Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
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 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	-	27.872	220.820	-	220.820	144.936	36.312	0.000	0.000	0.000	429.940
BU9: *IFPC High Energy Laser*	-	-	8.258	177.843	-	177.843	133.534	32.208	-	-	0.000	351.843
CO6: *IFPC High Power Microwave (HPM)*	-	-	19.614	42.977	-	42.977	11.402	4.104	-	-	0.000	78.097

Note

Work in this project continues from the work done under 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 systems 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

These funding lines are directly aligned to the Army Air and Missile Defense Modernization Priority.

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 swarms. The IFPC-HPM requirement consists of a HPM source, power and thermal subsystem, and an antenna subsystem interoperable 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
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)*

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

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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	0.000	50.674	0.000	-	0.000
Current President's Budget	0.000	27.872	220.820	-	220.820
Total Adjustments	0.000	-22.802	220.820	-	220.820
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-22.802			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	220.820	-	220.820

Change Summary Explanation

The planned prototype contract award dates supporting both Projects BU9 and CO6 were moved to late 4th quarter FY 2022. As such, the FY 2022 PPB was decremented $22.802M to align funding need with the new contract award dates.

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BU9: *IFPC High Energy Laser*	-	-	8.258	177.843	-	177.843	133.534	32.208	-	-	0.000	351.843
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Work in this project continues the work done under 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

This funding line is directly aligned to the Army Air and Missile Defense Modernization Priority.

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 capability 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 2021	FY 2022	FY 2023
Title: IFPC-High Energy Laser	-	7.957	177.843

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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 2021	FY 2022	FY 2023
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 delivered with residual combat capability at the Platoon Level in FY 2024 as part of the Indirect Fire Protection Capability (IFPC) Battery in support of Multi-Domain Operations (MDO). 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 2023 Plans:*** Will continue systems engineering, program management, engineering, and technical support, for weapon system prototyping. Fabrication will commence immediately upon contract award to include hardware integration and assembly. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increase from FY 2022 to FY 2023 due to four prototype buys on new OTA prototype contract award.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.301	-
Accomplishments/Planned Programs Subtotals	-	8.258	177.843

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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*

C. Other Program Funding Summary ($ in Millions)

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 the U.S. Army Forces deployed globally. A demonstration effort has been initiated for this capability that will culminate in an integrated laboratory demonstration in 4th Quarter FY 2022. Given a favorable outcome, four prototype weapon systems will be delivered with residual combat capability at the Platoon level in FY 2024 as part of the IFPC Battery in support of Multi-Domain Operations (MDO). Soldier touchpoints will be conducted to provide feedback in support of Army requirements generation/soldier centered design, prototype maturation, fielding, and future capability development. Performance characteristics will be utilized to establish a Program of Record within PEO Missiles and Space.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army		Date: April 2022
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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	TBD	Various : Various	-	-		0.795		11.360	Dec 2022	-		11.360	Continuing	Continuing	-
FY2022 SBIR / STTR Transfer	TBD	Various : Various	-	-		0.301		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		1.096		11.360		-		11.360	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Indirect Fire Protection Capability - High Energy Laser (IFPC-HEL)	TBD	TBD : TBD	-	-		7.162		166.483	Nov 2022	-		166.483	Continuing	Continuing	-
		Subtotal	-	-		7.162		166.483		-		166.483	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		8.258		177.843		-		177.843	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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*

