Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force												Date: May 2021
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603742F / *Combat Identification Technology*							
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	-	31.367	26.348	21.939	0.000	21.939	-	-	-	-	-	-
642597: *Noncooperative Identification Subsystems*	-	24.010	22.076	19.283	0.000	19.283	-	-	-	-	-	-
642599: *Cooperative Identification Techniques*	-	2.040	2.076	0.000	0.000	0.000	-	-	-	-	-	-
643420: *Combat ID Database Development*	-	5.317	2.196	2.656	0.000	2.656	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Combat Identification is the process of determining the identity of an entity in the battlespace. It is essential to determine if that entity is a friend, neutral or enemy; and if an enemy, the nature of the entity determines how it should be engaged. The Combat Identification team's mission is to identify new and promising technology candidates, evaluate the usefulness of the technologies, conduct demonstrations in operationally relevant environments, and coordinate strategies that expedite transition to more than one platform. This Program Element aims to integrate and transition new capabilities into fielded systems, and improve existing capabilities. The mission area consists of three projects: non-cooperative Combat Identification, cooperative Combat Identification, and Combat Identification database development. Non-cooperative Combat Identification techniques do not depend on a response from the targeted platform - such as high range resolution radar that measures the length of a target. Cooperative Combat Identification systems require communication between two participating platforms. Combat Identification database development matures techniques to ensure target representations in the database enable the algorithms to perform correctly. Both non-cooperative and cooperative Combat Identification techniques are currently in the field, and are necessary elements of the kill chain that ensure mission success and reduce fratricide.

Activities also include studies and analysis to support both current program planning and execution and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Combat Identification technologies. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force	Date: May 2021
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	32.085	26.396	24.797	0.000	24.797
Current President's Budget	31.367	26.348	21.939	0.000	21.939
Total Adjustments	-0.718	-0.048	-2.858	0.000	-2.858
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.718	-0.048	-2.858	0.000	-2.858

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: 643420: *Combat ID Database Development*		
Congressional Add: *Trusted Time Loaders*	4.417	0.000
Congressional Add Subtotals for Project: 643420	4.417	0.000
Congressional Add Totals for all Projects	4.417	0.000

Change Summary Explanation

This funding will enable the Combat Identification portfolio to continue developing critical Combat Identification technologies.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / *Combat Identification Technology*	Project (Number/Name) 642597 / *Noncooperative Identification Subsystems*	

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
642597: *Noncooperative Identification Subsystems*	-	24.010	22.076	19.283	0.000	19.283	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Non-cooperative combat identification employs a number of sensing technologies and signal processing techniques designed to extract discriminating features from a battlespace entity (target). Specifically-designed algorithms compare those extracted features to a tailored database to identify those targets. These technologies include: (A) Air-to-Air non-cooperative technologies, (B) Air to Ground non-cooperative technologies, and (C) Studies and Analysis, evaluating potential new technologies. Air-to-Air technologies include implementations of the Joint Multi-platform Advanced Combat identification architecture, which is a framework that allows multiple sensors to provide a robust combat identification solution; and an effort aimed at the discovery and generation of features. Air-to-Air efforts are (1) Hydravision, which is currently implementing and demonstrating the architecture in an F-16 testbed aircraft; and (2) Integrated Combat identification and Electronic warfare (ICE), which incorporates features extracted from an electronic warfare suite to enhance the F-16 solution. Air-to-Ground technologies consist of (3) Compact Aided target recognition and Sustainable Environments (CASE), an approach that focuses on tailoring algorithms to use small, efficient databases that are relatively inexpensive to generate and maintain; (4) Passive Radio frequency IDentification Environment (PRIDE), an effort to develop a capability useful in a denied access environment using passive radar and electronic warfare information; (5) Radio IDentification (RID), an effort to develop methods (including machine learning and artificial intelligence algorithms) paired with advances in software defined radios to provide enhanced solutions, improve aircrew situational awareness and assist in fratricide prevention with military and civil air platforms - potentially fusing non-cooperative and cooperative technologies; and (6) Kill-chain Weapon Integrated CID (KWIC), an effort that will use information from launched weapons through a back channel communication link to provide combat identification from within the hot battlespace. Studies and Analysis will continue to discover novel technologies that are ready to become a transitionable project, and includes (7) Enhanced Combat ID (ECID), an activity to develop a robust ability to quantitatively evaluate promising technologies using enhanced modeling and simulation capabilities. The Studies and Analysis effort will also perform early assessments of promising technologies to determine if the program should incorporate them as a formal project within the non-cooperative portfolio.

