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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army										Date: March 2019		
Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0203801A I Missile/Air Defense Product Improvement Program							
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	-	43.615	3.641	1.287	-	1.287	1.289	0.128	1.500	1.500	0.000	52.960
038: Avenger PIP	-	2.615	3.641	1.287	-	1.287	1.289	0.128	1.500	1.500	0.000	11.960
DT5: Stinger Product Improvement	-	41.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	41.000

A. Mission Description and Budget Item Justification

The Avenger Air Defense System is a lightweight, ground-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle. The Avenger's mission is to protect fixed critical assets and Corps/Echelons above Corps Maneuver forces from Fixed Wing (FW) Aircraft, Rotary Wing (RW) Aircraft, Unmanned Aircraft Systems (UAS) and Cruise Missiles (CM). Avenger provides day/night adverse weather operations, shoot on the move capability, rapid target engagement, and remote firing capability.

The Avenger Modification - Service Life Extension Program (MOD-SLEP) consists of Project 038: Avenger Production Improvement Program (PIP) and Program Element CE8710: Avenger MODS. FY 2020 funding of \$1.287 million ensures that Avenger is viable and sustainable through the end of program life. Avenger MOD-SLEP maintains operational capability of Avenger until FY 2031.

The Stinger missile is an advanced, fire-and-forget, short-range, man-portable, shoulder-fired and platform mounted guided missile that provides the maneuver force and point defense assets air defense protection. Stinger's mission is to provide the force with low-altitude air defense against FW, RW, UAS and CM. The Stinger missile is deployable from a variety of platforms that includes vehicles, helicopters, UAS and Man Portable Air Defense System (MANPADS). The missile is delivered as a certified round and requires no field testing or maintenance.

Stinger Product Improvement completes the design, development, test and integration of the Proximity Fuze (PROX) and addresses obsolescence. This will make PROX available for incorporation into the existing Stinger Block I missile. The PROX will improve effectiveness by eliminating the need for a hit-to-kill against UAS threats. UAS defense is a requirement of the Operational Requirements Document (ORD) for the Stinger Guided Missile System and validated by the Deputy Chief of Staff, G-3/5/7, Current and Future Warfighting Capabilities Division (DAMO-CIC) in a memo dated 28 May 2013.

Stinger Product Improvement also includes the following efforts: redesign of Stinger missile components to address obsolescence and improve performance; integration of the Javelin Lightweight Command Launch Unit (CLU) onto the Stinger MANPADS to improve target acquisition capabilities; and redesign of Stinger Training Aids, Devices, Simulators and Simulations (TADSS) to address obsolescence.

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Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development		R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program			
B. Program Change Summary (\$ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	17.723	3.643	1.287	-	1.287
Current President's Budget	43.615	3.641	1.287	-	1.287
Total Adjustments	25.892	-0.002	0.000	-	0.000
• Congressional General Reductions	-0.002	-0.002			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	26.000	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.106	-			
Congressional Add Details (\$ in Millions, and Includes General Reductions)				FY 2018	FY 2019
Project: DT5: Stinger Product Improvement					
Congressional Add: Stinger Component Redesign, Integrate Javelin CLU with MANPADS, TADSS				26.000	-
Congressional Add Subtotals for Project: DT5				26.000	-
Congressional Add Totals for all Projects				26.000	-
Change Summary Explanation					
The FY 2018 increase of \$25.892 million is a \$26.000 million Congressional Add titled "Stinger PIP Congressional Add" with a reduction for the SBIR/STTR transfer.					

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Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program				Project (Number/Name) 038 / Avenger PIP			
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
038: Avenger PIP	-	2.615	3.641	1.287	-	1.287	1.289	0.128	1.500	1.500	0.000	11.960
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Avenger Air Defense System is a lightweight, ground-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle. The Avenger's mission is to protect fixed critical assets and Corps/Echelons above Corps Maneuver forces from Fixed Wing (FW) Aircraft, Rotary Wing (RW) Aircraft, Unmanned Aircraft Systems (UAS) and Cruise Missiles (CM). Avenger provides day/night adverse weather operations, shoot on the move capability, rapid target engagement, and remote firing capability.

