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Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Army **DATE:** February 2012

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE							
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 5: <i>Development & Demonstration (SDD)</i>				PE 0604663A: <i>FCS Unmanned Ground Vehicles</i>							
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
Total Program Element	200.000	35.966	-	-	-	-	-	-	-	Continuing	Continuing
FC4: <i>BCT UNMANNED GROUND VEHICLES</i>	200.000	35.966	-	-	-	-	-	-	-	Continuing	Continuing

Note

Change Summary Explanation: Funding: FY13: Funding (\$13.141 million) will continue under Program Element 0604641A Project DV7.

A. Mission Description and Budget Item Justification

This PE has no FY 2013 Base or OCO request. The FY2013 funding continues under Tactical Unmanned Ground Vehicle (Small Unmanned Ground Vehicle) Program Element 0604641A Project DV7.

The Small Unmanned Ground Vehicle (SUGV), designated as the XM-1216, is a lightweight (32 lbs), man-portable, DC powered UGV capable of conducting Military Operations in Urban Terrain (MOUT) to include tunnels, sewers, and caves. The SUGV provides an unmanned capability for those missions that are manpower intensive or high-risk such as Urban Intelligence, Surveillance, and Reconnaissance (ISR) missions in a MOUT environment, investigating Improvised Explosive Devices and Chemical/Toxic Materials reconnaissance missions without exposing soldiers directly to the hazard. The SUGV will be used to obtain information on situational awareness at the squad level.

SUGV Increment 1 XM1216: The INC 1 SUGV is based on the IBCT Capability Production Document (CPD) threshold requirements. The SUGV INC 1 features a lightweight highly mobile SUGV platform with improved and tested reliability and an integrated Commercial off the Shelf (COTS) sensor head and radio. In early FY10 the SUGV INC 1 platform underwent an Independent Verification Test (IVT) at Aberdeen Test Center (ATC) that provided the basis for many of the component reliability improvements that have been incorporated and validated in the FY11 Initial Qualification Test (IQT). Enhancements included improved seals on the drive motors, design changes to the drive motor themselves, Electromagnetic Interference (EMI) improvements to reduce the emissions and susceptibility of the SUGV platform and operator control unit enhancements. The XM1216 is currently conducting missions in support of units in OEF.

SUGV Planned Product Improvements (Increment 1 Follow on) designated as the XM1216E1: The SUGV configuration for Low Rate Initial Production (LRIP) moving to Full Rate Production (FRP) is based on the SUGV IBCT CPD Threshold Requirements. It will weigh 35 pounds and is capable of carrying up to 4 lbs of payload weight. The SUGV will have the following capabilities: a hardened militarized Electro Optical/Infrared (EO/IR) sensor to meet stringent day & night detection of enemy personnel & systems, an National Security Agency (NSA) compliant radio from the Joint Tactical Radio system program, improved hand controller, the capability to provide grid location of the enemy, and the following capability to mount payloads: tether spooler, manipulator arm, Chemical, Biological, Radiological, Nuclear (CBRN) suite and Embedded-Tactical Engagement Simulation System (E-TESS).

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APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE			
2040: Research, Development, Test & Evaluation, Army		PE 0604663A: FCS Unmanned Ground Vehicles			
BA 5: Development & Demonstration (SDD)					
B. Program Change Summary (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	249.948	143.840	124.472	-	124.472
Current President's Budget	200.000	35.966	-	-	-
Total Adjustments	-49.948	-107.874	-124.472	-	-124.472
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-124.472	-	-124.472
• Other Adjustments 1	-49.948	-107.874	-	-	-

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APPROPRIATION/BUDGET ACTIVITY 2040: Research, Development, Test & Evaluation, Army BA 5: Development & Demonstration (SDD)				R-1 ITEM NOMENCLATURE PE 0604663A: FCS Unmanned Ground Vehicles				PROJECT FC4: BCT UNMANNED GROUND VEHICLES			
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
FC4: BCT UNMANNED GROUND VEHICLES	200.000	35.966	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles											

