

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

February 2003

<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>				<b>PE NUMBER AND TITLE</b> <b>0604201A - AIRCRAFT AVIONICS</b>					<b>PROJECT</b> <b>C97</b>		
COST (In Thousands)	FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total Cost	
C97 ACFT AVIONICS	48999	39559	64650	44685	32052	46642	33348	26374	Continuing	Continuing	

**A. Mission Description and Budget Item Justification:** This Program Element (PE) funds the development of avionics systems required to horizontally and vertically integrate the battlefield. Tasks in this PE support research efforts in the engineering and manufacturing development phases of these systems. All of these systems support the Legacy-to-Objective transition path of the Transformation Campaign Plan.

The Army Airborne Command and Control System (A2C2S) is the Army's only airborne Command & Control (C2) system supporting corps, division and brigade commanders. This system is critical to enhance the Battle Command Group's ability to effectively perform combat unit operations and serve as a force multiplier in Army XXI. It provides the capability to access the tactical internet to manipulate, store, manage, and analyze situational awareness information, intelligence data, mission plans, and mission progress data to support the command and control decision making process. The A2C2S will provide situational awareness and command & control hosting Army Battle Command System (ABCS) such as Maneuver Control Systems (MCS), All Source Analysis System (ASAS), Advanced Field Artillery Tactical Data System (AFATDS), and Force XXI Battle Command Brigade and Below (FBCB2). The A2C2S provides communication capability that supports deep operations with non-line-of-sight communications such as High Frequency (HF) and Demand Assigned Multiple Access (DAMA), and Satellite Communications System Satellite Command (SATCOM). In addition, the system has the potential to improve the ability of state, local, and federal agencies to communicate and coordinate in a crisis environment such as hurricanes, forest fires, or terrorist incidents using weapons of mass destruction.

The Improved Data Modem (IDM) is the key link to joining Army Aviation with the digital battlefield and provides digital communication interoperability and flexibility on a fluid battlefield. Developed as an open system architecture, the IDM takes advantage of commercially available software and hardware solutions to enforce common communications protocols and the Joint Variable Message Format (JVMF). The IDM provides a flexible, software-driven digital messaging system interoperable with existing Battlefield Operating Systems and the Joint Forces. IDM improves Army Aviation's lethality and operational tempo through the exchange of fast and accurate data-burst communications through the Army's Fire Support and Tactical Internet (TI), providing seamless communications across the digital battlefield. These RDT&E funds are required to develop and integrate IDM hardware and software interfaces for the UH/HH-60M as well as fund the software and hardware engineering development that will transform the IDM from a Line Replaceable Unit (LRU) to a Standard Electronic Module-Format E (SEM-E).

The Joint Tactical Radio System (JTRS) aircraft installation lays the foundation for achieving network connectivity across the radio frequency (RF) spectrum and provides the means for digital information exchanges, both vertically and horizontally, between joint warfighting elements, while enabling connectivity to civil and national authorities. The JTRS will provide affordable, high-capacity, tactical radios to meet the interoperability requirements with all DOD services. The JTRS will provide an internal capability through an open systems architecture approach in compliance with the joint technical architecture which improves system performance at minimal cost and effort.

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These RDT&E funds are required to design, develop, integrate, and qualify the aircraft installation kits (A Kits) to accommodate the JTRS in Army rotary wing aircraft. Installed A Kits and JTRS will provide the AH-64D, CH-47F, and UH/HH-60M the capability to transmit, receive, bridge and gateway between similar and diverse waveforms over multiple communications media & networks.

The Joint Mission Planning System (JMPS) is a congressionally directed Multi-Service system that is on the OSD C4I Special Interest List and supports the top two SECDEF priorities (17 Sep 02 memo). It is scheduled for delivery in FY03 and will be the core around which the services build their mission planning systems. The Army variant, JMPS-A, will leverage the common components being developed in collaboration with the Air Force and Navy, and provide the capabilities required to support Army Aviation fleet modernization programs. JMPS-A is currently in the requirements analysis and design phase. The Army plans to start software fielding for JMPS-A for all rotary-wing aircraft in 2005. The architecture inherent in JMPS will accommodate modifications required to support the Future Combat System and the associated family of Unmanned Aerial Vehicles that are to be deployed within Aviation Brigades in the Objective Force.

