

# ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

**February 2008**

<b>BUDGET ACTIVITY</b> <b>5 - System Development and Demonstration</b>		<b>PE NUMBER AND TITLE</b> <b>0604664A - FCS Unattended Ground Sensors</b>					<b>PROJECT</b> <b>FC5</b>		
COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total Cost
FC5 FCS UNATTENDED GROUND SENSORS		10929	12967	18968	16754				59618

**A. Mission Description and Budget Item Justification:** The FCS BCT Unattended Ground Sensors (UGS) program is divided into two major configurations of sensing systems: URBAN-UGS (U-UGS), also known as Urban Military Operations in Urban Terrain (MOUT) Advanced Sensor System (UMASS); and TACTICAL-UGS (T-UGS), which includes Intelligence, Surveillance and Reconnaissance (ISR)-UGS and Chemical, Biological, Radiological and Nuclear (CBRN)-UGS. U-UGS - Will provide a low cost, network-enabled reporting system for Situational Awareness (SA) and force protection in an urban setting, as well as residual protection for cleared areas of urban MOUT environments. The U-UGS system can support BCT operations by monitoring urban choke points such as rooms, halls, attics, basements, sewers, culverts, tunnels, caves, and alleyways. They can be hand-emplaced by Soldiers or robotic vehicles either inside or outside buildings and structures. When a platoon or squad clears a building for example, U-UGS are left behind to perform surveillance that would otherwise require dedicated soldiers.

The U-UGS system provides a self-organizing wireless network that consists of three configuration items; personnel detect sensors, imaging sensors, and gateways.

1. Personnel Detect Sensors provide dual mode, passive infrared and RF microwave motion sensing for "trip-wire" detection of intruders.
2. Imaging Sensors provide electro-optical visual imaging with a near-infrared illuminator for operation in full darkness.
3. Gateways organize and manage the sensor network, and communicate sensor data to FCS C2 Joint Tactical Radio System (JTRS) systems and to the local dismounts.

T-UGS - Tactical-UGS (T-UGS) includes Intelligence, Surveillance and Reconnaissance (ISR)-UGS and Chemical, Biological, Radiological and Nuclear (CBRN)-UGS. The UGS (T-UGS) are designed for remote tactical operations in open spaces, at road choke points, avenues of approach, etc, and are designed to be emplaced by hand or by remote deployment methods. T-UGS provides ISR and CBRN awareness to the FCS (BCT) areas not covered by manned/unmanned ground/air vehicles. Packaging the common form factor enables simplified scalability and upgrade paths for future technology insertion, while the distributed sensing capability enhances mission flexibility and system versatility. The T-UGS system consists of five configuration items (nodes), each containing a unique set of sensing capabilities, and sharing a common hardware form factor.

1. The T-UGS ISR sensor node provides for vehicle and personnel detection capabilities via seismic, acoustic and magnetic sensors. Seismic sensors are the primary means of personnel detection. The principal means of vehicle detection and tracking are the acoustic bearing sensors. The ISR-UGS will be modular and composed of tailorable sensor groups using multiple ground-sensing technologies. Multiple sensors support precision location and simultaneous tracking of multiple targets.
2. When confirmed as a valid target of interest, Electro Optical/Infrared (EO/IR) sensor nodes will autonomously capture multiple images of the target.
3. The CBRN node provides for chemical, biological, radiological, and nuclear sensing and reporting capability.
4. The Hazard/Clear Lane Marker (H/CLM) nodes are deployed to mark hazardous keep-out zones, or to define cleared lanes through hazardous areas such as minefields.
5. The final component of the T-UGS system is the Long-Haul gateway node that provides radio communications and integration into the FCS network.

