Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0604019A / *Expanded Mission Area Missile (EMAM)*							
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	-	-	-	50.674	-	50.674	-	-	-	-	-	-
BU9: *IFPC High Energy Laser*	-	-	-	15.015	-	15.015	-	-	-	-	-	-
CO6: *IFPC High Power Microwave (HPM)*	-	-	-	35.659	-	35.659	-	-	-	-	-	-

Note

This is a new start in FY 2022.

Work in this project complements PE 0602150A (Air and Missile Defense Technology) / Project AC9 (High Energy Laser Tactical Vehicle Demonstrator Technology) and PE 0603466A (Air and Missile Defense Advanced Technology) / Project AD1 (High Energy Laser Tactical Vehicle Demo Advanced Technology).

This PE supports transitioning the High Energy Laser -Tactical Vehicle Demonstration S&T effort to manufacturing four rapid prototype vehicles for delivery in FY 2024, with transition to a program of record in FY 2025.

Project BU9 Indirect Fire Protection Capability (IFPC)- High Energy Laser has been restructured to transfer all funds for IFPC-High Power Microwave (HPM) effort to Program Element (PE) 0604019A Expanded Mission Area Missile (EMAM) Project CO6 IFPC-HPM.

A. Mission Description and Budget Item Justification

Work in this PE, the Expanded Mission Area Missile (EMAM) program, supports the Integrated Air and Missile Defense (IAMD) architecture and provides Directed Energy - Indirect Fire Protection Capability (DE-IFPC) intercept capability to defeat Cruise Missiles (CM), Unmanned Aircraft System (UAS), and Rocket, Artillery, and Mortar (RAM) threats.

The DE-IFPC is an Air Defense capability consisting of the IFPC-High Energy Laser (HEL) and the IFPC-High Power Microwave (HPM). IFPC-HEL will provide a ground-based weapon system designed to acquire, track, engage, and defeat the CM, UAS, and RAM threats. The IFPC-HEL requirement consists of a vehicle, 300 kW class laser subsystem, power and thermal subsystem, and a beam control subsystem integrated with a battle management command, control and communication software. IFPC-HEL provides much needed protection against adversarial threat systems capable of targeting U.S. and Allied forward operating bases, convoys, and other critical assets.

IFPC-HPM will provide a ground-based weapon system designed to acquire, track, engage, and defeat UAS. The IFPC-HPM requirement consist of a HPM source, power and thermal subsystem, and an antenna subsystem integrated with a battle management command, control and communication software. IFPC-HPM provides much needed protection against adversarial UAS swarms capable of targeting and overwhelming U.S. and Allied air defense systems.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604019A *I Expanded Mission Area Missile (EMAM)*

Work in this PE is performed by the United States Army Rapid Capabilities and Critical Technologies Office (RCCTO).

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	50.674	-	50.674
Total Adjustments	0.000	0.000	50.674	-	50.674
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	50.674	-	50.674

Change Summary Explanation

Project BU9 IFPC- High Energy Laser has been restructured to transfer all funds for IFPC-HPM effort to PE 0604019A EMAM Project CO6 IFPC-HPM.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604019A / *Expanded Mission Area Missile (EMAM)*	Project (Number/Name) BU9 / *IFPC High Energy Laser*	

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
BU9: *IFPC High Energy Laser*	-	-	-	15.015	-	15.015	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is a new start in FY 2022.

Work in this project complements PE 0602150A (Air and Missile Defense Technology) / Project AC9 (High Energy Laser Tactical Vehicle Demonstrator Technology) and PE 0603466A (Air and Missile Defense Advanced Technology) / Project AD1 (High Energy Laser Tactical Vehicle Demo Advanced Technology).

This PE supports transitioning the High Energy Laser -Tactical Vehicle Demonstration S&T effort to manufacturing four rapid prototype vehicles for delivery in FY 2024, with transition to a program of record in FY 2025.

Project BU9 Indirect Fire Protection Capability (IFPC)- High Energy Laser TVD has been restructured to transfer all funds for IFPC-High Power Microwave (HPM) effort to Program Element (PE) 0604019A Expanded Mission Area Missile (EMAM) Project CO6 IFPC-HPM.

