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Exhibit R-2, RDT&E Budget Item Justification								Date: February 2000	
APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE						
RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4			JOINT ROBOTICS PROGRAM PE 0603709D8Z						
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	15.646	17.516	10.294	11.238	8.876	9.047	9.220	Continuing	Continuing
MPRS	2.000	2.200	4.094	4.000	2.576	2.747	2.500	Continuing	Continuing
ROCS	3.600	3.600	4.000	4.400	3.300	3.000	3.320	Continuing	Continuing
TECHNOLOGY BASE	9.146	9.866						Continuing	Continuing
JAUGS	0.200	0.400	0.600	0.800	0.800	0.800	0.900	Continuing	Continuing
FTUV		0.750	0.900	1.138	1.000	1.000	1.500	Continuing	Continuing
BUGS	0.700	0.700	0.700	0.900	1.200	1.500	1.000	Continuing	Continuing

A. Mission Description and Budget Item Justification. This program is a budget activity level 4 based on the demonstration/validation activities ongoing within the program. This PE was established in response to Congressional guidance to consolidate DoD robotic programs on unmanned ground systems and related robotic technologies in order to increase focus of the Services' robotic programs on operational requirements. The program will demonstrate maturity of robotics technologies for their application to the formal acquisition process of land systems and subsystems. Emphasis is on the development of robotic technologies that: are amenable to multi-service applications; provide capability in high hazard environments; provide improved battlefield efficiency using supervised autonomous operational capability; reduce or enhance force manpower and support; and are affordable. This PE consolidates the DoD robotics program for unmanned ground vehicles (UGV) into two activities: (1) advancement of UGV concepts into Advanced Development (AD) acquisition programs and (2) the enhancement and exploitation of critical robotic technologies for today's and future UGV acquisition requirements. Categories under this PE are: (1) the Basic Unexploded Ordnance System (BUGS) - a Joint Service EOD effort to locate and dispose of surface UXO; (2) the Robotics Ordnance Clearing System (ROCS) - a USAF effort to develop a robotic/autonomous vehicle capability for area clearance, including active range clearance (ARC). ROCS Platforms include the following: All-purpose Remote Transport System (ARTS), Subsurface Ordnance Characterization System (SOCS), and Automated Ordnance Excavator (AOE). This technology can also be applied to formerly used defense sites for cleanup/disposal. (3) The Technology Enhancement program (DEMO III) is centered upon the enhancement and exploitation of critical robotics technologies for today's and future UGV acquisition requirements. DEMO III, in part a follow-on to the very successful DEMO II program, is a four year effort to further advance semi-autonomous technologies. (4) The Family of Tactical Unmanned Vehicles (FTUV) is a joint Army/Marine Corps effort to provide commanders a family of reconnaissance, surveillance and target acquisition UGV's that are properly sized to operate in a variety of tactical situations. Requirements are emerging for small and medium unmanned systems that improve warfighters situational awareness in scout, mechanized and infantry in urban terrain operations.

