ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE
5 - System Development and Demonstration	**0604662A - FCS Reconnaissance (UAV) Platforms**

COST (In Thousands)		FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
FC3	FCS RECONNAISSANCE (UAV) PLATFORMS	42772	57190	68701	Continuing	Continuing

A. Mission Description and Budget Item Justification: The XM 156 Class I system for System Development and Demonstration (SDD) consists of an air vehicle with a 10 HP heavy fuel engine, a combined EO/IR/LD/LRF sensor pod, and a common controller with a set of ancillary equipment. The Class I UAV provides the dismounted soldier Reconnaissance, Surveillance, and Target Acquisition (RSTA) and has the ability to hover and stare at military operations on rural and urban terrain. The Class I provides imagery data in order to recognize personnel and provide targeting information to the FCS network during day and night operations and in adverse weather conditions from as high as 1000 feet above ground level. Weighing less than 41 pounds, the air vehicle operates in complex urban and rural terrains with a vertical take-off and landing capability. The Class I system is carried in two custom MOLLEs and is air droppable with soldier. The Class I program will integrate and test the following sensors and software developed as part of Project FC6, PE 0604665A: EO/IR/LD/LRF sensor and all of SoSCOE and Battle Command Software. The Chief of Staff, Army (CSA) has directed the FCS program to incorporate the Class I (Block 0) UAV into the Early-Infantry Brigade Combat Team (E-IBCT) increment in order to expedite providing this additional ISR capability to the soldier starting in 2011. The Class I (Block 0) capability will consist of a smaller airframe than the threshold FCS Class I with a current force EO sensor and an IR sensor and a gasoline based propulsion system. This technology will be incorporated into the Class I SDD UAV with an airframe featuring an EO/IR/LD/LRF sensor and a heavy fuel based propulsion system. The Class I solution for the Threshold-Infantry Brigade Command Team (T-IBCT) will be the threshold compliant system, to include the larger airframe and the EO/IR with the laser target designator.

The XM157 Class IV UAV has a range and endurance appropriate for the brigade mission. Class IV supports the BCT Commander with communications relay, long endurance persistent stare, and wide area surveillance over 75km radius. Unique missions include Wide Band Communications Relay; standoff radiological detection; and minefield detection. Additionally, Class IV has the payloads to enhance the RSTA capability by cross-cueing multiple sensors. It operates at survivable altitudes at standoff range day and night and during adverse weather. The Class IV is a joint effort with the Navy's VTUAV Fire Scout program. The CL IV uses a two phase assembly process. Phase I Integration corresponds to approximately 90% of the complete assembly, includes major components airframe, engine, and wiring harness. Phase II Integration adds the unique avionics and payloads completing the FCS Class IV UAV. The FCS unique equipment includes: 1) Type IV Integrated Computer System (ICS); 2) Joint Tactical Radio System (JTRS) Handheld, Manpack, Small Form Fit (HMS SFF-J); 3) Warfighter's Information Network - Tactical (WIN-T) JC4ISR radio; 4) ASTAMIDS EO/IR/LRF/LD/CM payload; 5) STARLite SAR/GMTI payload; 6) System Survivability Suite (SSS); 7) JTRS - Airborne, Maritime and Fixed (AMF) Communications Relay Package (CRP). The Class IV program will integrate and test the following sensors and software: developed as part of Project FC6 PE 0604665A - Type IV Integrate Computer System (ICS), Warfighter's Information Network - Tactical (WIN-T) JC4ISR radio, EO/IR/LRF/LD/CM payload, System Survivability Suite (SSS); ASTAMIDS; JTRS - JTRS-GM, JTRS HMS, SAR/GMTI Payload. The Class IV UAV is included in the T-IBCT increment.