<b><u>Accomplishments/Planned Program:</u></b>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
IAW Section 214 of the FY2006 National Defense Authorization Act, this Program Element was established commencing with FY2008 President's Budget request. This Program Element replaced the previous Project F57 under the Armored System Modernization Program Element 0604645A. The major FY2007 program accomplishments for that project are described below to show continuity of the			

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development efforts.			
UNATTENDED GROUND SENSORS FY08 - UNATTENDED GROUND SENSORS - FY08 - Complete and release Thresholds PIDS. Complete delivery of 16 U-UGS and 10 T-UGS systems by 2nd Qtr 08. Complete safety certification at SO1 LUT Qualification Testing. Provide technical support to TFT & LUT test at JEFX 08. Update Future UGS LRIP Design by changing MSRT radio into a JTRS HMS. Conducting affordability initiatives to attempt to lower production costs. Also redesigning deck shape and material to lower production costs and make emplacement easier.		10623	
Unattended Ground Sensors FY09 - Conduct CDR for SO1 LRIP UGS design, incorporating new radio and affordability configurations. Build, qualify and deliver UGS systems for CVT (5 each T-UGS and 5 U-UGS). Conduct SRR for UGS Core Systems.			12967
Small Business Innovative Research/Small Business Technology Transfer Programs		306	
<b>Total</b>		<b>10929</b>	<b>12967</b>

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**PROJECT**  
**FC5**

<u><b>B. Program Change Summary</b></u>	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008/2009)		10999	12942
Current BES/President's Budget (FY 2009)		10929	12967
Total Adjustments		-70	25
Congressional Program Reductions		-70	25
Congressional Recissions			
Congressional Increases			
Reprogrammings			
SBIR/STTR Transfer			
Adjustments to Budget Years			

<u><b>C. Other Program Funding Summary</b></u>	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Compl	Total Cost
0604660A FCS M060anned Grd Vehicles & Common Grd Vehicle Components		592244	774257	785575	358641	214207	103230	Continuing	Continuing
0604661A FCS System of Systems Engr & Program Management		1497321	1413945	1874987	1916207	1290308	1027816	Continuing	Continuing
0604662A FCS Reconnaissance (UAV) Platforms		43388	34379	14296	9235	4556	1336	Continuing	Continuing
0604663A FCS Unmanned Ground Vehicles		90091	96918	64744	43601	26855	3580	Continuing	Continuing
0604664A FCS Unattended Ground Sensors		10929	12967	18968	16754			Continuing	Continuing
0604665A FCS Network Hardware & Software		647649	539145	334085	365287	290790	169526	Continuing	Continuing
0604646A Non Line of Sight - Launch System	313981	253075	200099	40043	5957			Continuing	Continuing
0604647A Non Line of Sight _ Cannon	108689	136929	89841	71396	43222	28775		Continuing	Continuing
0604666A FCS Spin Outs	27900	64385	64900	67021	51026	56287	14637	Continuing	Continuing
0603639A FCS MRM		44294	45866	71451	56296	106353	50757	Continuing	Continuing
0604715A STRICOM/NAWCTSD Support		378	388	398	406	415	426	Continuing	Continuing
WTCV G86100 FCS Core Program		80932	154583	148028	677820	2175327	5744649	Continuing	Continuing
WTCV G86200 FCS Spin Out Program		19987	176667	367962	550821	766274	944999	Continuing	Continuing

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AMMO E88103					24634	47624	61762	134020
0604645 F52 UAV Recon & Sensors	41813						Continuing	Continuing
0604645 F53 UGV	104301						Continuing	Continuing
0604645 F54 UGS	10391						Continuing	Continuing
0604645 F55 SUSTAINMENT	104302						Continuing	Continuing
0604645 F57 MANNED GROUND VEHICLES	516217						Continuing	Continuing
0604645 F61 SoS Engineering and Program Management	2150508						Continuing	Continuing

Comment:

**D. Acquisition Strategy** The original FCS Contract was awarded to the Lead Systems Integrator 30 May 2003 and definitized 10 Dec 2003, to Boeing. The LSI contracted with its One Team Partner, Textron Systems, Wilmington, (MA) producing the Urban Unattended Ground Sensors (U-UGS) and Tactical Unattended Ground Sensor (T-UGS). T/U UGS prototypes were delivered to the Army Evaluation Task Force (AETF) and will complete Spin Out 1 Milestone C in Jan 09.