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<p>Man Portable Robotic Systems (MPRS) - is an effort to develop smaller (10-40 lb. Class) UGVs as part of the FTUV program. The Joint Architecture for Unmanned Ground Systems (JAUGS) is a software-standards oriented approach to standardizing all aspects of protocols and approaches to the software aspects of all anticipated DoD unmanned systems.</p>	
<p>(U) <u>FY 1999 Accomplishments</u></p>	
<p>JOINT ARCHITECTURE FOR UNMANNED GROUND SYSTEMS (JAUGS) DEVELOPMENT (0.200 million)</p>	
<ul style="list-style-type: none"><li>• Continued to update JAUGS based on technology improvements, Joint Technical Architecture (JTA) standards established by DoD, and mission requirements</li><li>• Coordinated JAUGS activities closely with 4D/RCS and Demo III development efforts</li><li>• Began validation process on the JAUGS</li><li>• Drafted and published documentation that described the UGV domain and set performance specifications</li><li>• Incorporated JAUGS into Standardized Robotic System (SRS) contract (Previously Vehicle Teleoperation (VT))</li><li>• Drafted and published the Configuration Management Plan</li></ul>	
<p>BASIC UXO GATHERING SYSTEM (BUGS) (0.700 million)</p>	
<ul style="list-style-type: none"><li>• Demonstrated single vehicle subsystem, autonomous random-search, obstacle avoidance, and submunition pick-up</li><li>• Demonstrated electronic and mechanical design of the random-search platforms which were improved for repeatable manufacturability, and flexibility for future experimentation</li><li>• Selected one contractor to develop the BUGS directed-search system, an alternative to the random-search system</li></ul>	
<p>U) <u>FY 2000 Plans</u></p>	
<p>JOINT ARCHITECTURE FOR UNMANNED GROUND SYSTEMS (JAUGS) DEVELOPMENT (0.400 million)</p>	
<ul style="list-style-type: none"><li>• Evolve, refine, and update to achieve greater autonomous capability. Inputs will be received primarily from user appraisals, fielded systems feedback, and industry/Tech Base development efforts</li><li>• Implement JAUGS throughout the Joint Robotics Program</li><li>• Place JAUGS under configuration control</li></ul>	
<p>FAMILY OF TACTICAL UNMANNED VEHICLES (FTUV) (0.750 Million)</p>	
<ul style="list-style-type: none"><li>• Conduct modeling and simulation for U.S. Army Maneuver Support Center, U.S. Army Infantry Center, and U.S. Marine Corps efforts to define/evaluate emerging technologies from the Demo III Experimental Unmanned Vehicle (XUV)</li><li>• Procure two DEMO III XUV Vehicles/Support/Options for emerging technologies</li></ul>	

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Exhibit R-2, RDT&E Budget Item Justification				Date:
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<ul style="list-style-type: none"> <li>• Coordinate FTUV Capstone Requirement Document for Robotic Systems</li> </ul>				
BASIC UXO GATHERING SYSTEM (BUGS) (0.700 million)				
<ul style="list-style-type: none"> <li>• Implement cooperative behaviors, test and demonstrate five-vehicle systems for the random-search system</li> <li>• Complete initial design, test and demonstrate five-vehicle systems for the directed-search system</li> </ul>				
(U) <u>FY 2001 Plans</u>				
JOINT ARCHITECTURE FOR UNMANNED GROUND SYSTEMS (JAUGS) DEVELOPMENT (0.600 million)				
<ul style="list-style-type: none"> <li>• Evolve, refine, and update to achieve greater autonomous capability. Inputs will be received primarily from user appraisals, fielded systems feedback, and industry/Tech Base development efforts</li> <li>• Continue configuration management and control</li> </ul>				
FAMILY OF TACTICAL UNMANNED VEHICLES (FTUV) (0.900 million)				
<ul style="list-style-type: none"> <li>• Conduct user appraisals/field experiments and platform analysis</li> <li>• Establish a Joint Working Group that will begin working on the Integrated Product Team (ICT) charter</li> <li>• Prepare milestone documentation</li> </ul>				
BASIC UXO GATHERING SYSTEM (BUGS) (0.700 million)				
<ul style="list-style-type: none"> <li>• Continue development of ten-vehicle test systems</li> <li>• Conduct test and experiments in user-developed scenarios</li> <li>• Collect data for input to Analysis of Alternatives</li> </ul>				
B. <u>Program Change Summary</u> (\$ million)				
	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>Total</u>
Previous President's Budget	16.013	12.937	10.492	<u>Cost</u>
Appropriated Value		17.937		Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed				
Appropriation Reduction				
b. Congressionally Directed				
Undistributed Reduction				
c. Below threshold reprogramming,				
inflation savings, and government wide rescission	(0.367)	(0.421)	(0.198)	
Current Budget Submit/President's Budget	15.646	17.516	10.294	Continuing
Change Summary Explanation:				