The UAV program has been changed due to restructuring of the MGV portion of the FCS program and the refocusing of the FCS program to spin out FCS technologies faster to the IBCT. The accomplishments, funding, and schedule reflected in this justification are based on preliminary analysis of the new direction and reduced program budget. Upon further resolution and detailed planning, adjustments may occur which could potentially change planned accomplishments, funding requirements, and program schedule. The schedule reflects the current FCS program.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE
5 - System Development and Demonstration	**0604662A - FCS Reconnaissance (UAV) Platforms**

B. Program Change Summary	FY 2008	FY 2009	FY 2010
Previous President's Budget (FY 2009)	43388	34379	14296
Current BES/President's Budget (FY 2010)	42772	57190	68701
Total Adjustments	-616	22811	54405
Congressional Program Reductions		-189	
Congressional Recissions			
Congressional Increases		23000	
Reprogrammings	500		
SBIR/STTR Transfer	-1214		
Adjustments to Budget Years	98		54405

Change Summary Explanation: Funding - FY10: $54.405M increase due to: 1) Army procuring Class I earlier than planned in FY08 to support SO, 2) Army delayed Class I work from FY08 to FY10 due to no additional FY08 funds, 3) Increase to cost due to loss of efficiency from delays noted from FY08 to FY10, 4) Increase Class IV effort to meet T-IBCT schedule.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - System Development and Demonstration	**0604662A - FCS Reconnaissance (UAV) Platforms**	**FC3**

COST (In Thousands)		FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	Cost to Complete	Total Cost
FC3	FCS RECONNAISSANCE (UAV) PLATFORMS	42772	57190	68701	Continuing	Continuing

A. Mission Description and Budget Item Justification: Please see Exhibit R-2.

Accomplishments/Planned Program:	FY 2008	FY 2009	FY 2010
UAV Class I Engineering & Program Mgt FY08 - Began design effort to support the Class I preliminary design review (PDR) scheduled for 1st qtr FY09. Conducted the 10 horsepower Heavy Fuel Engine (HFE) critical design review (CDR) 2nd qtr FY 08. Completed integration of Laser Designation capability for Class I into the program design.	15702		
UAV Class I Engineering & Program Mgt FY09 - Conduct Class I PDR 1st qtr FY09. Begin design effort required to support the Class I critical design review scheduled for 4th qtr FY10. Approximately 500 drawings are estimated to be required; forty drawings were completed.		23149	
UAV Class I Engineering & Program Mgt FY10 - Conduct Class I critical design review 4th qtr FY10. A total number of 500 drawings are estimated to be complete, 400 drawings are estimated to be released by CDR. Begin planning efforts to support T-IBCT.Conduct Class I critical design review 4th qtr FY10. Approximately 500 drawings are estimated to be require, 400 drawings are estimated to be released by CDR. Begin planning efforts to support T-IBCT.			13705
UAV Class I Prototype Development FY08 - Began Early Air Vehicle Integration in the Class I System Integration Lab (SIL) for hardware and software development of Electro Optical Infra-Red Laser Designator Range Finder (EO/IR/LD/LRF) sensor control and air vehicle flight controls. Continued Early Risk Reduction testing of HFE. Provided prototypes to begin Early Air Vehicle Integration in the Class I SIL for hardware and software development of EO/IR/LD/LRF sensor control and air vehicle flight controls.	2040		
UAV Class I Prototype Development FY09 - Begin manufacturing and fabrication of 4 engines and airframes for Engineering Development Assets (EDAs) where EDAs are to be used to conduct initial Class I risk reduction testing.		1396	
UAV Class I Prototype Development FY10 - Deliver 4 engines and airframes for EDAs, where the EDAs are to be used to conduct initial Class I risk reduction testing and early environmental risk reduction testing. EDAs will be delivered to Honeywell Upgrade 11 Class I Block 0 Systems with Digital Data Link (DDL) (C2 and video) radios.			525
UAV Class I Test FY08 - Executed Experiment 2.1 and documented the operation of the Class I surrogate (MAV system) utilizing a JTRS surrogate (SLICE) radio link and the Soldier Radio Waveform (SRW). Participated in Joint Expeditionary Force Experiment (JEFX)/Experiment 2.1 to determine value of manned/unmanned teaming with Apache AH-64 D and UAV Class IV Surrogate, disseminating stream videos over future networks.	8105		
UAV Class I Test FY09 - Continue Class I system integration in the Class I system integration laboratory to support software development for EO/IR/LD/LRF sensor control, air vehicle flight controls, heavy fuel engine integration and executing mission sets, in order to meet threshold requirements.		4639	

