Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Office of the Secretary Of Defense	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603183D8Z / *Joint Hypersonic Technology Development & Transition*

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	-	0.000	0.000	51.340	-	51.340	-	-	-	-	-	-
066: *Joint Hypersonic Transition Office (JHTO)*	-	0.000	0.000	51.340	-	51.340	-	-	-	-	-	-

Note

The Joint Hypersonics Transition Office (JHTO) is not a new start program, but was created in FY 2020 as a result of a Congressional add that highlighted the threats to national security posed by hypersonic weapons and the need to better synchronize hypersonic technology development and workforce development. Funding transfer from the Prompt Global Strike Capability Development Program Element (0604165D8Z), Project code 065, Joint Hypersonics, is to better align the hypersonic mission and budget activity with the congressional intent.

A. Mission Description and Budget Item Justification

The Joint Hypersonics Transition Office (JHTO) within the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E) was created to establish a university consortium for hypersonics research and support workforce development; expedite testing, evaluation, and acquisition of hypersonic technologies to meet the stated needs of the warfighter, including flight testing, ground-based-testing, and underwater launch testing; ensure that prototyping demonstration programs on hypersonic systems integrate advanced technologies to speed the maturation and deployment of future hypersonic systems; develop strategies and roadmaps for hypersonic technologies to enable the transition of such technologies to future operational capabilities for the warfighter; and develop and implement a strategy for enhancing the current and future hypersonics workforce.

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	51.340	-	51.340
Total Adjustments	0.000	0.000	51.340	-	51.340
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Transfer from Program Element 0604165D8Z	-	-	52.000	-	52.000
• Program Adjustments	-	-	-0.660	-	-0.660

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Change Summary Explanation

FY 2022 funding transfer from the Prompt Global Strike Capability Development Program Element (0604165D8Z), Project code 065, Joint Hypersonics, is to better align the hypersonic mission and budget activity with the congressional intent.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603183D8Z / *Joint Hypersonic Technology Development & Transition*	Project (Number/Name) 066 / *Joint Hypersonic Transition Office (JHTO)*	

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
066: *Joint Hypersonic Transition Office (JHTO)*	-	0.000	0.000	51.340	-	51.340	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The Joint Hypersonics Transition Office (JHTO) is not a new start, but was created in FY 2020 as a result of a Congressional add that highlighted the threats to national security posed by hypersonic weapons and the need to better synchronize hypersonic technology development and workforce development. The JHTO transfers from the Prompt Global Strike Capability Development Program Element (0604165D8Z), Project code 065, Joint Hypersonics, to JHTO is to better align the hypersonic mission and budget activity with the congressional intent.

A. Mission Description and Budget Item Justification

The Joint Hypersonics Transition Office (JHTO) within the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E) was created to establish a university consortium for hypersonics research and support workforce development; expedite testing, evaluation, and acquisition of hypersonic technologies to meet the stated needs of the warfighter, including flight testing, ground-based-testing, and underwater launch testing; ensure that prototyping demonstration programs on hypersonic systems integrate advanced technologies to speed the maturation and deployment of future hypersonic systems; develop strategies and roadmaps for hypersonic technologies to enable the transition of such technologies to future operational capabilities for the warfighter; and develop and implement a strategy for enhancing the current and future hypersonics workforce.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: University Consortium for Applied Hypersonics	0.000	-	22.840
Description: The JHTO established the University Consortium for Applied Hypersonics and plans to solicit research projects through the Consortium that address priorities and gaps identified by the JHTO Hypersonics Science and Technology (S&T) Roadmap, focusing on workforce development, applied research and advanced technology development related to the hypersonics mission. To facilitate development of the next generation hypersonics workforce, the JHTO intends to leverage the Consortium to award scholarships to graduate students who are focusing on key hypersonic development areas. Additionally, the Consortium will host Consortium Industry Days, Project Industry Days, and participate in career/internship fairs to cross-level information and enhance workforce development. ***FY 2022 Plans:*** The JHTO plans to solicit research projects through the Consortium that address priorities and gaps identified by the JHTO Hypersonics Science and Technology (S&T) Roadmap, focusing on workforce development, applied research and advanced technology development related to the hypersonics mission. To facilitate development of the next generation hypersonics workforce, the JHTO intends to leverage the Consortium to award scholarships to graduate students who are focusing on key			