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2011	FY 2012	FY 2013
Title: SUGV Product Improvement	9.429	27.200	-
Articles:	0	0	
Description: Funding is provided for the following effort			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2011	FY 2012
<p><i>FY 2011 Accomplishments:</i> Conducted SUGV Critical Design Review 25-27 July 2011. Complete the engineering tasks and analysis from the SUGV CDR design review to enable the contractor to proceed to the build of the SUGV platforms for IQT. Complete integration, build and checkout of the EO/IR sensor, Handheld Manpack & Small form fit (HMS) radio, Operator Control Unit (OCU) and payloads. Began assessments of an NSA approved radio, improved detection capability for the EO/IR sensor and integration of the SUGV with OCU. Conduct an early assessment of the SUGV, HMS radio, Soldier Radio Waveform (SRW) and improved Hand Controller to support the development and build of SUGV prototypes for IQT/LUT in FY12/FY13. Continue work and development of payloads to support IQT: Tether, manipulator arm, CBRN, and Embedded training. Build five SUGV prototypes for delivery in FY12.</p> <p><i>FY 2012 Plans:</i> FY 2012 Description: Complete the build, integration and delivery of five prototypes and payloads in the September 2011-August 2012 timeframe. Conduct termination of Prime SUGV contractor. Award a follow-on SUGV contract to complete development of SUGV Engineering Manufacturing Demonstration (EMD) to include a bridging effort to continue SUGV development between termination with the Prime and award of the follow on contract to complete SUGV. Conduct the following actions for the EMD follow-on contract: prepare proposal package, solicit and evaluate proposals and award contract for 7 SUGV Pre-Production prototypes. Tasks include preparing A Spec, B spec and Statement of Work. Transition responsibilities and work from the Prime to Government counterparts to close out current SUGV contract and ease government takeover of the existing and future contract with SUGV vendor. Close out the SUGV Critical Design Review to finalize current design and assess that design to the SUGV CDD. Utilize prototypes to assess CDR design to meet CDD requirements and operational utility, (Oct11-Mar12) under the bridging effort. Evaluation and assessment will be used to assess requirement compliance and prepared SOW and Performance Specifications for the Follow-on contract. Assess performance of the HMS/SRW radio for range, latency and National Security Agency/ Information Assurance Strategy (NSA/IAS) compliance. Evaluate the performance and operational utility of the Operator Control Unit that will replace the Common Controller that was terminated. Assess design and performance for requirement compliance for payloads, environments, shock/vibration, and command and control software and platform mobility utility. Evaluate performance of the improved EO/IR sensor to meet critical KPPs for day and night recognition. Conduct a Limited User Test (LUT) to confirm operational utility. Award Follow-on contract (April 12) to finalize design, build production prototypes and conduct contractor/government testing. Conduct Delta Critical Design Review to confirm design decisions made from the testing with prototypes and changes to the drawing package. Delta CDR will focus on design changes and critical subsystem components: HMS/SRW radio, Operator Control unit, Software, Payloads: tether, manipulator arm, CBRN detection and E-TESS. Evaluate design to meet CDD requirements. Build seven SUGV Pre-Production prototypes (July-Sept 12) with payloads. Conduct integration and contractor checkout of SUGV Pre-Production prototypes to include payloads. Prepare for prototype testing.</p>			
<i>Title:</i> SUGV Sensor Hardware		4.783	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2011	FY 2012	FY 2013
Articles: Description: Funding is provided for the following effort FY 2011 Accomplishments: Build, integration and checkout of seven (7) C4 sensors packages to support SUGV Platform integration.			0		
Title: MM UGV (MULTI-MISSION UNMANNED GROUND VEHICLE) (FORMER ARV A(L)) Description: Funding is provided for the following effort FY 2011 Accomplishments: Conduct Critical Design Review for the ARV-A(L). Begin Long Lead Procurement of prototype hardware and assembly of ARV-A(L) platforms. Continue the engineering effort for design and integration of all sensors payloads, battle command software, network communications and Common Controller for ARV-A(L) to support design reviews. Verify interfaces and integration of all allocated subsystems to the ARV-A(L): JTRS Radio/Waveform, ICS, Turret, M240 ROK, and Javelin. Receive initial subsystem deliverables to complete integration of BAE Power and Propulsion System, Advanced Integrated Systems M240 Remote Operating Kit, ITMS and MillenWorks suspension that will facilitate Acceptance Test Plans and the testing of detail parts and Line Replaceable Units that enables subsystem qualification testing. Continue development of operational and simulation software including the Vehicle Control Services (VCS), Mobility Control Services (MCS) and Power & Propulsion Services (PPS). Begin Modeling and Simulation integration with the ICS and Battle Command software to prepare for efficient integration of hardware and software on the ARV-A(L). Conduct CP 13/14 Phase 1 and Phase 2 Software Architecture Design and Internal and External Interface Design. Conduct CP 13/14 Software Phase 2 Build planning and allocation to support the ARV-A(L) chassis and ARV-A(L) Mission Equipment Packages to demonstrate functionality of payloads: M240, Communications Systems, Battle Command, and Common Controller. Complete Phase 1 software coding and begin CP 13/14 Phase 1 software integration and testing.			41.339 0	-	-
Title: MM UGV Sensors/Computers/Radios Description: Funding is provided for the following effort FY 2011 Accomplishments: Continue design/development efforts to support incorporation of 3rd Gen FLIR engine within MREO (light) sensor package. Conduct PRR for MREO ARV-A(L). Begin procurement of 8 MREOs or equivalent sensors (7 prototypes and 1 spare) for ARV-			44.864 0	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2011	FY 2012	FY 2013
A(L).Continue the Acoustic Sensor design to support ARV-A(L) CDR milestones. Conduct PDR and CDR for ALAS. Continue development of Sensor Suite Control software code to support testing with the ARV-A(L) .				
Title: MULE-CM & MULE-T Special Termination Costs Description: Funding is provided for the following effort FY 2011 Accomplishments: Special termination costs include severance pays, settlement expenses, and return of field service representatives.		Articles: 1.500 0	-	-
Title: ANS (AUTONOMOUS NAVIGATION SYSTEM) Description: Funding is provided for the following effort FY 2011 Accomplishments: Support integration in accordance with ICDs and execution of ARV-A (L) program . Continue procurement and fabrication of prototype hardware to support delivery of prototype sets (IPMs, LIPMs, GPS/INS, and ACS) for integration and IQT. Assess performance and durability of prototype components during test evaluations in support of RAM-T development. Test and validate software performance at the system level. Support preparation for SoS testing (TFT, FDTE & LUT). Continue to provide closure of software problem reports (SPRs) and software-hardware integration with the ANS prototype (P1) and ARV-A (L) platform integration. Complete development of operational Phase 1 software followed by FQT. Continue ANS Phase 2 software construction, coding, test and integration to support CP 13/14 Phase 2. Complete Phase 2 LCA and build checkpoints. Deliver Engineering Phase 16 software.		Articles: 54.593 0	-	-
Title: CONTRACTOR FEE Description: Funding is provided for the following effort FY 2011 Accomplishments: Moved from System of Systems Engineering; consists of prime contractor fee for remaining work in FY11.		Articles: 20.495 0	-	-
Title: GOVERNMENT SYSTEMS ENGINEERING/PROGRAM MANAGEMENT Description: Funding is provided for the following effort		Articles: -	7.478 0	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2011	FY 2012	FY 2013
FY 2012 Plans: Funding to support the Government program management staff for salaries, travel, computers/cell phones, supplies and building/office space. The Government program management staff consists of personnel from: Business, Acquisition, Engineering, Logistics, Admin & IT support. Due to the termination of the BCTM EMD Contract (Boeing) and the transition of PEO I to PEO GCS, many of the functions/efforts performed by the Boeing and PEO I will now have to be performed by RS JPO personnel. FY11 efforts will involve major initiatives: completing TDP, developing competitive selection criteria for follow-on contract, developing milestone documentation and analysis to support creation of APB for the Small Unmanned Ground Vehicle. The UGV team is heavily involved in other efforts such as the potential fielding of the SUGV to units moving to theater, investigating alternative sensors and communications suites to reduce platform cost and weight and managing testing at government facilities.				
Title: GOVERNMENT TEST AND M&S Articles: Description: Funding is provided for the following effort.		-	1.288 0	-
FY 2012 Plans: Developmental testing and Limited User Testing will be conducted for the product improved SUGV platform at Government test sites and facilities. Testing will verify that the product improved SUGV meets requirements for the HMS/SRW radio, Militarized EO/IR Head and mission payloads (tether and manipulator arm). The SUGV will require detailed test plan development, test range support to include platform and sensor instrumentation, on-site test engineering support for testing and engineer support for data collection and analysis.				
Title: IED COUNTERMEASURE DEV Articles: Description: Funding is provided for the following effort		22.997 0	-	-
FY 2011 Accomplishments: Anticipate Army Guidance in 1QFY11 to proceed with the development of a Counter-IED platform. Complete preliminary and detail design of CIED Sub-components. Conduct Sub-system Prototype builds for integration with the CMP. Develop SW package to support performance and functionality of the platform.				
Accomplishments/Planned Programs Subtotals		200.000	35.966	-