UAV Class I Test FY10 - Begin Class I risk reduction testing with 4 EDAs to include early environmental testing. Conduct 1st Risk Reduction Flight in 1st qtr FY10 (Tethered Flight with Airframe & Heavy Fuel Engine). Continue Class I system integration in the Class I system integration laboratory to support software development for EO/IR/LD/LRF sensor control, air vehicle flight controls, heavy fuel engine integration, executing mission sets, and to support risk reduction testing of EDAs in order to meet threshold requirements.			8970
UAV Class I Software Development FY08 - Began Early Air Vehicle Integration in the Class I System Integration Lab for software development of Electro Optical Infra-Red Laser Designator Range Finder (EO/IR/LD/LRF) sensor control and air vehicle flight controls.	853		
UAV Class I Software Development FY09 - Complete Class I system integration in the Class I System Integration Lab for software development of EO/IR/LD/LRF sensor control and air vehicle flight controls.		1837	
UAV Class I Software Development FY10 - Perform test-fix-test in the Class I system integration lab for EO/IR/LD/LRF sensor control and air vehicle flight control software.			1496
GFX- Developed the mission kit for the Class IV Surrogate and install in UH-1 flight test to achieve Air Worthiness approval. The Class IV Surrogate capabilities include a day camera providing Intelligence, Surveillance and Reconnaissance (ISR) to Highband Networking Waveform (HNW) and Tactical Common Data Link (TCDL) transport layers allowing the opportunity to experiment with Manned/Unmanned Teams. Also provided Airborne network thickening via comms relay for HNW, Wideband Networking Waveforms (WNW), and Soldier Radio Waveforms (SRW). Completion of the Apache participation in the Joint Expeditionary Force Experiment (JEFX) 2.1 which integrates Soldier Radio Waveform (SRW) and the H264 video card onto an AH-64D.	629		
UAV Class IV Engineering and Program Mgt FY08 - Began planning for PDR. Supported Source Selection activities for Synthetic Aperture Radar (SAR) payload for Class IV. Continued Integration Phase 2 activities to include Engineering Iteration 2. Supported System of System logistics and training. Accepted delivery of Class IV Simulation Build to SoSIL. A total of 686 drawings are estimated for the Class IV program. A total of 592 are completed to date, 94 drawings remain to be completed.	8309		
UAV Class IV Engineering and Program Mgt FY09 - Conducted the Class IV UAVS Preliminary Design Review in Dec 2008. Conduct Joint Executive Steering group meetings on Common Air Vehicle with Navy to ensure cost effective decisions in E3 and structures. Plan and initiate the efforts needed to complete the CDR effort in FY10. Develop weight and endurance improvement plans to meet ORD requirements. Manage interfaces between Class IV and STARLite SAR/GMTI, and ASTAMIDS programs. Remaining open drawings will capture design changes associated with endurance improvements, transportability changes, ICS redesign, and parallel Complementary Program changes. Complete drawings will make up part of the LRIP Technical Data Package. Final design changes will be approved at CDR.		12490	
UAV Class IV Engineering and Program Mgt FY10 - Conduct Class IV CDR beginning 1st qtr FY10. Complete remaining Class IV 94 drawings. Final design changes will be approved at CDR. FY10 Engineering activities include NG SIL integration of the Integrated Computer System, JTRS radios, and BC 2F software. NGC Phase II Integration activities (FCS hardware installation in prototypes) begin in FY10. Begin planning efforts to support T-IBCT.			17048
UAV Class IV Prototype Development FY08 - Accepted delivery of Army/Navy common airframes A6-A8. Completed Phase 1 assembly install common Army/Navy components of SDD for Air Vehicles #A3-A5.	1082		
UAV Class IV Prototype Development FY09 - Complete Phase 1 assembly (install common Army/Navy components) of Air Vehicles A6-A8. Accept delivery of emulator and brass board Air Platform Communications Systems (APCS) Hardware for initial integration into FCS SILs.		1183	