In FY 2022 our non-cooperative Air to Air goals will be to follow on to the FY 2021 transition of the Joint Multi-platform Advanced Combat Identification architecture into the F-16 System Integration Laboratory and initial flight test. The follow-on activity will consist of an extensive demonstration of the capability during a flight test series, confirming the performance improvements effected by Joint Multi-platform Advanced Combat Identification. The Integrated Combat Identification and Electronic Warfare project will move into the F-16 System Integration Laboratory in FY 2022, enabling an initial flight test in FY 2023. For non-cooperative Air-to-Ground projects, Compact Aided Target Recognition and Sustainable Environments will come to a close at the end of FY 2022 after a successful demonstration and transition to the F-15E. The Passive Radio Frequency Identification Environment effort will largely complete the second of three phases in FY 2022, paving the way for the third phase which will provide a Technology Readiness Level 6 insertion into an operational platform - the third phase will be paid for by that platform. Radio Identification will also largely complete its second phase in FY 2022, enabling the System Program Office funded demonstration on a surrogate platform in FY 2023. Kill-chain Weapon Integrated Combat Identification will enter its second full year in FY 2022, the team will have had an opportunity to analyze data collected in mid-FY 2021 and craft a plan to tailor algorithms and existing synthetic databases to accommodate the unique requirements of the transition platform; FY 2022 will see the team executing that plan. Per Senior Advisory Group direction, Laser Vision activities will be put into a hibernation state starting in FY 2022; Vibrometry Advanced Mode Processor and 3-dimensional

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

laser imaging will both be complete as scheduled and ready to transition Combat Identification capability to Litening in FY 2021, and the multi-mode ladar effort no longer has a targeted transition platform.

Activities also include studies and analysis to support both current program planning and execution and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Combat Identification technologies. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Laser Vision	3.920	3.100	0.000
Description: The Vibrometry Advanced Mode Processor effort develops advanced algorithms for processing data provided by laser vibrometry sensors to demonstrate prototype pilot Aided Target Recognition software. This leverage ability of active electro-optic sensors to sense micro-displacements of operating machinery to measure the resulting frequency spectrum. The effort will assess utility for air-to-ground Combat Identification and will apply Aided Target algorithms to determine how well the technology can separate target classes. Laser Vision is part of a family of electro-optical systems that significantly increase Identification ranges. It provides the demonstration and evaluation data necessary to support decisions on future electro optical technologies supporting Combat Identification, including 3-dimensional imaging laser radar (Ladar) and exploration of advanced concepts. The 3-dimensional laser imaging technology provides a display of a 3-dimensional image to the pilot for high confidence combat identification and is a potential for the next generation targeting pods for the Department of the Air Force. The Multi-Mode Ladar Aided Target Recognition, which combines the work of 3-dimensional laser imaging and Sensor for Image Recognition and Exploitation / Vibrometry Advanced Mode Processor (laser vibrometry), to create a longer-range fused-feature Combat Identification technique that uses the combined orthogonal features of both systems to provide a robust long-range Combat Identification capability. ***FY 2021 Plans:*** Will integrate Multi-Mode Ladar Aided, 3-dimensional laser imaging, and Vibrometry Advanced Mode Processor work into new, more capable package. ***FY 2022 Plans:*** Effort will be completed in FY 2021, thus no additional funding is required. ***FY 2021 to FY 2022 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2022 decreased compared to FY 2021 by $3.100 million. Funding decreased due to effort scheduled to be completed in FY 2021.			
Title: Hydra Vision/Air to Air ***Description:*** Hydra Vision Multi-Sensor Enhanced Identification is a balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence Combat Identification results on surface or air targets. This effort focuses on Air-to-Air and Air-to-Ground. ***FY 2021 Plans:*** Will further development of feature level fusion that will be integrated into a tactical platform's mission computer. ***FY 2022 Plans:*** This effort will be implementing and demonstrating Joint Multi-sensor Advanced Combat Identification in an F-16 testbed aircraft and Integrated Combat Identification with Electronic Warfare. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 decreased compared to FY 2021 by $0.835 million. Justification for this decrease is described in plans above.	5.100	4.778	3.943
Title: Compact Aided Target Recognition and Sustainable Environment (CASE) ***Description:*** Compact Aided Target Recognition and Sustainable Environment is a family of efforts to address efficiency and sustainability issues associated with the development, operation and maintenance of non-cooperative Aided Target Recognition technology. Develop sustainable multi-phenomenology Aided Target Recognition based on low fidelity, compact, and inexpensive database technology. ***FY 2021 Plans:*** This effort will transition Synthetic Aperture Radar Automatic Target Recognition capability to National Air and Space Intelligence Center in FY 2021; nearing completion. ***FY 2022 Plans:*** This effort will investigate the viability of using machine learning algorithms to continue to provide Combat Identification ranges for ground targets, but less is needed. Conduct verification/validation and analysis of data collected during FY 2021. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 increased compared to FY 2021 by $0.250 million. Justification for this increase is described in plans above.	2.666	0.700	0.950
Title: Passive Radio Frequency Identification Environment (PRIDE)	4.888	4.281	4.123

