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Exhibit R-2, RDT&E Budget Item Justification									Date: February 1999	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE					
ENGINEERING AND MANUFACTURING DEVELOPMENT, DEFENSE-WIDE, BUDGET ACTIVITY 5					JOINT ROBOTICS PROGRAM PE 0604709D8Z					
COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	N/A	15.115	12.004	11.742	13.357	13.860	14.150	14.448	CONTINUING	CONTINUING
SRS		10.000	8.504	2.000						
RCSS		2.000	2.000	6.200						
TUV				2.042						
MDARS-I		3.115	1.500	1.500						

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: This program is a budget activity level 5 based on the successful transition of robotic technologies from demonstration/validation activities to Engineering, Manufacturing and Development (EMD) as part of an Evolutionary Strategy. This PE was established by FY 1998 PBD 202, in response to OSD and Service agreement at the April 1997 Joint Robotics Program General Officer Steering Committee (GOSC) to have OSD retain consolidation of DoD robotics programs on unmanned ground systems through EMD. Individual Services are responsible for requirements generation and procurement funding. The JRP demonstration/validation efforts have demonstrated maturity of robotics technologies for their application to the formal acquisition process of land systems and subsystems. Emphasis is on the development of robotics 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. Success has been achieved in three programs to justify EMD at this time. This PE establishes the consolidated DoD robotics program for unmanned ground vehicles (UGV) which advances the UGV concepts into EMD acquisition projects for (1) the Standardized Robotic System (SRS) - a generic, modular set of kits that can be used to retrofit several different types of currently fielded vehicles to allow remote teleoperation capabilities, like obstacle breaching operations (minefields, earthworks, bunkers, etc.), that have supported Operations Joint Endeavor and Joint Guard in Bosnia; and (2) the Robotic Combat Support System (RCSS) - a light version, RCSS-L will be developed for limited anti-personnel (AP) landmine/scattermine and unexploded ordnance (UXO) proofing for the light, rapid deployment forces, while a medium version, RCSS-M will be designed for AP landmine/scattermine, UXO and wire obstacle clearing, and bucket and fork capabilities to support operations by heavy force divisions and corps engineers in all terrain conditions; and (3) the Tactical Unmanned Vehicle (TUV) - a joint Army/USMC effort to develop a robotic UGV for the Reconnaissance, Surveillance and Target Acquisition (RSTA) mission; and (4) the Mobile Detection Assessment Response System, Interior (MDARS-I) - is intended to support the physical security of fixed installations, protection of critical inventory items, and tracking movement of items in warehouses.

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<p>(U) <u>FY 1998 Accomplishments</u> TACTICAL UNMANNED VEHICLE (TUV)</p> <ul style="list-style-type: none"> • No EMD Funding during this fiscal year 					
<p>(U) <u>FY 1999 Plans</u> TACTICAL UNMANNED VEHICLE (TUV)</p> <ul style="list-style-type: none"> • No EMD Funding during this fiscal year 					
<p>(U) <u>FY 2000 Plans</u> TACTICAL UNMANNED VEHICLE (TUV)</p> <ul style="list-style-type: none"> • No EMD Funding during this fiscal year 					
<p>(U) <u>FY 2001 Plans</u> TACTICAL UNMANNED VEHICLE (TUV) (2.042 million)</p> <ul style="list-style-type: none"> • TUV EMD effort for the design, manufacture and delivery of engineering prototypes • Engineering and program management support for the TUV development 					
<p>B. <u>Program Change Summary</u> (\$ million)</p>					
	<u>FY1998</u>	<u>FY1999</u>	<u>FY2000</u>	<u>FY2001</u>	<u>Total Cost</u>
Previous President's Budget	N/A	11.307	12.190	11.954	Continuing
Appropriated Value		15.307			
Adjustments to Appropriated Value					
a. Congressionally Directed Appropriation Reduction					
b. Congressionally Directed Undistributed Reduction					
c. OSD Directed Undistributed Reduction		(0.192)	(0.186)	(0.212)	
Current Budget Submit/President's Budget	N/A	15.115	12.004	11.742	Continuing
<p>Change Summary Explanation:</p> <p style="padding-left: 20px;">Funding: N/A</p> <p style="padding-left: 20px;">Schedule: N/A</p>					