UAV Class IV Prototype Development FY10 - Begin Phase 2 Assembly (installation of FCS-unique mission equipment) of SDD air vehicles A1-A4; complete assembly of A1 and A2. Launch Control Unit (LCU) #1 will be delivered.			3510
UAV Class IV Test FY08 - Concluded Army-Navy Rotor Hub Fatigue Test. Conducted vendor level component and subsystem delta testing for Electromagnetic Environmental Effects.	4379		
UAV Class IV Test FY09 - Joint Navy/Army Common System Level E3 Testing on Navy platform. Main rotor hub fatigue testing (envelope expansion to Army usage) conducted by RTTC using loaned Navy and Schweizer developed test hardware (Navy structures personnel participating). Begin integration of Build 2 Final Engineering Release SW into NGC SIL for IQT.		7824	
UAV Class IV Test FY10 - Begin detailed test planning in FY10 for IQT, including: system-level Electromagnetic Environmental Effects (E3), transportability/mobility, and climatic testing, and flight testing of the basic air vehicle, STARLite SAR/GMTI, ASTAMIDS, AiTR, and Comms Relay Package. Conduct hardware and software system integration. Perform Functional Qualification Testing (FQT) with Battle Command Build 2 Final engineering release ending 3rd Qtr FY10. Conclude vendor level component and subsystem Electromagnetic Environmental Effects (E3) testing.			16518
UAV Class IV Software Development FY08 - Accepted delivery of Class IV Simulation S/W Build 1 to SoSIL. Began Class IV Simulation S/W Build 2 (incorporate BC B2F operational code, ASI ASTAMDS and STARLite SAR/GMT simulation updates, air vehicle updates based on flight test data, and limited dynamic weather/terrain updates). Begin Operational Flight Test (OFT) Software Build 2.	1673		
UAV Class IV Software Development FY09 - Complete development of Class IV Simulation S/W Build 2. Begin development of Class IV Simulation S/W Build 3 (incorporate BC B3E and B3F operational code, ASI simulation updates as required, air vehicle updates based on flight test data, and enhanced dynamic weather/terrain updates). Continue development of Operational Flight Software Build 2.		3070	
UAV Class IV Software Development FY10 - Accept delivery of Battle Command Build 2 Final engineering release 3rd Qtr FY10. Continue development of Northrop Grumman Corporation operational flight software Build 3. Continue development of (NGC) Simulation S/W Build 3.			6929
Small Business Innovative Research/Small Business Technology Transfer Programs		1602	
Total	42772	57190	68701

B. Other Program Funding Summary	FY 2008	FY 2009	FY 2010	To Compl	Total Cost
0604660A FCS Manned Grd Vehicles & Common Grd Vehicle Components	635846	782664	368557	Continuing	Continuing
0604661A FCS System of Systems Engr & Program Management	1292514	1414756	1067191	Continuing	Continuing
0604663A FCS Unmanned Ground Vehicles	78826	102976	125616	Continuing	Continuing
0604664A FCS Unattended Ground Sensors	22007	17011	26919	Continuing	Continuing
0604665A FCS Network Hardware & Software	724397	556301	749182	Continuing	Continuing
0604646A Non Line of Sight - Launch System	246071	208009	88660	Continuing	Continuing

0604647A Non Line of Sight - Cannon	133139	89545	58216	Continuing	Continuing
0604666A FCS Spin Outs	84111	111032		Continuing	Continuing
0603639A FCS MRM	43068	40731		Continuing	Continuing
WTCV G86100 FCS Core Program	78932	154127		Continuing	Continuing
WTCV G86200 FCS Spin Out Program	1370	67268	327921	Continuing	Continuing
0605625A FCS Manned Ground Vehicles			100000	Continuing	Continuing