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Description: Develop passive Radio Frequency target Identification capability for denied access environment utilizing passive Radio Frequency and Electronic Warfare information with potential non-traditional Intelligence, Surveillance and Reconnaissance capabilities. ***FY 2021 Plans:*** Will continue expansion of higher-offset-angle synthetic aperture radar bistatic mode. ***FY 2022 Plans:*** This effort will develop an Identification capability useful in a denied access environment using passive Radio Frequency and Electronic Warfare (EW) information. Efforts require less for data collection activities in FY 2022. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 decreased compared to FY 2021 by $0.158 million. Justification for this decrease is described in plans above.			
Title: Radio ID (RID) ***Description:*** Radio Identification will develop technologies to integrate radio based cooperative technologies with non-cooperative technologies into the cockpit. The benefits will be increased confidence target identification and situational awareness as well as reduced fratricides. ***FY 2021 Plans:*** Will execute the first airborne demonstration of the technology. ***FY 2022 Plans:*** This effort will develop methods for using advances in software defined radios to provide enhanced Combat Identification solutions and improve aircrew situational awareness. Initial development will give way to a lab demonstration with smaller funding requirements. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 decreased compared to FY 2021 by $0.919 million. Justification for this decrease is described in plans above.	3.058	3.919	3.000
Title: Studies ***Description:*** Conduct Combat Identification related studies/demos. ***FY 2021 Plans:***	4.378	4.281	4.267

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Will shake out advanced concepts to determine if they will become development projects. These include integration of electronic warfare features as a Combat Identification source; upgrades to synthetic aperture radar combat identification; extraction of features from sensors on flyout weapons; and a variety of modeling and simulation efforts. ***FY 2022 Plans:*** In FY 2022 efforts will continue modeling, simulation and analysis of Combat Identification technologies and also new Concept Call technology development. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 decreased compared to FY 2021 by $0.014 million. Justification for this decrease is described in plans above.			
Title: Kill-chain Weapon Integreated CID (KWIC) ***Description:*** Kill-chain Weapons Integrated Combat Identification will use air to ground sensors to provide better situational awareness and Combat Identification of target area ***FY 2021 Plans:*** Collect information from launched weapons through a back link to provide Combat Identification for the hot battlespace. Develop novel Combat Identification technologies that are ready to turn into a transitional Non-Cooperative Combat Identification effort. ***FY 2022 Plans:*** Continue with feature extraction and algorithm development. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 increased compared to FY 2021 by $1.983 million. Funding increased due to increased interest from transition partner to accelerate schedule. Partner has provided additional funding and a timeline for development and Combat Identification funding has been allocated to meet this timeline.	0.000	1.017	3.000
Accomplishments/Planned Programs Subtotals	24.010	22.076	19.283

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Combat Identification develops technologies for exploitation by the United States Air Force and other services. Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs). Management develops a technology to a point it can be demonstrated in a relative combat environment.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*	

