Vol. 1, Issue 4

Message from the Defense SBIR/STTR Program Office

A few months ago, the future of the SBIR/STTR programs was uncertain. However, thanks to a lot of hard work and support from our leadership, SBIR/STTR colleagues across the Department, and the small business community, the SBIR/STTR programs prevailed and Congress passed the SBIR/STTR Extension Act of 2022 on September 30, 2022.

Our primary focus now turns to the implementation of new requirements mandated in the reauthorization, and continuing to support our small business partners in the midst of these programmatic changes.

Looking forward to a successful FY2023.

Sincerely,

Susan Celis & Matthew Williams

Susan Celis
DoD SBIR/STTR Program Manager
Office of the Under Secretary of Defense
for Research & Engineering

Matthew Williams
Technology Portfolio Manager
Defense SBIR/STTR Program Office

Inside This Issue

THE HILL

The Department worked tirelessly over the past several months to support Congress on its path to reauthorization of the SBIR/STTR programs. Through numerous briefings, informal views, and responses to requests for information, everyone worked hard to ensure that the programs would continue. The successful three-year reauthorization highlights not only the value of the SBIR/STTR programs within the DoD ecosystem, but the importance of preserving the Department's partnerships with American small businesses in the development of innovative technology for the warfighter.

The SBIR/STTR Extension Act of 2022, includes many new requirements that must be implemented such as Foreign Risk Management, Agency Recovery Authority and Ongoing Reporting, Report on Adversarial Military and Foreign Influence in the SBIR and STTR Programs, Program on Innovation Open Topics, Increased Minimum Performance Standards for Experienced Firms, Prohibition Against Writing Solicitation Topics, GAO Study on Multiple Award Winners, and GAO Report on Subcontracting in SBIR and STTR Programs. The full bill text is available at https://www.congress.gov/bill/117th-congress/senate-bill/4900/text. To that end, we remain committed to communicating how these new requirements will impact the Department's SBIR/STTR programs and the small business community through this newsletter, our website and focused announcements from our Listserv.

Sign up for the Listserv at https://www.dodsbirsttr.mil/submissions/ login and select "DSIP Listserv" located under Quick Links.
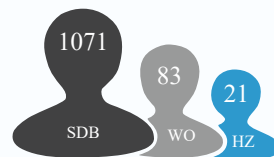
DOD SBIR/STTR PROGRAM STATISTICS

The following data provides a snapshot of end of year statistics to date.
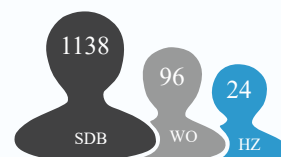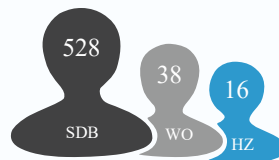
Data: FY22 Awards

Pie chart: STTR 549, SBIR 1367
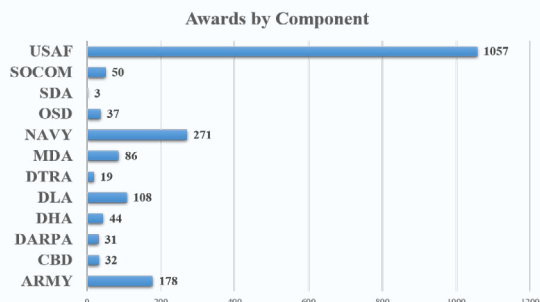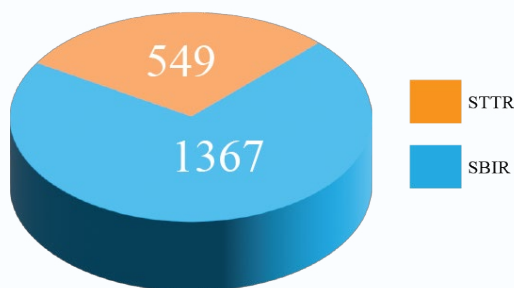
SBIR Phase I proposal submissions by socioeconomic category: SDB 1071, WO 83, HZ 21

SBIR Phase II proposal submissions by socioeconomic category: SDB 1138, WO 96, HZ 24

STTR Phase I proposal submissions by socioeconomic category: SDB 528, WO 38, HZ 16

