Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0607142A *I Aviation Rocket System Product Improvement and Development*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	1.847	13.421	12.417	-	12.417	-	-	-	-	-	-
EW9: *Aviation Rocket System Product Improvement and Dev*	-	1.847	13.421	12.417	-	12.417	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Aviation Rockets and Small Guided Munitions Product Improvement and Development line funds the development, integration and test of current and future munitions and launchers, and their interface to platforms. Additionally, it will fund a range of improvement initiatives to modernize the Hydra-70 2.75 Inch rocket and launcher system. The current Hydra-70 2.75 inch rocket system requires performance improvements to comply with 1) US Code - Title 10, Chapter 141, Section 2389 "Ensuring Safety regarding Insensitive Munitions", 2) Department of Defense (DoD) Directive 5000.1, Chairman of the Joint Chiefs of Staff (CJCS) Instruction 3170.01C, Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD (AT&L)) Memorandum of January 26, 1999, "Exemption for Existing Inventory Items to Insensitive Munitions (IM) Requirements", 3) signed Initial Capability Document (ICD) for Army Aviation Weapons, Sub systems and Munitions (AAWSSM), 4) Air Launched Effects (ALE) Initial Capability Refinement Document (ICRD) dated 21 October 2019, and 5) existing/emerging Headquarters, Department of the Army (HQDA) G-3/5/7 and U.S. Army Training and Doctrine Command (TRADOC) aviation weapon requirements for guided and unguided rocket systems. Improvements to existing rocket systems and munitions will include design, qualification and integration of precision guidance capability, increased lethality, improved target suppression, increased standoff range, reduced minimum engagement range, improved pre-launch constraints and munitions communications/programmability, increased stowed kills, increased product reliability, improved hardness against unplanned stimuli, reduced war fighter workload, and reduced environmental impact for both manned and unmanned applications.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	1.927	17.155	13.596	-	13.596
Current President's Budget	1.847	13.421	12.417	-	12.417
Total Adjustments	-0.080	-3.734	-1.179	-	-1.179
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-3.108			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.080	-0.626			
• Adjustments to Budget Years	-	-	-1.179	-	-1.179

