DEFENSE SBIR/STTR PROGRAM QUARTERLY REVIEW

Q3 Volume 2 Issue 3

Message from the Defense SBIR/STTR Program Director

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As we approach fiscal year 2024, I have the bittersweet task of announcing my retirement, effective August 25, 2023. For 35 years, I have had the honor and privilege of serving the Department of Defense and the Warfighter. The last 25 years have been dedicated to the SBIR/STTR programs that I believe are the most rewarding programs in the Federal government. These programs allow the smallest of small businesses to respond to National Security challenges with innovative solutions, and if successful, will ultimately increase the technological edge of our Warfighters.

One of the most rewarding parts of my job is participating in the SBIR/STTR outreach events, where I have met hundreds of small companies that were eager to share their innovative ideas with me. However, the highlight of my career has been getting to know and work with wonderful colleagues from across the DoD as well as SBA and other Federal agencies. Our agencies may not execute the programs the same way, but we listen to one another with an open mind, bounce ideas off one another, share best practices and, in the end, come up with workable solutions. We are truly a close-knit community. Managing these programs isn't easy and sometimes requires difficult decisions – potential government shutdowns, continuing resolutions, funding gaps, contracting delays, legislative changes – some for the better, some not – but it has always, without a doubt, been rewarding.

I have so many people on the OSD SBIR/STTR team to thank who have supported me over the last four years – the support contractors who have worked tirelessly to keep all of the balls in the air in this dynamic environment – working together and getting it done. I also thank my colleagues across the Department who have supported me and trusted me to do the right thing(s) for the programs and the small businesses that understand our challenges and know that we are doing the best we can.

Lastly, a very special thank you goes to Matt Williams who has been on this journey with me since the beginning and who gives 1000% to this office, these programs, and to helping small businesses transition. I hand the baton to him without hesitation – effective August 28, 2023, Matt will serve as the Acting Director, Defense SBIR/STTR Program Office.

As I transition into retirement, Matt and I are pleased to welcome Ms. Tina Barnhill, who is serving a 120-day detail as the Associate Director of the Defense SBIR/STTR Program Office. You may already know Tina from her role as the SBIR/STTR Operations Manager at the Missile Defense Agency, and we are thrilled to have her supporting our office.

I have enjoyed a very rewarding career, but I'm ready to begin my next chapter.

Farewell,

Susan Celis

Inside This Issue

The Hill

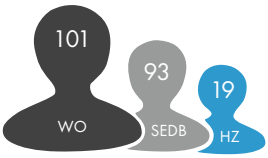
As of June 14th, the Defense Due Diligence program has been implemented across the Department and is being carried out on all current and future SBIR/STTR broad agency announcements (BAAs) and Commercial Solutions Openings (CSOs) as well as all Phase II proposal submissions. Our office will continue to provide oversight of the newly implemented program to ensure that adjustments are made to enhance and improve the foreign risk management process.

On the legislative front, our office has been engaging with Congress on proposed extensions of sunsetting SBIR/STTR pilot programs as the Fiscal Year 2024 National Defense Authorization Act (NDAA) and Consolidated Appropriations Act take shape. These improvements, and others, will aid the SBIR/STTR programs in transitioning innovative technologies to the Warfighter in a timely manner.

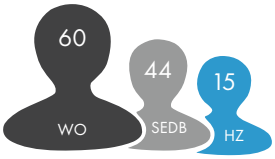
DoD SBIR/STTR Program Statistics

The following data provides a snapshot of program statistics as of July 18, 2023.

