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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army I BA 4: Advanced Component Development & Prototypes (ACD&P)					R-1 Program Element (Number/Name) PE 0603619A I Landmine Warfare and Barrier - Adv Dev							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	40.943	72.117	72.909	-	72.909	76.845	76.889	78.887	81.694	Continuing	Continuing
606: Cntrmn/Barrier Adv Dev	-	0.000	3.757	4.149	-	4.149	3.149	3.200	3.264	3.184	0.000	20.703
EK7: Area Denial Capability Development	-	40.943	68.360	68.760	-	68.760	73.696	73.689	75.623	78.510	Continuing	Continuing

Note

Project EK7, Area Denial Capability Development is a new start in FY 2016.

Project 606, Cntrmn/Barrier Adv Dev is a new start in FY 2017.

A. Mission Description and Budget Item Justification

This Program Element (PE) provides for the Concept Exploration and Refinement of a Deep-Range employed Networked Obstacle. This PE develops alternatives to the aging inventory of the Family of Scatterable Mines systems.

Project 606 enables component development of a new detection capability for explosive hazards, improvised explosive devices (IED), and components in support of route clearance operations. These capabilities will enhance the effectiveness of the Route Clearance Platoon within the Engineer Company, the Brigade Combat Team as well as other related Army missions.

Project EK7 Area Denial Capability Development will evaluate integrated technologies and prototype systems in a realistic operating environment to expedite technology transition for a Deep-Range employed Networked Obstacle. The obstacle will be delivered via fixed wing aircraft and deny the enemy terrain and freedom of action while allowing friendly forces to maneuver freely within the same battlespace. Area Denial Capability Development provides controlled scalable effects against mounted enemy forces that disrupt, turn, fix, delay or block their ability to maneuver. Area Denial Capability Development enables the Combatant Commander to establish early Situational Awareness of an area without exposing friendly forces to enemy engagement, and to actively detect, and engage the enemy in order to shape the battlespace at deep operational ranges. Area Denial Capability Development will utilize an open system, modular architecture to facilitate future development, maintenance, repair, and product improvements.

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Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)		R-1 Program Element (Number/Name) PE 0603619A / Landmine Warfare and Barrier - Adv Dev			
B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	45.757	72.117	73.095	-	73.095
Current President's Budget	40.943	72.117	72.909	-	72.909
Total Adjustments	-4.814	0.000	-0.186	-	-0.186
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.000	-			
• SBIR/STTR Transfer	-1.814	-			
• Adjustments to Budget Years	0.000	0.000	0.006	-	0.006
• Other Adjustments 1	0.000	0.000	-0.192	-	-0.192
Change Summary Explanation					
Funding deltas attributable to realigned higher priorities.					

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Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603619A / Landmine Warfare and Barrier - Adv Dev				Project (Number/Name) 606 / Cntrmn/Barrier Adv Dev			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
606: Cntrmn/Barrier Adv Dev	-	0.000	3.757	4.149	-	4.149	3.149	3.200	3.264	3.184	0.000	20.703
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
Project 606 Countermine/Barrier Advanced Development enables development and evaluation of technologies that will perform detection, neutralization, and clearing of landmines and Improvised Explosive Devices (IEDs) at operational speeds.												
The FY 2018 Base RDTE dollars in the amount of \$4.149 million supports Explosive Hazard Detection technology analysis, system analysis, test design and evaluation. It also funds system engineering and program management.												
B. Accomplishments/Planned Programs (\$ in Millions)										FY 2016	FY 2017	FY 2018
Title: System Engineering and Program Management										-	0.400	1.435
Description: Supports System Engineering and Program Management												
FY 2017 Plans: Supports System Engineering and Program Management												
FY 2018 Plans: Supports System Engineering and Program Management												
Title: Explosive Hazard Detection Technology Development										-	2.850	2.440
Description: Explosive Hazard Detection Technology Analysis												
FY 2017 Plans: Explosive Hazard Detection technology analysis, system analysis, and test design.												
FY 2018 Plans: Explosive Hazard Detection development and evaluation of evolving technologies												
Title: Explosive Hazard Detection Test and Evaluation										-	0.507	0.274
Description: Explosive Hazard Detection Test and Evaluation												
FY 2017 Plans:												