# ARMY RDT&E COST ANALYSIS (R3)

February 2008

BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT		
5 - System Development and Demonstration			0604664A - FCS Unattended Ground Sensors							FC5		
I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Unattended Ground Sensors (UGS)	FAR	The Boeing Company - St Louis, MO See Remark 1				10623	1Q	12967	1Q		23590	
Subtotal:						10623		12967			23590	
Remarks: Remarks 1: Subcontractor: Textron Systems, Intelligent Battlefield System Division - Willington, MA												
II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR		OSD				306	2-3Q				306	
Subtotal:						306					306	
III. Test And Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal:												
IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award Date	FY 2008 Cost	FY 2008 Award Date	FY 2009 Cost	FY 2009 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal:												
<b>Project Total Cost:</b>						<b>10929</b>		<b>12967</b>			<b>23896</b>	

# Schedule Profile (R4 Exhibit)

February 2008

BUDGET ACTIVITY  
**5 - System Development and Demonstration**

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**0604664A - FCS Unattended Ground Sensors**

PROJECT  
**FC5**

Event Name	FY 07				FY 08				FY 09				FY 10				FY 11				FY 12				FY 13											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
(1) FCS SoS Critical Reviews-PDR, (2) CDR									▲ PDR								▲ CDR																			
FCS SoS Integration / Verification Phase 1																	IV1																			
FCS SoS Test - Phase 1																	LUT1 & IMT1																			
FCS SoS Integration / Verification Phase 2																					IV2															
FCS SoS Test - Phase 2																					IMT2 & LUT2															
FCS SoS Integration / Verification Phase 3																									IV3											
FCS SoS Test - Phase 3																													IMT3 & LUT3							
FCS SoS Integration / Verification Phase 4																																	IV4			
(3) FCS UGS T/U for SO1 Critical Reviews									▲ UGS T/U SO1 CDR																											
FCS T/U UGS SO1 Prototype Deliveries																																				
FCS T/U UGS SO1 Testing	T/U UGS SO1 Prototypes (10-T 16-U)								T/U UGS SO1 Test																											
(4) FCS UGS T/U Core Critical Reviews-PDR																	▲ UGS T/U PDR																			
(5) FCS UGS T/U Core Critical Reviews-CDR																	▲ UGS T/U CDR																			
FCS UGS-T/U Core Prototype Deliveries																																				

UGS-T/U Prototypes (8-T 8-U)

# Schedule Profile (R4 Exhibit)

February 2008

BUDGET ACTIVITY  
**5 - System Development and Demonstration**

PE NUMBER AND TITLE  
**0604664A - FCS Unattended Ground Sensors**

PROJECT  
**FC5**

Event Name	FY 07				FY 08				FY 09				FY 10				FY 11				FY 12				FY 13			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FCS UGS-T/U Testing																					UGS-T/U Test							

**Schedule Detail (R4a Exhibit)**

**February 2008**

BUDGET ACTIVITY  
**5 - System Development and Demonstration**

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PROJECT  
**FC5**

<u>Schedule Detail</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>
FCS SoS Critical Reviews-PDR			3Q				
CDR					3Q		
FCS SoS Integration / Verification Phase 1		1Q - 4Q	1Q - 2Q				
FCS SoS Test - Phase 1		2Q - 4Q					
FCS SoS Integration / Verification Phase 2			3Q - 4Q	1Q - 4Q	1Q - 2Q		
FCS SoS Test - Phase 2				3Q - 4Q			
FCS SoS Integration / Verification Phase 3					1Q - 4Q	1Q - 4Q	1Q - 3Q
FCS SoS Test - Phase 3						3Q - 4Q	1Q
FCS SoS Integration / Verification Phase 4							1Q - 4Q
FCS SoS Test - Phase 4							
FCS UGS T/U for SO1 Critical Reviews							
FCS UGS T/U for SO1 Critical Reviews	2Q						
FCS T/U UGS SO1 Prototype Deliveries		1Q					
FCS T/U UGS SO1 Testing		1Q - 2Q					
FCS UGS T/U Core Critical Reviews-PDR				3Q			
FCS UGS T/U Core Critical Reviews-CDR					2Q		
FCS UGS-T/U Core Prototype Deliveries						2Q	
FCS UGS-T/U Testing					3Q - 4Q	1Q - 2Q	