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 0603790F / *NATO Research and Development*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	4.774	3.640	4.114	0.000	4.114	-	-	-	-	-	-
64NATO: *Nato Coop R&D*	-	4.774	3.640	4.114	0.000	4.114	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016, PE 0603791F, International Space Cooperative Research & Development, Project 645035, International Space Coop R&D, efforts were transferred to PE 0603790F, NATO Research and Development, Project 64NATO, NATO Coop R&D, in order to consolidate international cooperative research and development activities.

A. Mission Description and Budget Item Justification

These funds will be used to initiate air, space, and cyber international cooperative research, and development (ICR&D) agreements with North Atlantic Treaty Organization (NATO) member states, major non-NATO allies and friendly foreign countries. Each of the selected activities and projects are required to have a concluded international agreement (IA), prior to funds being released, that implements the provisions of Title 10 U.S. Code, Section 2350a. This legislation (Title 10 U.S. Code, Section 2350) authorizes funds to significantly improve U.S. and allied conventional defense capabilities by leveraging the best defense technologies, eliminating costly duplication of R&D efforts, accelerating the availability of defense systems, and promoting US and allied interoperability or commonality. These funds will not be used for government civilian salaries, permanent construction, or spent overseas. This program element funds the implementation of Air Force ICR&D agreements in (1) Basic Research (2) Applied Research (3) Advanced Technology Development (4) Advanced Component Development and Prototypes (5) System Development and Demonstration and (6) RDT&E Management Support.

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 0603790F / *NATO Research and Development*	

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	4.955	3.647	4.141	0.000	4.141
Current President's Budget	4.774	3.640	4.114	0.000	4.114
Total Adjustments	-0.181	-0.007	-0.027	0.000	-0.027
• 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	-0.181	0.000			
• Other Adjustments	0.000	-0.007	-0.027	0.000	-0.027

Change Summary Explanation

FY22 funds decreased by $.027M to support other Air Force Requirments.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: International Cooperative Research and Development	4.774	3.640	4.114	0.000	4.114

Description: Supports bi- and multi-lateral international agreements that meet USAF RDT&E objectives and goals. Each of the cooperative projects that receive funding must meet one or more of the following requirements: enhance warfighter capabilities and coalition interoperability; accelerate the availability of defense systems; strengthen and reinforce strategic partnerships; gain access to the best defense technologies, capabilities and techniques; build relationships and influence with allies; and/or eliminate duplication of R&D efforts.

FY 2021 Plans:

FY21 cooperative projects involve RDT&E efforts in Artificial Intelligence, directed energy, hypersonics, Autonomy, human performance, information systems, aerospace systems, munitions, materials and manufacturing, sensors, space situational awareness, missile warning, military satellite communications, global positioning systems, responsive space capabilities, cyber network defense and information assurance, and space vehicles. These projects include but are not limited to: Development of Emerging Additive Manufacturing Technologies (DAWN); Mission Planning for Photonic Systems; Micro-Satellite Military Utility (MSMU) Ground Station Interoperability; Improved Technology for High-temperature Alloys Necessary to Optimize Small Supersonic Systems (I-THANOS3); Himalayan Eagle; Ignition Optimization Using Pulsed Discharge; Selected

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 0603790F / *NATO Research and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Cyber Information Exchange; Next Generation EO IR Sensor Technology (NGIEST); Solid State High Power Microwave 'Cannon'; HPM Target Effects & Weaponization; Deep Space Radar; Confined Quantum Sensors; Embedded Flow Control for Low Pressure Turbines (LPTs); Sensors & PID (Positive threat Identification) Enhanced Model for Directed Energy; Hybrid Ultra-Wide/Narrow Band Directed Energy Weapon (DEW); Quantum Sensors for Ephemeris-Free Space Operations; Improved HPEM Elements for Next Generation RF-Directed Energy Weapons; and Intelligent Adaptive Collaborative Teaming Technologies (IACTT). These projects involved interoperability in cooperative R&D ventures with these Allies, Major Non-NATO Allies and Strategic Partners: Australia, Estonia, Israel, Germany, Canada, United Kingdom, Italy, Netherlands, Norway, New Zealand, India, Republic of Korea, Japan, and Singapore.					
N/A					
FY 2022 Base Plans: FY22 cooperative projects involve RDT&E efforts in Artificial Intelligence, directed energy, hypersonics, Autonomy, human performance, information systems, aerospace systems, munitions, materials and manufacturing, sensors, local area airbase / airfield defense, machine learning, space situational awareness, missile warning, military satellite communications, global positioning systems, responsive space capabilities, cyber network defense, sensors,information assurance, and space vehicles. These projects include but are not limited to: Joint Advanced Laser Integration (JAVALIN), Confined Quantum Sensors, Military Applications of Laser Produced Particle Beams, Solid State High Power Microwave "Cannon", DEAD AIM, Advanced Electro-Optic Modulators for Enhancing RF Photonic Systems, Intelligent Adaptive Collaborative Teaming Technologies (iACTT), Hyperspectral Detection / ID with EO / IR Fusion (HyDEF), Quick Reaction Laser Assessment Sensor, Advanced Data Analytics for C4ISR, MADCAP, Ranging of GEO Uncooperative Entities (RoGUE), Improved HPEM Elements for Next Generation, RF-Directed Energy Weapons, AI Based ISR for Contested and Diverse Environments, Autonomous Drone Swarm for Airfield and Runway Inspection, Operational Research Collaboration for Human Improvement in Defense (ORCHID), Multimodal Open Source Analytic Insights for C4ISR (MOSAIC), Dynamic Material Analysis Fatigue Life, Sustainment and Augmentation of the Military Enterprise through Synthetic Biology Engineering, Corrosion: Modeling and Accelerated Testing, and Damaged Composite Airframe Management Tools. International Cooperation are with but not limited to the following partners: Australia, Canada, Estonia, France, Germany, India, Italy, Israel, Japan, Netherlands, Norway, Republic of Korea, Singapore, Sweden, Switzerland, and United Kingdom.					
FY 2022 OCO Plans:					