<u>Accomplishments/Planned Program</u>	FY 2002	FY 2003	FY 2004	FY 2005
Continue software development for RAH-66 (IDM)	1000	0	0	0
Initiate software development for ATC (IDM)	319	0	0	0
Continue integration of IDM/EBC software into the CH-47F (IDM)	2111	0	0	0
Continue effort to integrate IDM/EBC software into the UH/HH-60M (IDM)	900	2875	0	0
Continue Program Management Support (IDM)	132	151	0	0
Continue System Development and Evaluation BLK I (A2C2S)	9408	0	0	0
Initiate Integration of Prototype Systems 3 to 7 and upgrades to Systems 1 and 2(A2C2S)	4955	0	0	0
Continue Systems Engineering, Logistics, and Software Integration (A2C2S)	9628	0	0	0
Initiate System Software Development (A2C2S)	1867	0	0	0
ABCS System Engineering and Integration Efforts (A2C2S)	280	0	0	0
Continue Developmental Testing, participate in DCX II, and prepare for LUT (A2C2S)	6169	0	0	0
Continue Support for System 1 and Deploy System 2 (A2C2S)	1026	0	0	0
Complete design analysis and initiate development of JTRS A-Kit for the AH-64D, CH-47F, and UH-60M (JTRS)	4011	0	0	0
Continue development of JTRS A-Kit and begin system testing for AH-64D, CH-47F, and UH-60M/Q (JTRS)	0	23941	52592	30006
Continue Systems Engineering and Logistics efforts (JTRS)	811	4262	3559	1896
Continue Program Management support for the JTRS A-Kit development (JTRS)	452	1774	3233	2231
Continue ICNIA compliance to JTRS requirements (JTRS)	1866	5000	4000	3000
Continue CECOM antenna effort (JTRS).	0	250	0	0

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<u>Accomplishments/Planned Program (continued)</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Continue contractual effort to support AH-64D, CH-47F, and UH-60M/Q (JTRS)	1964	220	0	0
Continue Test and Evaluation Support(JTRS)	0	36	1266	7482
Initiate transition of AMPS to JMPS	1000	0	0	70
Continue development of Airborne Separation Video System (ASVS)	1100	1050	0	0
<b>Totals</b>	<b>48999</b>	<b>39559</b>	<b>64650</b>	<b>44685</b>

<u>B. Program Change Summary</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget (FY 2003)	50838	40308	59535	31645
Current Budget (FY 2004/2005 PB)	48999	39559	64650	44685
Total Adjustments	-1839	-749	5115	13040
Congressional program reductions				
Congressional rescissions	-313	-454		
Congressional increases		1050		
Reprogrammings	-112	-227		
SBIR/STTR Transfer	-1414	-1118		
Adjustments to Budget Years			5115	13040

Beginning in FY 2003, funding in PE 64201 for A2C2S was transferred to PE 64818.

FY 2004 and FY 2005 increases were to align funding for JTRS with CAIG and Joint Cost Position (JCP) estimates, respectively.

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<b>C. Other Program Funding Summary</b>	<b>FY 2002</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>To Compl</b>	<b>Total Cost</b>
Airborne Command and Control SSN AA0710 (A2C2S)	0	2184	26594	30676	24114	3906	4281	3950	0	95705
Airborne Command and Control PE 64818, Project C3A (A2C2S)	0	32255	23151	6025	4453	4633	0	0	0	70517
Aircraft Avionics SSN AA0700 (IDM)	45072	58361	31641	23391	20133	36761	57381	32499	Continue	Continue
Joint Tactical Radio System SSN AA0702 (JTRS)	0	0	1906	22674	46498	62121	60544	66014	Continue	Continue
JTRS Ground Domain Integration PE 64805/D615 (JTRS)	90673	60688	206137	149510	93403	58143	25038	6501	0	690093
Army Data Distribution System (Data Radio) SSN BU1400 (JTRS)	63885	72811	52384	178163	153071	133978	126248	125488	Continue	Continue
Airborne Avionics SSNAA0700 (AMPS/JMPS)	12357	22701	24784	12698	9926	11814	12453	12729	Continue	Continue