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607142A / *Aviation Rocket System Product Improvement and Development*	Project (Number/Name) EW9 / *Aviation Rocket System Product Improvement and Dev*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EW9: *Aviation Rocket System Product Improvement and Dev*	-	1.847	13.421	12.417	-	12.417	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Aviation Rockets and Small Guided Munitions Product Improvement and Development line funds the development, integration and test of current and future munitions and launchers, and their interface to platforms. Additionally, it will fund a range of improvement initiatives to modernize the Hydra-70 2.75 Inch rocket and launcher system. The current Hydra-70 2.75 inch rocket system requires performance improvements to comply with 1) US Code - Title 10, Chapter 141, Section 2389 "Ensuring Safety regarding Insensitive Munitions", 2) Department of Defense (DoD) Directive 5000.1, Chairman of the Joint Chiefs of Staff (CJCS) Instruction 3170.01C, Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD (AT&L)) Memorandum of January 26, 1999, "Exemption for Existing Inventory Items to Insensitive Munitions (IM) Requirements", 3) signed Initial Capability Document (ICD) for Army Aviation Weapons, Sub systems and Munitions (AAWSSM), 4) Air Launched Effects (ALE) Initial Capability Refinement Document (ICRD) dated 21 October 2019, and 5) existing/emerging Headquarters, Department of the Army (HQDA) G-3/5/7 and U.S. Army Training and Doctrine Command (TRADOC) aviation weapon requirements for guided and unguided rocket systems. Improvements to existing rocket systems and munitions will include design, qualification and integration of precision guidance capability, increased lethality, improved target suppression, increased standoff range, reduced minimum engagement range, improved pre-launch constraints and munitions communications/programmability, increased stowed kills, increased product reliability, improved hardness against unplanned stimuli, reduced war fighter workload, and reduced environmental impact for both manned and unmanned applications.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Guided Air-to-Ground Rockets (AGR) variants (Advanced Precision Kill Weapon System (APKWS))	0.119	0.748	0.785
Description: These funds will be used to optimize current and future air-to ground variant integration on the Apache and for activities required to obtain an Army Full Materiel Release (FMR). This effort will utilize in-house expertise and Other Government Agencies in order to complete activities to include design and build of all-up-round (AUR) containers and test assets, conduct of environmental qualification testing, performance of ground firings, update of aviation platform software, support of Apache weapon survey firings, technical support to platform integration and testing, and development and revision of training/maintenance materiel.			
FY 2021 Plans: 1. Complete efforts to optimize fire control integration on the AH-64 Apache for rotary wing guided variants. 2. Begin efforts to optimize fire control integration for single software variant guided rockets.			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607142A / *Aviation Rocket System Product Improvement and Development*	**Project (Number/Name)** EW9 / *Aviation Rocket System Product Improvement and Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
1. Complete development of fire control integration on the AH-64E Apache for current rotary wing guided variants, and continue fire control optimization for the single variant block upgrade variant. 2. Characterize performance changes/improvements of single software variant block upgrade of guided rockets and qualify for use on Army Aviation platforms. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding remains stable. Minimal increase accounts for inflation.			
Title: Army Aviation Weapons ***Description:*** These funds will be used for fielded Army Aviation modular weapon systems and their interface to fielded launchers and platforms. These efforts will utilize in-house subject matter expertise, Other Government Agencies, defense industry capabilities, and Other Transactional Agreements to complete activities to include technical assessment, risk reduction efforts, technology maturation, demonstration, engineering design, engineering/manufacturing development, test, integration and document preparation for Army Aviation manned and unmanned platforms. ***FY 2021 Plans:*** 1. Continue technical assessments, perform risk reduction efforts and prepare appropriate documentation for Army Aviation Weapons, Sub systems and Munitions (AAWSSM) Initial Capability Document and subordinately derived requirements. 2. Perform analysis to support emerging efforts such as extended range propulsion technology, sensors, and inertial guidance. ***FY 2022 Plans:*** 1. Perform analysis, engineering design, and demonstration of propulsion, sensor, datalink and navigation technologies that will enable future munitions to meet requirements of the Army Aviation Weapons, Sub systems and Munitions (AAWSSM) Initial Capability Document and the Army Aviation Munition Strategy and providing future munitions capabilities. 2. Assessments, development, risk reduction effort and documentation to determine feasibility of the adaptation of fielded/legacy launcher technologies with future launcher technologies. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increased due to additional emphasis on technology and concept maturation supporting the Army Aviation Munition Strategy as well as efforts to support the adaptation of fielded/legacy launcher technologies with future launchers/launch platforms.	1.728	0.762	4.193
Title: Integrated Munitions Launcher (IML)/Launcher Electronic Assembly (LEA) ***Description:*** These funds will be used to upgrade and enhance launcher components to support current and future munitions outlined in the Army Aviation Weapons, Sub Systems and Munitions Initial Capability Document, dated 17 July 2018 and the Air Launched Effects (ALE) Initial Capability Refinement Document (ICRD) dated 21 Oct 2019. This effort allows the government to align technology enabling solutions with the Army Aviation Weapons, Sub Systems and Munitions Initial Capability Document,	-	11.911	7.439

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607142A / *Aviation Rocket System Product Improvement and Development*	**Project (Number/Name)** EW9 / *Aviation Rocket System Product Improvement and Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
maturing technological developments of Integrated Munitions Launcher (IML) components prototypes to mitigate Apache helicopter and Gray Eagle Unmanned Aerial System launcher obsolescence limitations. The launcher component efforts will define and provide the interfaces between aircraft and emerging munitions utilizing a non-proprietary, open systems architecture allowing easy compatibility when integrating on to aviation platforms. The inherent flexibility of an open architecture serves as a building block for future weapons systems. ***FY 2021 Plans:*** 1. Continue IML architecture design and structure concept development. 2. Complete sub-system System Requirements Review (SRR) and Preliminary Design Review (PDR). 3. Build select IML component prototypes. 4. Continue Launcher Electronics Assembly (LEA) architecture design and structure concept development. ***FY 2022 Plans:*** 1. Continue Launcher Electronics Assembly (LEA) development. 2. Inform fielded/legacy launcher capabilities against evolving threats and with future munitions/launch platform interface requirements. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease due to completion of SRR and PDR.			
Accomplishments/Planned Programs Subtotals	1.847	13.421	12.417

