Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army											Date: March 2023	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0203802A / *Other Missile Product Improvement Programs*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	9.956	9.027	10.044	0.000	10.044	9.030	0.000	0.000	0.000	0.000	38.057
VT9: *Lethal Miniature Aerial Missile System (LMAMS)*	-	1.800	-	-	-	-	-	-	-	-	0.000	1.800
VV2: *TOW*	-	8.156	9.027	10.044	-	10.044	9.030	-	-	-	0.000	36.257
Program MDAP/MAIS Code: PRE												

A. Mission Description and Budget Item Justification

VT9: LMAMS is a single man-portable/operable, light-weight organic, beyond line-of-sight, precision guided, loitering aerial missile system capable of locating and engaging obscured and/or fleeing enemy targets that otherwise cannot be engaged by typical direct fire weapon systems.

LMAMS has no FY 2024 funding.

VV2: TOW Weapon System includes the Improved Target Acquisition System (ITAS) and other TOW missile launchers, TOW missiles (BGM-71 series) and other missiles capable of being fired from TOW Missile launchers, and associated tactical training aids/devices. The TOW Weapon System provides long-range, lethal anti-armor and precision assault fires capability for Army Infantry Brigade Combat Teams (IBCT), Stryker Brigade Combat Teams (SBCT) and Armor Brigade Combat Teams (ABCT) within the Active, Reserve, and National Guard components. The United States Marine Corps (USMC) employs the TOW missile from its ITAS derived M41A7 Saber launchers and Anti-Tank Guided Missile (ATGM) vehicles.

The TOW Weapon System improvement program integrates U.S. Army missile and launcher modifications to improve missile safety and reliability, increase system survivability and lethality, and enhance system network capabilities. These capability improvements support Multi-Domain Operations (MDO) as a part of Joint All Domain Operations (JADO) and the Functional Concept for Movement and Maneuver by providing precise lethal capabilities in multiple domains against armored threat systems.

FY 2024 funding in the amount of $10.044M is for TOW missile obsolescence mitigation, system improvements, integration management, and countermeasure/threat management.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army	Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0203802A / *Other Missile Product Improvement Programs*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	10.265	9.027	0.000	-	0.000
Current President's Budget	9.956	9.027	10.044	-	10.044
Total Adjustments	-0.309	0.000	10.044	-	10.044
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.309	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	10.044	-	10.044

Change Summary Explanation

FY 2024 increase reflects Army investment in TOW missile obsolescence mitigation, system improvements, integration management, and countermeasure/threat management.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / *Other Missile Product Improvement Programs*	Project (Number/Name) VT9 / *Lethal Miniature Aerial Missile System (LMAMS)*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
VT9: *Lethal Miniature Aerial Missile System (LMAMS)*	-	1.800	-	-	-	-	-	-	-	-	0.000	1.800
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

VT9: LMAMS is a single man-portable/operable, light-weight organic, beyond line-of-sight, precision guided, loitering aerial missile system capable of locating and engaging obscured and/or fleeing enemy targets that otherwise cannot be engaged by typical direct fire weapon systems.

LMAMS has no FY 2024 funding.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: LMAMS Capability Improvements	1.800	-	-
Description: Joint Urgent Operational Need (JUON) User Required Capability Improvements supporting CC-0556.			
Accomplishments/Planned Programs Subtotals	1.800	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• C88001: *LETHAL MINIATURE AERIAL MISSILE SYSTEM (LMAMS)*	94.118	37.937	0.000	-	0.000	-	-	-	-	0.000	132.055