Comment: Comp Programs: ASTAMIDS, GSTAMIDS, WIN-T, JTRS-HMS, JTRS-GMR, JTRS-AMF, STARLite SAR/GMTI, JAVELIN, JCADS, JSLSCAD, DCGS-A, FBCB2, OneTESS, OneSAF

C. Acquisition Strategy The original FCS Contract was awarded to the Boeing Company 30 May 2003 and definitized 10 Dec 2003. Boeing has contracted with various One Team Partners as follows: Honeywell (NM) and Northrop Grumman (CA). The Class I UAV (non-threshold) will be included in the initial Spin Out to the IBCT. As the program transitions to an incremental development approach, the above will continue to be provided by Boeing to the E-IBCT and T-IBCT.

ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604662A - FCS Reconnaissance (UAV) Platforms

PROJECT
FC3

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
Class I	FAR	Boeing Co., St. Louis, MO See Remark 1		26700	1-3Q	31021	1-3Q	24696	1-3Q	Cont.	Cont.	
Class IV	FAR	Boeing Co., St. Louis, MO See Remark 2		15345	1-3Q	24567	1-3Q	44005	1-3Q	Cont.	Cont.	
GFX	MIPR	PM FCS (BCT), ST Louis,MO		629	1-3Q						629	
Congressional Add for FCS Reconnaissance Platforms	Direct				1-2Q						2500	
Subtotal:				42674		55588		68701		Cont.	Cont.	

Remarks: Remark 1: Subcontractor: Honeywell International, Inc - Albuquerque, New Mexico
Remark 2: Subcontractor: Northrop Grumman Unmanned Systems - San Diego, CA

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
SBIR/STTR	Direct	OSD				1602	2-3Q				1602	
Adjustment to budget years	Direct	ABO		98	1Q						98	
Subtotal:				98		1602					1700	

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
Subtotal:												

Remarks: All Test and Evaluation costs for this project are included in 0604661 FC2 SoS Engineering and Program Management project.

IV. Management Services	Contract	Performing Activity &	Total	FY 2008	FY 2008	FY 2009	FY 2009	FY 2010	FY 2010	Cost To	Total	Target

ARMY RDT&E COST ANALYSIS (R3)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - System Development and Demonstration	**0604662A - FCS Reconnaissance (UAV) Platforms**	**FC3**

	Method & Type	Location	PYs Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Complete	Cost	Value of Contract
Subtotal:												

Remarks: All Management Services costs for this project are included in 0604661 FC2 SoS Engineering and Program Management project.

