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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Office of the Secretary Of Defense **Date:** February 2020

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603920D8Z I <i>Humanitarian De-mining</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	77.723	10.952	14.700	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
920: <i>Humanitarian De-mining</i>	77.723	10.952	14.700	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Defense-Wide Reviews (DWR) - Funding for the Initiative will end in FY 2021 resulting from the DWR, which focused on the Secretary's guidance to streamline operations, increase efficiency, and promote greater affordability within the OSD and Defense Agencies and Field Activities in order to ensure the Department's optimum alignment to the National Defense Strategy and DoD strategic guidance, with particular focus on building a more lethal, resilient, agile, and ready force while strengthening alliances, prioritizing cyber and space capabilities, and focusing on innovation to maintain the technological advantage. These funds will transfer to the Dept. of the Army.

A. Mission Description and Budget Item Justification

The Humanitarian Demining Research and Development (HD R&D) Program is overseen by the Deputy Assistant Secretary for Stability and Humanitarian Affairs (SHA) within the Assistant Secretary of Defense for Special Operations/Low – Intensity Conflict (SO/LIC) in the Office of the Under Secretary of Defense (OUSD) for Policy. The HD R&D Program coordinates with SHA and the with Humanitarian Mine Action (HMA) programs of the Geographical Combatant Commands (CCMD) to develop, demonstrate and validate cost-effective technologies for use in humanitarian demining via OCONUS operational field evaluations. The HD R&D Program's low-cost and highly effective technology reduces landmine and UXO threat to the local population and US forces, and bolsters host nations' mine action capacity while improving DoD's visibility and access, generating long-term positive perceptions of DoD and the USG, and fostering collaborative relationships with host nation governments. The program directly supports the National Defense Strategy through ensuring common domains remain open and free.

The HD R&D Program crafts a research and development plan based on CCMDs' security cooperation and theater campaign plan objectives to advance the state-of-the-art of demining technology and evaluate prototype technology utilizing host nation humanitarian demining operations partners. Continuous operations test data against live mines/UXO around the world is unavailable to any other DoD organization. Such data informs HD R&D Program investment decisions and is leveraged by U.S. military countermine R&D programs to improve U.S. forces' technology. In addition, the program conducts mine and UXO detector training at the Humanitarian Demining Training Center (HDTC) in support of mil-to-mil training and partnerships. Since 1995 the program has fielded technologies for 227 evaluations in 42 countries, including Afghanistan, Iraq, Vietnam, Cambodia, Angola and Zimbabwe. The program's technologies have cleared 66.8 million square meters of the world's toughest minefields, and found or destroyed 205,474 mines and UXO.

New technology requirements and areas of emphasis are identified and validated at a biennial Requirements Workshop and a biennial UXO Working Group Meeting held by OASD SO/LIC. The meetings involve representatives from Department of State (DOS), CCMD Humanitarian Mine Action programs, international mine action organizations and mine-affected nations. The program element's work fulfills the Department of Defense's strategic guidance to address instability and reduce the demand for significant US force commitments to stability operations; with DODI 3000.05 to foster security, economic security and development, and build indigenous capacity; and with § 407 and CJCSI 3207.01C to reduce the social, economic and environmental impact of landmines and unexploded ordnance.

UNCLASSIFIED

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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	11.262	10.820	10.952	-	10.952
Current President's Budget	10.952	14.700	0.000	-	0.000
Total Adjustments	-0.310	3.880	-10.952	-	-10.952
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.880			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.002	-			
• SBIR/STTR Transfer	-0.308	-			
• Reductions were in support of Departmental efficiencies and economic assumptions	-	-	-0.308	-	-0.308
• Funding has been transferred to the Dept. of the Army beginning in FY21 and out.	-	-	-10.644	-	-10.644

Change Summary Explanation

Reductions were in support of Departmental efficiencies and economic assumptions. Funding has been transferred to the Dept. of the Army beginning in FY21 and out.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: 0603920D8Z - SO/LIC Humanitarian De-mining	10.952	14.700	0.000
Description: The HD R&D Program adapts commercial-off-the-shelf equipment, integrates mature technologies, and leverages R&D activity within DoD, particularly in the Army's Night Vision and Electronic Sensors Directorate (NVESD) Tactical Countertermine mission area. The program aims to improve existing technologies for: mine/unexploded ordnance (UXO) detection, technical survey/area reduction, mechanical mine/UXO clearance, underwater UXO detection and clearance, vegetation clearance, mechanical mine neutralization, and post-clearance quality control (QC).			
FY 2020 Plans:			
• • Deploy new technology, including Scorpion to Afghanistan; Badger and Little Storm to Cambodia; Little Storm and Rambo to Colombia; HSTAMIDS mine detectors to Colombia and Lebanon; Robomax and Vehicle-Mounted Mine Detection System to Ukraine			
• Complete ongoing equipment developments/modifications and test technology including survey and mine/UXO detection technologies such as Combined Auxiliary Positioning System, Delta-2, Empact 3D, Minelab MDS-10, Minelab F3Ci, Minelab			