Avenger PIP consists of the ongoing Avenger Modification - Service Life Extension Program (MOD-SLEP). Avenger MOD-SLEP provides development and testing of six key components to ensure Avenger maintains operational capability through FY 2031. The six components are: Targeting Console (TC), .50 Caliber Machine Gun (M3P), Avenger Fire Control Computer (AFCC), Mode 5 Identification Friend or Foe (IFF), Vehicle Internal Communications (VIC-5) and the Environmental Control Unit/ Prime Power Unit (ECU/PPU) governor and starter.

FY 2020 Base dollars in the amount of \$1.287 million supports activities to ensure the Avenger is viable and sustainable through FY 2031. The funding will complete the Materiel Release package for the AFCC, IFF, VIC-5 and ECU/PPU governor and starter.

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

	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Avenger MOD-SLEP	2.615	3.588	1.287	-	1.287
Description: The Avenger MOD-SLEP consists of development activities for platform integration, software upgrades, and capability enhancements. Develops and executes test requirements and conducts limited contractor and government testing. Performs technical assessments, concept studies, cost reduction, risk reduction and development documentation.					
FY 2019 Plans: Complete test requirements and initiate Materiel Release package.					
FY 2020 Base Plans: Funding will complete the Materiel Release package for MOD-SLEP. This effort's funding will be executed by Program Executive Office Missiles & Space.					
FY 2019 to FY 2020 Increase/Decrease Statement:					

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Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program				Project (Number/Name) 038 / Avenger PIP				
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Decrease from FY 2019 to FY 2020 is due to the completion of testing in FY 2019.												
Title: FY 2019 SBIR / STTR Transfer								-	0.053	-	-	-
FY 2019 Plans: FY 2019 SBIR / STTR Transfer												
FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer												
Accomplishments/Planned Programs Subtotals								2.615	3.641	1.287	-	1.287
C. Other Program Funding Summary (\$ in Millions)												
Line Item	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	
• CE8710: AVENGER MODS	62.931	31.093	0.000	14.107	14.107	13.958	11.394	-	-	0.000	133.483	
Remarks												
The Avenger MODS procures the MOD-SLEP components for the Avenger system. This ensures that Avenger is viable and sustainable through FY 2031. This program is an integral part of the Army Air and Missile Defense Modernization strategy.												
D. Acquisition Strategy												
The Avenger MOD-SLEP addresses obsolescence of key components and ensures that Avenger is viable and sustainable through FY 2031.												
The MOD-SLEP Phase I component is the TC.												
The MOD-SLEP Phase II components are the AFCC, the Mode 5 IFF, the VIC-5, the M3P machine gun, and the ECU/PPU governor and starter. The M3P machine gun and the ECU/PPU governor will be fielded through attrition. The other MOD-SLEP Phase II components will be installed in the field as a single installation package.												
E. Performance Metrics												
N/A												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
Appropriation/Budget Activity 2040 / 7						R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program				Project (Number/Name) 038 / Avenger PIP					
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Avenger Modification Management Services	Various	Various : Redstone Arsenal, AL	1.006	0.673	Jul 2018	0.164	Nov 2018	0.187	Oct 2019	-		0.187	0.540	2.570	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.053		-		-		-	0.000	0.053	-
Subtotal			1.006	0.673		0.217		0.187		-		0.187	0.540	2.623	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Avenger Modification Product Development	PO	Raytheon, The Boeing Company and others : Aberdeen Proving Grounds, MD and Huntsville, AL	7.698	0.602	Jul 2018	1.945	Nov 2018	0.512	Oct 2019	-		0.512	2.227	12.984	-
Subtotal			7.698	0.602		1.945		0.512		-		0.512	2.227	12.984	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Avenger Modification Test Support	Various	The Boeing Company, Aviation and Missile Research Development and Engineering Center (AMRDEC) and others : Huntsville, AL and Redstone Arsenal, AL	4.167	1.340	Jul 2018	1.479	Oct 2018	0.588	Oct 2019	-		0.588	1.650	9.224	-
Subtotal			4.167	1.340		1.479		0.588		-		0.588	1.650	9.224	N/A