**D. Acquisition Strategy:** This project is comprised of multiple systems:

- 1)IDM - The IDM/FBCB2-Air nonrecurring engineering and software development will be performed by Rockwell/Boeing for CH-47F and by Sikorsky for UH/HH-60M. The B-kits will be procured and installed during CH-47F and UH/HH-60M production.
- 2)JTRS - Initial JTRS A-Kit hardware development, installation and integration will be procured via host platform vendor. It is planned that full production contracts will be competitively awarded.
- 3)AMPS/JMPS - Migration to the Joint Mission Planning System (JMPS) is being accomplished in two phases: support of near term Army Aviation Fleet requirements and risk reduction by developing platform-specific modules for the Army variant of Portable Flight Planning Software (PFPS), and modification of those modules and development of additional capabilities under the JMPS architecture. Those additional capabilities include support for the Future Combat System and the associated family of Unmanned Aerial Vehicles that are to be deployed within Aviation Brigades.

ARMY RDT&E COST ANALYSIS(R-3)								February 2003				
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 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . System Dev and Eval (BLK I )) (A2C2S)	Various	Various	55160	0		0		0		0	55160	0
b . Prototype and TDS Integration (Sys 1-7)) (A2C2S)	MIPR/CPIF	Army Aviation TD Ft. Eustis, VA/Raytheon, AL	18714	0		0		0		0	18714	0
c . Systems Engineering (A2C2S)	Various	Various	27735	0		0		0		0	27735	0
d . GFE (A2C2S)	MIPR	Naval Research Lab, Wash, D.C.	578	0		0		0		0	578	0
e . Integrated Development of IDM into CH47-F SIL (IDM)	MIPR	AMCOM, AL	644	0		0		0		0	644	0
f . Initiated development of CH-47F wiring design (IDM)	MIPR	AMCOM, AL	1126	0		0		0		0	1126	0
g . UH/HH-60M Integration of B-Kit (IDM)	MIPR	AMCOM,AL	5500	2875	1-3Q	0		0		0	8375	0
h . CH-47F Test Plans, software development and B-Kit Integration in support of the IDM	MIPR	Various	12732	0		0		0		0	12732	0

ARMY RDT&E COST ANALYSIS(R-3)									February 2003			
BUDGET ACTIVITY 5 - System Development and Demonstration				PE NUMBER AND TITLE 0604201A - AIRCRAFT AVIONICS						PROJECT C97		
I. Product Development (continued)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
i . RAH-66 Software Development (IDM)	MIPR	Naval Research Lab, Wash, D.C.	2000	0		0		0		Continue	Continue	0
j . A-Kit AH-64D , CH-47F, and UH/HH-60M/Q R&D Contracts (JTRS) (Design Analysis & SDD)	CPFF	Boeing, Mesa, AZ, Boeing, Philadelphia, PA and Sikorsky, Stratford, CT	6056	23941	1-4Q	52592	1-4Q	30006	1-4Q	Continue	112595	0
k . Systems Engineering, Logistics Efforts (JTRS)	MIPR	Various	2850	4262	1-4Q	3559	1-4Q	1896	1-4Q	Continue	12567	0
l . Contractual efforts to support platforms (JTRS)	MIPR	Various	3327	220	1-4Q	0		0		0	3547	0
m . ATC Software Development (IDM)	MIPR	AMCOM, AL	319	0		0		0		0	319	0
n . Initiate Transition Software Development (AMPS)	MIPR	AMCOM, AL	1000	0		0		70	1Q	0	1070	0
o . Development of Airborne Separation Video System (ASVS)	MIPR	Various	1100	1050	1-4Q	0		0		0	2150	0
Subtotal:			138841	32348		56151		31972		Continue	Continue	0

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II. Support Cost	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Software Integration (A2C2S)	CPFF	TBD	1761	0		0		0		0	1761	1030
b . Systems Logistics Support (ILS,NET,Tech) (A2C2S)	Various	Various	3271	0		0		0		0	3271	0
c . System 1 & 2 Deployment to 4ID & 101st (A2C2S)	Various	Various	1460	0		0		0		0	1460	0
d . ABCS System Eng & Int Efforts (A2C2S)	MIPR	Various	492	0		0		0		0	492	0
e . Software Development (A2C2S)	MIPR/CPIF	Naval Research Labs, Wash, D.C., Raytheon, AL	20076	0		0		0		0	20076	0
f . Training Development (A2C2S)	CPFF, CPIF	CAS, AL, Raytheon, AL	120	0		0		0		0	120	0
g . Configuration Management/Technical Data (A2C2S)	MIPR/CPIF	Naval Research Lab Wash, D.C.,Raytheon, AL	1557	0		0		0		0	1557	0
h . Technical Data (A2C2S)	CPFF/SS, CPIF	Dynamics Research Corp, Andover, MA, NRL, Wash D.C., Raytheon, AL	772	0		0		0		0	772	0