A. Mission Description and Budget Item Justification

The Directed Energy Indirect Fire Protection Capability (DE-IFPC) - High Energy Laser (HEL) is an Air Defense capability consisting of IFPC - HEL 300kW class laser experimental prototypes with residual combat capability at the IFPC Battery Level in support of Multi-Domain Operations (MDO). IFPC-HEL will provide the Army prototype weapon systems for defense of fixed and semi-fixed sites from Cruise Missiles (CM), Unmanned Aircraft Systems (UAS), and Rocket, Artillery, and Mortar (RAM) threats. This project will deliver an operationally effective rapid prototype capabilities in the near- and mid-terms. Efforts will include accelerated materiel development and competitive prototyping. IFPC-HEL funds an improved mechanism to effectively confront emerging threats and advance America's military dominance in accordance with the National Defense Strategy. Efforts include development, acquisition, assessment, maturation, and transition of prototype technologies to acquisition programs.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, and the Army Modernization Strategy, and supports the Army's future capability opportunities for leap-ahead technology for directed energy.

Work is performed by the United States (US) Army Rapid Capabilities and Critical Technologies Office (RCCTO).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: IFPC-High Energy Laser	-	-	15.015

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** BU9 / *IFPC High Energy Laser*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Description: This effort will provide for the planning, prototype manufacturing, and testing of 4 IFPC-HEL rapid prototypes with residual combat capability to support the IFPC mission. The IFPC-HEL is a 300 kilowatt (kW) modularized laser weapon system that can be integrated onto a Heavy Expanded Mobility Tactical Truck (HEMTT) Palletized Load System (PLS) to defend fixed and semi-fixed sites from Cruise Missiles (CM), Unmanned Aircraft Systems (UAS), and Rocket, Artillery, and Mortar (RAM) threats to be fielded to a IFPC Battery in FY 2024. IFPC-HEL builds on the technology maturation and demonstration from PE 0602150A (Air and Missile Defense Technology) / Project AC9 (High Energy Laser Tactical Vehicle Demonstrator Technology) and PE 0603466A (Air and Missile Defense Advanced Technology) / Project AD1 (High Energy Laser Tactical Vehicle Demo Advanced Technology). ***FY 2022 Plans:*** These funds will provide systems engineering, program management, engineering, and technical support to transition the High Energy Laser Tactical Vehicle Demonstrator from Science and Technology into rapid prototyping, complete the competitive source selection, award the prototype contract in late FY 2022, and conduct planning to transition to the program of record beginning in FY 2025. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The $15.0 million increase is in support of transitioning the HEL-TVD S&T effort to rapid prototyping 4 prototypes for delivery in FY 2024, with transition to a program of record in FY 2025.			
Accomplishments/Planned Programs Subtotals	-	-	15.015

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Army RCCTO capitalizes on current and emerging technologies to provide near-term and mid-term solutions to address emerging threats and high impact capability opportunities for U.S. Army Forces deployed globally. DE-IFPC will utilize streamlined acquisition methods, processes and techniques to rapidly acquire capability. IFPC HEL will utilize the RCCTO procurement authority and an in-house contracting staff, with the flexibility to use both traditional and non-traditional contracting approaches. Where practicable, both IFPC-HEL prototypes will be acquired using competitive procedures. Soldier touch points will be conducted to provide feedback in support of Army requirements generation, prototype maturation, fielding residual combat capability to a unit of action, and future capability development.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604019A / *Expanded Mission Area Missile (EMAM)*	Project (Number/Name) BU9 / *IFPC High Energy Laser*	

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
Program Management Support	TBD	Various : Various	-	-		-		1.501		-		1.501	0.000	1.501	-
		Subtotal	-	-		-		1.501		-		1.501	0.000	1.501	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
Indirect Fire Protection Capability - High Energy Laser (IFPC-HEL)	TBD	TBD : TBD	-	-		-		13.514		-		13.514	0.000	13.514	-
		Subtotal	-	-		-		13.514		-		13.514	0.000	13.514	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	-	-		0.000		15.015		-		15.015	0.000	15.015	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** BU9 / *IFPC High Energy Laser*