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 0603790F / *NATO Research and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
None / N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The funds increased is attributed to higher program demand and the projects identified in the FY22 Base Plan. This program is a vital building and sustaining partnership enabler providing the Department of Air Force, US Air Force and US Space Force, the strategic direction in collaboration with our Allies and Strategic Partners.					
Accomplishments/Planned Programs Subtotals	4.774	3.640	4.114	0.000	4.114

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

A principal goal of the NATO Cooperative R&D program is to effectively utilize the aggregate resources invested by the US and our allies in air, space, and cyber R&D. This program element provides the critical funding incentive needed to pursue air, space and cyber related International Cooperative Research Development and Acquisition (ICRD&A) agreements and helps to (a) leverage USAF and allied resources through cost sharing and economies of scale; (b) exploit the best US and allied technologies for equipping coalition forces; (c) demonstrate areas of commonality or interoperability with our allies; and (d) accelerate the availability of defense technology and systems. Candidate projects are reviewed against USAF goals, DoD objectives, and warfighter needs prior to being approved. An international agreement defining project objectives, responsibilities and costs is required prior to release of funds. To obtain these funds and ensure service commitment, projects are selected from existing or new RDT&E programs funded in the Future Years Defense Plan (FYDP). Project offices must show matching funds and contributions from associated program elements and equitable allied funding. As appropriate, funding responsibility for out-year requirements and follow-on efforts are transferred to the project office and associated program elements. Any new contracts are awarded after full and open competition.

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 0603790F / *NATO Research and Development*	Project (Number/Name) 64NATO / *Nato Coop R&D*	

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
NATO Coop R&D (International Research Projects)	Various	Various : NV	-	3.287	Feb 2020	2.048	Feb 2021	2.873	Feb 2022	-		2.873	-	-	-
		Subtotal	-	3.287		2.048		2.873		-		2.873	-	-	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
NATO Coop R&D (International Research Projects)	Various	Various : NV	-	1.487	Feb 2020	1.592	Feb 2021	1.241	Feb 2022	-		1.241	-	-	-
		Subtotal	-	1.487		1.592		1.241		-		1.241	-	-	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	-	4.774		3.640		4.114		-		4.114	-	-	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 0603790F / *NATO Research and Development*	**Project (Number/Name)** 64NATO / *Nato Coop R&D*

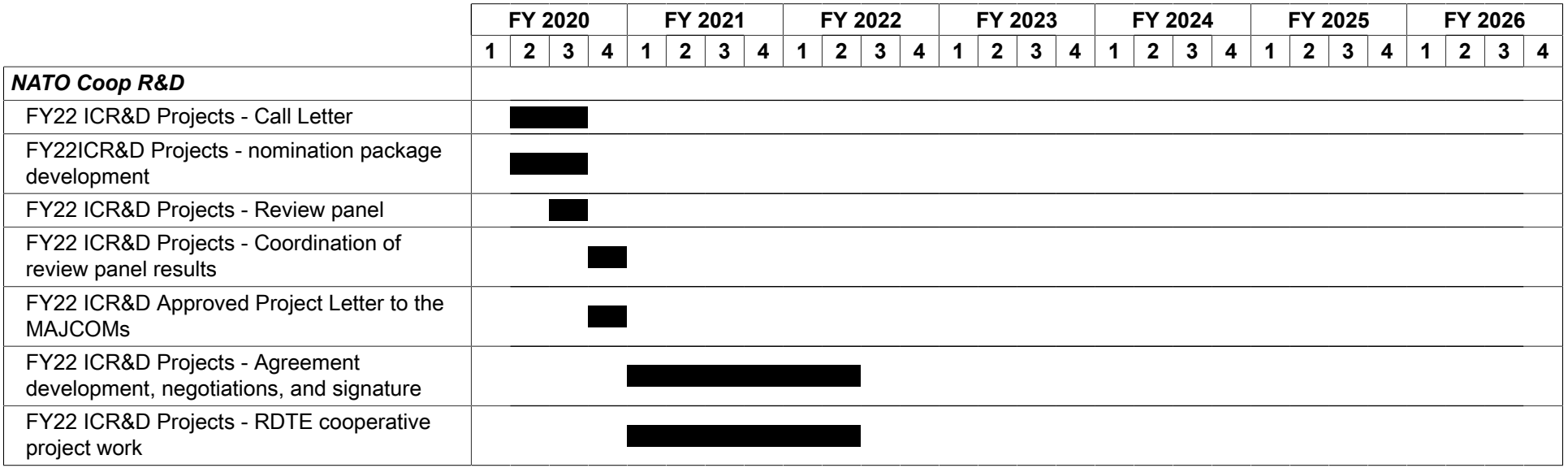

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603790F / *NATO Research and Development*	**Project (Number/Name)** 64NATO / *Nato Coop R&D*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NATO Coop R&D				
FY22 ICR&D Projects - Call Letter	2	2020	3	2020
FY22ICR&D Projects - nomination package development	2	2020	3	2020
FY22 ICR&D Projects - Review panel	3	2020	3	2020
FY22 ICR&D Projects - Coordination of review panel results	4	2020	4	2020
FY22 ICR&D Approved Project Letter to the MAJCOMs	4	2020	4	2020
FY22 ICR&D Projects - Agreement development, negotiations, and signature	1	2021	2	2022
FY22 ICR&D Projects - RDTE cooperative project work	1	2021	2	2022