STTR Phase II proposal submissions by socioeconomic category: SDB 251, WO 19, HZ 6

Awards by Component:
- USAF: 1057
- SOCOM: 50
- SDA: 3
- OSD: 37
- NAVY: 271
- MDA: 86
- DTRA: 19
- DLA: 108
- DHA: 44
- DARPA: 31
- CBD: 32
- ARMY: 178
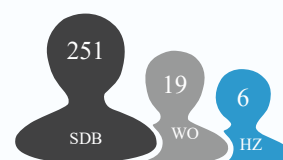
TERMINOLOGY KEY:
SDB = Small Disadvantaged Business
HZ = HUBZONE Historically Underutilized Business Zone
WO = Woman-owned Small Business

Data Source: DSIP as of 10/17/2022

FUNDING OPPORTUNITIES

In the fourth quarter, the DoD Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) programs rele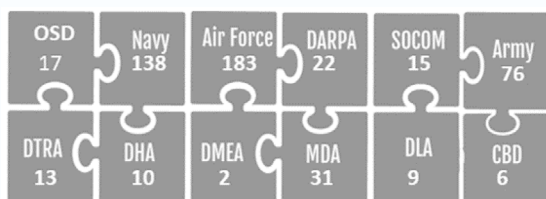ased 79 SBIR topics and 8 STTR topics across two Broad Agency Announcements (BAAs). During this timeframe, approximately 3,200 proposals were submitted across all topics and solicitations. Below is a snapshot of highlights for FY22.

- Proposals Received – 11, 972
- BAAs – 11
- CSOs – 5
- Awards – 1,916
- Topics Posted – 522

OSD 17	Navy 138	Air Force 183	DARPA 22	SOCOM 15	Army 76
DTRA 13	DHA 10	DMEA 2	MDA 31	DLA 9	CBD 6

Total Number of 2022 Topics

For more information on BAAs, subscribe to our Listserv by visiting https://www.dodsbirsttr.mil/submissions/ login and clicking "DSIP Listserv" located under Quick Links.
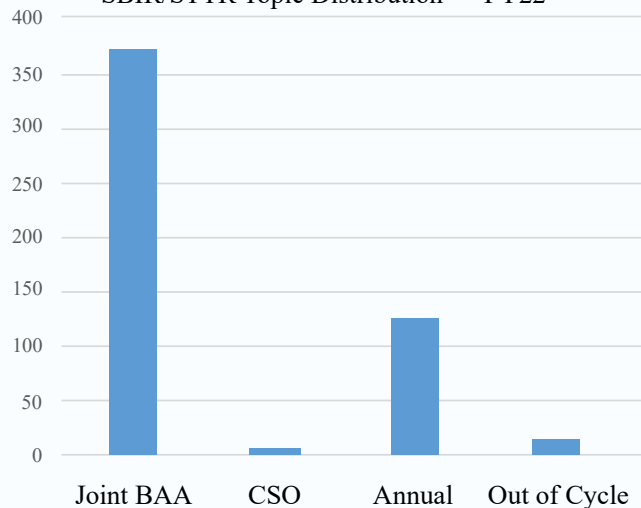
In addition, follow us on social media and visit our website.

Twitter @dodsbir
Facebook, dodsbir
Website www.defensesbirsttr.mil.

SBIR/STTR Topic Distribution — FY22

Joint BAAs: 21.3/C, 22.1/A, 22.2/B
CSOs: x21.S, x22.1, x22.2, x22.4/D
Annual: 22.4/D
Out of Cycle: DARPA SBIR/STTR HR001121S0007, Army 21.4

COMPONENTS CONNECTION

DoD Air Force/Space Force Blue Cyber Initiative Wraps Up Fiscal Year Reaching Thousands of Small Businesses

In FY22, over 11.5K small businesses were reached in a series of cyber security events hosted by the Chief Information Security Officer (CISO), including weekly Ask-Me-Anything webinars covering various topics, monthly boot camps, as well as direct outreach to the CISO. In addition, Blue Cyber was featured at the NAVY Gold Coast event, the Association of Procurement Technical Assistance Centers (APTAC) Conference, the Department of the Air Force Information Technology and Cyberpower (DAFITC) 2022 Conference, and the first official Cybersecurity Maturity Model Certification (CMMC) Conference sponsored by GovExec/Cyber Accreditation Body (AB).
The Department of the Air Force and the Space Force launched the Blue Cyber initiative to provide DoD SBIR/STTR firms with cyber security and information protection requirements and educate small businesses about the necessary state and federal resources for implementation.