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		Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		12.871	2.615		3.641		1.287		-		1.287	4.417	24.831	N/A
Remarks														

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army																Date: March 2019												
Appropriation/Budget Activity 2040 / 7								R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program								Project (Number/Name) 038 / Avenger PIP												
Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Integration and Testing (MOD-SLEP Phase II)	[REDACTED]				System Integration and Testing																							
Live Fire Testing (MOD-SLEP Phase II)					[REDACTED]																							
Logistics Demo (MOD-SLEP Phase II)					Flight Test																							
Logistics Demo (MOD-SLEP Phase II)					[REDACTED]																							
Materiel Release (MOD-SLEP Phase II)					Log Demo																							
Materiel Release (MOD-SLEP Phase II)									1 Materiel Release																			
Future Modifications to Address Evolving Threat																												
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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>	Project (Number/Name) 038 / <i>Avenger PIP</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Integration and Testing (MOD-SLEP Phase II)	2	2018	1	2019
Live Fire Testing (MOD-SLEP Phase II)	4	2018	4	2018
Logistics Demo (MOD-SLEP Phase II)	2	2019	4	2019
Materiel Release (MOD-SLEP Phase II)	4	2020	4	2020
Future Modifications to Address Evolving Threat	1	2020	4	2024

Note

MOD-SLEP Phase II components are the AFCC, IFF, VIC-5, M3P machine gun, and ECU/PPU governor and starter.

AFCC: Avenger Fire Control Computer

ECU/PPU: Environmental Control Unit/Prime Power Unit

IFF: Identification Friend or Foe

MOD-SLEP: Modification - Service Life Extension Program

VIC: Vehicle Internal Communications

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program				Project (Number/Name) DT5 / Stinger Product Improvement			
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
DT5: Stinger Product Improvement	-	41.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	41.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Stinger missile is an advanced, fire-and-forget, short-range, man-portable, shoulder-fired and platform mounted guided missile that provides the maneuver force and point defense assets air defense protection. Stinger's mission is to provide the force with low-altitude air defense against Fixed Wing (FW) and Rotary Wing (RW) Aircraft, Unmanned Aircraft Systems (UAS) and Cruise Missiles (CM). The Stinger missile is deployable from a variety of platforms that includes vehicles, helicopters, UAS and Man Portable Air Defense System (MANPADS). The missile is delivered as a certified round and requires no field testing or maintenance.

Stinger Product Improvement completes the design, development, test and integration of the Proximity Fuze (PROX) and addresses obsolescence. This will make PROX available for incorporation into the existing Stinger Block I missile. The PROX will improve effectiveness by eliminating the need for a hit-to-kill against UAS threats. UAS defense is a requirement of the Operational Requirements Document (ORD) for the Stinger Guided Missile System and validated by the Deputy Chief of Staff, G-3/5/7, Current and Future Warfighting Capabilities Division (DAMO-CIC) in a memo dated 28 May 2013.

Stinger Product Improvement also provides for the following efforts: redesign of Stinger missile components to address obsolescence and improve performance; integration of the Javelin Lightweight Command Launch Unit (CLU) with the Stinger MANPADS to improve target acquisition capabilities; and redesign of Stinger Training Aids, Devices, Simulators and Simulations (TADSS) to address obsolescence.

Stinger Product Improvement does not have FY 2020 funding.

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

	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: PROX Development, Test and Integration	15.000	-	-	-	-
Description: Development, test and integration of the PROX which will be incorporated into existing Stinger Block I missiles during Stinger SLEP.					
Accomplishments/Planned Programs Subtotals	15.000	-	-	-	-
	FY 2018	FY 2019			
Congressional Add: Stinger Component Redesign, Integrate Javelin CLU with MANPADS, TADSS	26.000	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019	
Appropriation/Budget Activity 2040 / 7		R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>		Project (Number/Name) DT5 / <i>Stinger Product Improvement</i>
			FY 2018	FY 2019
FY 2018 Accomplishments: Stinger Component Redesign, Integrate Javelin CLU with MANPADS, TADSS				
Congressional Adds Subtotals			26.000	-

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u> <u>Base</u>	<u>FY 2020</u> <u>OCO</u>	<u>FY 2020</u> <u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• C21300: <i>STINGER</i> <i>BLK I UPGRADES</i>	83.061	94.756	0.000	89.115	89.115	1.457	3.072	-	-	0.000	271.461

Remarks

Stinger Block 1 Upgrades program (Procurement) C21300 provides for SLEP of Stinger Block I missiles and the addition of the PROX.