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Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603183D8Z / *Joint Hypersonic Technology Development & Transition*	**Project (Number/Name)** 066 / *Joint Hypersonic Transition Office (JHTO)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
hypersonic development areas. Additionally, the Consortium will host Consortium Industry Days, Project Industry Days, and participate in career/internship fairs to cross-level information and enhance workforce development. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.			
Title: Navigation, Guidance and Controls (NGC) Science and Technology Development ***Description:*** In alignment with the jointly-developed Hypersonics S&T Roadmap, the JHTO funds NGC science and technology projects to improve the operational capabilities of both offensive and defensive hypersonic systems. These projects focus on navigation in contested environments, on-vehicle trajectory generation, communications risk reduction, guidance electronics, and conformal antenna development. Additional details regarding these projects are sensitive and/or classified and will be provided upon request. ***FY 2022 Plans:*** Continue activities initiated under the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics. Additional details regarding FY 2022 NGC projects are sensitive and/or classified and will be provided upon request. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.	0.000	-	6.200
Title: Propulsion Science and Technology Development ***Description:*** In alignment with the jointly-developed Hypersonics S&T Roadmap, the JHTO funds propulsion science and technology projects designed to enhance propulsion capabilities for both offensive and defensive hypersonic systems. These efforts will close critical gaps in the development of hypersonic cruise missiles and enhance range and/or payload capacity of boost-glide systems. Focus areas for these projects include solid rocket motor component technologies, expanding the operating envelope of Dual-Mode Ramjet/Scramjet propulsion systems, developing new actuator technologies for axial thrusters, and establishing a proof-of-principle for an improved endothermic fuel for hypersonic applications. Additional details regarding these projects are sensitive and/or classified and will be provided upon request. ***FY 2022 Plans:***	0.000	-	3.832

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Continue activities initiated under the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics. Additional details regarding FY 2022 propulsion projects are sensitive and/or classified and will be provided upon request. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.			
Title: Systems Engineering, Design and Analysis (SEDA) Science and Technology Development ***Description:*** In alignment with the jointly-developed Hypersonics S&T Roadmap, the JHTO funds SEDA science and technology projects designed to: (1) improve the modeling and prediction of hypersonic vehicle plumes, wakes, and signatures, and (2) provide performance baselines for offensive and defensive systems. Additional details are sensitive and/or classified and will be provided upon request. ***FY 2022 Plans:*** Continue activities initiated under the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics. Additional details regarding FY 2022 SEDA projects are sensitive and/or classified and will be provided upon request. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.	0.000	-	1.600
Title: Materials, Structures and Manufacturing (MSM) Science and Technology Development ***Description:*** In alignment with the jointly-developed Hypersonics S&T Roadmap, the JHTO funds MSM science and technology projects essential to develop new high-temperature materials for hypersonic applications and to design more efficient and effective manufacturing methods for hypersonic structural components. Specific projects seek to characterize alternative ceramic matrix composites for hypersonics, improve the ability to produce multiphase monolithic ceramic dielectric materials, test and characterize the performance of leading edge coatings, and improve manufacturing processes to build cruiser fins. Additional details regarding these projects are sensitive and/or classified and will be provided upon request. ***FY 2022 Plans:***	0.000	-	1.800

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Continue activities initiated under the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics. Additional details regarding FY 2022 MSM projects are sensitive and/or classified and will be provided upon request. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.			
Title: Ordnance Science and Technology Development ***Description:*** In alignment with the jointly-developed Hypersonics S&T Roadmap, the JHTO funds ordnance science and technology projects to better understand hypersonic ordnance effects and improve those effects across a broad range of target sets. Projects will develop and demonstrate a survivable fuze system designed to function under extreme hypersonic terminal conditions, model shock loads associated with a multi-mission warhead, and conduct high-fidelity modeling to analyze and optimize the effects of hypersonic munitions. Additional details regarding these projects are sensitive and/or classified and will be provided upon request. ***FY 2022 Plans:*** Continue activities initiated under the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics. Additional details regarding FY 2022 Ordnance projects are sensitive and/or classified and will be provided upon request. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.	0.000	-	3.200
Title: Mission Planning Science and Technology Development ***Description:*** In alignment with the jointly-developed Hypersonics S&T Roadmap, the JHTO funds mission planning science and technology projects to support rapid mission planning of hypersonic systems when employed in a variety of operational conditions. Projects focus on flight-trajectory survivability analysis, the development of prototype tools to facilitate rapid mission planning, and the assessment of weather impacts during different segments of hypersonic flight. Additional details regarding these projects are sensitive and/or classified and will be provided upon request. ***FY 2022 Plans:***	0.000	-	1.218