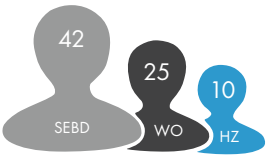
SBIR Phase I proposal submissions by socioeconomic category



SBIR Phase II proposal submissions by socioeconomic category



STTR Phase I proposal submissions by socioeconomic category



STTR Phase II proposal submissions by socioeconomic category

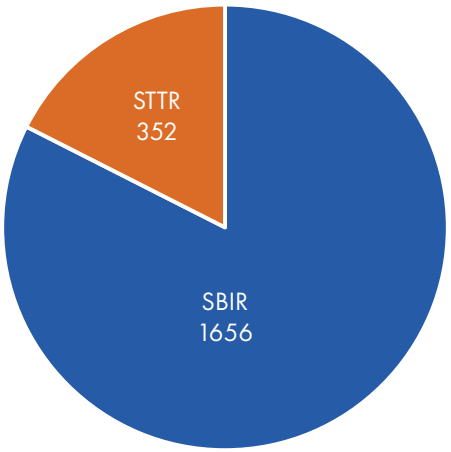
TERMINOLOGY KEY:

SEDB = Socially and Economically Disadvantaged Business

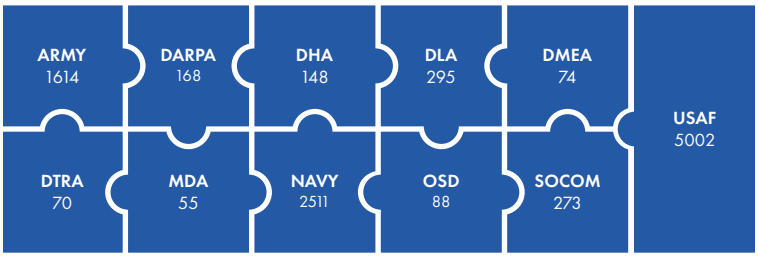
HZ = HUBZONE Historically Underutilized Business Zone