D. Acquisition Strategy

In FY 2012, the Stinger Based Systems (SBS) Product Office utilized Picatinny Arsenal to award the PROX development contract for the design, development, test and integration of the PROX capability. This capability will be incorporated into the existing Stinger Block I missile SLEP.

Using FY 2018 funds, the SBS Product Office utilizes an Other Transactional Authority (OTA) with Defense Ordnance Technology Consortium (DOT-C) for the redesign of Stinger missile components to address obsolescence. The SBS Product Office used an existing contract through Joint Attack Munitions Systems (JAMS) Project Office for the Javelin Lightweight CLU integration. The SBS Product Office used the existing Stinger Engineering Services contract to redesign TADSS to address obsolescence.

E. Performance Metrics

N/A

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Appropriation/Budget Activity 2040 / 7						R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program				Project (Number/Name) DT5 / Stinger Product Improvement					
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 Mgt/Admin	Various	Trident, Intuitive Research and others : Redstone Arsenal, AL	0.981	5.126	Jul 2018	-		-		-		-	0.000	6.107	-
Subtotal			0.981	5.126		-		-		-		-	0.000	6.107	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Proximity Fuze (PROX) Development and Integration	Various	Aviation and Missiles Research Development and Engineering Center, Redstone Test Center and others : Redstone Arsenal, AL	22.977	-		-		-		-		-	0.000	22.977	-
Stinger Component Redesign	C/CPAF	Defense Ordnance Technology Consortium (DOTC) (Raytheon Missile Systems) : Tuscon, AZ	-	15.000	Jan 2019	-		-		-		-	0.000	15.000	-
Javelin Lightweight Command Launch Unit (CLU)	Option/ FFP	Raytheon/Lockheed Martin Javelin Joint Venture : Tucson, AZ	-	4.991	Jul 2018	-		-		-		-	0.000	4.991	-
Javelin Lightweight CLU (AMRDEC)	C/CPAF	DOTC : TBD	-	2.000	Jul 2018	-		-		-		-	0.000	2.000	-
Stinger Engineering Services (includes TADSS redesign)	SS/IDIQ	Raytheon Missile Systems : Tuscon, AZ	-	4.968	Jan 2018	-		-		-		-	0.000	4.968	-
Subtotal			22.977	26.959		-		-		-		-	0.000	49.936	N/A

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Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Engineering Support	MIPR	AMRDEC : Redstone Arsenal, AL	-	1.509	Jul 2018	-		-		-		-	0.000	1.509	-
Subtotal			-	1.509		-		-		-		-	0.000	1.509	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
PROX Test and Evaluation	MIPR	Redstone Test Center and others : Redstone Arsenal, AL and Eglin Air Force Base, FL	-	7.406	Jul 2018	-		-		-		-	0.000	7.406	-
Subtotal			-	7.406		-		-		-		-	0.000	7.406	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			23.958	41.000		0.000		-		-		-	0.000	64.958	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army																Date: March 2019																
Appropriation/Budget Activity 2040 / 7										R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program										Project (Number/Name) DT5 / Stinger Product Improvement												
Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024							
	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				
Proximity Fuze (PROX) Test	<div></div>																															
PROX Urgent Materiel Release (UMR)	<div></div>																															
Stinger Missile Component Redesign	<div></div>																															

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army			Date: March 2019
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Proximity Fuze (PROX) Test	4	2017	1	2020
PROX Urgent Materiel Release (UMR)	3	2019	3	2019
Stinger Missile Component Redesign	4	2018	3	2020