Exhibit R-2, RDT&E Budget Item Justification				Date:
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:				
	FY 1998	FY 1999	FY2000	FY2001
Acquisition Milestones				MSII
Engineering Milestones				
T&E Milestones				
Contract Milestones				

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Exhibit R-2a, RDT&E Project Justification									Date: February 1999	
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER				
EMD, DEFENSE WIDE, BUDGET ACTIVITY 5			PE 0604709D8Z			STANDARDIZED ROBOTIC SYSTEM (SRS)				
Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY2005	Cost to Complete	Total Cost
SRS	N/A	10.000	8.504	2.000					20.504	20.504
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification. The Standardized Robotic System (SRS) program is a generic, modular set of kits that can be used to retrofit several different types of currently fielded engineer vehicles to allow remote teleoperation capabilities to accomplish obstacle breaching operations (minefields, earthworks, bunkers, etc.) Prototypes have been used in support of Operation Joint Endeavor and Joint Guard in Bosnia. The US Army has an approved Operational Requirements Document (ORD).

(U) FY 1998 Accomplishments

- No EMD funding during this fiscal year

(U) FY 1999 Plans

- SRS EMD contract effort for the design, manufacture and delivery of engineering prototypes (D7G, M9 Armored Combat Excavator [ACE], T3 Dozer, Deuce) for Developmental Testing (DT) and Operational Testing (OT)
- DT and OT for the D7G and M9 SRS kit applications
- Engineering management for the SRS kit development
- Program management support for SRS kit development

(U) FY 2000 Plans

- Continue SRS EMD effort for the design, manufacture and delivery of engineering prototypes
- DT and OT completion for the M9 ACE and performance of the T3 and Deuce SRS kit applications
- Engineering and program management support for the SRS kit development

(U) FY 2001 PLANS

- Continue SRS EMD effort for the design, manufacture, and delivery of engineering prototypes
- Complete DT and OT for the T3 and OT for the M9 and Deuce
- Engineering and program management support for the SRS kit development

B. Other Program Funding Summary

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<p>C. Acquisition Strategy The SRS kit development effort is contracted under a Small Business Innovative Research (SBIR) effort. The EMD contract was awarded 4th Quarter FY 1998 to Omnitech Robotics Incorporated. The contract will be incrementally funded in FY 1999 and FY 2000. The SRS Milestone III production decision is scheduled for 3d Quarter FY 2000, based on the D7G kit development.</p>					
<p>D. Schedule Profile</p> <p>Fiscal Year actual and planned events:</p>					
	FY1998	FY1999	FY2000	FY2001	
Acquisition Milestones					
SRS (D7G)			MSIII		
(M9 ACE/Deuce)					IPR
(T3)					IPR
Engineering Milestones					
T&E Milestones					
SRS (D7G)		DT	OT		
(M9 ACE/Deuce)			DT	OT	
(T3)				DT/OT	
Contract Milestones		EMD			

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Exhibit R-3 Cost Analysis (page 1)										Date: February 1999		
EMD, DEFENSE-WIDE BUDGET ACTIVITY 5,				PROGRAM ELEMENT PE 0604709D8Z				STANDARDIZED ROBOTIC SYSTEM (SRS)				
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	CPIF	OmniTech		8.000		4.744		1.500			12.744	15.250
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				8.000		4.744		1.500			12.744	15.250
Remarks: Omnitech Robotics, Inc., Englewood, CO												
Development Support												
Software Development								0.200				
Training Development												
Integrated Logistics Support								0.100				
Configuration Management												
Technical Data												
GFE												
Subtotal Support								0.300			CONT	CONT
Remarks												