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E37300: *Rocket, Hydra 70, All Types*	250.453	159.795	109.536	-	109.536	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The Acquisition Strategy utilizes in-house expertise, Other Government Agencies, defense industry capabilities, and when appropriate Other Transactional Agreements. The strategy allows the Government the ability to support urgent operational needs and unanticipated requirements, which require immediate and expert attention. This strategy will allow for the Government to maintain the Hydra-70 all-up-round rocket, its variants, Small Guided Munitions, and posture for emerging requirements while leveraging new authorities and bringing along as many technologies as funding allows.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607142A / *Aviation Rocket System Product Improvement and Development*	Project (Number/Name) EW9 / *Aviation Rocket System Product Improvement and Dev*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering/ Project Management	Various	Various : Performers	8.356	0.523	Oct 2019	1.902	Oct 2020	2.038	Nov 2021	-		2.038	Continuing	Continuing	-
		Subtotal	8.356	0.523		1.902		2.038		-		2.038	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Precision Kill Weapon System (APKWS)	MIPR	CCDC : Redstone Arsenal, AL	1.388	-		0.405	Apr 2021	0.667	Apr 2022	-		0.667	0.000	2.460	-
Modernized Rocket Launcher Increment 1	MIPR	CCDC : Redstone Arsenal, AL	7.041	-		-		-		-		-	0.000	7.041	-
Smart Digital Interface	MIPR	CCDC : Redstone Arsenal, AL	14.055	-		-		-		-		-	0.000	14.055	-
Army Aviation Weapons	MIPR	Various : Various Performers	11.839	0.124	Jan 2020	0.419	Mar 2021	0.678	Mar 2022	-		0.678	Continuing	Continuing	-
Integrated Munitions Launcher	MIPR	CCDC : Redstone Arsenal, AL	-	-		10.695	Mar 2021	6.165	Jan 2022	-		6.165	Continuing	Continuing	-
		Subtotal	34.323	0.124		11.519		7.510		-		7.510	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Research Studies	MIPR	CCDC : Redstone Arsenal, AL	2.076	-		-		2.869	Jan 2022	-		2.869	Continuing	Continuing	-
		Subtotal	2.076	-		-		2.869		-		2.869	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607142A / *Aviation Rocket System Product Improvement and Development*	Project (Number/Name) EW9 / *Aviation Rocket System Product Improvement and Dev*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing	C/Various	TBD : TBD	0.118	1.200	Dec 2019	-		-		-		-	Continuing	Continuing	-
		Subtotal	0.118	1.200		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	44.873	1.847		13.421		12.417		-		12.417	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607142A / *Aviation Rocket System Product Improvement and Development*	**Project (Number/Name)** EW9 / *Aviation Rocket System Product Improvement and Dev*