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Exhibit R-2, RDT&E Budget Item Justification	Date: February 2000		
Funding: Adjustments reflect inflation savings and the government-wide rescission. Schedule: N/A Technical: N/A			
C. <u>Other Program Funding Summary</u>			
D. <u>Acquisition Strategy</u>			
E. <u>Schedule Profile</u>			
Fiscal Year actual and planned events:			
	FY1999	FY2000	FY2001
<b>Acquisition Milestones</b>			
<b>Engineering Milestones</b>			
<b>T&amp;E Milestones</b>			
<b>Contract Milestones</b>			

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Exhibit R-2a, RDT&E Project Justification								Date: February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4		PROGRAM ELEMENT PE 0603709D8Z			PROJECT NAME AND NUMBER MAN PORTABLE ROBOTIC SYSTEMS (MPRS)				
Cost (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
MPRS	2.000	2.200	4.094	4.000	2.576	2.747	2.500	Continuing	Continuing
<p>A. <u>Mission Description and Budget Item Justification.</u> The MPRS program is a research and development program to provide small, man portable unmanned vehicle systems to support the missions of light military and special operations forces. The program meets mission needs in the areas of reconnaissance during Military Operations in Urban Terrain (MOUT).</p> <p>(U) <u>FY 1999 Accomplishments</u></p> <ul style="list-style-type: none"> <li>• Designed and implemented a computer data base to track all available small robots and associated technology</li> <li>• Assisted Army Battle Labs and users in developing realistic requirements and supported experiments conducted by the Battle Labs</li> <li>• Teamed with the Defense Advanced Research Projects Agency (DARPA) Tactical Mobile Robots (TMR) Program to provide small robots to the user community for evaluation and experimentation</li> </ul> <p>(U) <u>FY 2000 Plans</u></p> <ul style="list-style-type: none"> <li>• Conduct Concept Experimentation Program (CEP) at Ft. Leonard Wood, MO</li> <li>• Participate in Joint Contingency Force Advance Warfare Exercise (JCF AWE) with the US Army Maneuver Support Center (MANSCEN)</li> <li>• Provide the user community with MPRS prototype vehicles</li> </ul> <p>(U) <u>FY 2001 Plans</u></p> <ul style="list-style-type: none"> <li>• Participate in Military Police Concept Experimentation Program</li> <li>• Conduct baseline testing of MPRS prototype vehicles</li> <li>• Obtain MSO decision</li> </ul>									

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<b>Exhibit R-2a, RDT&amp;E Project Justification</b>				Date:
B. Other Program Funding Summary				February 2000
C. Acquisition Strategy				
D. Schedule Profile				
Fiscal Year actual and planned events:				
	FY1999	FY2000	FY2001	
<b>Acquisition Milestones</b>				
MPRS			MS0	
<b>Engineering Milestones</b>				
<b>T&amp;E Milestones</b>				
<b>Contract Milestones</b>				

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Exhibit R-3 Cost Analysis (page 1)										Date: February 2000		
RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 4			PROGRAM ELEMENT PE 0603709D8Z				MAN PORTABLE ROBOTIC SYSTEMS (MPRS)					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 1998 Cost	1999 Cost	1999 Award Date	2000 Cost	2000 Award Date	2001 Cost	2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.850		0.950		1.502				
Ancillary Hardware Development												
Systems Engineering				0.150		0.150		0.460				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				1.000		1.100		1.962		CONT	CONT	
Remarks: [1] MIPR/CPIF/FPIF/FFP activities												
Development Support												
Software Development				0.530		0.530		0.771				
Training Development												
Integrated Logistics Support				0.050		0.050		0.100				
Configuration Management												
Technical Data												
GFE												
Subtotal Support				0.580		0.580		0.871		CONT	CONT	
Remarks												