WO = Woman-owned Small Business

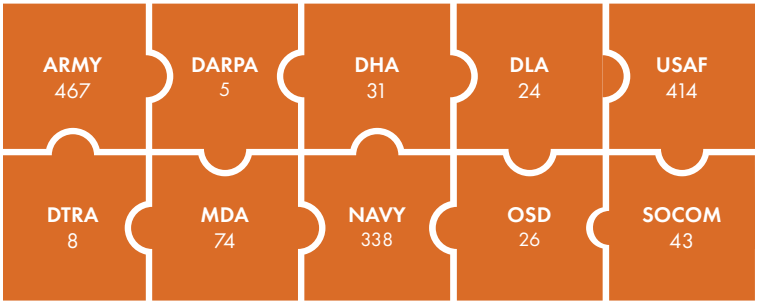
Q3 Awards



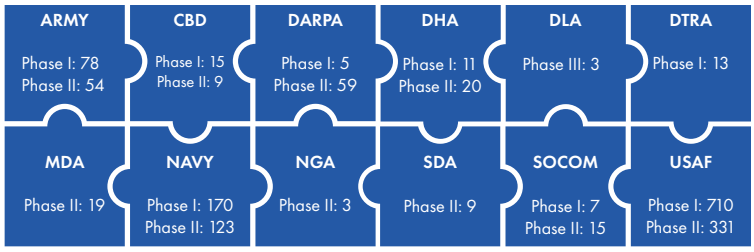
SBIR Proposal Submissions by Component



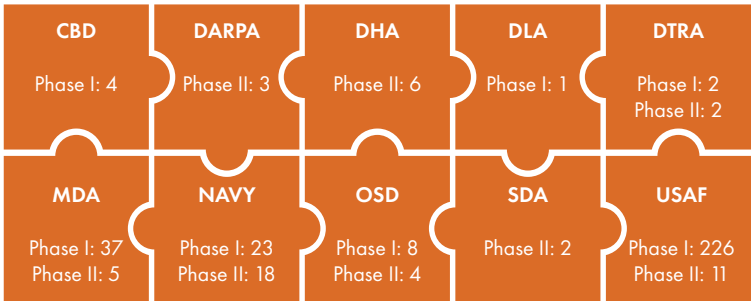
STTR Proposal Submissions by Component



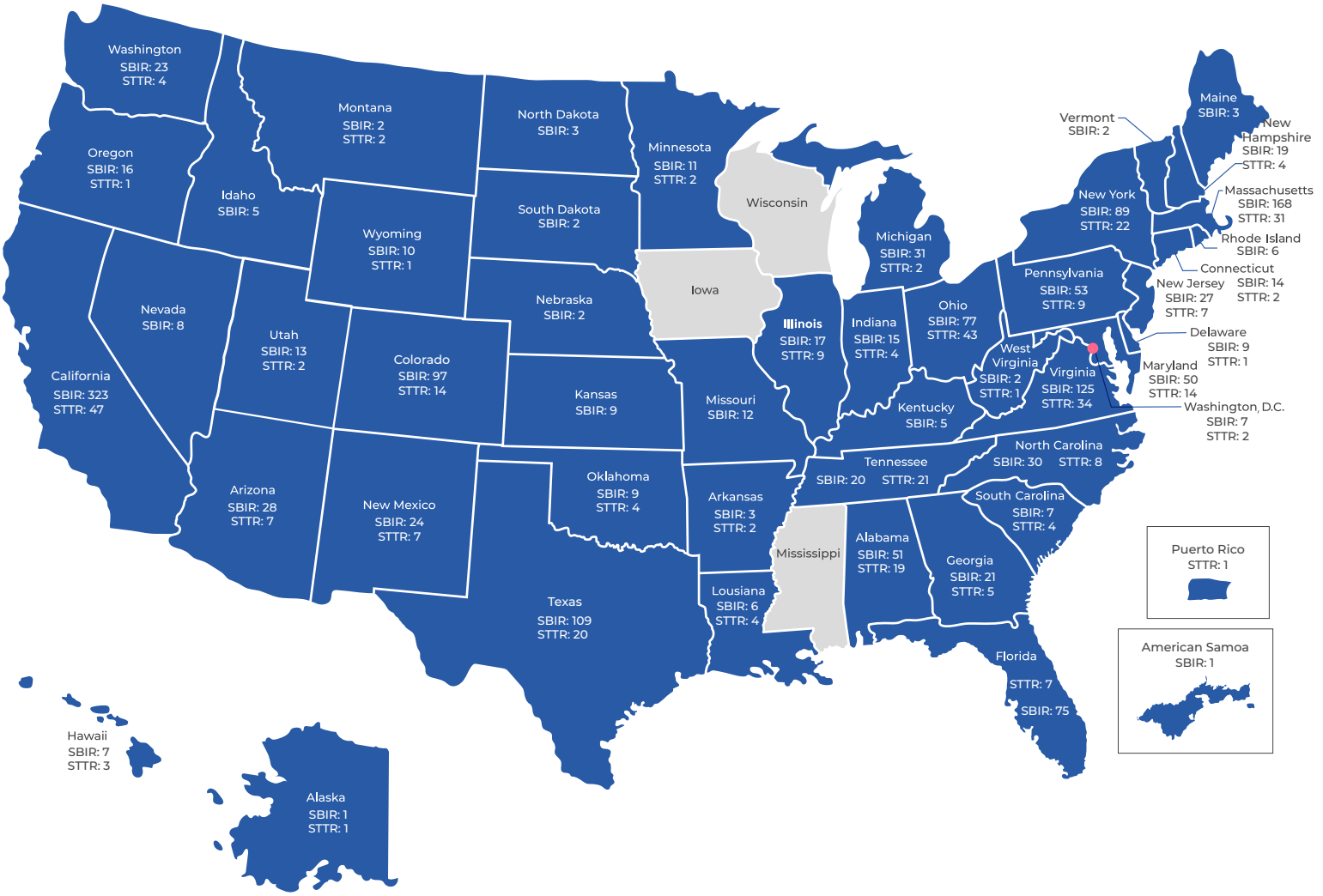
SBIR Awards by Component



STTR Awards by Component



SBIR/STTR Contract Awards by State



Funding Opportunities

In the third quarter, the Defense SBIR/STTR Program Office released approximately 103 Small Business Innovation Research (SBIR) topics and 42 Small Business Technology Transfer (STTR) topics across four Broad Agency Announcements (BAAs) and one Commercial Solutions Opening (CSO). This included topics under the DoD-wide Annual SBIR & STTR BAAs, as well as topics under the DoD 23.2 SBIR & 23.B STTR and the Air Force X23.6 CSO. During this timeframe, approximately 3,200 proposals were submitted across all topics and solicitations.

