Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*

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	9.249	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
SBIR-: *Small Business Innovation Research*	0.000	8.109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
STTR-: *Small Business Technology Transfer*	0.000	1.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

New Requirement (Y/N): Yes

This is a new PE created to manage and execute the Space Development Agency (SDA)'s Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding.

A. Mission Description and Budget Item Justification

The goals of the Small Business Innovation Research (SBIR) program are 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 Small Business Technology Transfer (STTR) program are 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, the 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Space Development Agency	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502SDA *I Small Business Innovation Research (SBIR)*

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	0.000	0.000	-	0.000
Current President's Budget	9.249	0.000	0.000	-	0.000
Total Adjustments	9.249	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	9.249	-			

Change Summary Explanation

PE 0605502SDA was created in FY 2021 to house SDA's Congressionally-mandated SBIR/STTR funding to be consistent with other SBIR/STTR PE's across the Department. Funds were transferred from PEs 1206310SDA and 1206410SDA. SBIR/STTR funds were previously executed out of PE 1206310SDA in FY 2020.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502SDA / *Small Business Innovation Research (SBIR)*	Project (Number/Name) SBIR- / *Small Business Innovation Research*	

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
SBIR-: *Small Business Innovation Research*	0.000	8.109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021, effective on October 1, 2022, SDA will be an element of the U.S. Space Force (USSF), and report to Assistant Secretary of the Air Force (ASAF) for Space Acquisition and Integration (ASAF/SA&I) with respect to acquisition decisions and directly to the Chief of Space Operations with respect to requirements decisions, personnel decisions, and any other matter not covered by ASAF/SA&I. This program and funding continue in FY 2023 and out under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.

A. Mission Description and Budget Item Justification

The goals of the Small Business Innovation Research (SBIR) program are 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.

Numerous, capable small businesses are driving down the cost of accessing and utilizing space, which is accelerating the commoditization of space hardware and software. The SDA highly leverages the SBIR program to invest in the research, development, and demonstration of innovative technologies from these small businesses that support the modernization of our national defense space capabilities. These SBIR opportunities have the potential to enhance future tranches and inform the spiral development projects that demonstrate enhanced warfighter capability via proliferated a low Earth orbit architecture. This program has sought investments in the following space-based technology areas : laser communications; novel antenna steering methods; data networking; automated encryption; on-orbit data fusion algorithms; reduced size, weight, and power multi-modal sensors; higher accuracy, low latency information processing; and space-related modeling and simulation testbeds.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Small Business Innovation Research	8.109	0.000	-
Description: This project funds small business research and development activities providing analysis products and enabling technologies and capabilities for the National Defense Space Architecture (NDSA). In FY 2021, SDA issued the following Topic solicitations: Free-Space Optical Communication (FSOC) Technology for Optical Intersatellite Links (OISLs); L-Band Multiband/Interleaved Electronically Scanned Array (ESA) Antenna; Advanced Space Mesh			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*	**Project (Number/Name)** SBIR- / *Small Business Innovation Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Networking; Mesh Network NSA Certifiable Cryptographic Solution; Target Recognition and Acquisition in Complex Environments (TRACE); Compact Passive Polarimetric Microwave Radiometer and Sounder (CP2MRS); and, Commercial Synthetic Aperture Radar and Scatterometry (COSAS). In FY 2021, SDA funded the following efforts: - FSOC for OISLs ($4.995 million): Compact Multi-Link OISL Terminal, V'Ger-T1 10 Gbps OISL Terminal, MOCA One-to-Many OISL - Mesh Network NSA Certifiable Cryptographic Solution ($1.700 million): High Integrity, Performant, Efficient Realization of a Spaceborne Cryptographic Engine - Prototype On-Orbit Experimental Testbed (POET) ($1.391 million) The remaining $0.023 million will be allocated to an additional project associated to FSOC for OISLs. ***FY 2022 Plans:*** The following efforts will be funded with FY 2022 funds: - FSOC for OISLs (estimated funding, $1.727 million): Addressing development of a FSOC solution that demonstrates a next-generation low size, weight, power, and cost (SWAP-C) OISL terminal or enabling technology that will provide advancement in one or more of the following interest areas: 1. Reduction of the SWAP-C per bit 2. Design for manufacturing considerations to support high rate production and assembly, integration, and test processes 3. Demonstration of a path to 100 Gbps for space-to-space FSOC 4. Development of low-cost, mobile or fixed optical ground terminals (OGTs) 5. Demonstration of enhanced space-to-ground and space-to-air FSOC links 6. Development of compact FSOC systems capable of supporting coherent and non-coherent optical links. 7. Demonstration of one-to-many optical terminal links 8. Demonstration of enhanced position, navigation, and timing technology - L-Ba.5nd Multiband/Interleaved ESA Antenna (estimated funding, $0.500 million): Addressing an L-band ESA antenna for use on the Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) class space vehicles (SV) - Advanced Space Mesh Networking (estimated funding, $1.750 million): Addressing preliminary system design for a router/ switch implementation and networking technology capable of forwarding packets/frames in excess of 50Gbps and targeted at current / next-generation space-qualified hardware - TRACE (estimated funding, $1.250 million): Addressing advancement of the capability and utility of algorithms for low-latency recognition and acquisition of tactically relevant targets from overhead persistent infrared (OPIR) systems			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*	**Project (Number/Name)** SBIR- / *Small Business Innovation Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
- CP2MRS (estimated funding, $0.250 million): Addressing development of a preliminary system design for a next-generation compact passive polarimetric microwave radiometer and sounder capable of performing multiple SBEM functions from low earth orbit (LEO) The remaining $20.323 million will be allocated to additional projects that have yet to be selected in Integrated Architecture Technology and other space related topics. Where possible and of value, SDA will partner with other SBIR/STTR funding agencies such as DARPA, AFRL, NRL, ARL, etc. to take advantage of ongoing and/or emerging efforts with broad applicability to accelerate completion and delivery of capability to the warfighter via partnership funding. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This program and funding continue in FY 2023 forward under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.			
Accomplishments/Planned Programs Subtotals	8.109	0.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities include small businesses.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency			Date: April 2022
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502SDA / *Small Business Innovation Research (SBIR)*	Project (Number/Name) STTR- / *Small Business Technology Transfer*	