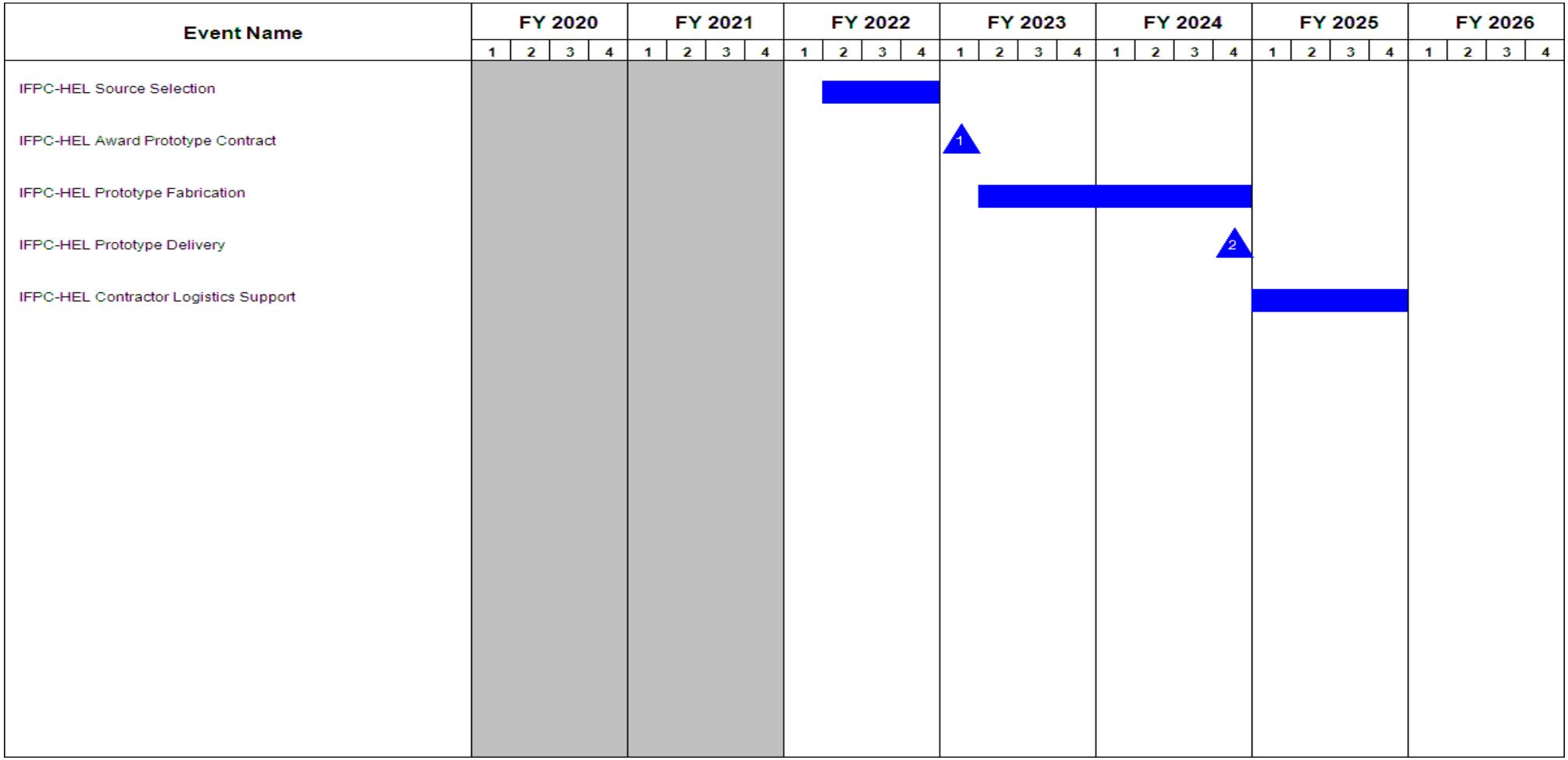

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** BU9 / *IFPC High Energy Laser*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
IFPC-HEL Source Selection	2	2022	4	2022
IFPC-HEL Award Prototype Contract	1	2023	1	2023
IFPC-HEL Prototype Fabrication	2	2023	4	2024
IFPC-HEL Prototype Delivery	4	2024	4	2024
IFPC-HEL Contractor Logistics Support	1	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604019A / *Expanded Mission Area Missile (EMAM)*	Project (Number/Name) CO6 / *IFPC High Power Microwave (HPM)*	

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
CO6: *IFPC High Power Microwave (HPM)*	-	-	-	35.659	-	35.659	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is a new start in FY 2022.