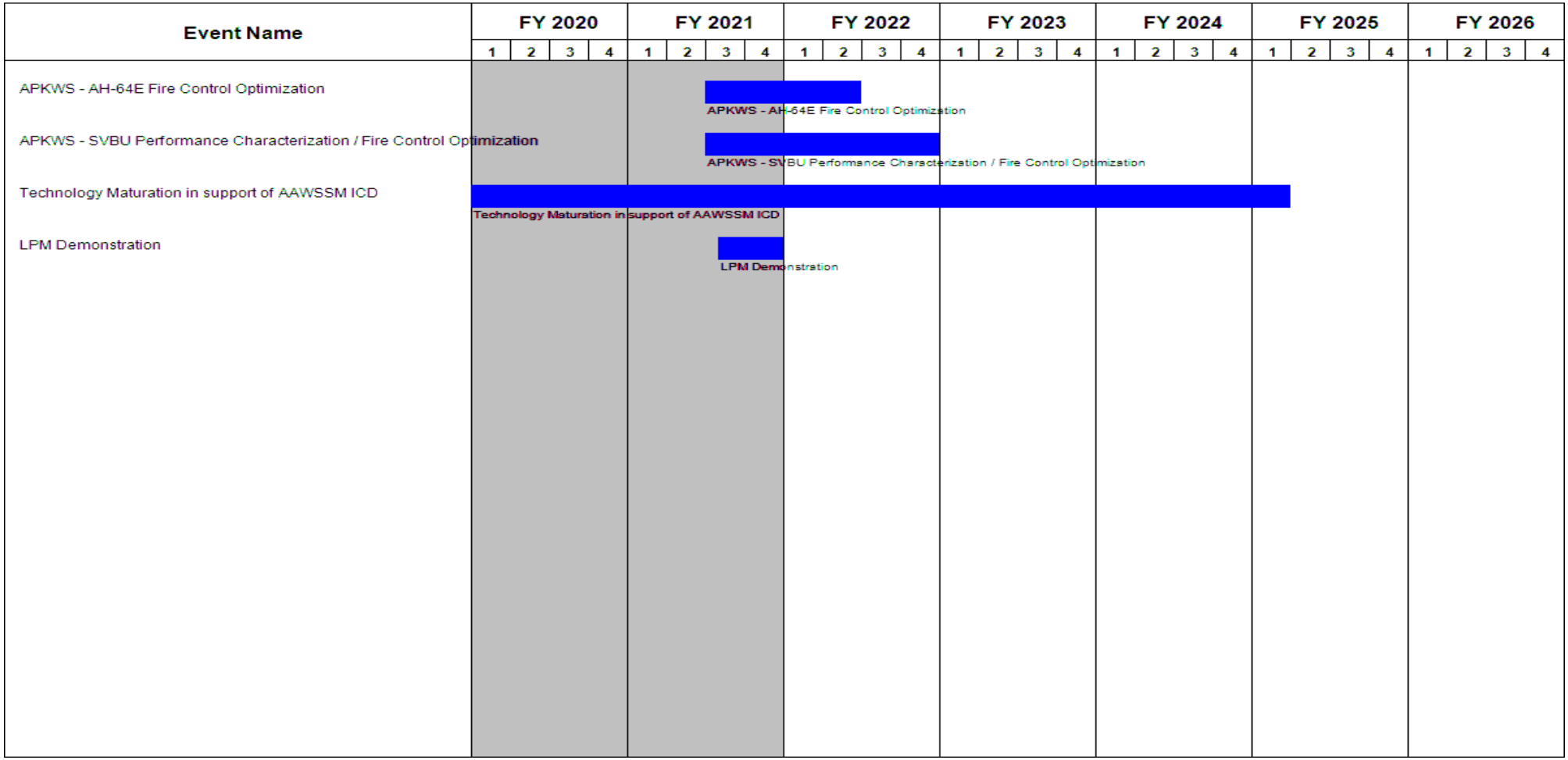

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607142A / *Aviation Rocket System Product Improvement and Development*	**Project (Number/Name)** EW9 / *Aviation Rocket System Product Improvement and Dev*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
APKWS - AH-64E Fire Control Optimization	3	2021	2	2022
APKWS - SVBU Performance Characterization / Fire Control Optimization	3	2021	4	2022
Technology Maturation in support of AAWSSM ICD	2	2019	1	2025
LPM Demonstration	3	2021	4	2021

Note

APKWS: Advanced Precision Kill Weapon System
AAWSSM ICD: Army Aviation Weapons, Sub-systems and Munitions Initial Capability Document
LPM: Lightweight Precision Munition
SVBU: Single Variant Block Upgrade