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / *Other Missile Product Improvement Programs*	Project (Number/Name) VT9 / *Lethal Miniature Aerial Missile System (LMAMS)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering / Program Management	MIPR	CCDC AvMC : Redstone Arsenal, AL	0.193	0.163	May 2022	-		-		-		-	0.000	0.356	-
		Subtotal	0.193	0.163		-		-		-		-	0.000	0.356	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	MIPR	CCDC AvMC : Redstone Arsenal, AL	2.061	0.986	May 2022	-		-		-		-	0.000	3.047	-
Technology Integration	SS/CPFF	AeroVironment : Simi Valley, CA	-	0.500	May 2022	-		-		-		-	0.000	0.500	-
		Subtotal	2.061	1.486		-		-		-		-	0.000	3.547	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Level Product Verification Testing	MIPR	Dugway Proving Grounds : Dugway, UT	-	0.151	May 2022	-		-		-		-	0.000	0.151	-
		Subtotal	-	0.151		-		-		-		-	0.000	0.151	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.254	1.800		-		-		-		-	0.000	4.054	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203802A / *Other Missile Product Improvement Programs*	**Project (Number/Name)** VT9 / *Lethal Miniature Aerial Missile System (LMAMS)*

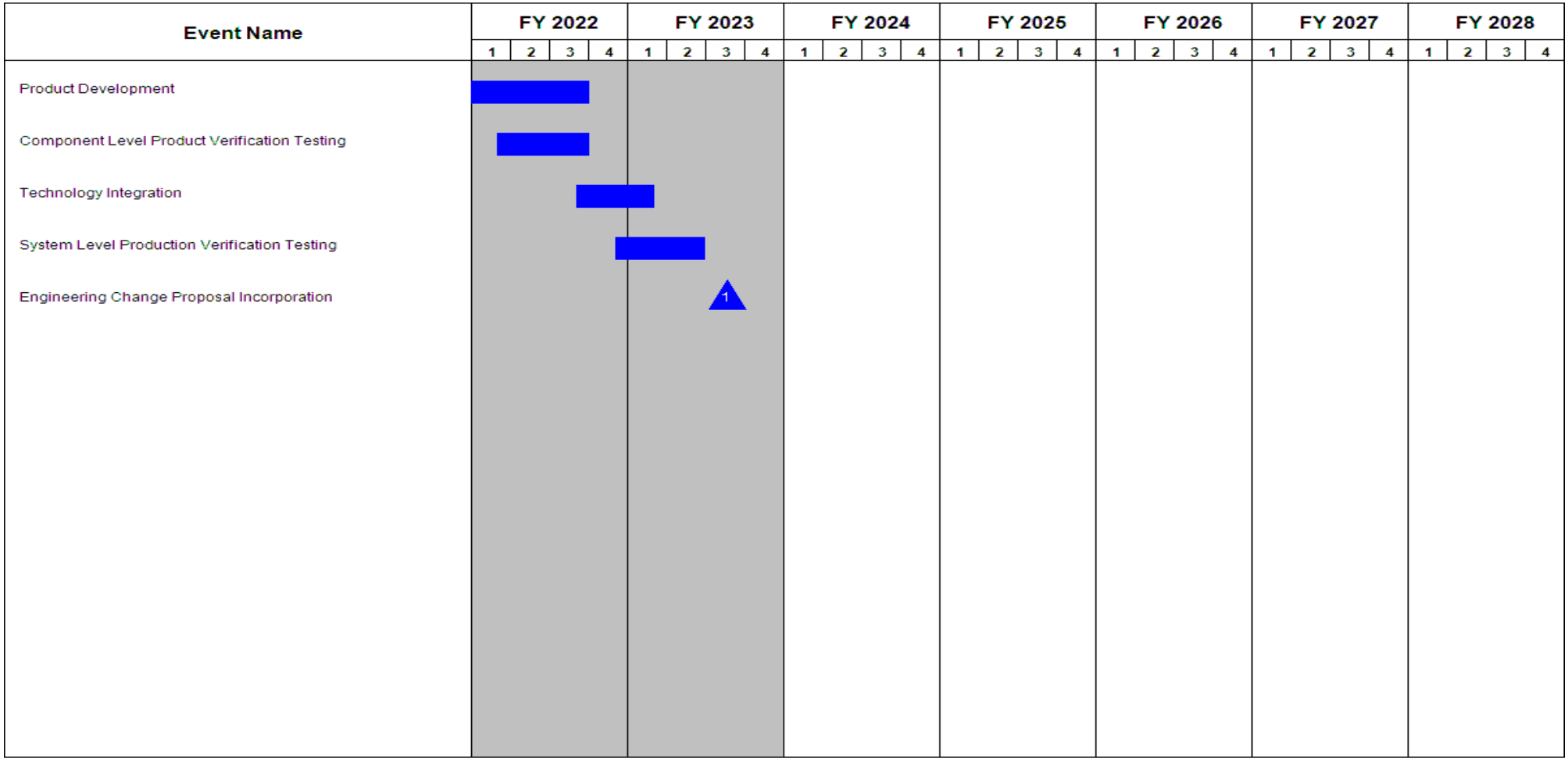

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203802A / *Other Missile Product Improvement Programs*	**Project (Number/Name)** VT9 / *Lethal Miniature Aerial Missile System (LMAMS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Product Development	3	2021	3	2022
Component Level Product Verification Testing	1	2022	3	2022
Technology Integration	3	2022	1	2023
System Level Production Verification Testing	4	2022	2	2023
Engineering Change Proposal Incorporation	3	2023	3	2023

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / *Other Missile Product Improvement Programs*	Project (Number/Name) VV2 / *TOW*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
VV2: *TOW*	-	8.156	9.027	10.044	-	10.044	9.030	-	-	-	0.000	36.257
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

VV2: TOW Weapon System includes the Improved Target Acquisition System (ITAS) and other TOW missile launchers, TOW missiles (BGM-71 series) and other missiles capable of being fired from TOW Missile launchers, and associated tactical training aids/devices. The TOW Weapon System provides long-range, lethal anti-armor and precision assault fires capability for Army Infantry Brigade Combat Teams (IBCT), Stryker Brigade Combat Teams (SBCT) and Armor Brigade Combat Teams (ABCT) within the Active, Reserve, and National Guard components. The United States Marine Corps (USMC) employs the TOW missile from its ITAS derived M41A7 Saber launchers and Anti-Tank Guided Missile (ATGM) vehicles.

The TOW Weapon System improvement program integrates U.S. Army missile and launcher modifications to improve missile safety and reliability, increase system survivability and lethality, and enhance system network capabilities. These capability improvements support Multi-Domain Operations (MDO) as a part of Joint All Domain Operations (JADO) and the Functional Concept for Movement and Maneuver by providing precise lethal capabilities in multiple domains against armored threat systems.