Project BU9 Indirect Fire Protection Capability (IFPC)- High Energy Laser has been restructured to transfer all funds for IFPC-High Power Microwave (HPM) effort to Program Element (PE) 0604019A Expanded Mission Area Missile (EMAM) Project CO6 IFPC-HPM.

A. Mission Description and Budget Item Justification

The Indirect Fire Protection Capability (DE-IFPC) - High Power Microwave (HPM) is an Air Defense capability consisting of the IFPC - HPM experimental prototype with residual combat capability at the IFPC Battery Level in support of Multi-domain Operations (MDO). IFPC-HPM will provide the Army with a High Powered Microwave prototype weapon systems for the short-range defense of fixed and semi-fixed sites from Unmanned Aircraft Systems (UAS) threats. This project will deliver an operationally effective rapid prototype capabilities in the near- and mid-terms. Efforts will include accelerated materiel development and competitive prototyping. IFPC-HPM funds an improved mechanism to effectively confront emerging threats and advance America's military dominance in accordance with the National Defense Strategy. Efforts include development, acquisition, assessment, maturation, and transition of prototype technologies to acquisition programs.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, and the Army Modernization Strategy, and supports the Army's future capability opportunities for leap-ahead technology for directed energy.

Work is performed by the United States (US) Army Rapid Capabilities and Critical Technologies Office (RCCTO).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: IFPC-High Power Microwave	-	-	35.659
Description: This effort will provide for the development, planning, prototype manufacturing, and testing of 4 IFPC-HPM rapid prototypes with residual combat capability to support the IFPC mission. The IFPC-HPM is a containerized HPM weapon system that can be transported by common brigade combat team equipment to defend fixed and semi-fixed sites from UAS, and particularly UAS swarms. IFPC-HPM is common with US Air Force and the Joint Counter-UAS Office HPM effectors for countering UAS. IFPC-HPM builds on previous Air Force HPM technology demonstrations and experimentation campaigns such as the Tactical High-Power Responder (THOR).			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** CO6 / *IFPC High Power Microwave (HPM)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
These funds will provide systems engineering, program management, engineering, and technical support to transition Air Force HPM Science and Technology demonstrators into rapid prototyping. US Air Force contracts will be leveraged to complete the development and prototyping of the common HPM system, delivering 4 prototypes in FY 2024. Funding will also be utilized to conduct planning to transition to the program of record beginning in FY 2025. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The $35.7 million increase is in support of transitioning Air Force technology demonstrators to rapid prototypes for delivery in FY 2024, with transition to a program of record in FY 2025.			
Accomplishments/Planned Programs Subtotals	-	-	35.659

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Army RCCTO capitalizes on current and emerging technologies to provide near-term and mid-term solutions to address emerging threats and high impact capability opportunities for U.S. Army Forces deployed globally. DE-IFPC will utilize streamlined acquisition methods, processes and techniques to rapidly acquire capability. IFPC-HPM will leverage US Air Force contracts to provide prototypes. Soldier touchpoints will be conducted to provide feedback in support of Army requirements generation, prototype maturation, fielding residual combat capability to a unit of action, and future capability development.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** CO6 / *IFPC High Power Microwave (HPM)*

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
Program Management Support	Various	Various : Various	-	-		-		3.566		-		3.566	0.000	3.566	-
		Subtotal	-	-		-		3.566		-		3.566	0.000	3.566	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
Indirect Fire Protection Capability - High Power Microwave (IFPC-HPM)	TBD	TBD : TBD	-	-		-		32.093		-		32.093	0.000	32.093	-
		Subtotal	-	-		-		32.093		-		32.093	0.000	32.093	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	-	-		0.000		35.659		-		35.659	0.000	35.659	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** CO6 / *IFPC High Power Microwave (HPM)*