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Exhibit R-3 Cost Analysis (page 2)										Date: February 2000		
RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 4			PROGRAM ELEMENT PE 0603709D8Z							MAN PORTABLE ROBOTIC SYSTEMS (MPRS)		
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 1998 Cost	1999 Cost	1999 Award Date	2000 Cost	2000 Award Date	2001 Cost	2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing				0.200		0.300		0.300				
Operational Testing								0.400				
Tooling												
GFE												
Subtotal T&E				0.200		0.300		0.700		CONT	CONT	
Remarks												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support				0.150		0.170		0.500				
Program Management Personnel												
Travel				0.070		0.050		0.061				
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.220		0.220		0.561		CONT	CONT	
Remarks												
Total Cost				2.000		2.200		4.094		CONT	CONT	
Remarks												

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Exhibit R-2a, RDT&E Project Justification								Date: February 2000	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT		PROJECT NAME AND NUMBER					
RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4		PE 0603709D8Z		ROBOTIC ORDNANCE CLEARING SYSTEM (ROCS)					
Cost (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
ROCS	3.600	3.600	4.000	4.400	3.300	3.000	3.320	CONT	CONT
<p>A. <u>Mission Description and Budget Item Justification.</u> The Robotics Ordnance Clearing System (ROCS) is a generic examination of Unexploded Ordnance (UXO) clearing applications and assessments. Prototypes are being examined for force protection in Saudi Arabia, range clearance at Nellis AFB, NV, as well as terrain assessments for probability of UXO. The US Air Force has created an Operational Requirements Document (ORD) for both force protection and active range clearance systems, utilizing the All-purpose Remote Transport System (ARTS).</p> <p>U) <u>FY 1999 Accomplishments</u></p> <ul style="list-style-type: none"> <li>• Responded to USAF MAJCOM "urgent and compelling" requirements for (ARTS) in support of Combat Air Force (CAF) needs <ul style="list-style-type: none"> <li>- Delivered 5 ARTS, including mission specific modifications, to SWA, Central Air Forces (CENTAF), in support of Operation Southern Watch</li> <li>- Delivered 7 ARTS, including mission specific modifications, to Central Europe, United States Air Forces, Europe (USAFE), in support of Operation Allied Force</li> </ul> </li> <li>• Technology transfer of ARTS baseline program to Acquisition System Program Office (ASC/WMO) for large scale procurement, delivery, and sustainment of baseline system <ul style="list-style-type: none"> <li>- Finalized documentation package for operation and maintenance of baseline ARTS</li> <li>- Upgraded 2 Nellis AFB R&amp;D prototypes to ARTS baseline configuration</li> <li>- Provided technical support to ASC/WMO source selection of the ARTS procurement</li> </ul> </li> <li>• Developed robotic attachments and tools to defeat large vehicle bombs (LVB), clear/remove large quantities of UXO, and perform active range clearance (ARC) <ul style="list-style-type: none"> <li>- Completed proof-of-concept integration of dual-arm manipulator system for Eglin AFB ARTS</li> <li>- Modified Unmanned Ground Vehicles/Systems Joint Program Office (UGV/S JPO) designed mini-flail for integration onto ARTS platform</li> <li>- Investigated low cost CO2 laser system developed and tested by AFRL/DE as potential component for ARTS Laser Ordnance Neutralization System (ALONS)</li> <li>- Conducted detailed RDT&amp;E and characterization of anti-terrorist techniques for integration on robotic platforms including but not limited to the ARTS.</li> </ul> </li> </ul>									