For a full list of current and upcoming funding opportunities, please visit https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/.

To be notified of new funding opportunities and to receive e-mail updates on the DoD SBIR and STTR Programs, subscribe to our listserv by visiting https://www.dodsbirsttr.mil/submissions/login and clicking "DSIP Listserv" located under Quick Links.

Meet the PM

Dr. Matthew P. Willis
Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology
Arlington, Virginia

Dr. Matt Willis leads the Army's portfolio of private sector engagements through prize competitions and the Army Small Business Innovation Research (SBIR) program, comprising over $275M in annual research and development investments. Previously, Dr. Willis has served as the Army Director for Laboratory Management; Chief for Acquisition at the Joint Chemical Biological Radiological Nuclear Program Analysis and Integration Office; and the Deputy Director for Special Projects in the Office of the Deputy Assistant Secretary of Defense for Research, providing alignment for DoD's S&T investments amongst the Services.

Dr. Willis started his Army career as a Research Chemical Engineer at the U.S. Army Edgewood Chemical Biological Center. Dr. Willis received a BS in Chemical Engineering from Cornell University, an MS and Ph.D. in Chemical Engineering from the University of Illinois Urbana-Champaign and is the author of numerous manuscripts, technical reports, and patents. He has received several awards including the Achievement Medal for Civilian Service in 2014 and 2015.

Components Connection

Army SBIR CATALYST Pilot Offers Five Businesses up to $75M

Five businesses accelerating innovation are at the helm of the Army SBIR CATALYST pilot — a novel program that uses up to $75 million in matching capital from transition partners and technology integrators to tackle Army customer needs. Announced at the October 2022 Association of the United States Army Annual Meeting and Exposition by the Under Secretary of the Army, Hon. Gabe Camarillo, the Army SBIR CATALYST Program is one of the five initiatives incentivizing the Army's collaborative efforts with industry. Launched in February 2023, the Army SBIR CATALYST pilot requested small businesses to submit proposals for participation. While the pilot accepted several small business technology proposals capable of supporting the Army of 2030, it focused on solutions within specific technology ecosystems where small businesses lead in innovation. To ensure the U.S. can overcome any adversary, the Army SBIR CATALYST pilot prioritized ecosystems such as artificial intelligence and machine learning; autonomy; sensors; climate and clean tech; immersive and wearables; and supply-chain logistics.

ANDRO Computational LLC
"DeepSPEC: Artificial Intelligence-Powered Blind Signal Detector and Classifier"
- Technology ecosystem: AI/ML
- Potential transition partner: PEO Intelligence, Electronic Warfare and Sensors (PL Tactical Space Superiority)

Compound Eye Inc.
"VIDAS-SLAM: Undetectable, GPS Denied Mapping and Positioning"
- Technology ecosystem: Autonomy
- Potential transition partner: PEO Ground Combat Systems

EM Photonics Inc.
"Image Analysis Approach for Wind Management"
- Technology ecosystem: Sensors
- Potential transition partner: PEO Soldier (Individual Weapons)

R-Dex Systems, Inc.
"Blue Jay: Strengthening SIGINT Classifiers and Identifying Adversarial Attacks"
- Technology ecosystem: Immersive and Wearables
- Potential transition partner: PEO IEW&S (PD Sensors-Aerial Intelligence)

Solvus Global LLC
"Repair & Restoration of Gun Tubes"
- Technology ecosystem: Contested Logistics and Sustainment
- Potential transition partners: DEVCOM Armaments Center, DEVCOM Army Research Laboratory, and PEO Ground Combat Systems (PM Main Battle Tank Systems)