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B. Accomplishments/Planned Programs (\$ in Millions)										FY 2016	FY 2017	FY 2018
Explosive Hazard Detection Test and Evaluation												
FY 2018 Plans: Conduct testing of candidate technologies.												
Accomplishments/Planned Programs Subtotals										-	3.757	4.149
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
• PE 0604808A Proj 415	49.724	36.858	19.848	-	19.848	30.617	38.202	25.732	30.011	Continuing	Continuing	
RDTE: <i>PE 0604808A Proj 415</i>												
<i>Mine Neutralization/Detection</i>												
• R64001 OPA: <i>R64001 OPA Husky</i>	13.565	0.274	21.695	-	21.695	41.423	50.646	81.219	46.019	Continuing	Continuing	
<i>Mounted Detection System (HMDS)</i>												
Remarks												
PE 0604808 Project 415 Mine Neutralization and Detection is the engineering development follow-on to this funding line, and is a shared project line. The above profile represents the total line, not only the follow on tasks within this program.												
D. Acquisition Strategy												
The Acquisition Strategy for Route Clearance Operations will be developed in conjunction with program initiation.												
The Husky Mounted Detection System (HMDS) program is pursuing an acquisition approach that delivers capability to the Warfighter by leveraging the Quick Reaction Capability (QRC) Ground Penetrating Radar (GPR) currently deployed in support of Operation Enduring Freedom (OEF) and Operation Inherent Resolve (OIR). In FY2018, as part Engineering Development activities, the program will execute an ECP to add a wire detection capability to address evolving threat, and Infrared illumination to enable nighttime operation. A second ECP to improve operational availability of the HMDS during inclement weather and address obsolescence and Cyber Security deficiencies will follow. As part of the Advanced Development activities, the HMDS Program will conduct additional development and evaluation of technologies to address a broader spectrum of emerging threats, interoperability with electronic countermeasures, and detection and neutralization of landmines and Improvised Explosive Devices (IEDs) at operational speeds.												
E. Performance Metrics												
N/A												

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Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603619A / Landmine Warfare and Barrier - Adv Dev				Project (Number/Name) EK7 / Area Denial Capability Development			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EK7: Area Denial Capability Development	-	40.943	68.360	68.760	-	68.760	73.696	73.689	75.623	78.510	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the Development of a Deep-Range employed Networked Obstacle to replace the aging inventory of the Family of Scatterable Mines systems.

Area Denial Capability Development will evaluate integrated technologies and prototype systems in a realistic operating environment to expedite technology transition for a Deep-Range employed Networked Obstacle. The obstacle will be delivered via fixed wing aircraft and will deny the enemy terrain and freedom of action while allowing friendly forces to maneuver freely within the same battlespace. Area Denial Capability Development provides controlled scalable effects against mounted enemy forces that disrupt, turn, fix, delay or block their ability to maneuver. Area Denial Capability Development enables the Combatant Commander to establish early Situational Awareness of an area without exposing friendly forces to enemy engagement, and to actively detect, and engage the enemy in order to shape the battlespace at deep operational ranges. Area Denial Capability Development will utilize an open system, modular architecture to facilitate future development, maintenance, repair, and product improvements.

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

	FY 2016	FY 2017	FY 2018
Title: Area Denial Capability Development	26.571	52.254	51.386
Description: Develop and build system and sub-system level concepts that will be evaluated for affordability, feasibility, and technical maturity. Complete competitive development of systems and perform initiatives to mature technical feasibility and reduce risk.			
FY 2016 Accomplishments: Awarded 4 contract agreements to build prototypes that represent system and sub-system level concepts. The concepts and prototypes were evaluated for technical maturity and potential operational effectiveness, suitability, and affordability.			
FY 2017 Plans: Award four follow-on prototyping agreements to continue development of competing system prototypes, perform technical/ engineering analysis of preferred materiel solution, inform the Capability Development Document (CDD) requirements, reduce program technical risk, and program cost risk.			
FY 2018 Plans:			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Award contract agreements to conduct analysis on delivery bomb unit and integration with aircraft. Develop the Capability Development Document (CDD) requirements, conduct technical activities to reduce program technical and cost risk.				
Title: Engineering Support Description: Provide Engineering Support. FY 2016 Accomplishments: Engineering support for Analysis of Alternatives, Concept Prototype Contract/Agreement Award, initial development of Models and Simulations, Milestone A Documentation, and Technology Readiness Assessment of Concept Prototypes. FY 2017 Plans: Engineering support for follow-on prototyping contracts/agreements and execution. Develop models and simulations, develop Milestone A documentation, conduct technology readiness assessment, and support requirements development. FY 2018 Plans: Engineering support to execute contract agreements to conduct analysis on delivery bomb unit and integration with aircraft. Continue developing models and simulations, achieve Milestone A decision, conduct technology readiness assessments, and support requirements development.		10.101	9.660	10.156
Title: Test and Evaluation Description: Provide support to Contractor/Government test Activities. FY 2016 Accomplishments: Conducted test planning for a Technical Demonstration and Evaluation of system and sub-system level prototypes. Developed test scenarios and vignettes. Conducted multiple site surveys and selected appropriate test ranges and facilities. Supported contractor test planning.		0.429	-	-
Title: Program Management and Oversight Description: Program Management and Support FY 2016 Accomplishments: Program Management support for Analysis of Alternatives, Test and Evaluation, Modeling and Simulation, Milestone A planning, and Concept Prototype contracts/agreements. FY 2017 Plans:		3.842	6.446	7.218