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II. Support Cost (continued)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
i . ICNIA compliance to JTRS requirements (JTRS)	MIPR	TRW, CA	2866	5000	1-4Q	4000	1-4Q	3000	1-4Q	Continue	14866	0
j . Integrated Digital Environment for JTRS	CPFF	ARINC, NJ	175	0		0		0		0	175	0
k . CECOM Antenna Effort (JTRS)	MIPR	Booz Allen and Hamilton, McLean, VA	0	250	1-3Q	0		0		0	250	0
Subtotal:			32550	5250		4000		3000		Continue	44800	1030
III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Developmental Test & Evaluation (A2C2S)	MIPR/CPIF	ATEC/RTTC/AATD/AED/Raytheon, AL	7256	0		0		0		0	7256	0
b . Operational Test & Evaluation (A2C2S)	MIPR	TEXCOM FT. Hood, TX	250	0		0		0		0	250	0
c . IA Certification (IDM)	MIPR	AMCOM,CECOM	701	0		0		0		0	701	0
d . Test and Evaluation (JTRS)	MIPR	Various	0	36	1-4Q	1266	1-4Q	7482	1-4Q	Continue	8784	0

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III. Test and Evaluation (continued)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
			8207	36		1266		7482		Continue	16991	0
Subtotal:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a . Program Management Operations (A2C2S)	Various	Various	9182	0		0		0		0	9182	0
b . Government Engineering Support (A2C2S)	MIPR	AMCOM, AL	742	0		0		0		0	742	0
c . PM Spt (Digitization)	CPFF/C MIPR	AMCOM PATS, AL	215	0		0		0		0	215	0
d . PM Spt (IDM)	MIPR	AMCOM, AL	1119	151	1-4Q	0		0		Continue	1270	0
e . PM Spt (JTRS)	MIPR	AMCOM, AL	815	1774	1-4Q	3233	1-4Q	2231	1-4Q	Continue	8053	0
Subtotal:			12073	1925		3233		2231		Continue	19462	0
Project Total Cost:			191671	39559		64650		44685		Continue	Continue	1030

Schedule Profile Detail (R-4a Exhibit)							February 2003	
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Schedule Detail	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Continue RAH-66 Software Development (IDM)	1-3Q					1-4Q		
Initiated ATC Support	4Q							
Continue CH-47F test plans, software development, and B-Kit Integration in support of IDM (IDM)	1-4Q					1-4Q		
Initiate/Continue effort to Integrate IDM/EBC software into the UH/HH-60M (IDM)	1-4Q	1-3Q				1-4Q		
Initiate/Continue Program Management support for IDM (IDM)	1-4Q	1-4Q				1-4Q		
Deploy System 2 to 101st ABN (A2C2S)	1Q							
Continued Developmental Testing (A2C2S)	1-4Q							
DCX II (A2C2S)	1Q							
Received JTRS MDAP decision (JTRS)	3Q							
Initiate/Continue system level testing for AH-64D, CH-47F, UH/HH060M (JTRS)		1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Initiate/Continue development of JTRS A-Kit for AH-64D, CH-47F, and UH/HH-60M (JTRS)	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Initiated/Continue Systems Eng/Log Efforts for JTRS (JTRS)	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Initiated/Continue Prog Mgmt Support for JTRS A-Kit (JTRS)	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q
Initiate/Continue ICNIA Efforts for JTRS (JTRS)	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q		
Initiate/Continue CECOM Antenna Development (JTRS)		1-3Q						
Initiated/Continue contractual effort to support AH-64D, CH-47F & UH/HH-60M (JTRS)	1-4Q	1-4Q						
Continue Test and Evaluation Support (JTRS)		1-4Q	1-4Q	1-4Q				
Continue development of Airborne Separation Video System (ASVS)		1-4Q						
Initiate Transition Software Development (AMPS)	4Q			1-4Q		1-4Q	1-4Q	1-4Q