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Exhibit R-2a, RDT&E Project Justification	Date: February 2000
<ul style="list-style-type: none"><li>• Conducted detailed research, development, and test on advanced robotic system technologies for integration onto existing and future robotic system platforms for ARC and Force Protection (FP) applications.<ul style="list-style-type: none"><li>- Investigated and tested semi-autonomous point-to-point travel capability for Nellis AFB range clearance operations</li><li>- Investigated lower-cost navigation system using multiple navigation sensors and Kalman filter technology</li><li>- Investigated automated ordnance recognition system for identifying BLU-97 and BLU-63 submunitions</li><li>- Continued evaluation of subsurface sensors to establish operating parameters and merits</li></ul></li> <li>• Provided RDT&amp;E support to operational forces, DoD, and other government agencies to demonstrate advanced unmanned ground vehicles and systems(UGV/S) and their mission capabilities<ul style="list-style-type: none"><li>- Demonstrated full scale robotic ordnance clearing operations at Nellis AFB for Joint Robotics Program (JRP) General Officer Steering Committee Working Group</li><li>- Performed detailed system requirements investigation in conjunction with the Headquarters Air Combat Command (HQ ACC) for ROCS at training bases throughout the United States Air Force (USAF)</li><li>- Demonstrated advanced robotic systems to the United States Navy (USN) as part of Exercise DRAGON at "In From the Sea 1999"</li><li>- Participated in United States Marine Corps (USMC) logistics exercise, Combat Support and Supply (CSS) Enterprise, Limited Objective Experiment (LOE) 1999, by demonstrating the use of robotic systems for force sustainment during tactical operations</li><li>- Conducted counter-terrorism (CT) robotic applications demonstration during Technical Support Working Group (TSWG) Technology Conference with European Command (EUCOM)</li><li>- Provided tele-operated Automated Ordnance Excavator (AOE) and training to US Army Corps of Engineers, Huntsville Center for use in ordnance investigation and clean-up of Jefferson Proving Grounds (JPG) - reducing clearance costs from \$70K per week to \$6K per week</li></ul></li></ul> <p>U) <u>FY 2000 Plans</u></p> <ul style="list-style-type: none"><li>• Develop robotic vehicles, attachments, and tools to defeat LVB, clear/remove large quantities of UXO, and perform ARC while providing EOD personnel the capability to quickly, accurately, and safely detect, locate, access, render safe, remove, and/or dispose of UXO/IEDs<ul style="list-style-type: none"><li>- Complete development/integration/test of dual-arm manipulator system onto ARTS platform; coordinate technology transfer (ASC/WMO)</li><li>- Complete development/integration/test of UGV/S JPO designed mini-flail onto ARTS platform; coordinate technology transfer (ASC/WMO)</li><li>- Complete proof-of-concept of ALONS</li></ul></li></ul>	

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<b>Exhibit R-2a, RDT&amp;E Project Justification</b>	Date: February 2000
Fiscal Year actual and planned events:	
	FY1999    FY2000    FY2001
<b>Acquisition Milestones</b>	
<b>Engineering Milestones</b>	
<b>T&amp;E Milestones</b>	
<b>Contract Milestones</b>	

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Exhibit R-3 Cost Analysis (page 1)										Date: February 2000		
RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 4			PROGRAM ELEMENT PE 0603709D8Z							Robotic Ordnance Clearing System (ROCS)		
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 1998 Cost	1999 Cost	1999 Award Date	2000 Cost	2000 Award Date	2001 Cost	2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.800		0.800		1.000				
Ancillary Hardware Development				0.100		0.100		0.300				
Systems Engineering				0.100		0.100		0.200				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				1.000		1.000		1.500		CONT	CONT	
Remarks:												
Development Support				0.300		0.300		0.400				
Software Development				0.300		0.300		0.250				
Training Development				0.100		0.100		0.100				
Integrated Logistics Support				0.050		0.050		0.050				
Configuration Management				0.050		0.050		0.050				
Technical Data				0.150		0.150		0.150				
GFE												
Subtotal Support				0.950		0.950		1.000		CONT	CONT	
Remarks												