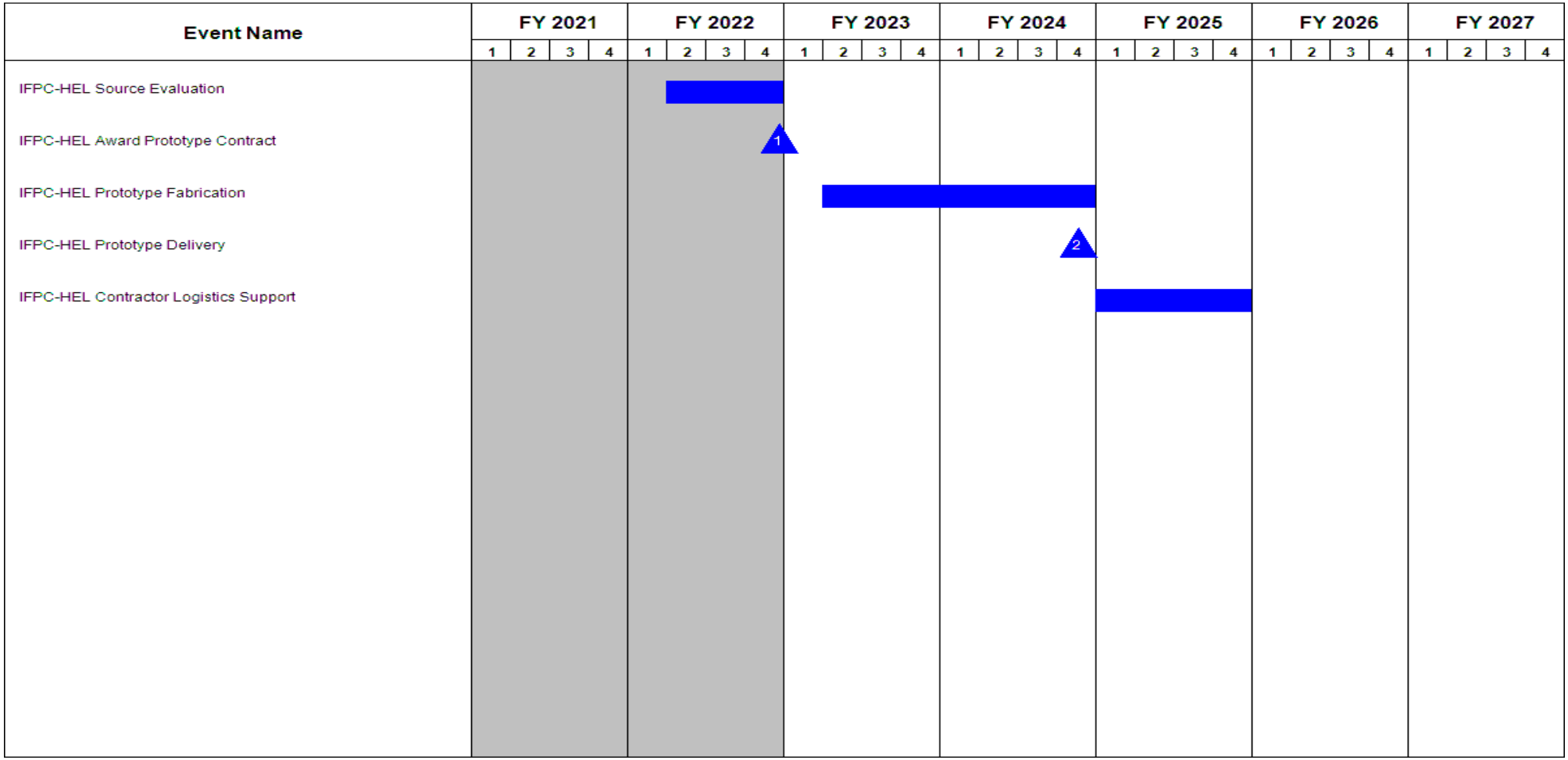

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** BU9 / *IFPC High Energy Laser*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
IFPC-HEL Source Evaluation	2	2022	4	2022
IFPC-HEL Award Prototype Contract	4	2022	4	2022
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 2023 Army			Date: April 2022
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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
CO6: *IFPC High Power Microwave (HPM)*	-	-	19.614	42.977	-	42.977	11.402	4.104	-	-	0.000	78.097
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

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

This funding line is directly aligned to the Army Air and Missile Defense Modernization Priority.

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 High Powered Microwave prototype weapon systems for the short-range defense of fixed and semi-fixed sites from Unmanned Aircraft System (UAS) swarms. This project will deliver an operationally effective rapid prototype capability 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 2021	FY 2022	FY 2023
Title: IFPC-High Power Microwave	-	18.898	42.977
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 against Group 1-2 UAS swarms. IFPC-HPM is common with other Services and the Joint Counter-UAS Office HPM effectors for countering UAS. IFPC-HPM leverages previous 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 2023 Army		Date: April 2022
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 2021	FY 2022	FY 2023
These funds will provide systems engineering, program management, engineering, and technical support to transition HPM Science and Technology demonstrators into rapid prototyping. US Services 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 2023 Plans:*** Continuation of fabricating and producing prototypes of the common HPM system, delivering 4 prototypes in FY 2024. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increase from FY2022 to FY2023 to integrate initial prototype and complete the platoon with additional prototypes in FY2023.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.716	-
Accomplishments/Planned Programs Subtotals	-	19.614	42.977