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
Hydra Vision (Air-to-Air) - L	C/CPFF	Leidos : Dayton, OH	-	0.246	Feb 2020	1.000	Jan 2021	0.603	Jan 2022	-		0.603	-	-	-
Air Target ID (Air-to-Air)	C/CPAF	TBD : TBD	-	-		-		1.370	Feb 2022	-		1.370	-	-	-
Target Recognition & Tracking Technology	MIPR	Sandia : Albuquerque, NM	-	0.900	Feb 2020	0.600	Feb 2021	0.400	Oct 2021	-		0.400	-	-	-
CASE - Compact AiTR and Sustainable Environment Analysis - L	C/CPFF	Leidos : Dayton, OH	-	1.066	Jan 2020	1.295	Jan 2021	0.500	Jan 2022	-		0.500	-	-	-
Passive Radar Identification Environment (PRIDE) - L	C/CPFF	Leidos : Mclean, VA	-	3.631	Feb 2020	3.000	Oct 2020	2.700	Oct 2021	-		2.700	-	-	-
Radio Identification (RID) L	MIPR	DMEA : Sacramento, CA	-	1.000	Feb 2020	2.000	Feb 2021	2.100	Feb 2022	-		2.100	-	-	-
Radio Identification (RID) NG	MIPR	DMEA : Sacramento, OH	-	0.678	Jul 2020	1.919	Mar 2021	0.900	Feb 2022	-		0.900	-	-	-
M2LATR	C/CPFF	TBD : TBD	-	0.455	Mar 2020	1.430	Mar 2021	0.581	Apr 2022	-		0.581	-	-	-
M2LATR MIT Lincoln Lab	MIPR	MIT Lincoln Lab : Boston, MA	-	0.786	Sep 2020	0.000		0.000		-		0.000	-	-	-
VAMP	C/CPAF	Northrop Grumman : Rolling Meadows, IL	-	1.250	Feb 2020	0.350	Jan 2021	0.000		-		0.000	-	-	-
3DTO	C/CPAF	DEC : Beavercreek, OH	-	0.600	Mar 2020	0.000	Mar 2021	0.000		-		0.000	-	-	-
Infoscitex	C/CPAF	Infoscitex : Dayton, OH	-	0.380	Mar 2020	0.000	Mar 2021	0.130	Mar 2022	-		0.130	-	-	-
PRECISE-N	C/CPAF	Northrop Grumman : Baltimore, MD	-	3.200	Jan 2020	1.700	Jan 2021	1.015	Dec 2021	-		1.015	-	-	-
PRECISE-R	C/CPAF	Raytheon : El Segundo, CA	-	3.050	Jan 2020	1.691	Jan 2021	0.981	Dec 2021	-		0.981	-	-	-
PRECISE-M	C/CPAF	Matrix : Beavercreek, OH	-	0.891	Jun 2020	0.980	Mar 2021	0.750	Jan 2022	-		0.750	-	-	-
CAST	MIPR	DMEA : Sacramento, CA	-	1.436	Jan 2020	0.300	Jan 2021	0.200	Jan 2022	-		0.200	-	-	-
Concept Call #1	C/CPAF	TBD : TBD	-	-		0.400	May 2021	0.200	May 2022	-		0.200	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

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
Concept Call #2	C/CPAF	TBD : TBD	-	-		0.250	May 2021	0.450	May 2022	-		0.450	-	-	-
Concept Call #3	C/CPAF	Not specified. : TBD	-	-		0.100	May 2021	0.100	May 2022	-		0.100	-	-	-
Integrated CID and EW GTRI	C/CPAF	GTRI : Dayton, OH	-	0.400	Dec 2019	0.400	Jan 2021	0.800	Jan 2022	-		0.800	-	-	-
Integrated CID and EW NG	C/CPAF	Northrop Grumman : Baltimore, MD	-	0.100	May 2020	0.500	Jan 2021	0.700	Jan 2022	-		0.700	-	-	-
Kill Chain Weapons Integrated CID	C/CPAF	Raytheon : El Segundo, CA	-	0.450	Jan 2020	1.500	Jan 2021	1.500	Jan 2022	-		1.500	-	-	-
AFSIM Development	C/CPAF	TBD : TBD	-	0.200	Feb 2020	0.300	Feb 2021	0.200	Feb 2022	-		0.200	-	-	-
JMAC Integration	C/CPAF	TBD : TBD	-	0.240	Feb 2020	0.159	Feb 2021	-		-		-	-	-	-
XPatch Upgrades	C/CPAF	Leidos : Mclean, VA	-	0.250	Aug 2020	0.250	Aug 2021	0.000		-		0.000	-	-	-
		Subtotal	-	21.209		20.124		16.180		-		16.180	-	-	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
Systems Engineering Support	MIPR	MITRE : Rome, NY	-	0.021	Dec 2019	0.000		-		-		-	-	-	-
Systems WSRI Support	C/CPAF	WSRI : Dayton, OH	-	0.050	Aug 2020	-		-		-		-	-	-	-
ECID MS&A	C/CPAF	TBD : TBD	-	0.000	Dec 2019	0.600	Dec 2020	-		-		-	-	-	-
		Subtotal	-	0.071		0.600		-		-		-	-	-	N/A