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
STTR-: *Small Business Technology Transfer*	0.000	1.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for FY 2021, effective on October 1, 2022, SDA will be an element of the U.S. Space Force (USSF), and report to Assistant Secretary of the Air Force (ASAF) for Space Acquisition and Integration (ASAF/SA&I) with respect to acquisition decisions and directly to the Chief of Space Operations with respect to requirements decisions, personnel decisions, and any other matter not covered by ASAF/SA&I. This program and funding continue in FY 2023 and out under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.

A. Mission Description and Budget Item Justification

The goals of the Small Business Technology Transfer (STTR) program are 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.

SDA leverages STTR funds to support the collaborative development of defense space technologies by small businesses partnering with U.S. research institutions. By supporting such partnerships between emerging technology development companies and leading research organizations, SDA will help to foster the growth of a stronger, more integrated space industrial base while addressing our nation's greatest technical challenges in space. These STTR opportunities have the potential to enhance future tranches and inform the overall architecture of spiral development projects to demonstrate warfighter capability via proliferated low Earth orbit.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Small Business Technology Transfer	1.140	0.000	-
Description: This project supports collaborative research and development activities by small businesses and research institutions providing enabling technologies and capabilities for the National Defense Space Architecture (NDSA). In FY 2021, SDA issued the following Topic solicitations: Advanced Space Mesh Networking, Mesh Network NSA Certifiable Cryptographic Solution; Target Recognition and Acquisition in Complex Environments (TRACE); Compact Passive Polarimetric Microwave Radiometer and Sounder (CP2MRS); and, Commercial Synthetic Aperture Radar and Scatterometry (COSAS). In FY 2021, SDA funded the following efforts: - Mesh Network NSA Certifiable Cryptographic Solution ($0.322 million): Secure Communications Architecture Low Earth, Mesh Network NSA Certifiable Cryptographic Solution - TRACE ($0.250 million): Target Recognition and Acquisition in Complex Environments			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Space Development Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502SDA / *Small Business Innovation Research (SBIR)*	**Project (Number/Name)** STTR- / *Small Business Technology Transfer*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
The remaining $0.568 million will be allocated to additional projects that have yet to be selected from the topics listed above and other space related topics. ***FY 2022 Plans:*** In FY 2022, SDA plans to fund projects in the areas of advanced space mesh networking, mesh network NSA certifiable cryptographic solutions, target recognition and acquisition in complex environments, compact passive polarimetric microwave radiometer and sounder, commercial synthetic aperture radar and scatterometry, and other space related topics. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This program and funding continue in FY 2023 forward under Appropriation 3620, Research, Development, Test & Evaluation, Space Force.			
Accomplishments/Planned Programs Subtotals	1.140	0.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Partners for these activities include small businesses teamed with a non-profit research institution.