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 the 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 2023 Army		Date: April 2022
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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	-	-		1.889		2.840	Dec 2022	-		2.840	0.000	4.729	-
FY2022 SBIR / STTR Transfer	TBD	Various : Various	-	-		0.716		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		2.605		2.840		-		2.840	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Indirect Fire Protection Capability - High Power Microwave (IFPC-HPM)	TBD	TBD : TBD	-	-		17.009		40.137	Nov 2022	-		40.137	Continuing	Continuing	-
		Subtotal	-	-		17.009		40.137		-		40.137	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		19.614		42.977		-		42.977	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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)*

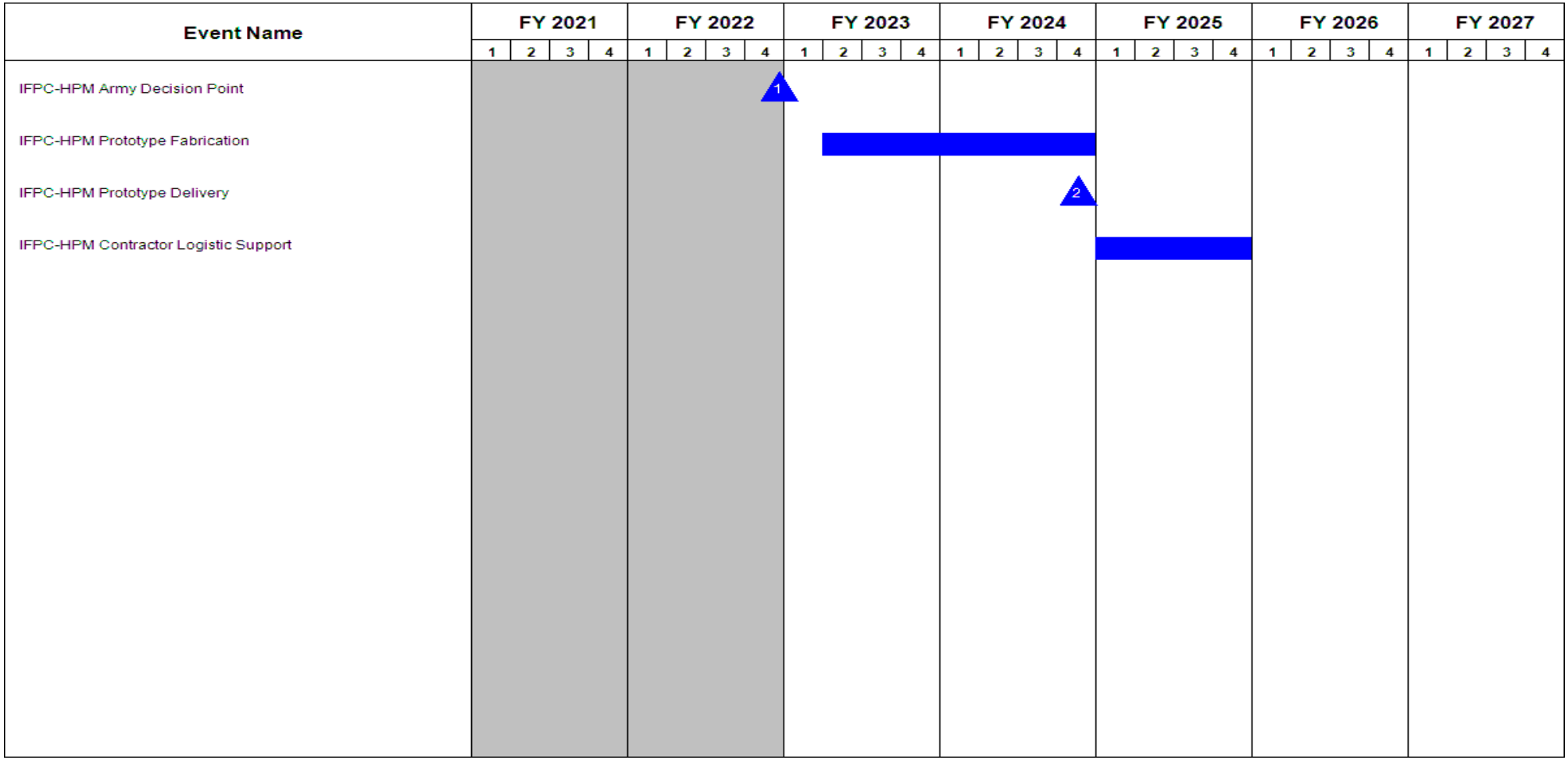

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0604019A / *Expanded Mission Area Missile (EMAM)*	**Project (Number/Name)** CO6 / *IFPC High Power Microwave (HPM)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
IFPC-HPM Army Decision Point	4	2022	4	2022
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