Project Total Cost:		**42772**		**57190**		**68701**		**Cont.**	**Cont.**	

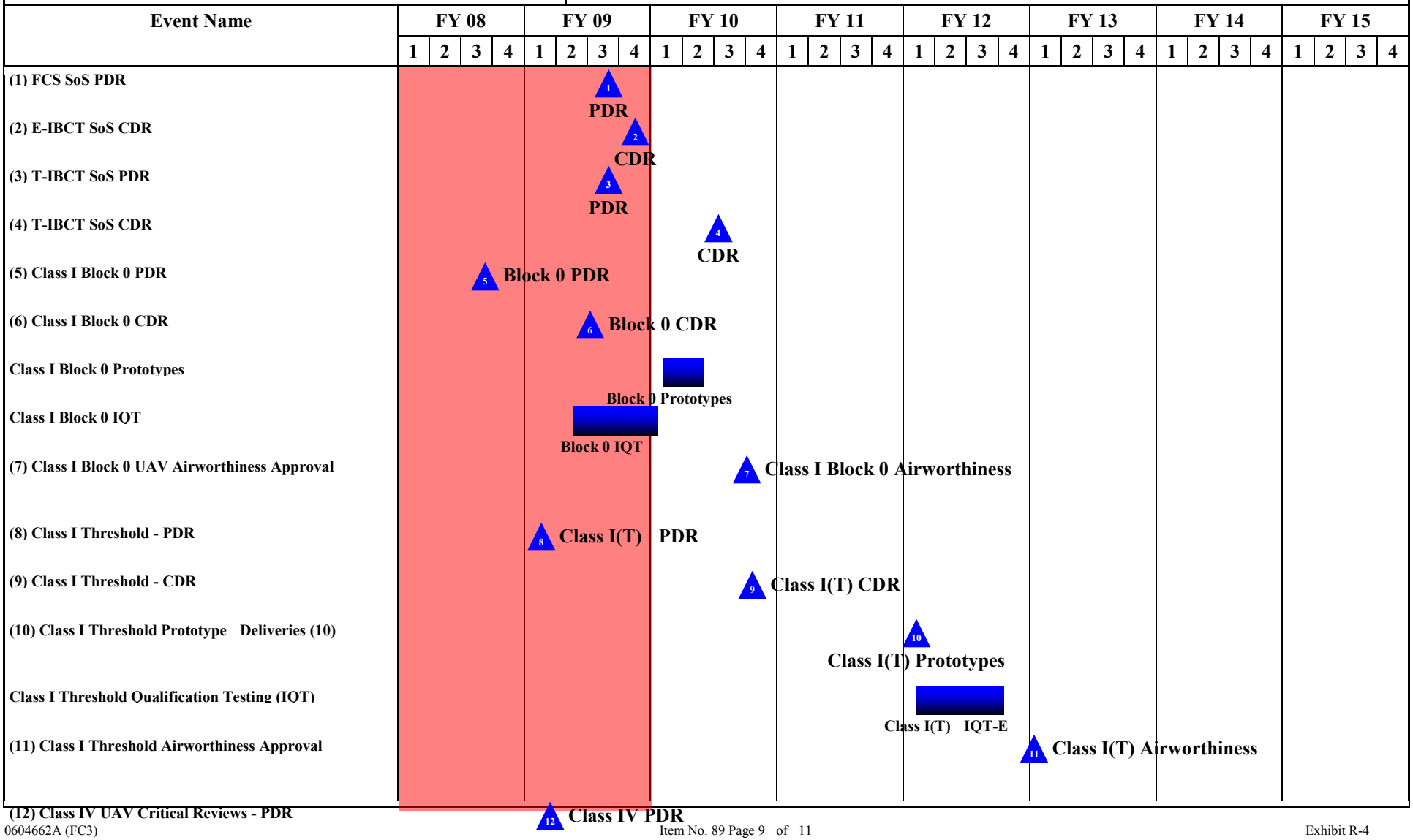
Schedule Profile (R4 Exhibit)