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
Test and Evaluation	PO	704TSS : Holloman, NM	-	0.040	Jun 2020	-		-		-		-	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / *Combat Identification Technology*	Project (Number/Name) 642597 / *Noncooperative Identification Subsystems*	

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
Data Collection-AvMC	MIPR	AvMC : Huntsville, AL	-	0.189	Sep 2020	0.754	Feb 2021	-		-		-	-	-	-
Data Collection-Eglin	PO	96th Test Wing : Eglin AFB, FL	-	0.190	Mar 2020	-		-		-		-	-	-	-
Data Collection-Yuma	MIPR	Yuma Proving Ground : Yuma, AZ	-	0.100	Sep 2020	0.245	Feb 2021	-		-		-	-	-	-
Data Collection-NNSS	MIPR	NNSS : NNSS, NE	-	0.215	Sep 2020	0.090	Feb 2021	-		-		-	-	-	-
Data Collection	MIPR	TBD : TBD	-	0.776	Dec 2020	-		1.000	Feb 2022	-		1.000	-	-	-
		Subtotal	-	1.510		1.089		1.000		-		1.000	-	-	N/A

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
AFRL PMA	Various	Various : Various, OH	-	1.220	Mar 2020	0.263	Mar 2021	2.103	May 2022	-		2.103	-	-	-
		Subtotal	-	1.220		0.263		2.103		-		2.103	-	-	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	-	24.010		22.076		19.283		-		19.283	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

