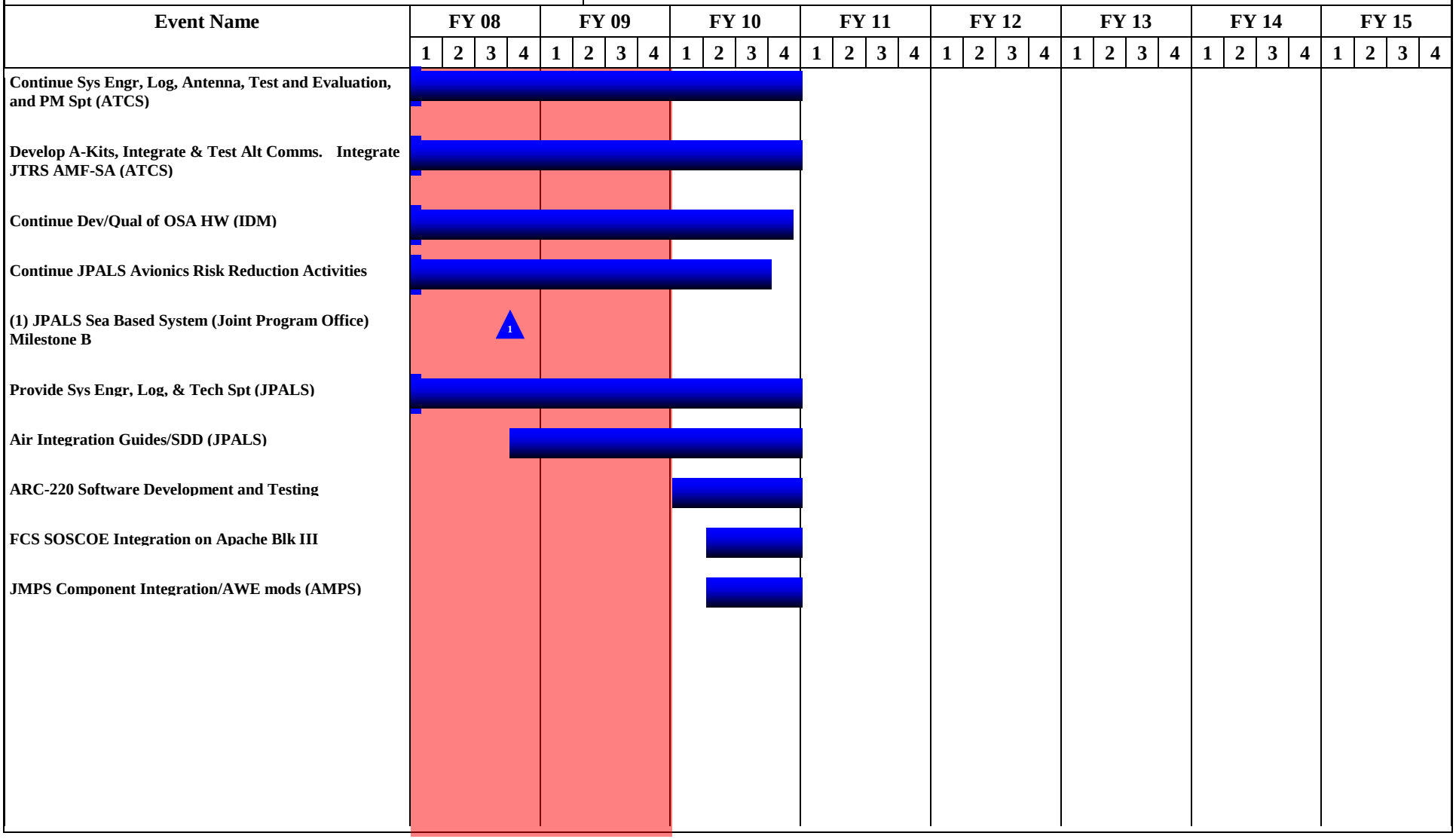
Schedule Profile (R4 Exhibit)

May 2009

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604201A - AIRCRAFT AVIONICS

PROJECT
C97



Schedule Detail (R4a Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - System Development and Demonstration	**0604201A - AIRCRAFT AVIONICS**	**C97**

Schedule Detail	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Continue Sys Engr, Log, Antenna, Test and Evaluation, and PM Spt (ATCS)	1Q - 4Q	1Q - 4Q	1Q - 4Q					
Develop A-Kits, Integrate & Test Alt Comms. Integrate JTRS AMF-SA (ATCS)	1Q - 4Q	1Q - 4Q	1Q - 4Q					
Continue Dev/Qual of OSA HW (IDM)	1Q - 4Q	1Q - 4Q	1Q - 4Q					
Continue JPALS Avionics Risk Reduction Activities	1Q - 4Q	1Q - 4Q	1Q - 4Q					
JPALS Sea Based System (Joint Program Office) Milestone B	4Q							
Provide Sys Engr, Log, & Tech Spt (JPALS)	1Q - 4Q	1Q - 4Q	1Q - 4Q					
Air Integration Guides/SDD (JPALS)	4Q	1Q - 4Q	1Q - 4Q					
ARC-220 Software Development and Testing			1Q - 4Q					
FCS SOSCOE Integration on Apache Blk III			2Q - 4Q					
JMPS Component Integration/AWE mods (AMPS)			2Q - 4Q					