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C. Other Program Funding Summary (\$ in Millions)												
	<u>Line Item</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u> <u>Base</u>	<u>FY 2013</u> <u>OCO</u>	<u>FY 2013</u> <u>Total</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
	• F00001: <i>OPA BCT Unmanned Ground Vehicle</i>	27.433	24.805	83.937		83.937		122.731	149.748	62.766	Continuing	Continuing
	• 0604641A: <i>RDTE Tactical Unmanned Ground Vehicle (Small Unmanned Ground Vehicle Project DV7)</i>			13.141		13.141					0.000	13.141
D. Acquisition Strategy N/A												
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Army											DATE: February 2012			
APPROPRIATION/BUDGET ACTIVITY 2040: Research, Development, Test & Evaluation, Army BA 5: Development & Demonstration (SDD)					R-1 ITEM NOMENCLATURE PE 0604663A: FCS Unmanned Ground Vehicles					PROJECT FC4: BCT UNMANNED GROUND VEHICLES				
Management Services (\$ in Millions)					FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
MULE-CM & MULE-T SPECIAL TERMINATION	Various	The Boeing Company:Various	2.500	-		-		-		-	0.000	2.500	2.500	
Subtotal			2.500	-		-		-		-	0.000	2.500	2.500	
Product Development (\$ in Millions)					FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Small Unmanned Ground Vehicle (SUGV)	Various	The Boeing Company:St Louis, MO	43.150	14.200		-		-		-	0.000	57.350	57.350	
Small Unmanned Ground Vehicle (SUGV)	SS/CPFF	i Robot Corporation:Burlington, MA	-	13.000		-		-		-	0.000	13.000	13.000	
Autonomous Navigation System - Software	Various	The Boeing Company:St. Louis, MO	91.877	-		-		-		-	0.000	91.877	91.877	
MM UGV, (former ARV-A (L))	Various	The Boeing Company:St. Louis, MO	184.741	-		-		-		-	0.000	184.741	184.741	
Subtotal			319.768	27.200		-		-		-	0.000	346.968	346.968	
Remarks														
Remark 1: Subcontractor: iRobot Corp. - Burlington, MA														
Remark 2: This contract will continue under Program Element 0604641A Project DV7														
Remark 2: Subcontractor: Lockheed Martin Missile and Fire Control - Grand Prairie, TX														
Remark 3: Subcontractor: General Dynamics Robotic Systems - Westminster, MD														
Support (\$ in Millions)					FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
GOVERNMENT SEPM	Various	PEO GCS:Warren, MI	0.150	7.478		-		-		-	0.000	7.628	7.628	
Subtotal			0.150	7.478		-		-		-	0.000	7.628	7.628	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Army											DATE: February 2012		
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Test and Evaluation (\$ in Millions)				FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
GOVERNMENT TEST & EVALUATION M&S	Various	PEO GCS:Warren, MI	-	1.288		-		-		-	0.000	1.288	1.288
Subtotal			-	1.288		-		-		-	0.000	1.288	1.288