FY 2024 funding in the amount of $10.044M is for TOW missile obsolescence mitigation, system improvements, integration management, and countermeasure/threat management.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: TOW Missile Obsolescence Mitigation and System Improvements	7.384	8.211	9.498
Description: These funds will be used for development and qualification of new components, associated parts, and sub-systems such as the Radio Frequency Data-Link (RF DL), Missile Computer (MC), and Short Wave Infra-Red (SWIR) beacon. These components will be cut into production via Engineering Change Proposal upon qualification.			
FY 2023 Plans: Implement the design engineering of the RF DL, MC, and SWIR beacon, and required software to facilitate integration into a tactical system. Initiate the build and test of components at the component and sub-system level. FY 2023 engineering efforts culminate in the completion of Component Preliminary Design Review (PDR), and System PDR.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203802A / *Other Missile Product Improvement Programs*	**Project (Number/Name)** VV2 / *TOW*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue the design engineering of the RF DL, MC, and SWIR beacon, and required software to facilitate integration into a tactical system. Continue the build and test of components at the component and sub-system level. FY 2024 engineering efforts culminate in the completion of Design Engineering, Component Critical Design Review (CDR), and System CDR. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increase in funds from FY 2023 to FY 2024 is due to a continuation in requirements to validate producibility of designed and tested components for TOW Missile obsolescence mitigation.			
Title: Integration and Counter Measure/Threat management ***Description:*** These funds will be used to prepare and perform technical assessments, threat analysis, concept studies, demonstrations, tests and risk mitigation efforts to address current and emerging threats. ***FY 2023 Plans:*** Perform technical assessments, analysis and testing of missiles against various targets to demonstrate current and future capabilities. ***FY 2024 Plans:*** Perform technical assessments, analysis and testing of missiles against various targets to demonstrate current and future capabilities. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** No significant increase from FY 2023 to FY 2024.	0.772	0.487	0.546
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC 638. ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC 638. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC 638.	-	0.329	-
Accomplishments/Planned Programs Subtotals	8.156	9.027	10.044