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Exhibit R-3 Cost Analysis (page 2)									Date: February 1999			
EMD, DEFENSE-WIDE, BUDGET ACTIVITY 5			PROGRAM ELEMENT PE 0604709D8Z				STANDARDIZED ROBOTIC SYSTEM (SRS)					
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 Test D7G	MIPR	APG, MD		0.650		0.300		0.100				
IOT&E D7G	MIPR	T&E CMD		0.650		0.170		0.100				
DT M9 ACE	MIPR	APG, MD				0.350						
IOT&E M9 ACE	MIPR	T&E CMD				0.650						
DT DEUCE	MIPR	APG, MD				0.400						
IOT&E DEUCE	MIPR	T&E CMD				0.550						
DT T3	MIPR	APG, MD				0.175						
IOT&E T3	MIPR	T&E CMD				0.305						
Subtotal T&E				1.300		2.900		0.200		CONT	CONT	
Remarks DT - Developmental Test IOT&E - Initial Operational Test & Evaluation APG, MD - Aberdeen Proving Ground, Maryland T&E CMD - Test and Evaluation Command												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support		US AMCOM		0.700		0.860						
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.700		0.860				CONT	CONT	
Remarks												
Total Cost				10.000		8.504		2.000				
Remarks												

Exhibit R-2a, RDT&E Project Justification									Date: February 1999	
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER				
EMD, DEFENSE WIDE, BUDGET ACTIVITY 5			PE 0604709D8Z			ROBOTIC COMBAT SUPPORT SYSTEM (RCSS)				
Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY2005	Cost to Complete	Total Cost
RCSS	N/A	2.000	2.000	6.200					CONT	CONT
RDT&E Articles Qty										
<p>A. <u>Mission Description and Budget Item Justification.</u> The Robotic Combat Support System (RCSS) will consist of light and medium weight versions. A lightweight prototype has been supporting Operation Joint Endeavor and Joint Guard in Bosnia. The lightweight system will be developed for limited anti-personnel (AP) landmine/scattermine and unexploded ordnance (UXO) proofing for light, rapid deployment forces. A medium version will be designed for AP landmine/scattermine proofing, UXO and wire obstacle clearing, and bucket and fork capabilities to support operations by heavy force divisions and corps engineers in all terrain conditions. A Mission Need Statement has been developed and a draft Operational Requirements Document (ORD) is being staffed.</p> <p>(U) <u>FY 1998 Accomplishments</u></p> <ul style="list-style-type: none"> • No EMD Funding available during this fiscal year <p>(U) <u>FY 1999 Plans</u></p> <ul style="list-style-type: none"> • RCSS-L Program Definition and Risk Reduction (PDRR) effort for the design, manufacture and delivery of engineering prototypes <p>(U) <u>FY 2000 Plans</u></p> <ul style="list-style-type: none"> • RCSS-L EMD effort for the design, manufacture and delivery of engineering prototypes • DT for the RCSS-L development • Engineering and program management support for the RCSS-L development <p>(U) <u>FY 2001 Plans</u></p> <ul style="list-style-type: none"> • Continue RCSS-L EMD effort for the design, manufacture and delivery of engineering prototypes • OT for the RCSS-L development 										

Exhibit R-2a, RDT&E Project Justification					Date:
• Engineering and program management support for the RCSS-L/M development					
B. Other Program Funding Summary					
C. Acquisition Strategy The RCSS-L contract will be awarded under full and open competition in FY 2000.					
D. Schedule Profile					
Fiscal Year actual and planned events:					
	FY1998	FY1999	FY2000	FY2001	
Acquisition					
Milestones					
RCSS-L		MSI	MSII		
Engineering Milestones					
T&E Milestones					
RCSS-L			DT		
Contract Milestones			EMD		