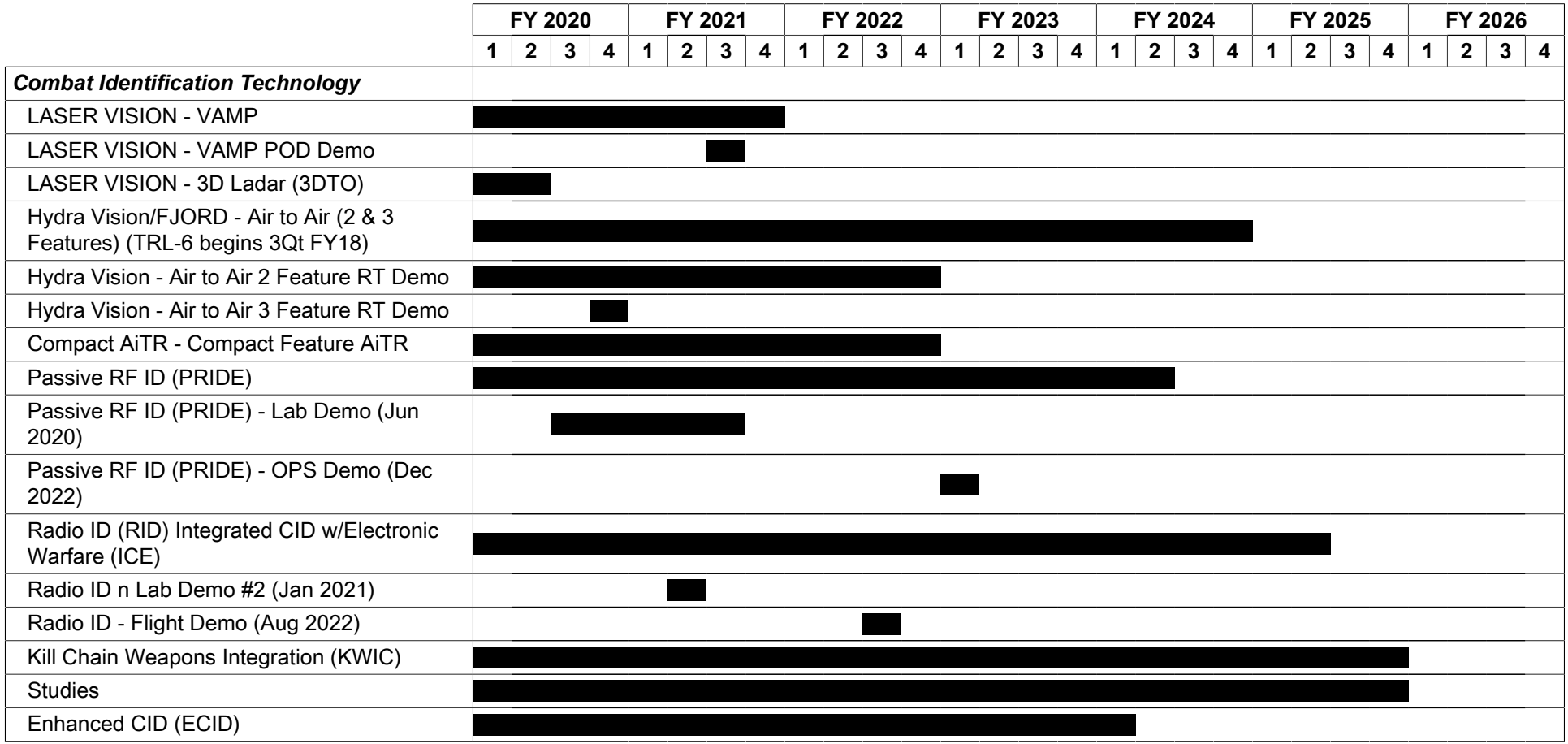

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Combat Identification Technology				
LASER VISION - VAMP	1	2020	4	2021
LASER VISION - VAMP POD Demo	3	2021	3	2021
LASER VISION - 3D Ladar (3DTO)	1	2020	2	2020
Hydra Vision/FJORD - Air to Air (2 & 3 Features) (TRL-6 begins 3Qt FY18)	1	2020	4	2024
Hydra Vision - Air to Air 2 Feature RT Demo	1	2020	4	2022
Hydra Vision - Air to Air 3 Feature RT Demo	4	2020	4	2020
Compact AiTR - Compact Feature AiTR	1	2020	4	2022
Passive RF ID (PRIDE)	1	2020	2	2024
Passive RF ID (PRIDE) - Lab Demo (Jun 2020)	3	2020	3	2021
Passive RF ID (PRIDE) - OPS Demo (Dec 2022)	1	2023	1	2023
Radio ID (RID) Integrated CID w/Electronic Warfare (ICE)	1	2020	2	2025
Radio ID n Lab Demo #2 (Jan 2021)	2	2021	2	2021
Radio ID - Flight Demo (Aug 2022)	3	2022	3	2022
Kill Chain Weapons Integration (KWIC)	1	2020	4	2025
Studies	1	2020	4	2025
Enhanced CID (ECID)	1	2020	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / *Combat Identification Technology*	Project (Number/Name) 642599 / *Cooperative Identification Techniques*	

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
642599: *Cooperative Identification Techniques*	-	2.040	2.076	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Cooperative Combat Identification employs technologies required to rapidly identify friendly platforms. The program develops, integrates and evaluates technologies that provide Air Force platforms with a means of positively identifying an air or ground platform as a friendly, via active or passive cooperative identification capabilities. The development funded by this project ensures availability of a Mode 5 upgrade path for implementing ground and air platforms across the Air Force fleet. The Department of Defense International AIMSPO has system level interoperability testing and certification responsibilities for the present Mark XIIB system, development and integration of new Identification Friend or Foe (IFF) system capabilities, and development/integration of civil Mode S capabilities into Mark XIIB Identification Friend or Foe equipment. The AIMSPO ensures Identification Friend or Foe equipment/platform functionality in accordance with established standards and ensures total system interoperability to meet Department of Defense/Service mission areas (e.g. Offensive Counter Air, Defensive Counter Air, and Integrated Air and Missile Defense).