Statistics released by the Cyber AB show that small business contractors are still struggling to understand NIST SP 800-171, a special publication providing requirements for protecting controlled unclassified information (CUI), which is called for in the Defense Federal Acquisition Regulation Supplement (DFARS). The inability to comply and protect CUI will affect the success of small businesses as their IT or software will not be eligible for a Phase II or III contract. SBIR/STTR firms need professional help to accomplish/maintain NIST SP 800-171 standards and the Blue Cyber initiative connects them to those resources.

Beginning in FY23, the Department of the Air Force Blue Cyber initiative for SBIR/STTR cybersecurity transitioned to the Department of the Navy Deep Blue Cyber initiative—which will continue outreach with Ask-Me-Anything webinars every Tuesday, monthly boot camps and conference participation.

UPCOMING BLUE CYBER EVENTS:

Nov 22 - Don't trust anyone! Demystifying ZT for contractors. DAU Professor Dr. Paul Shaw talks about Zero Trust and how it is built into NIST SP 800-171.
Walk away understanding Zero Trust and how you can implement Zero Trust Steps in your small business.
https://www.linkedin.com/in/pshawsd/

Nov 29-30 Boot Camp - A Walk Through of the NIST SP 800-171 and Proposed CMMC 2.0 Level 1-3 requirements - 11am - 3pm EDT, both days. Join hundreds of your colleagues, technical experts and the Blue Cyber Director, Kelley Kiernan, who will cover the 110 security requirements in the proposed CMMC Level 2 and NIST SP 800-171, that includes a comprehensive cyber hygiene and intellectual property protection for your small business. Learn what is gained by implementing NIST SP 800-171, a component of the DFARS 7012, and how to evaluate your compliance and how to contract for what you need.

Dec 13 - "So you want to bring IT/Software to the DoD? Working through the RMF/Fast Track ATO Process." Guest Speaker is Fermin Gonzaga, DoD/DAF RMF and DAF Fast Track ATO Subject Matter Expert. Bring your questions and get answers that demystify the process for Small Businesses to bring IT/Apps/SaaS/BOT/AI/ML into the Air Force/Space Force. https://www.linkedin.com/in/ferminmgonzaga/

Dec 19 - Deep Blue Cyber December Boot Camp – Details to come. Register on www.sbir.gov/events starting in late November for more information

Dec 6 - "17 Ways to become more Cyber Secure Today!" The Blue Cyber Director, Kelley Kiernan, will answer your cybersecurity questions and present actions you can take to secure your intellectual property, your employees' personally identifiable information, your financial information and DOD Controlled Unclassified Information.
www.linkedin.com/in/kelley-kiernan-smallbusinesschampion/

Register for Blue Cyber events at: https://t.co/9SYYSgbPSO and feel free to add the Blue Cyber events to your organization's event calendar and/or follow on social media at:

LinkedIn: www.linkedin.com/company/donsbir, Twitter: https://twitter.com/donsbir or Facebook: https://www.facebook.com/DoDSBIR

SUCCESS STORIES

Reality Flights
Support from DoD's SBIR/STTR Program Helps Create Aircrew Virtual Reality Training System

The U.S. Department of Defense (DoD) training for Warfighters has long been a balancing act between traditional live exercises and alternative forms, including simulators. While live training may provide an experience that feels closest to real-life battle situations, it is also time-consuming, costly, dangerous at times and prone to restrictions and complex requirements. Live exercises require dedicated training sites and fixed locations, specialized equipment, and intense logistical prep work. Moreover, even these live training events, due to technological, environmental, regulatory, security, and safety constraints, cannot truly capture battlefield situations.

Since the late 1990s, when immersive virtual, augmented, and mixed reality technologies became the new frontier, DoD has been interested in creating virtual Warfighter training. DoD's specific goal was to develop more effective training solutions to support Warfighter readiness without putting soldiers through dangerous, costly, and time-consuming live exercises.