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017
<p>Program Management support for technical/engineering analysis of materiel solution, Modeling and Simulation, Capability Development Document requirements development, competitive prototype contracts/agreements, and Milestone A preparation.</p> <p><i>FY 2018 Plans:</i> Program Management support for technical/engineering analysis of the materiel solution and management of contract agreements to conduct analysis on delivery bomb unit and integration with aircraft. Prepare the requirements for two Technology Maturation and Risk Reduction phase development contracts/agreements. Conduct industry engagements.</p>			
Accomplishments/Planned Programs Subtotals		40.943	68.360
C. Other Program Funding Summary (\$ in Millions)			
N/A			
Remarks			
N/A			
D. Acquisition Strategy			
<p>An Analysis of Alternatives (AoA) was completed in October 2016 which assessed the technical feasibility, operational feasibility, technical risk, and affordability of various potential materiel solutions. The Analysis of Alternatives was informed by previously executed studies and input from Government, Industry and Academia. In parallel to the Analysis of Alternatives, 4 Concept Prototype contracts/agreements were awarded to industry to develop representative prototypes (hardware and/or models) that will be used to assess the technology risks and costs associated with multiple system level concepts. The results of the Analysis of Alternatives and evaluation of representative prototypes will support a 3QFY18 Milestone A Decision. The Army will award contracts/agreements to conduct an analysis of current Bomb Unit technology that will inform future development requirements during the Technology Maturation and Risk Reduction (TMRR) phase. The Army will award two Technology Maturation and Risk Reduction (TMRR) contracts/ agreements to develop competing prototypes of the selected materiel solution. Technologies that support the selected system level concepts will be matured during Technology Maturation and Risk Reduction, and a Capability Development Document (CDD) will be developed. At the end of Technology Maturation and Risk Reduction, and after a successful Milestone B Decision, the Army will competitively award an Engineering and Manufacturing Development (EMD) contract to complete development of the system, complete system integration, develop manufacturing processes, and conduct testing before entering the Production and Deployment phase.</p>			
E. Performance Metrics			
N/A			