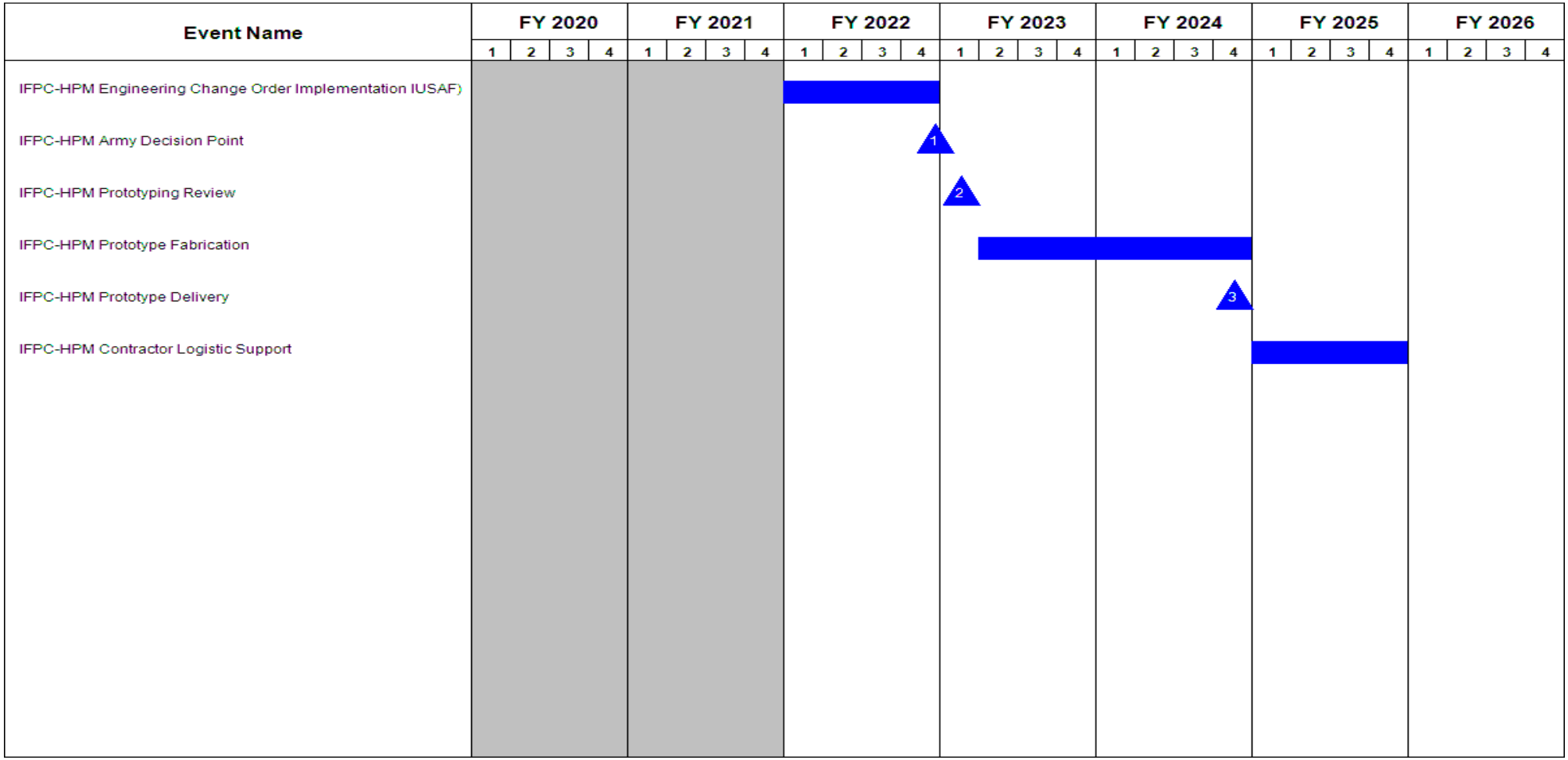

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** CO6 / *IFPC High Power Microwave (HPM)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
IFPC-HPM Engineering Change Order Implementation IUSAF)	1	2022	4	2022
IFPC-HPM Army Decision Point	4	2022	4	2022
IFPC-HPM Prototyping Review	1	2023	1	2023
IFPC-HPM Prototype Fabrication	2	2023	4	2024
IFPC-HPM Prototype Delivery	4	2024	4	2024
IFPC-HPM Contractor Logistic Support	1	2025	4	2025