The cooperative goals will be to test and certify the Mark XIIB system, develop and integrate the new Mark XIIB Identification Friend or Foe system capability (Mode 5 Level 2 Broadcast) and also continue the development/integration of civil Mode S capabilities into Mark XIIB Identification Friend or Foe equipment using newly fielded M-code GPS receivers.. The cooperative funds will be used to fund projects and personnel who develop and test technical standards, perform certification testing, process certifications and track all Office of the Secretary of Defense and Federal Aviation Administration guidelines to ensure the program remains current. The Office of the Secretary of Defense and Federal Aviation Administration guidelines required Mode 5 be fully implemented by FY 2020 but many platforms continue to integrate this capability. The Department of Defense AIMS Program will ensure those certifications are current on all applicable platforms/systems and work with both domestic and foreign military sales partners to ensure compliance. The funds also support Department of Defense representation to several military (United States and NATO) and civil (Federal Aviation Administration, International Civil Aviation Organization and Radio Technical Commission for Aeronautics) requirements meetings for Mode 5, Mode S and ADS-B. These important meetings allow the Department of Defense to remain interoperable with our foreign military partners as well as the United States. and international civil aviation community. Department of Defense AIMS Program will continue to update the Department of Defense AIMS Mark XIIB Standards, Security Classification Guide, Handbook, and Test Requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Air Traffic Control and Radar Beacon Systems Identification Friend or Foe Mark XIIA System (AIMS) Program Office	2.040	2.076	0.000
Description: Develop and maintain technical standards on development, integration, testing, and certification of Department of Defense Identification Friend or Foe equipment. Coordinate and execute equipment/subsystem-level certifications and platform certifications of Identification Friend or Foe capabilities (298 Mode 5 certifications were completed in FY20). Support Foreign Military Sales of the United States Identification Friend and Foe equipment. Currently managing 49 active Foreign Military Sales Cases. Support NATO Identification Friend or Foe Capabilities Team (Mode 5 Identification Friend or Foe is a NATO waveform).			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Support International Civil Aviation Organization (ICAO) Technical Support Group (develops standards for world-wide civil Air Traffic Control). Create and maintain civil Mode S address assignments and military Mode 5 Platform Identification Number assignments for every Department of Defense platform using these waveforms in their interrogator and/or transponder equipment. ***FY 2021 Plans:*** Will continue to fund AIMS for interoperability Identification Friend testing (civil and military), Federal Aviation Administration liaison, to support of Mode 4/Mode 5 equipment, updating and developing Identification Friend standards. ***FY 2022 Plans:*** In FY 2022, this work will be performed under PE 0207420F Combat Identification. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding from FY 2021 to FY 2022 decrease by $2.076 million. The decrease is due to realignment of funds to PE 0207420F Combat Identification.			
Accomplishments/Planned Programs Subtotals	2.040	2.076	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Combat Identification develops technologies for exploitation by the United States Air Force and the other services. Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs). Management develops a technology to a point it can be demonstrated in a relative combat environment.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*	

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
Systems Engineering / Program Management - AIMS Program Office	MIPR	DTIC : Robins AFB, GA	-	1.645	Feb 2020	1.890	Apr 2021	-		-		-	-	-	-
		Subtotal	-	1.645		1.890		-		-		-	-	-	N/A

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 Office Support	Various	Various : Various	-	0.300	Sep 2020	0.186	Sep 2021	0.000		-		0.000	-	-	-
Program Office Support - DOD AIMS Process System (DAPS) data base	MIPR	78ABW : Robins AFB, GA	-	0.095	Jul 2020	-		0.000		-		0.000	-	-	-
		Subtotal	-	0.395		0.186		0.000		-		0.000	-	-	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	-	2.040		2.076		0.000		-		0.000	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