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Exhibit R-3 Cost Analysis (page 1)									Date: February 1999			
EMD, DEFENSE-WIDE, BUDGET ACTIVITY 5			PROGRAM ELEMENT PE 0604709D8Z						Robotic Combat Support System (RCSS)			
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	CPIF	TBD		1.000		1.500		4.375				
Ancillary Hardware Development												
Systems Engineering				0.750				1.000				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				1.750		1.500		5.375		CONT	CONT	
Remarks:												
Development Support						0.250						
Software Development				0.250		0.250		0.500				
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support				0.250		0.500		0.500		CONT	CONT	
Remarks												

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EMD, DEFENSE-WIDE, BUDGET ACTIVITY 5			PROGRAM ELEMENT PE 0604709D8Z						Robotic Combat Support System (RCSS)			
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
DT								0.200				
IOT&E												
DT												
IOT&E												
Subtotal T&E								0.200		CONT	CONT	
Remarks												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support								0.125				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management								0.125		CONT	CONT	
Remarks												
Total Cost				2.000		2.000		6.200				
Remarks												

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APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT		PROJECT NAME AND NUMBER					
EMD, DEFENSE WIDE, BUDGET ACTIVITY 5			PE 0604709D8Z		MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I)					
Cost (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY2005	Cost to Complete	Total Cost
MDARS-I	N/A	3.115	1.500	1.500					CONT	CONT
RDT&E Articles Qty										
<p>A. <u>Mission Description and Budget Item Justification.</u> The Mobile Detection Assessment Response System - Interior (MDARS-I) is intended to support the physical security of fixed installations including warehouses and large storage facilities. In addition to security, the system will also support inventories and track movement or disturbance of critical inventory items.</p> <p>(U) <u>FY 1998 Accomplishments</u></p> <ul style="list-style-type: none"> No EMD Funding during this fiscal year <p>(U) <u>FY 1999 Plans</u></p> <ul style="list-style-type: none"> Award Engineering Manufacturing Development (EMD) contract Design/fabricate pre-production prototype system <p>(U) <u>FY 2000 Plans</u></p> <ul style="list-style-type: none"> Conduct Developmental and Operational Tests (DT/OT) <p>(U) <u>FY 2001 Plans</u></p> <ul style="list-style-type: none"> Initiate Pre-Planned Product Improvement effort Engineering and program management support for the MDARS-E program Obtain MSIII decision <p>B. Other Program Funding Summary</p> <p>C. Acquisition Strategy</p> <p>D. Schedule Profile</p>										

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Fiscal Year actual and planned events:					
	FY1998	FY1999	FY2000	FY2001	
Acquisition Milestones					
MDARS-I		MSI/II		MSIII	
Engineering Milestones					
T&E Milestones					
MDARS-I		TFT		DT/OT	
Contract Milestones			EMD		

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EMD, DEFENSE-WIDE, BUDGET ACTIVITY 5			PROGRAM ELEMENT PE 0604709D8Z						MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I)			
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	CPIF	TBD		1.750		1.000		1.000				
Ancillary Hardware Development												
Systems Engineering				0.200		0.150		0.150				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				1.950		1.150		1.150		CONT	CONT	
Remarks:												
Development Support												
Software Development				0.500		0.150		0.150				
Training Development				0.200								
Integrated Logistics Support						0.100		0.100				
Configuration Management				0.100								
Technical Data												
GFE												
Subtotal Support				0.800		0.250		0.250		CONT	CONT	
Remarks												

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EMD, DEFENSE-WIDE, BUDGET ACTIVITY 5			PROGRAM ELEMENT PE 0604709D8Z						MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I)			
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 Test				0.165		0.100						
Operational Test												
Tooling												
GFE												
Award Fees												
Subtotal T&E				0.165		0.100				CONT	CONT	
Remarks												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support				0.200				0.100				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.200				0.100		CONT	CONT	
Remarks												
Total Cost				3.115		1.500		1.500				
Remarks												