Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Office of the Secretary Of Defense	Date: April 2022
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 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	0.000	0.000	51.178	52.156	0.000	52.156	50.184	49.142	48.099	49.063	Continuing	Continuing
066: *Joint Hypersonic Transition Office (JHTO)*	0.000	0.000	51.178	52.156	0.000	52.156	50.184	49.142	48.099	49.063	Continuing	Continuing

Note

New Start (Y/N): No

In FY 2020 and FY 2021, the Joint Hypersonics Transition Office (JHTO) was funded via Congressional Add to better synchronize hypersonic technology development and workforce development. Those funds were administered through the Prompt Global Strike Capability Development Program Element (PE) - (0604165D8Z), a budget activity five (BA-5) PE. In FY 2022, the Office of the Secretary of Defense established the Joint Hypersonic Technology Development & Transition Program Element (0603183D8Z), a budget activity three (BA-3) PE, to better align the PE and budget activity to the JHTO mission and to congressional intent.

A. Mission Description and Budget Item Justification

This program supports the Department's initiatives to Build Sustainable and Long-Term Advantage, and Build a Resilient Joint Force and Defense Ecosystem.

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; 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Office of the Secretary Of Defense	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603183D8Z *I Joint Hypersonic Technology Development & Transition*

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	51.340	0.000	0.000	0.000
Current President's Budget	0.000	51.178	52.156	0.000	52.156
Total Adjustments	0.000	-0.162	52.156	0.000	52.156
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• FFRDC	-	-0.162	-	-	-
• Adjustments to Budget Year	-	-	50.358	-	50.358
• Economic Assumption	-	-	1.798	-	1.798

Change Summary Explanation

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 Office of the Secretary Of Defense			Date: April 2022
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 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
066: *Joint Hypersonic Transition Office (JHTO)*	0.000	0.000	51.178	52.156	0.000	52.156	50.184	49.142	48.099	49.063	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2020 and FY 2021, the Joint Hypersonics Transition Office (JHTO) was funded via Congressional Add to better synchronize hypersonic technology development and workforce development. Those funds were administered through the Prompt Global Strike Capability Development Program Element (PE) (0604165D8Z), a budget activity five (BA-5) PE. In FY 2022, the Office of the Secretary of Defense established the Joint Hypersonic Technology Development & Transition Program Element (0603183D8Z), a budget activity three (BA-3) to better align the PE and budget activity to the JHTO mission and to 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 2021	FY 2022	FY 2023
Title: University Consortium for Applied Hypersonics (UCAH)	-	22.194	28.333
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 applied 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. In FY 2021, the JHTO brought 17 such three-year projects under contract, leveraging the expertise of 31 universities, 16 companies, and three national laboratories. In FY 2022, the JHTO			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
plans to solicit and award 12 additional three-year and eight one-year projects. The JHTO will continue to use the Consortium's unique combination of academic, industry, and national laboratory expertise as represented by the Consortium's Technical Advisory Board, Industry Advisory Board, National Laboratory Advisory Board, and Outreach and Workforce Development Committee to facilitate cross-disciplinary/cross-organization collaboration and provide advice and assistance to the government hypersonics enterprise. 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. The scholarship program is contingent upon the ability of the Other Transaction Authority agreement to accommodate scholarships. Additionally, the Consortium will host Consortium Fora twice each year, Project Reviews, and participate in career/internship fairs to cross-level information and enhance workforce development. ***FY 2023 Plans:*** FY 2023 base plans for the UCAH are a continuation of the path identified for FY 2022, to include continued execution of research projects through the Consortium with the planned expansion of scope of the projects to further address priorities and gaps identified by the JHTO Hypersonics Science and Technology (S&T) Roadmap. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** UCAH funding increase supports the planned expansion of scope of projects under management within the Consortium.			
Title: Navigation, Guidance and Controls (NGC) Science and Technology Development	-	6.678	4.817
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 can be 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 can be provided upon request. ***FY 2023 Plans:*** Continue prioritized activities from FY 2022. Additional details regarding FY 2022 NGC projects are sensitive and/or classified and can be provided upon request. ***FY 2022 to FY 2023 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Office of the Secretary Of Defense		Date: April 2022
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 2021	FY 2022	FY 2023
Decrease in funding is associated with re-prioritization to focus on near-term technology insertion, reducing priority of NGC efforts.			
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 can 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 propulsion projects are sensitive and/or classified and can be provided upon request. ***FY 2023 Plans:*** Continue prioritized activities from FY 2022. Additional details regarding FY 2022 propulsion projects are sensitive and/or classified and can be provided upon request. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in FY 2023 funding reflects increased priority on, and funding for, FY 2023 UCAH projects.	-	4.310	3.317
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 can 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 can be provided upon request. ***FY 2023 Plans:***	-	2.078	1.817

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Continue prioritized activities from FY 2022. Additional details regarding FY 2022 SEDA projects are sensitive and/or classified and can be provided upon request. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** There is no significant change between FY 2022 and FY 2023.			
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 multi-phase 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 can 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 MSM projects are sensitive and/or classified and can be provided upon request. ***FY 2023 Plans:*** Continue prioritized activities from FY 2022. Additional details regarding FY 2022 MSM projects are sensitive and/or classified and can be provided upon request. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in FY 2023 funding reflects increased priority on, and funding for, FY 2023 UCAH projects.	-	2.278	1.817
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 can be provided upon request. ***FY 2022 Plans:***	-	3.680	4.353

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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 can be provided upon request. ***FY 2023 Plans:*** Continue prioritized activities from FY 2022. Additional details regarding FY 2022 Ordnance projects are sensitive and/or classified and can be provided upon request. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Reflects increased priority on, and funding for, FY 2023 UCAH projects.			
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 projects 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 can 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 can be provided upon request. ***FY 2023 Plans:*** Continue prioritized activities from FY 2022. Additional details regarding FY 2022 aerodynamics and aerothermal projects are sensitive and/or classified and can be provided upon request. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in FY 2023 funding reflects increased priority on, and funding for, FY 2023 UCAH projects.	-	3.335	3.017
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.	-	1.940	0.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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:*** 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 2023 Plans:*** JHTO has no FY 2023 plans associated with THOR-ER. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** JHTO activities associated with THOR-ER complete with FY 2022 funding.			
Title: JHTO Systems Engineering Field Activity at Naval Surface Warfare Center Crane Division (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, 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 2023 Plans:*** Continue to support cross-service systems engineering, technology transition, and workforce development. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** No increase/decrease in funding from FY 2022 to FY 2023.	-	4.685	4.685
Accomplishments/Planned Programs Subtotals	-	51.178	52.156

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A