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 4						R-1 Program Element (Number/Name) PE 0603619A / Landmine Warfare and Barrier - Adv Dev						Project (Number/Name) EK7 / Area Denial Capability Development			
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program	MIPR	PM-CCS : Picatinny Arsenal, NJ	0.000	3.841		4.700		4.474		-		4.474	Continuing	Continuing	0.000
SBIR/STTR/FFRDC	TBD	PM CCS : Picatinny Arsenal, NJ	0.000	-		1.746		2.750		-		2.750	Continuing	Continuing	0.000
Subtotal			0.000	3.841		6.446		7.224		-		7.224	-	-	0.000
Remarks Small Business Innovative Research (SBIR) cost are \$1,577,000. Small Business Technology Transfer (STTR) costs are \$237,000.															
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype Development A	SS/CPFF	Orbital ATK : Plymouth, MN	0.000	8.351	Feb 2016	-		-		-		-	0.000	8.351	0.000
Prototype Development B	SS/CPFF	Textron Defense Systems : Wilmington, MA	0.000	7.829	Feb 2016	-		-		-		-	0.000	7.829	0.000
Prototype Development C	SS/FFP	Fantastic Data LLC : San Fransisco, CA	0.000	7.363	Feb 2016	-		-		-		-	0.000	7.363	0.000
Prototype Development D	SS/CPFF	Northrop Grumman Systems Corporation : Redondo Beach, CA	0.000	3.028	Feb 2016	-		-		-		-	0.000	3.028	0.000
Technology Maturation Risk Reduction (TMRR) Development A	SS/TBD	TBD : TBD	0.000	-		26.127	Jun 2017	25.690	Jan 2018	-		25.690	Continuing	Continuing	0.000
Technology Maturation Risk Reduction (TMRR) Development B	SS/TBD	TBD : TBD	0.000	-		26.127	Jun 2017	25.690	Jan 2018	-		25.690	Continuing	Continuing	0.000
Subtotal			0.000	26.571		52.254		51.380		-		51.380	-	-	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 4						R-1 Program Element (Number/Name) PE 0603619A / <i>Landmine Warfare and Barrier - Adv Dev</i>						Project (Number/Name) EK7 / <i>Area Denial Capability Development</i>			
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ARDEC Engineering Support	MIPR	ARDEC : Picatinny Arsenal, NJ	0.000	3.484		5.284		5.110		-		5.110	Continuing	Continuing	0.000
CERDEC Engineering Support	MIPR	CERDEC : Fort Belvoir, VA	0.000	0.497		1.168		0.275		-		0.275	Continuing	Continuing	0.000
Mitre Engineering Support (C4)	FFRDC	Mitre : McLean, VA	0.000	0.863	Aug 2016	0.440		1.000		-		1.000	Continuing	Continuing	0.000
NVESD Engineering Support	MIPR	NVESD : Fort Belvoir, VA	0.000	0.440		0.800		0.800		-		0.800	Continuing	Continuing	0.000
Fibertek, INC. Operational Contractor Support	C/CPFF	FIBERTEK, INC. : Herndon, VA	0.000	0.131	Aug 2016	-		0.500		-		0.500	0.000	0.631	0.000
Millenium Program Support	C/FFP	Millennium Corporation : Arlington, VA	0.000	-		0.500		-		-		-	Continuing	Continuing	0.000
ARL Engineering Support	MIPR	ARMY RESEARCH LABORATORY (ARL) : Adelphi, MD	0.000	0.633		0.850		0.850		-		0.850	Continuing	Continuing	0.000
AMSAA Engineering Support	MIPR	Army Materiel Systems Analysis Activity (AMSAA) : Aberdeen, MD	0.000	0.663		0.206		0.215		-		0.215	Continuing	Continuing	0.000
TRAC Analysis Support	MIPR	TRADOC Analysis Center (TRAC) : White Sands, NM	0.000	2.200		-		-		-		-	0.000	2.200	0.000
USAF Engineering and Integration Support	SS/CPFF	Air Force Life Cycle Management Center, Armament Systems Development Division : Eglin AFB, FL	0.000	1.191	Dec 2016	0.206		1.200		-		1.200	Continuing	Continuing	0.000
USN Engineering and Integration Support	MIPR	TBD : TBD	0.000	-		0.206		0.206		-		0.206	Continuing	Continuing	0.000
Subtotal			0.000	10.102		9.660		10.156		-		10.156	-	-	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost To Complete	Total Cost	Target Value of Contract
Support Government Test Activities	MIPR	USAF 96th Test Squadron / OGEX : Eglin AFB, FL	0.000	0.429		-		-		-		-		Continuing	Continuing	0.000
Subtotal			0.000	0.429		-		-		-		-		-	-	0.000

