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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Office of the Secretary Of Defense **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605502D8Z I <i>Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)</i>
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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	122.216	133.393	0.000	0.000	-	0.000	-	-	-	-	-	-
502: <i>SBIR</i>	122.216	133.393	0.000	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

DoD SBIR/STTR programs are designed to provide small, high-tech businesses opportunities to propose innovative ideas and solutions in response to technological challenges posed by the DoD Components that will address existing and emerging national security threats and to develop new military capabilities. The SBIR and STTR programs are critical pathways for the Department to tap the innovation of America's small business community and research institutions to support development of cutting-edge technologies that will increase the readiness, modernization and lethality of the Joint Force.

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	133.393	0.000	0.000	-	0.000
Total Adjustments	133.393	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	133.393	-			

Change Summary Explanation

Funds are allocated from other OSD programs and select Defense Agencies to support the SBIR and STTR programs as defined in 15 U.S.C. 638 (f) and (n).

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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502D8Z / <i>Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)</i>	Project (Number/Name) 502 / SBIR
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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
502: SBIR	122.216	133.393	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The goals of the Office of the Secretary of Defense (OSD) Small Business Innovation Research (SBIR) program is to stimulate technological innovation, increase private sector commercialization of federal research and development (R&D), increase small business participation in federally funded R&D, and foster participation by minority and disadvantaged firms in technological innovation. Leveraging the innovation of small business concerns is an important contributor to the development of the cutting-edge technologies that will generate decisive and sustained U.S. military advantages by increasing the readiness, modernization and lethality of the Joint Force. This program supports high priority projects within the DoD Components, their missions, and the Warfighter.