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• C59300: *TOW 2 System Summary*	101.912	103.866	120.475	-	120.475	113.321	122.376	122.541	122.668	0.000	807.159

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203802A / *Other Missile Product Improvement Programs*	**Project (Number/Name)** VV2 / *TOW*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• C61700: *ITAS/TOW Mods*	4.561	5.154	0.000	-	0.000	-	-	-	-	0.000	9.715

Remarks

D. Acquisition Strategy

TOW Missile obsolescence mitigation design engineering, component hardware build, and component systems integration will be conducted through Raytheon Missiles and Defense (RMD) as the current TOW Missile Prime contractor and only source that is both facilitized and qualified to produce all TOW Missile configurations.

The Acquisition Strategy uses in-house expertise, Other Government Agencies (OGA), defense industry capabilities, and when appropriate Other Transaction Authority (OTA). The strategy allows the Government the ability to support urgent operational needs and unanticipated requirements, which require immediate and expert attention. This strategy allows the Government to maintain TOW Weapon System effectiveness and posture for emerging requirements while leveraging new authorities and incorporating new technologies.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / *Other Missile Product Improvement Programs*	Project (Number/Name) VV2 / *TOW*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engr/Program Management, Govt	MIPR	Multiple : Redstone Arsenal, AL	1.359	0.902	Jun 2022	0.792	Mar 2023	0.824	Mar 2024	-		0.824	0.000	3.877	-
SIBR/STTR Transfer	TBD	Various : Various	-	-		0.329		-		-		-	0.000	0.329	-
		Subtotal	1.359	0.902		1.121		0.824		-		0.824	0.000	4.206	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Component Design Engineering	SS/CPFF	Raytheon : Tucson, AZ	11.609	1.933	Jun 2022	2.291	Mar 2023	2.698	Mar 2024	-		2.698	0.000	18.531	-
Component Hardware Build	SS/CPFF	Raytheon : Tucson, AZ	-	3.129	Jun 2022	3.707	Mar 2023	4.162	Mar 2024	-		4.162	0.000	10.998	-
Integration and Counter Measure/Threat management	Various	Various : Various	-	0.665	May 2022	0.428	Mar 2023	0.489	Mar 2024	-		0.489	0.000	1.582	-
		Subtotal	11.609	5.727		6.426		7.349		-		7.349	0.000	31.111	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Component/System Test and Evaluation	SS/CPFF	Raytheon : Tucson, AZ	-	1.527	Jun 2022	1.480	Mar 2023	1.871	Mar 2024	-		1.871	0.000	4.878	-
		Subtotal	-	1.527		1.480		1.871		-		1.871	0.000	4.878	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	12.968	8.156		9.027		10.044		-		10.044	0.000	40.195	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203802A / *Other Missile Product Improvement Programs*	**Project (Number/Name)** VV2 / *TOW*