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Exhibit R-3 Cost Analysis (page 2)										Date: February 2000		
RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 4				PROGRAM ELEMENT PE 0603709D8Z						Robotic Ordnance Clearing System (ROCS)		
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 1998 Cost	1999 Cost	1999 Award Date	2000 Cost	2000 Award Date	2001 Cost	2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing				0.200		0.200		0.100				
Operational Testing				0.100		0.100		0.200				
Tooling												
GFE												
Subtotal T&E				0.300		0.300		0.300		CONT	CONT	
Remarks												
Contractor Engineering Support				0.600		0.600		0.400				
Government Engineering Support				0.100		0.100		0.150				
Program Management Support				0.150		0.150		0.150				
Program Management Personnel				0.100		0.100		0.100				
Travel				0.100		0.100		0.100				
Labor (Research Personnel)				0.200		0.200		0.200				
Miscellaneous				0.100		0.100		0.100				
Subtotal Management				1.350		1.350		1.200		CONT	CONT	
Remarks												
Total Cost				3.600		3.600		4.000		CONT	CONT	
Remarks												

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Exhibit R-2a, RDT&E Project Justification								Date: February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4		PROGRAM ELEMENT PE 0603709D8Z		PROJECT NAME AND NUMBER TECHNOLOGY BASE					
Cost (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY2005	Cost to Complete	Total Cost
TECHNOLOGY BASE	9.146	9.866	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
<p>A. <u>Mission Description and Budget Item Justification.</u> The Demo III Experimental Unmanned Vehicle (XUV) Program is designed to advance and demonstrate the technology required to develop future unmanned ground combat vehicles through three major thrusts: (1) concerted technology development; (2) modeling, simulation and experimentation; and (3) technology integration and evaluation with users. Demo III focuses on demonstration of technology that will enable the development of small, highly agile, unmanned vehicles capable of off-road, semi-autonomous operation at speeds of up to 32 km/hr during daylight and 16 km/hr at night by 4Q FY 2001. Demo III supports development of two emerging requirements at the U.S. Army Armor School for a robotic scout system and a robotic leader-follower system. Technologies for these systems are applicable to a wide array of Army programs. This program will be transferred to the Army for funding, beginning in FY 2001.</p> <ul style="list-style-type: none"> <li>• <b>Concerted Technology Development:</b> The technology development community, drawn primarily from government laboratories such as National Institute for Standards and Technology (NIST), the Jet Propulsion Laboratory (JPL), and the Army Research Lab (ARL), has organized itself into a series of working groups to address six technology areas deemed critical to the success of the program. The primary focus of the effort has centered on the development of perception for autonomous mobility; algorithms for local planning and autonomous behaviors; an intelligent software architecture; and a small, highly capable control interface that can be integrated into standard display units.</li> <li>• <b>Modeling, Simulation and Experimentation:</b> A modeling, simulation and experimentation effort conducted by the Mounted Battlespace Battle Lab (MBBL), with assistance from ARL, has been running in parallel with the technology development program. The program has the twin goals of utilizing simulations to estimate the operational effectiveness of differing technological solutions and hardware/software configurations, and developing Tactics, Techniques and Procedures required to employ this technology effectively. An important outcome of this effort will be the technical support package (TSP) that will be required to support the second generation Tactical Unmanned Vehicle (TUV) user appraisal currently scheduled for FY 2002.</li> <li>• <b>Technology Integration and Evaluation with Users:</b> This final component of the program will integrate</li> </ul>									