Binghamton Simulator Company (BSC), a small business in Binghamton, New York (later acquired by Kratos Technology & Training Solutions), was awarded a Small Business Innovation Research (SBIR) contract to develop immersive reality capabilities for DoD. With help from this contract, BSC produced the first U.S. Navy virtual reality device for the MH-60S Aircrew Virtual Environmental Trainer (AVET), in 2011. This device was a forerunner to much of the immersive reality technology within DoD simulation systems we see today.

A stand-alone and reconfigurable, full-motion simulator, the AVET supports aerial gunnery, search and rescue, cargo replenishment training, confined area landings, and emergency procedures training for the MH-60R Knighthawk and the MH-60S Seahawk aircrews.

BSC worked with experts from the Naval Aviation Training Systems and Ranges Program Office (PMA-205), Naval Air Station, Patuxent River, Maryland (PAX River) and the Naval Air Warfare Center, Training Systems Division, Orlando, Florida, to design and create the prototype sent to the fleet for evaluation. Instead of a large visual screen seen in most H-60 trainers, the AVET provides each student with an indi¬vidual headset to view images, known as the helmet-mounted display (HMD) visual system. The HMD system is mounted directly to the student's helmet, providing a 360-degree visual of the aircraft's exterior and interior. Before BSC applied this technology for military training, dome screens were used to project a visual scene. The AVET HMDs provided an immersive environment and removed the need for projection dome systems.

In 2011, the AVET was successfully transitioned into use by the Navy. Since then, the technology has evolved to the next generation of immersive technologies. One of these technologies, known as mixed reality, was adopted by the Air Force in 2020 to provide continuation and mission rehearsal training for aircrew members. ("Mixed reality" refers to the merging of real and virtual worlds to produce new environments and visualizations, where physical and digital objects co-exist and interact in real time.) The AVET simulates three aircrew stations: aerial gunnery operations, hoist operations, and cargo operations. The simulator also replicates two aircraft configurations, two rear doors and two windows with simulated weapons, and one cargo hatch door with a cargo hook.
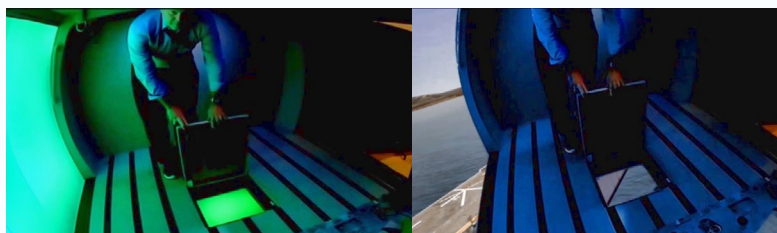
A mixed reality helicopter cockpit shows the environment both with and without the augmented reality.
Photo courtesy of Kratos Defense Solutions

"The instructor can perform as a simulated pilot to assist with multiple student performance initiatives. Using the HMD, crews can rehearse with six different weapon configurations," said Rick McKay, PMA-205 H-60 in-service integrated product team lead. "With the implementation of the AVET into the H-60 training continuum, the platform is on the cutting edge of modeling and simulation."

There are currently two sets of training requirements for Air Force and Navy aircrew members: initial qualification training to qualify new aircrew and recurring training to recertify aircrews that are more experienced. The initial qualification training primarily uses simulation technology along with live training sessions. For periodic training, the technology has now evolved far enough that it is being used to replace some of the live training requirements, saving the government money and resources.

Training in simulators brings several advantages over the more traditional training exercises. It enables the introduction of scenarios that would be too dangerous to include in live training exercises, leading to more comprehensive training and improving overall Warfighter readiness. Simulation training can be completed much faster than traditional training. Moreover, it provides a significant cost savings over relying on live training on an aircraft that cost thousands of dollars per flight hour to operate.

BSC utilized the SBIR program for the entire evolution of the technology, from inception to the finished product. The SBIR Phase I allowed BSC to conduct a feasibility study for the technology and demonstrate a use case for aerial gunnery on Navy rotorcraft platforms. The follow-on SBIR Phase II supported a prototype, and the SBIR Phase III funded manufacturing of the final product.