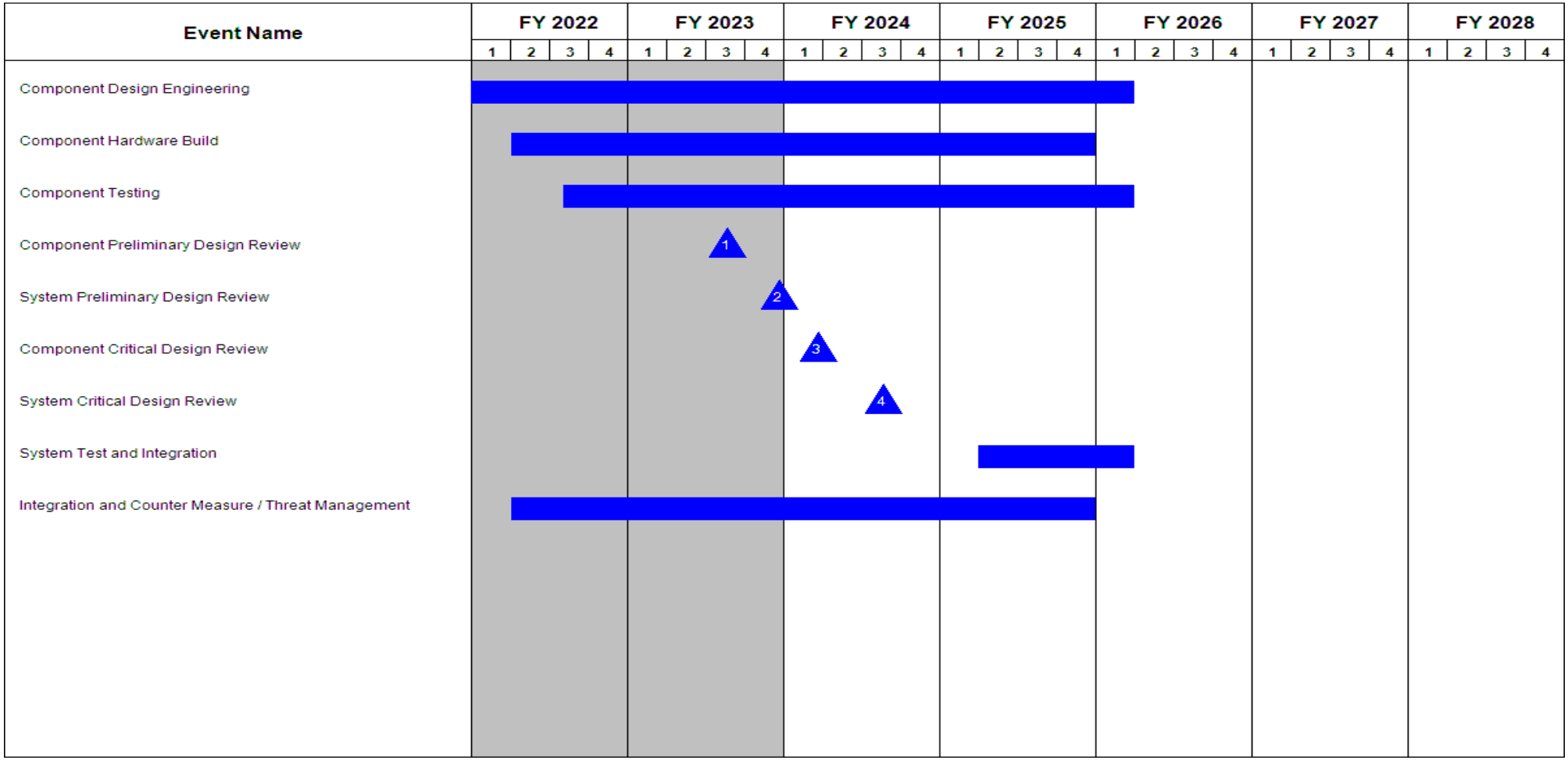

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203802A / *Other Missile Product Improvement Programs*	**Project (Number/Name)** VV2 / *TOW*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Component Design Engineering	2	2021	1	2026
Component Hardware Build	2	2022	4	2025
Component Testing	3	2022	1	2026
Component Preliminary Design Review	3	2023	3	2023
System Preliminary Design Review	4	2023	4	2023
Component Critical Design Review	1	2024	1	2024
System Critical Design Review	3	2024	3	2024
System Test and Integration	2	2025	1	2026
Integration and Counter Measure / Threat Management	2	2022	4	2025