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Continue activities initiated under the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics. Additional details regarding FY 2022 Mission Planning projects are sensitive and/or classified and will be provided upon request. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.			
Title: Aerodynamics and Aerothermodynamics Science and Technology Development ***Description:*** In alignment with the jointly-developed Hypersonics S&T Roadmap, the JHTO funds aerodynamics and aerothermal science and technology project to enhance aero optics modeling and simulation testing. This project seeks to increase the fidelity of infrared aero optics modeling and simulation data while driving down man-hours through creation/validation of a more useful and collaborative collection format. Additional details are sensitive and/or classified and will be provided upon request. ***FY 2022 Plans:*** Continue activities initiated under the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics. Additional details regarding FY 2022 aerodynamics and aerothermal science and technology projects are sensitive and/or classified and will be provided upon request. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.	0.000	-	1.700
Title: Tactical High-speed Offensive Ramjet for Extended Range (THOR-ER) ***Description:*** In FY 2022, THOR-ER transitioned from Program Element 0603338D8Z Defense Modernization and Prototyping. The THOR-ER project will develop and demonstrate a full-scale missile prototype incorporating advanced solid fuel ramjet technologies, culminating in a series of operationally relevant flight demonstrations. THOR-ER enables leap-ahead gains in missile range and cruise speed while maintaining form factors similar to currently-fielded solid-rocket motor systems. Technology developed as part of the THOR-ER project will enhance the affordability and survivability of next generation weapon systems. THOR-ER is a co-development effort partnering with the U.S. Navy Naval Air Warfare Center, Weapons Division China Lake; the Norwegian Defence Research Establishment; and, the Norwegian industrial base partner, Nammo. ***FY 2022 Plans:***	0.000	-	1.400

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
In FY 2022, flight testing of the full-scale missile prototypes will commence followed by an iterative series of flight test and prototype refinement phases through FY 2024. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** In FY 2022, funding increases due to increased costs associated with full-scale prototype flight testing.			
Title: JHTO Manpower, Support and Administration ***Description:*** Supports all JHTO activities to include financial oversight, Hypersonic S&T Roadmap Development; competitive award of the University Consortium for Applied Hypersonics, competitive award of University Grants; administrative efforts associated with all S&T project funding, and general administrative support for conferences and reporting. Planned and obligated funding covers support contracts, support provided through the Johns Hopkins University Applied Physics Laboratory, and funding reserved to potentially establish a JHTO field office. ***FY 2022 Plans:*** Continue to support all JHTO activities, to include financial oversight, Hypersonic S&T Roadmap Development; oversight of the University Consortium for Applied Hypersonics; administrative efforts associated with all S&T project funding, and general administrative support for conferences and reporting. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.	0.000	-	2.865
Title: JHTO Systems Engineering Field Activity at NSWC Crane ***Description:*** Supports systems engineering and integration for hypersonics development to generate efficiencies and facilitate technology transition. Support will include coordinating with systems engineering teams across the Services and programs; negotiating more modular Government Reference Architectures to support individual programs; define and execute system on-ramping plans, primarily; and guide accelerated development plans. Additionally, the activity will represent the JHTO as a technical execution area co-lead for workforce development. ***FY 2022 Plans:*** Continue to support cross-service systems engineering, technology transition, and workforce development. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding is transferred from the Prompt Global Strike Capability Development Program Element (0604165D8Z) Project code 065, Joint Hypersonics.	0.000	-	4.685
Accomplishments/Planned Programs Subtotals	0.000	-	51.340

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C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A