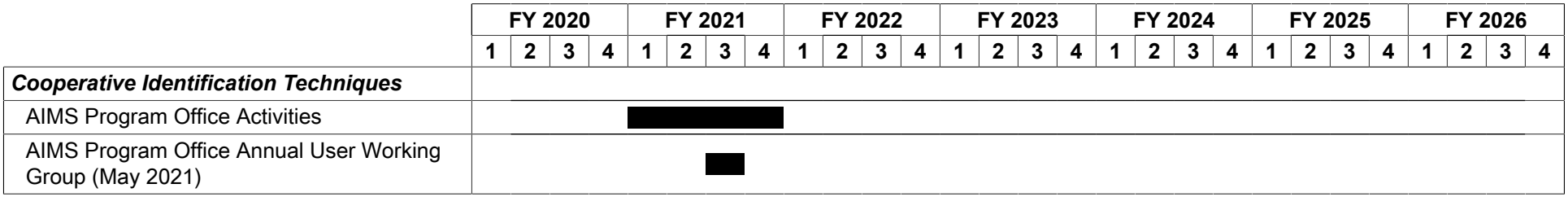

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Cooperative Identification Techniques				
AIMS Program Office Activities	1	2021	4	2021
AIMS Program Office Annual User Working Group (May 2021)	3	2021	3	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / *Combat Identification Technology*	Project (Number/Name) 643420 / *Combat ID Database 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
643420: *Combat ID Database Development*	-	5.317	2.196	2.656	0.000	2.656	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Database Initiative (DBI) is a project designed to remove the "hard-coded" static identification (ID) parameters (typically updated every 4-5 years) from the host platform's sensor(s) and replace them with parameterized values that are easily and quickly updated when new intelligence inputs come available (this allows maximum flexibility to tailor each aircraft's Combat Identification database(s) based on assigned theater of operation, threat country of interest, and assigned mission tasks). This project primarily consists of four objectives: A.) determining a sensor's requisite identification parameters for combat identification, B) designing and developing a database to contain the combat identification parameters identified in Objective A, C) developing techniques to generate the requisite parameters, and D) provide combat identification parameters developed from measured or modeled data.

In FY22, the Database effort will focus on air target features associated with the Joint Multi-sensor Advanced Combat Identification (JMAC) architecture described above. The team expects to develop specific feature sets in FY21, and will conduct a real-time database insertion demonstration in an F-15 System Integration Laboratory. This will lead to the maturation of further Joint Multi-sensor Advanced Combat Identification feature sets that will provide progressively improved Combat Identification improvement. Feature sets for other Combat Identification modalities will be added over time (specifically, ground radar modes).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Combat Identification technologies. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Database Development	0.900	2.196	2.656
Description: Develop techniques to remove the "hard-coded" static ID parameters from the host platform's sensor and replace them with parameterized values that are dynamic. ***FY 2021 Plans:*** - Determine the requisite Combat Identification features for high range resolution radar (HHR) and non-cooperative target recognition (NCTR) air-to-air radar modes. - Specify the requirements for initial Combat Identification database design for these radar modes			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 643420 / *Combat ID Database Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
- Collect initial sample data to populate the high range resolution radar (HHR) and non-cooperative target recognition (NCTR) databases for developmental test/debug ***FY 2022 Plans:*** Continue to collect data to populate the high range resolution radar (HHR) and non-cooperative target recognition (NCTR) databases for developmental test/debug. Develop techniques to remove the "hard-coded" static ID parameters from the host platform's sensor and replace them with parameterized values for Joint Multi-sensor Advanced Combat Identification (JMAC) architecture. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 increased compared to FY 2021 by $0.460 million. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	0.900	2.196	2.656

	FY 2020	FY 2021
Congressional Add: Trusted Time Loaders ***FY 2020 Accomplishments:*** Conducted Congressional directed efforts ***FY 2021 Plans:*** Not applicable	4.417	0.000
Congressional Adds Subtotals	4.417	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Combat Identification develops technologies for exploitation by the USAF and the other services. Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs). Management develops a technology to a point it can be demonstrated in a relative combat environment.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 643420 / *Combat ID Database Development*

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
Database Development	MIPR	NASIC : WPAFB, OH	-	5.317	May 2020	2.196	Feb 2021	2.656		-		2.656	-	-	-
		Subtotal	-	5.317		2.196		2.656		-		2.656	-	-	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	-	5.317		2.196		2.656		-		2.656	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 643420 / *Combat ID Database Development*

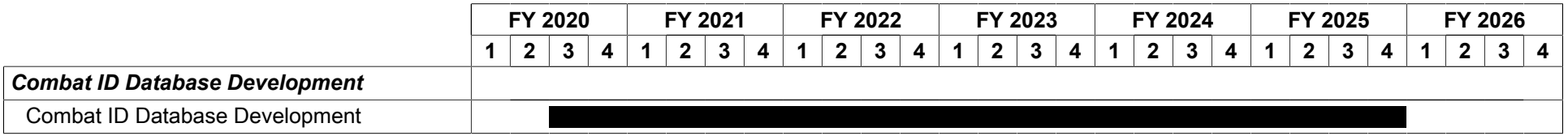

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 643420 / *Combat ID Database Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Combat ID Database Development				
Combat ID Database Development	3	2020	4	2025