UNCLASSIFIED

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>F3 Compact, Vallon VMH4, Vallon VMR3, Vallon VR-1, Ceia CMD3 and Minex 4.600; and vegetation and mine clearance and neutralization technologies</p> <ul style="list-style-type: none"> • Continue successful operational evaluations from FY2019 • Support the combatant commands and Embassy staffs by conducting new site surveys and country assessments in Colombia, Laos, Lebanon, Thailand, Vietnam • Convene UXO Working Group Meeting in Thailand to identify technology needs for battle area clearance • Develop, test and evaluate new prototype technologies based on feedback from the field and working group meeting <p><i>FY 2021 Plans:</i> Deploy new technology to Iraq, Laos, potentially Syria and other countries</p> <ul style="list-style-type: none"> • Complete ongoing equipment developments/modifications • Continue successful operational evaluations from FY2020 • Support the combatant commands and Embassy staffs by conducting new site surveys and country assessments • Convene Demining Requirements Workshop to define critical technology needs globally • Develop, test and evaluate new prototype technologies based on feedback from the field in the following areas: technical survey, individual mine/UXO and minefield detection, mechanical mine/UXO and vegetation clearance, underwater UXO detection and clearance, mechanical mine neutralization, and post-clearance QA <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding has been transferred to the Dept. of the Army beginning in FY21 and out.</p>			
Accomplishments/Planned Programs Subtotals	10.952	14.700	0.000

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
Following a rapid prototyping strategy, the program emphasizes the use/modification of existing, commercially-available equipment and components to build functional prototype equipment suited for humanitarian demining operations. This approach is required due to the immediate need for new demining technologies in the face of ongoing U.S. forces and host nation citizen casualties in mine-affected countries. The program evaluates prototype equipment by acquiring it off-the-shelf from industry using competition to the extent possible, by leveraging ongoing countermine R&D efforts in other U.S. and foreign R&D activities, and by taking advantage of extensive in-house fabrication capabilities at the Army's Night Vision and Electronic Sensors Division (NVESD).

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Office of the Secretary Of Defense **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / Humanitarian De-mining	Project (Number/Name) 920 / Humanitarian De-mining
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Hardware Development	Various	RDECOM-NVESD : Ft Belvoir, VA	44.129	4.960		7.939		0.000		0.000		0.000	Continuing	Continuing	-
Subtotal			44.129	4.960		7.939		0.000		0.000		0.000	Continuing	Continuing	N/A

Remarks
The HD R&D Program adapts commercial-off-the-shelf equipment, integrates mature technologies, and leverages R&D activity within DoD, particularly in the Army's Night Vision and Electronic Sensors Directorate (NVESD) Tactical Countermining mission area.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Humanitarian Demining Research and Development Program	Various	RDECOM-NVESD : Ft Belvoir, VA	31.323	5.718		6.489		0.000		-		0.000	Continuing	Continuing	-
Subtotal			31.323	5.718		6.489		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
Evaluations of HD R&D Program-developed technologies in actual minefields are conducted by host nation demining partners (foreign military, non-governmental organizations and mine action centers) and provide valuable data for US military countermining R&D and next generation HD technology developments while directly contributing to world-wide mine and UXO clearance.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Humanitarian Demining Program Management Support	Various	RDECOM-NVESD : Ft Belvoir, VA	2.271	0.274		0.272		0.000		-		0.000	Continuing	Continuing	-
Subtotal			2.271	0.274		0.272		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
The HD R&D Program managers oversee adaptation of commercial-off-the-shelf equipment, integration of mature technologies, and leverage of R&D activity within DoD, particularly in the Army's Night Vision and Electronic Sensors Directorate (NVESD) Tactical Countermining mission area. Areas of emphasis are identified and validated at a

UNCLASSIFIED

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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
biennial Requirements Workshop held by OASD SO/LIC. The Requirements Workshop involves representatives from Department of State (DoS), U.S. combatant commands (COCOMS) and mine-affected nations.															
			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract				
Project Cost Totals			77.723	10.952	14.700	0.000	0.000	0.000	Continuing	Continuing	N/A				

Remarks
 The Humanitarian Demining Research and Development (HD R&D) program element rapidly develops, demonstrates and validates new technologies for DoD-supported nations to detect and clear landmines and unexploded ordnance (UXO), and to contribute to US military countermining R&D. The HD R&D Program focuses on development of new technologies to improve the efficiency and safety of indigenous nation-conducted, post-conflict clearance of residual mines and UXO, which pose a serious threat to US forces conducting stability operations, and to the host nation's population and economy.

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Office of the Secretary Of Defense Date: February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / Humanitarian De-mining	Project (Number/Name) 920 / Humanitarian De-mining
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	FY19				FY20				FY21				FY22				FY23				FY24				FY25							
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Mine / UXO Technology Development																																
Contracting Process	■				■				■				■				■				■				■							
Develop Prototype Equipment	■				■				■				■				■				■				■							
Technical Evaluation	■				■				■				■				■				■				■							
Operational Field Evaluations	■																															
Requirements Working Group Meetings	▲				▲				▲				▲				▲				▲				▲				▲			

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Office of the Secretary Of Defense **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / <i>Humanitarian De-mining</i>	Project (Number/Name) 920 / <i>Humanitarian De-mining</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mechanical Mine/UXO Clearance Systems	1	2019	4	2025
Mine/UXO Detection Systems	1	2019	4	2025