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<b>Exhibit R-2a, RDT&amp;E Project Justification</b>	Date: February 2000
<p>technology onto a testbed vehicle and demonstrate autonomous mobility required to conduct the military scout mission under tactical conditions. Unlike the other program elements, this program element was designed to be conducted by an industrial contractor chosen through a competitive procurement process that is being managed by the U.S. Army Tank-automotive/Armament Command's Research, Development, and Engineering Center (TARDEC). In January 1998 TARDEC awarded a contract to a contractor team led by the former Robotic Systems Technology (RST) now General Dynamic Robotic Systems (GDRS), teaming with Science Applications International Corporation (SAIC) Center for Intelligent Systems (CIS) and Sarnoff Corporation.</p> <p>(U) <u>FY1999 Accomplishments:</u></p> <ul style="list-style-type: none"><li>• Conducted Critical Design Review (CDR) in mid-November 1998 by the technology integration contractor team who presented their final design and integration plans - the result of an extensive series of trade studies and analyses conducted over the previous twelve months coupled with feedback from the government at the July Preliminary Design Review - for review, analysis and constructive criticism by the government participants, and for further refinement prior to fabrication of platforms and/or operator control units</li><li>• Completed the second of four constructive simulations investigating alternative chassis configurations with differing size, weight, and mobility characteristics, together with a series of reconnaissance, surveillance and target acquisition (RSTA) mission packages of varying capability using Modular Semi-Automated Forces (ModSAF) simulations at the MBL. Here, the Demo III XUVs were employed together with manned systems to form notional battalion and brigade scout forces engaged in both offensive and defensive operations as part of a mechanized combined arms force. Measures of effectiveness, such as loss exchange ratio, were obtained for a limited number of experiments employing accepted, standard operational scenarios</li><li>• Fabricated the first two (2) XUV platforms and accomplish the integration of system architecture and sensors to meet Demo III Alpha (A) performance goals in August 1999</li><li>• Fabricated the first of two Operator Control Units in September 1999</li><li>• Successfully conducted Demo III A in late September 1999</li></ul> <p>(U) <u>FY 2000 Plans</u></p> <ul style="list-style-type: none"><li>• Develop baseline autonomous tactical behaviors for application to the scout mission</li><li>• Complete the second Virtual Simulation</li><li>• Initiate the third Virtual Simulation</li><li>• Initiate the third and fourth Constructive Simulations</li><li>• Prepare for Demo III Bravo (B) consisting of an Engineering Evaluation Test and a Battle Lab Warfighting Experiment (BLWE)</li></ul>	

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<b>Exhibit R-2a, RDT&amp;E Project Justification</b>		Date:	
(U) <u>FY 2001 Plans:</u>		February 2000	
• US Army will assume funding responsibility in FY 2001			
B. Other Program Funding Summary			
C. Acquisition Strategy			
D. Schedule Profile			
Fiscal Year actual and planned events:			
	FY1999	FY2000	FY2001
<b>Acquisition Milestones</b>			
<b>Engineering Milestones</b>			
<b>T&amp;E Milestones</b>	DEMOIIIA		DEMOIIB
<b>Contract Milestones</b>			

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Exhibit R-3 Cost Analysis (page 1)										Date: February 2000		
RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 4			PROGRAM ELEMENT PE 0603709D8Z							Technology Base		
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 1998 Cost	1999 Cost	1999 Award Date	2000 Cost	2000 Award Date	2001 Cost	2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPAF	RST, MD		1.915		2.275						
Ancillary Hardware Development	CPAF	RST, MD		1.425		1.425						
Systems Engineering	CPAF	RST, MD		0.900		0.900						
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				4.240		4.600						
Remarks: RST, Westminster, Maryland												
Development Support												
Software Development				1.440		1.800						
Software Development	CPAF	RST, MD		1.125		1.125						
Training Development				0.070		0.070						
Integrated Logistics Support												
Configuration Management												
Technical Data				0.271		0.271						
GFE												
Subtotal Support				2.906		3.266						
Remarks: RST, Westminster, Maryland												

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Exhibit R-3 Cost Analysis (page 2)										Date: February 2000		
RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 4			PROGRAM ELEMENT PE 0603709D8Z							Technology Base		
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 1998 Cost	1999 Cost	1999 Award Date	2000 Cost	2000 Award Date	2001 Cost	2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing				1.000		1.000						
Operational Testing												
Tooling												
GFE												
Subtotal T&E				1.000		1.000						
Remarks												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support				0.750		0.750						
Program Management Personnel												
Travel				0.250		0.250						
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				1.000		1.000						
Remarks												
Total Cost				9.146		9.866						
Remarks												

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