The mixed reality training environment developed under the SBIR program extends even to air traffic control training.
Photo courtesy of Kratos Defense Solutions

Immersive technology is now impacting nearly every commercial and military sector. This growing industry has benefited immensely from the high-risk/high-reward research and development the SBIR program fosters. Neil Oatley, Kratos' Division Marketing Vice President, explained that the military needs commercial advancements to benefit each other: "The immersive training field is one of the most exciting industries worldwide. DoD needs the commercial advancements of SBIR technologies designed for specific systems or platforms that have special requirements and applications. This results in DoD pushing the envelope on technologies that have military appeal, which in turn incentivizes the commercial market to offer custom capabilities to DoD."

Jose Diaz, Kratos' Senior Vice President for Training Solutions, said, "The SBIR program funding helps companies innovate technologies and products on a much faster timeline. Through the SBIR program, companies develop initial technologies that can keep evolving into a greater capability set for the DoD. For example, if you look at the original SBIR technology that we transitioned into Navy use, you see that we continued to evolve the project from a technology standpoint and expanded it to other DoD branches. Currently, there is a substantial industry for immersive technology. Still, for our company, it started with that first SBIR, and our advanced technology capabilities are based on that initial research and development."

The content in this article does not constitute or imply endorsement by the Department of Defense or the Military Service(s) of the provider or producer of the technology, product, process, or services mentioned.

Small Packages
Contract from the Rapid Innovation Fund Helps Eliminate Tradeoffs in F-35 Circuitry

There are few places where space is more of a premium than in the cramped confines of a fighter aircraft. Therefore, when the U.S. Navy began looking for ways to upgrade the radar system aboard the F-35 Lightning II Joint Strike Fighter Aircraft, the size, weight and power (SWAP) of the circuitry that powered its reconnaissance and targeting systems, was a key factor in upgrading the system.

It is such a complex problem that there is a specific acronym describing the engineering tradeoffs involved, CSWaP, or cost, size, weight, and power. Rising to the challenge, a woman-owned small business in Colorado Springs, Colorado, took advantage of a Rapid Innovation Fund (RIF) contract to develop an integrated circuit board capable of bringing more power to a limited space aboard the F-35. In the process, and building on a lengthy history of contracts from the Department of Defense (DoD) SBIR/STTR programs, they found other use cases as well.

"You're limited to the amount of space you have available, so maximizing the technology and the amount of compute is critical," said Greg Deemer, director of business development for Colorado Engineering, Inc. (CEI), which received the RIF contract in 2016. While an upgraded radar system for the F-35 was of primary concern, according to Deemer, they also "needed a node that could provide multiple types of computing solutions."

Photo of F-35 by Samuel King, 96th Test Wing Public Affairs

High-performance computing solutions typically involve an advanced central processor unit (CPU), a graphics-processing unit (GPU), or a field programmable gate array (FPGA). CEI developed an integrated circuit that can be configured for a wide range of uses because it uses heterogeneous computing, which allows computations to be completed on a wide range of processor types.

CEI has state-of-the-art design and manufacturing experience working with X86 *(a family of instruction set architectures (ISA))*, PowerPC, ARM, GPU, and FPGA processors, and is capable of integrating these types of processors onto a single printed circuit board, or PCB. According to Michael Rodgers, business development engineer for Colorado Engineering, the challenge confronting designers had to do with the complexity of the components and the density require-ments of such an airborne application. Typically, a PCB destined for a cramped space like the ones found aboard the F-35 would be able to squeeze only two or three of these components onto a single board.

Founded in 2003 by Nancy and Larry Scally, Colorado Engineering has a long track record in developing cutting-edge high-performance computing solutions, including radar signal processing for both the military and commercial sectors, as well as meeting the complex networking needs of modern data centers. It has developed more than 50 unique board designs, and participated in a wide range of research funding opportunities targeted at small businesses. The Naval Air Warfare Center Aircraft Division (PAX River), recognizing the company's capabilities, used RIF program funding to award Colorado Engineering a contract to design, fabricate, and test complex boards specific to Navy needs.

Established in the 2011 National Defense Authorization Act (NDAA), the RIF program is intended to help companies, many of which had previously received SBIR/STTR awards, further mature their innovations to the point where they can be included in DoD acquisition programs. For Colorado Engineering, which was awarded SBIR contracts in 2008, 2011, and 2012 to develop technology and embedded processing solutions for military radars and unmanned aerial and ground systems, the RIF program provided an entry point to the F-35 program.