May 2009

BUDGET ACTIVITY
5 - System Development and Demonstration

PE NUMBER AND TITLE
0604662A - FCS Reconnaissance (UAV) Platforms

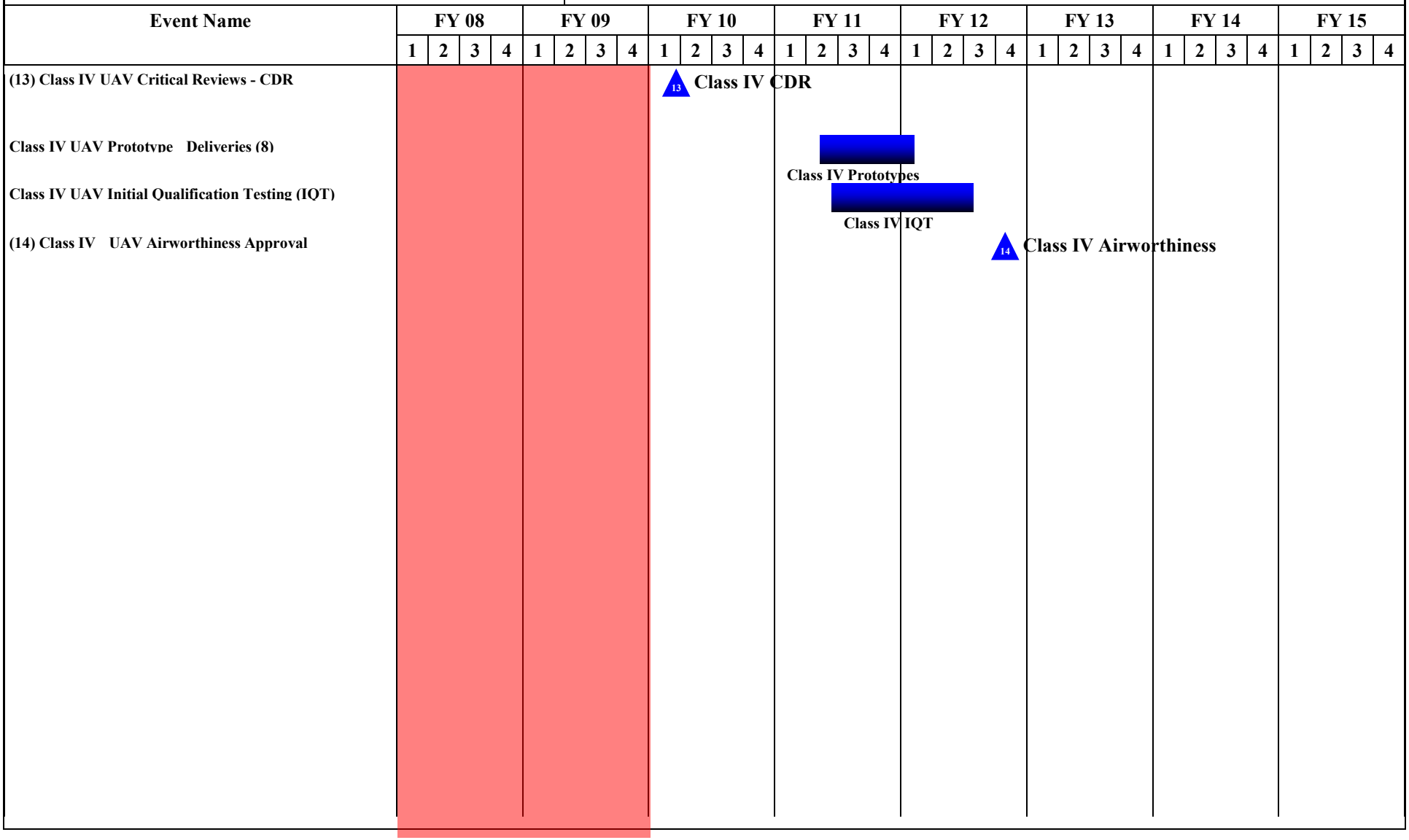
PROJECT
FC3



Schedule Profile (R4 Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - System Development and Demonstration	0604662A - FCS Reconnaissance (UAV) Platforms	FC3



Schedule Detail (R4a Exhibit)

May 2009

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
5 - System Development and Demonstration	**0604662A - FCS Reconnaissance (UAV) Platforms**	**FC3**

Schedule Detail	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
FCS SoS PDR		3Q						
E-IBCT SoS CDR		4Q						
T-IBCT SoS PDR		3Q						
T-IBCT SoS CDR			3Q					
Class I Block 0 PDR	3Q							
Class I Block 0 CDR		3Q						
Class I Block 0 Prototypes			1Q - 2Q					
Class I Block 0 IQT		2Q - 4Q	1Q					
Class I Block 0 UAV Airworthiness Approval			3Q					
Class I Threshold - PDR		1Q						
Class I Threshold - CDR			4Q					
Class I Threshold Prototype Deliveries (10)					1Q			
Class I Threshold Qualification Testing (IQT)					1Q - 4Q			
Class I Threshold Airworthiness Approval						1Q		
Class IV UAV Critical Reviews - PDR		1Q						
Class IV UAV Critical Reviews - CDR			1Q					
Class IV UAV Prototype Deliveries (8)				2Q - 4Q	1Q			
Class IV UAV Initial Qualification Testing (IQT)				2Q - 4Q	1Q - 3Q			
Class IV UAV Airworthiness Approval					4Q			

The schedule reflected in this R-Form is based on preliminary analysis of the available budget. Upon further resolution and detailed planning, adjustments may occur which could potentially change the program schedule.