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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Army **Date:** February 2015

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0205410A / Materials Handling Equipment
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	-	0.834	0.402	-	0.402	0.304	0.750	0.750	-	-	3.040
EE9: Material Handling Equipment - Advance Development	-	-	0.834	0.402	-	0.402	0.304	0.750	0.750	-	-	3.040

Note

Funding realigned from 603804A Project G14

A. Mission Description and Budget Item Justification

This program element supports component development and Material Handling Equipment (MHE) prototyping and stays abreast of emerging and available technologies to be integrated into military MHE to address identified capability gaps and warfighter objectives. This project enables the development of selected technologies and transition to system integration and development or production of MHE products. MHE includes Rough Terrain Forklifts, Rough Terrain Container Handlers (RTCH) and Cranes, as well as ancillary MHE equipment, to support distribution of critical supplies in the theater of operations. FY16 funding will allow innovative research with the goal to improve fuel efficiency, operational energies, machine diagnostics and to enhance operation of MHE equipment.

B. Program Change Summary (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	-	0.834	0.402	-	0.402
Current President's Budget	-	0.834	0.402	-	0.402
Total Adjustments	-	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
EE9: <i>Material Handling Equipment - Advance Development</i>	-	-	0.834	0.402	-	0.402	0.304	0.750	0.750	-	-	3.040
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports component development and Material Handling Equipment (MHE) prototyping and stays abreast of emerging and available technologies to be integrated into military MHE to address identified capability gaps and warfighter objectives. This project enables the development of selected technologies and transition to system integration and development or production of MHE products. MHE includes Rough Terrain Forklifts, Rough Terrain Container Handlers (RTCH) and Cranes, as well as ancillary MHE equipment, to support distribution of critical supplies in the theater of operations. FY16 funding will allow for innovative research with the goal to improve fuel efficiency, operational energy technologies, machine diagnostics and to enhance operation of MHE equipment.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Baseline Fuel Efficiency of Material Handling Equipment (MHE)</p> <p>Description: Develop standard duty cycles for fielded system, investigate training/technology for improving efficiency and validate performance of proposed changes.</p> <p>FY 2015 Plans: Continue baseline and evaluate new solutions for fluid and controls</p> <p>FY 2016 Plans: Continue baseline and evaluate new solutions for fluid and controls</p>	-	0.250	0.060
<p>Title: Upgrade RTCH control systems and on-board diagnostics</p> <p>Description: Perform analysis of current control systems and technology which can be used to improve performance and reliability. Investigate integration of on-board diagnostics to aid in operation and maintenance.</p> <p>FY 2015 Plans: Investigate current RTCH control systems and conduct Market Research</p>	-	0.434	-
<p>Title: Investigate Robotic Assist on Material Handling Equipment (MHE)</p> <p>Description: Research and demonstrate technologies which would enhance operation such as the inclusion of cameras, collision sensors and lifting aids.</p>	-	0.150	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<i>FY 2015 Plans:</i> Conduct research into appliqué which will enhance operation			
<i>Title:</i> Operational Energy Technologies <i>Description:</i> Evaluate emerging technologies that can improve machine productivity and efficiency. Baseline fuel efficiency, engine management, efficient lubricants and hydraulic technologies.	-	-	0.240
<i>FY 2016 Plans:</i> Instrument up to three vehicle types (Light Capacity Rough Terrain Forklift, Rough Terrain Container Handler and All Terrain Lifting Army System) and monitor fuel consumption during operations. Build duty cycle profiles for the classes of equipment and identify areas of inefficiency and language to include in future procurements.			
<i>Title:</i> Machine Diagnostic <i>Description:</i> Evaluate machine diagnostic and condition based maintenance technologies to enhance operational availability and reduce overall maintenance burden.	-	-	0.102
<i>FY 2016 Plans:</i> Investigate the commercially available technology for integration on the RTCH which would allow onboard diagnostic and fault production capability.			
Accomplishments/Planned Programs Subtotals	-	0.834	0.402

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• M41200: <i>Rough Terrain Container Handler</i>	1.250	-	-	-	-	-	-	-	-	-	1.250
• M41800: <i>All Terrain Lifting Army System</i>	0.860	-	-	-	-	-	-	-	-	-	0.860
• G41002: <i>5K Light Capacity Rough Terrain (LCRT) Forklift</i>	7.517	14.327	27.982	-	27.982	17.843	18.199	18.555	17.916	-	122.339

Remarks

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D. Acquisition Strategy

Procure prototype component items for engineering tests and demonstrations with subject matter experts. Conduct trades between cost and improved maintainability and environmental risk reduction. Process engineering change proposals, update technical manuals and training materials, and prepare supporting acquisition documents and data to procure new training aids.

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Army **Date:** February 2015

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Event Name	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
Baseline fuel efficiency of equipment																												
Investigate current RTCH control systems and conduct market research																												
Investigate robotic assist on Material Handling Equipment																												
Operational Energy Technologies																												
Machine Diagnostic																												
Driver Assist																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Army		Date: February 2015
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Baseline fuel efficiency of equipment	1	2015	2	2017
Investigate current RTCH control systems and conduct market research	1	2015	4	2015
Investigate robotic assist on Material Handling Equipment	2	2015	4	2016
Operational Energy Technologies	2	2016	4	2020
Machine Diagnostic	2	2016	2	2017
Driver Assist	1	2017	4	2020