	Total Prior Years Cost	FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	322.418	35.966		-		-		-	0.000	358.384	358.384

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2013 Army			DATE: February 2012		
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	FY 2011				FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017			
	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
Incr 1 Production Delivery (Brigades 2 - 5)																												
Incr 1 Production Delivery (LRIP Brigades 6-7)																												
Follow On Production																												
Milestone C Low Rate Initial Production Review (MSC/LRIP REV)																												
SUGV Follow On Initial Operational Capability																												
SUGV Prototype Build/Delivery																												
SUGV Testing (IQT)																												
SUGV Testing (LUT)																												
SUGV Follow On CDR																												
SUGV EMD Bridging Effort Contract Award																												
SUGV EMD Follow On Contract Award																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2013 Army			DATE: February 2012
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Incr 1 Production Delivery (Brigades 2 - 5)	4	2012	1	2013
Incr 1 Production Delivery (LRIP Brigades 6-7)	2	2013	3	2013
Follow On Production	2	2014	4	2017
Milestone C Low Rate Initial Production Review (MSC/LRIP REV)	4	2013	4	2013
SUGV Follow On Initial Operational Capability	2	2015	2	2015
SUGV Prototype Build/Delivery	4	2012	4	2012
SUGV Testing (IQT)	1	2013	3	2013
SUGV Testing (LUT)	3	2013	4	2013
SUGV Follow On CDR	4	2011	4	2011
SUGV EMD Bridging Effort Contract Award	1	2012	1	2012
SUGV EMD Follow On Contract Award	4	2012	4	2012