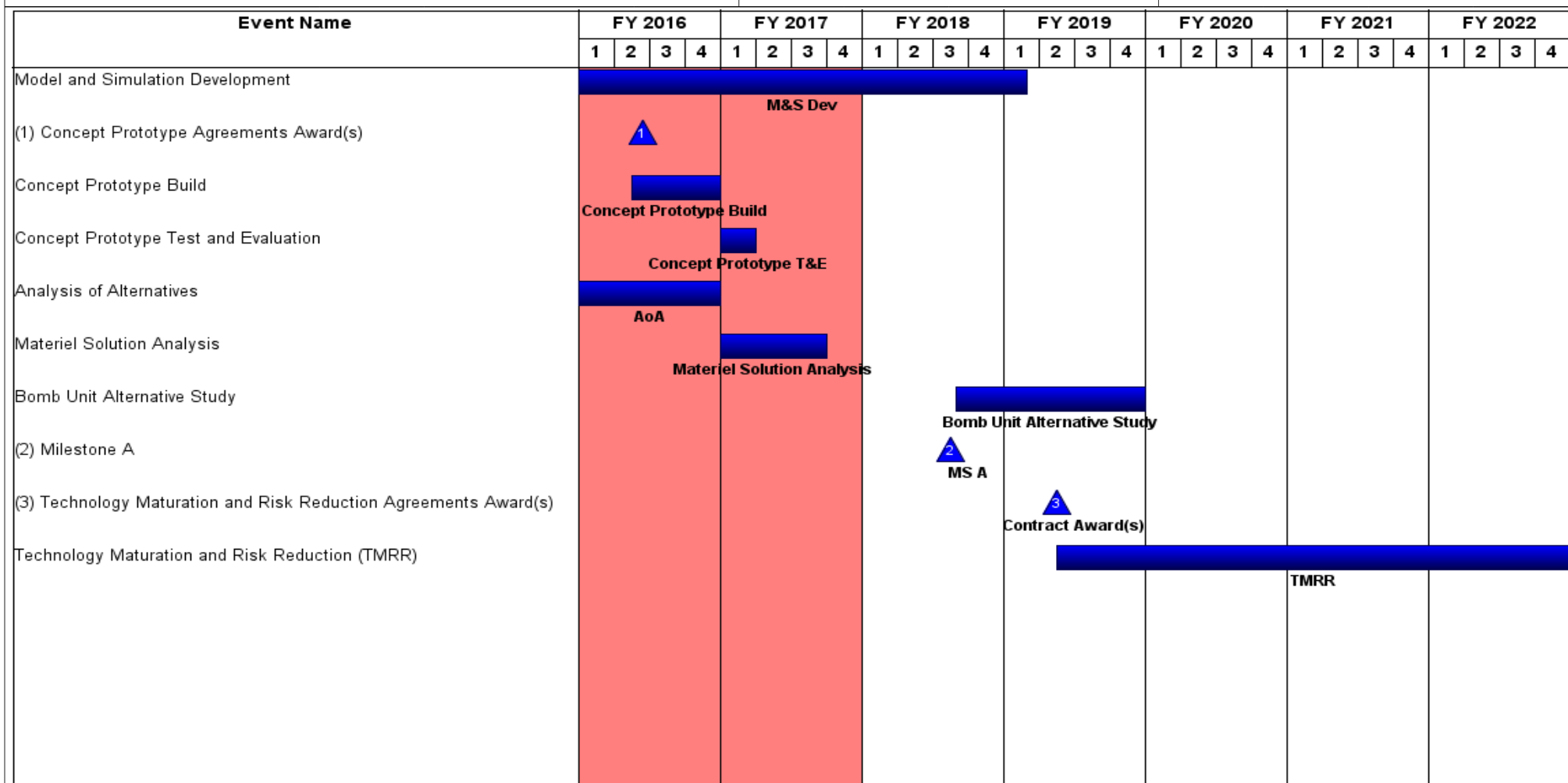
	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	40.943	68.360	68.760	-	68.760	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603619A / <i>Landmine Warfare and Barrier - Adv Dev</i>	Project (Number/Name) EK7 / <i>Area Denial Capability Development</i>
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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603619A / <i>Landmine Warfare and Barrier - Adv Dev</i>	Project (Number/Name) EK7 / <i>Area Denial Capability Development</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Model and Simulation Development	1	2016	1	2019
Concept Prototype Agreements Award(s)	2	2016	2	2016
Concept Prototype Build	2	2016	4	2016
Concept Prototype Test and Evaluation	1	2017	1	2017
Analysis of Alternatives	1	2016	4	2016
Materiel Solution Analysis	1	2017	3	2017
Bomb Unit Alternative Study	3	2018	4	2019
Milestone A	3	2018	3	2018
Technology Maturation and Risk Reduction Agreements Award(s)	2	2019	2	2019
Technology Maturation and Risk Reduction (TMRR)	2	2019	2	2024