Rising to the challenge presented by the Navy, CEI took state-of-the-art components and supporting archi¬tectures and managed to squeeze them onto one PCB. "Typically, what you'd see is one or two of these pro¬cessing components on a single module," Rodgers said. "We used state-of-the-art design technology and fabri¬cation methods to fit multiple processing components onto a single PCB."

The RIF award also brought CEI into a partnership with one of the prime contractors, which plays a key technology insertion role with the F-35. The partnership helped the company "understand how our technology should be developed to integrate onto the F-35 platform," Deemer said.

Ultimately, the RIF funding and the resulting technology "enables the warfighter to have state-of-the-art, cutting-edge technology at their disposal," Deemer said. "We're going to be able to respond faster, more accurately, and better than our adversaries."

Space is at a premium aboard the F-35. Any change in hardware, such as the radar circuitry spearheaded by Colorado Engineering, has to take into consideration CSWaP—cost, size, weight, and power. Photo courtesy of U.S Air Force/Samuel King

Given that the project solidified CEI's relationship with one of the F-35's prime con¬tractors, it further led to projects and partnerships with other divisions within the company. The complexity of the design also solidified CEI's relationship with Tier 1 sub-contractor processor manufacturers. "They are now coming to us and looking for our support to develop solutions of similar complexity," Deemer said. "It really added to our credibility and our ability to develop these complex solutions and solidified our position as an industry leader in the design and development of high-performance computing."

Colorado Engineering has since been awarded a prime contract of its own for another radar technology refresh and upgrade—this one involving the Navy's SPS-49 long-range air search radar. Since their RIF award in 2016, the company has enjoyed dou¬ble-digit revenue growth and added 20 employees. Deemer credits previous SBIR/STTR contracts, coupled with the RIF award, with helping Colorado Engineering develop the capability to create high-performance embedded computing solutions, which ultimately came to fruition in the F-35 aircraft. "You may start by developing a prototype under the SBIR program and then leverage that technology to develop something under the RIF program," he said. "SBIR and RIF, they go hand in hand, where the RIF is the next step in development. It is a great platform to help fund applications like this one."

OUTREACH EVENTS

DEFENSE TECHCONNECT
INNOVATION SUMMIT & EXPO

DoD SBIR/STTR Program Staff Led Panel, Agency Overview and Hosted Booth with Components at the Defense TechConnect Innovation Summit & Expo

On 27-28 September 2022, DoD SBIR/STTR participated in the Defense TechConnect Innovation Summit and Expo at the Gaylord Conference Center, National Harbor, MD. Ms. Susan Celis, DoD SBIR/STTR Program Manager, presented an overview of the Department's SBIR/STTR programs during the "SBIR/STTR Agency Briefings," where federal agencies with SBIR/STTR programs, "reversed pitched" current and upcoming funding opportunities to conference attendees.

Mr. Matthew Williams, Director, Rapid Innovation Fund (RIF) Program, OUSD (R&E) Technology Portfolio Manager, moderated a panel titled "SBIR: Working with Defense Primes" with representatives from several major Defense Prime contractors, including Boeing, Lockheed Martin, Northrup Grumman and Raytheon where they discussed technology transition and opportunities for "bridging the valley of death."

DoD SBIR/STTR hosted a booth in the main exhibit hall, alongside other Defense SBIR/STTR programs including Army, Navy, Missile Defense Agency (MDA), Defense Advanced Research Agency (DARPA), and United States Special Operations Command (USSOCOM). TechConnect also featured booths from approximately 200 companies and universities. The event offered the Department the opportunity to speak with potential new SBIR/STTR firms and provide information on how to do business with the DoD.

Matthew Williams (standing), moderates panel with leading defense prime corporations.
Photo credit: Ian Roth

UPCOMING EVENTS

DMC 2022
December 5 – 8, 2022
Tampa, Florida
www.dmcmeeting.com

2023 International CES
January 5 – 8, 2023
Las Vegas, NV
www.ces.tech

Surface Navy Association 35th National Symposium
January 10 – 12, 2023
Crystal City, VA
www.navysnaevents.org/national-symposium

DoD SBIR/STTR
https://www.defensesbirsttr.mil

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