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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2020 Office of the Secretary Of Defense **Date:** February 2019

<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603920D8Z I <i>Humanitarian De-mining</i>
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COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	67.204	10.519	11.262	10.820	-	10.820	11.031	11.267	11.260	11.260	Continuing	Continuing
920: <i>Humanitarian De-mining</i>	67.204	10.519	11.262	10.820	-	10.820	11.031	11.267	11.260	11.260	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**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 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 (HDTTC) in support of mil-to-mil training and partnerships. Since 1995 the program has fielded technologies for 223 evaluations in 40 countries, including Afghanistan, Iraq, Vietnam, Cambodia, Angola and Zimbabwe. The program’s technologies have cleared 60.2 million square meters of the world’s toughest minefields, and found or destroyed 197,328 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.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
Previous President's Budget	10.816	11.347	10.820	-	10.820
Current President's Budget	10.519	11.262	10.820	-	10.820
Total Adjustments	-0.297	-0.085	0.000	-	0.000
• Congressional General Reductions	-	-0.085			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.297	-			

**Change Summary Explanation**

Reductions were in support of Departmental efficiencies and economic assumptions.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<b>Title:</b> 0603920D8Z - SO/LIC Humanitarian De-mining	10.519	11.262	10.820
<b>Description:</b> 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 Countermine 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).			
<b>FY 2019 Plans:</b>			
<ul style="list-style-type: none"> <li>• Deploy new technology, including Scorpion to Afghanistan; Little Storm to Cambodia; HSTAMIDS to Colombia; Scorpion and Bearcat to Laos; HSTAMIDS to Lebanon; Primetech to Sri Lanka; and Traxx to Ukraine</li> <li>• 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, MDS-10, VMH4, F3C, CMD3; and vegetation and mine clearance and neutralization technologies such as Robomax, Robocut, Primetech, and Little Storm</li> <li>• Continue successful operational evaluations from FY2018</li> <li>• Support the combatant commands and Embassy staffs by conducting new site surveys and country assessments in Colombia, Laos, Lebanon, Palau, Sri Lanka, Ukraine, and Vietnam</li> <li>• Develop, test and evaluate new prototype technologies based on feedback from the field</li> </ul>			
<b>FY 2020 Plans:</b>			
<ul style="list-style-type: none"> <li>• Deploy new technology to Colombia, Iraq, Laos, Lebanon, potentially Syria and other countries</li> </ul>			

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<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>		<b>R-1 Program Element (Number/Name)</b> PE 0603920D8Z <i>I Humanitarian De-mining</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<ul style="list-style-type: none"> <li>• Complete ongoing equipment developments/modifications</li> <li>• Continue successful operational evaluations from FY2019</li> <li>• Support the combatant commands and Embassy staffs by conducting new site surveys and country assessments</li> <li>• 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</li> </ul> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Decrease from FY19 to FY20 to be achieved by reducing operating costs.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		10.519	11.262	10.820
<b>D. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>E. Acquisition Strategy</b>				
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).				
<b>F. Performance Metrics</b>				
Long Term Strategies: Obtain adequate funding to support critical shortfalls; prioritize proposals that are deemed acceptable and allocate funding accordingly; and establish outreach programs to leverage institutional knowledge and expertise.				
Performance Indicator and Rating:				
FY 2018 Target:				
90% of currently funded research technologies are completed on time and within budget				
Complete scheduled R&D project tasks				
Transition field-ready technologies to host nation demining partners				
FY 2019 Target:				
90% of currently funded research technologies are completed on time and within budget				

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<p>Complete scheduled R&amp;D project tasks Transition field-ready technologies to host nation demining partners Conduct biennial Humanitarian R&amp;D Program Requirements Workshop</p> <p>FY 2018 Performance Rating: Funded research technologies were completed per the target.</p> <p>Verification: The Humanitarian Demining Program performs program reviews with other USG agencies (DOS PM WRA, DSCA, HDTTC, CENTCOM, PACOM, SOUTHCOM, AFRICOM, EUCOM) and has oversight from OSD SO/LIC.</p> <p>Validation: Completed R&amp;D products increase the capabilities of the DoD to effectively perform demining missions.</p>		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Office of the Secretary Of Defense** **Date:** February 2019

<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603920D8Z / Humanitarian De-mining	<b>Project (Number/Name)</b> 920 / Humanitarian De-mining
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<b>Product Development (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Primary Hardware Development	Various	RDECOM-NVESD : Ft Belvoir, VA	39.215	4.914		5.321		5.059		-		5.059	Continuing	Continuing	-
<b>Subtotal</b>			39.215	4.914		5.321		5.059		-		5.059	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.

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Humanitarian Demining Research and Development Program	Various	RDECOM-NVESD : Ft Belvoir, VA	25.988	5.335		5.670		5.489		-		5.489	Continuing	Continuing	-
<b>Subtotal</b>			25.988	5.335		5.670		5.489		-		5.489	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.

<b>Management Services (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Humanitarian Demining Program Management Support	Various	RDECOM-NVESD : Ft Belvoir, VA	2.001	0.270		0.271		0.272		-		0.272	Continuing	Continuing	-
<b>Subtotal</b>			2.001	0.270		0.271		0.272		-		0.272	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

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**Exhibit R-3, RDT&E Project Cost Analysis:** PB 2020 Office of the Secretary Of Defense **Date:** February 2019

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Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	67.204	10.519	11.262	10.820	-	10.820	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.

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**Exhibit R-4, RDT&E Schedule Profile:** PB 2020 Office of the Secretary Of Defense **Date:** February 2019

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	FY18				FY19				FY20				FY21				FY22				FY23				FY24							
	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				
<b>Mine / UXO Technology Development</b>																																
Contracting Process	■				■				■				■				■				■				■							
Develop Prototype Equipment	■				■				■				■				■				■				■							
Technical Evaluation	■				■				■				■				■				■				■							
Operational Field Evaluations	■																															
Requirements Working Group Meetings	▲				▲				▲				▲				▲				▲				▲				▲			

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2020 Office of the Secretary Of Defense **Date:** February 2019

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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mechanical Mine/UXO Clearance Systems	1	2018	4	2024
Mine/UXO Detection Systems	1	2018	4	2024