The goals of the OSD Small Business Technology Transfer (STTR) program is to stimulate a partnership of ideas between small business concerns (SBCs) and research institutions through DoD funded research or research and development (R/R&D). By providing awards to SBCs or cooperative R/R&D efforts with research institutions, DoD supports innovation and economic growth to generate decisive and sustained U.S. military advantages. This program supports high priority projects within the DoD Components, their missions, and the Warfighter.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2020	FY 2021	FY 2022
<p>Title: SBIR</p> <p>Description: The set-aside program for small business supports mission-oriented R&D with the goal of providing advanced capabilities to the Warfighter and commercializing those technologies, resulting in a vibrant small business innovation base supporting economic growth and technology innovation.</p> <p>The SBIR program contributed to the readiness and modernization of the Joint Force and improved operational capabilities through 164 innovative research projects in the following areas:</p> <ul style="list-style-type: none"> • Special Operations: Color Night Vision; Unmanned Aerial Vehicle Durability; Tactical Data Processing, Exploitation and Dissemination; Field Cooling and Storage for Blood and Pharmaceuticals; Standoff Chemical Detector; • Strategic Capabilities: Hypersonic Electro-Optical Seeker; High Acceleration and Hypervelocity Inertial Measurement Unit; High-Resolution/High-Sensitivity Video Seeker; • Logistics: Additive Manufacturing for Improved Survivability and Cost Reduction; Reverse Engineering for Alternative Sources of Supply; Nutrient-Dense Soldier Food Bar Ration; NanoSonic Seals for Supply Chain Management; Tamper Resistant/Anti-Counterfeit Package Labelling; 	114.731	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> • Missile Defense: Ballistic Missile Defense System-Level Simulation Optimization; Distributed Real-Time Information Assurance Management Technologies; Divert and Attitude Control Systems; Debris Modelling; • Defense Advanced Research Projects: Hybrid Off-Road Motorcycle; Tools for Understanding Human Social Systems; Gun-Launched Integrated Guidance, Navigation and Control System; Load Bearing Thermal Protection Structure for Hypersonic Flight; • Advanced Small Arms Ammunition: Techniques for Caseless Ammunition; Active Noise Control for Small Arms Ammunition; Conductive Propellant Additives for Electrical Ignition; Small Arms Neural-Network Automatic Target Classification System; • Cybersecurity: Cyber Deception for Network Defense; Cyber Defense Ranking and Prioritization of Attack-related Events; Cyber Physical Security for Tactical Systems; Network Isolation of Industrial Control Systems; and • Geospatial Intelligence: Machine Learning to Suppress False Alarms in Automated Target Recognizers; Automated Assessment of Urban Environment Degradation for Disaster Relief and Reconstruction. <p>Emerging Results from SBIR Investments in FY 2019 include:</p> <ul style="list-style-type: none"> • DLA COVID-19: Pulsed Plasma Treatment for Rapid In-Between-Patient Disinfection of Non-Invasive Ventilation Systems and Personal Protection Equipment After COVID-19 Use; • DARPA: U.S.-based Secure Embedded L4 Microkernel (seL4) Center of Excellence; Design Tools for Hardware Trojan Detection and Mitigation • U.S. Special Operations Command (SOCOM): Indirect Fire Aiming Device; Handheld or Body-worn Hidden Chamber Detection; Radio Frequency(RF) Optical Front-End Receiver; Spectrum Aware Wideband Interference Rejector; • NGA: Adversarially-learned Labels using Activity and Reward Models; Object Counting using Unified Latent Representation; • SCO: High Velocity Gun-Launched Projectile and Sabot Structures; and • OSD: High Energy Density Spirally Wound Silicon Anode Lithium-ion (Li-ion) Batteries; Spirally-Wound Silicon Anode Cells for Enabling Longer Mission Runtime. <p>The Congressionally directed reorganization of the Office of the Secretary of Defense and the subsequent reprioritization of DoD research will result in the following areas receiving the bulk of future resource commitments:</p> <ul style="list-style-type: none"> • Artificial Intelligence: Improve algorithms, address data quality, optimize human-machine coordination and disrupt adversaries' efforts; • Autonomy: Address teaming of autonomous systems; machine perception, reasoning and intelligence; human and autonomy systems trust and interaction; • Communications: Addressing high-performance, low power embedded processing and developing algorithms for self-configuring, self-healing and resource allocation; • Cyber: Address behavioral issues, develop self-securing networks and develop methodologies to assess cyber effects and consequences; 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> • Directed Energy: Address power scaling, jitter reduction, laser size and weight, adaptive optics, beam propagation and target tracking; • Hypersonics: Address high temperature materials, hypersonic vehicle manufacturing, air breathing propulsion and hypersonic guidance and control systems; • Microelectronics: Develop domestic capabilities through small business investments; • Quantum Sciences: Address quantum clocks and sensors, quantum communications technologies and develop enabling technologies for quantum computing in the areas of cryogenics and photon detection; and • Space: Developing Low Earth Orbit nano-satellites for missile warning, intelligence, surveillance, reconnaissance, navigation and communications. 			
<p>Title: STTR</p> <p>Description: The set-aside program that funds cooperative R/R&D projects for small businesses in partnership with research institutions. The STTR program contributed to the readiness and modernization of the Joint Force and improved operational capabilities through nine innovative research projects in the following areas:</p> <ul style="list-style-type: none"> •Special Operations: Situational Awareness; •Chemical/Biological Defense: Mitigation of Radiation Effects; Electromagnetic Pulse and High Power Microwave Protection Systems; • Defense Advanced Research Projects: Radio Frequency Emitter-Localization for Complex Environments; Portable Lasers; Visual Recognition System; • Additive Manufacturing: Low Cost Phased Array Manufactured by 3D Printing; and • Geospatial Intelligence: Algorithms for Look-down Infrared Target Exploitation. <p>Emerging results from the nine STTR projects are unavailable due to project immaturity.</p> <p>The Congressionally directed reorganization of the Office of the Secretary of Defense and the subsequent reprioritization of DoD research will result in the following areas receiving the bulk of future resource commitments:</p> <ul style="list-style-type: none"> • Artificial Intelligence: Improve algorithms, address data quality, optimize human-machine coordination and disrupt adversaries' efforts; • Autonomy: Address teaming of autonomous systems; machine perception, reasoning and intelligence; human and autonomy systems trust and interaction; • Communications: Addressing high-performance, low power embedded processing and developing algorithms for self-configuring, self-healing and resource allocation; 	17.422	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> • Cyber: Address behavioral issues, develop self-securing networks and develop methodologies to assess cyber effects and consequences; • Directed Energy: Address power scaling, jitter reduction, laser size and weight, adaptive optics, beam propagation and target tracking; • Hypersonics: Address high temperature materials, hypersonic vehicle manufacturing, air breathing propulsion and hypersonic guidance and control systems; • Microelectronics: Develop domestic capabilities through small business investments; • Quantum Sciences: Address quantum clocks and sensors, quantum communications technologies and develop enabling technologies for quantum computing in the areas of cryogenics and photon detection; and • Space: Developing Low Earth Orbit nano-satellites for missile warning, intelligence, surveillance, reconnaissance, navigation and communications. 			
<p>Title: Commercialization Readiness Program</p> <p>Description: Under the authority defined in 15 U.S.C. 638 (y), Commercialization Readiness Program (CRP), OSD established the “OSD Transitions SBIR/STTR Technology (OTST) Program”. The OTST Program is a dynamic, results-oriented response to the Congressional challenge to the DoD in 2006 to deliver more advanced SBIR/STTR technologies faster to our warfighters. The OTST program is an interim technology maturity phase (Phase II) inserted into the SBIR/STTR development process and is structured to be a Technology Pull to meet requirements that address potential and emerging requirements.</p>	1.240	-	-
Accomplishments/Planned Programs Subtotals	133.393	-	-

C. Other Program Funding Summary (\$ in Millions) N/A
Remarks
D. Acquisition Strategy N/A