Army Releases 2022 SBIR|STTR Year in Review

In 2022, the Army Small Business Innovation Research and Small Business Technology Transfer Programs made great strides in connecting nontraditional businesses with Army needs. While the Army SBIR|STTR Programs continued to facilitate industry growth as an important part of the nation's economic landscape, the Army announced key initiatives to support small businesses and to better equip its most essential customer — the U.S. Soldier. To celebrate these accomplishments, the Army invites you to read its 2022 SBIR|STTR Year in Review, www.armysbir.army.mil/wp-content/uploads/2023/06/2022-SBIR-STTR-YIR.pdf.

The report details programmatic milestones such as the release of its first open-topic solicitations; the expansion of the Army SBIR|STTR technology ecosystems; and the launch of the Army SBIR CATALYST Program, xTechPrime Competition and Army Tech Marketplace in 2023.

Army Opens xTechPrime to Large and Small Businesses

On April 25, the U.S. Army xTech Program launched xTechPrime — the program's first competition focused on supporting Army modernization goals through partnerships between technology integrators and small businesses. In October 2022, Hon. Gabe Camarillo, Under Secretary of the Army, announced new strategic initiatives to expand collaboration between small businesses, technology integrators and the Army to bridge the valley of death between development, production and scale. The Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology helms the five strategic initiatives — xTechPrime, Army SBIR CATALYST Program, Army Tech Marketplace, Project VISTA and Army IP Cadre. In accordance with these efforts, the xTechPrime Competition aims to boost small-business innovation and integration across the Army's technology ecosystem by increasing the likelihood of contract awards. Together, small businesses showcase their innovations to a panel of

Army experts for the potential to receive up to $28.5 million in cash prizes and follow-on contracts. Meanwhile, technology integrators provide their expertise while also offering resources to scale technologies and form continued partnerships with small businesses as they integrate solutions into the Army ecosystem.

xTechSearch 7 Competition Offers 10 Winners $2.95M

The U.S. Army xTech Program announced the 10 winners of the seventh iteration of the xTechSearch competition series, the Army's open-topic prize competition focused on transforming concepts into equipment in the hands of our Soldiers.

Sponsored by the Assistant Secretary of the Army for Acquisition, Logistics and Technology, the Army designed the competition to attract small businesses developing technology innovations that can solve critical Army modernization challenges. While xTechSearch 7 utilizes an open-topic solicitation model, key focus areas included advanced materials, artificial intelligence and machine learning technologies. The xTechSearch 7 finals were held at TechConnect World 2023 on June 19-21, 2023, in National Harbor, Md., where finalists pitched their technologies to a live panel of Army technologists, scientists, engineers and acquisition experts. These judges narrowed their selections down to the 10 companies capable of earning a piece of the Army's $2.95 million investment.

Anello Photonics; *Santa Clara, California*
"Warfighter Handheld Optical Gyro GNSS INS for Contested Environments"

Arbor Batteries LLC; *Ann Arbor, Michigan*
"Li-ion Batteries with Improved Charge Rate, Energy Density, and Safety Using 3D Electrodes"

ForSight Technologies dba TeraDAR;
Cambridge, Massachusetts
"High-Resolution Terahertz Sensing for Army Autonomous Operations"

Impressio Tech; *Denver, Colorado*
"Ultra-Energy Absorbing Liquid Crystalline Elastomer Advanced Material and 3D Printing for Warfighter Protection"

Notch Inc.; *Cambridge, Massachusetts*
"Passive and Controllable RF Signature Using Lightweight Metasurfaces for Army Platforms and Equipment"

Protonex LLC dba PNI Sensor;
Santa Rosa, California
"FORT Plus – Zippo-sized APNT Tracker for the Dismounted Soldier for When Nothing Else is Available"

Soar Technology, Inc.; *Ann Arbor, Michigan*
"Centralized Control of Commercial Drones (C3D)"

Talus Ridge; *Raleigh, North Carolina*
"Talus Airflow & Ballistic Support Platform"

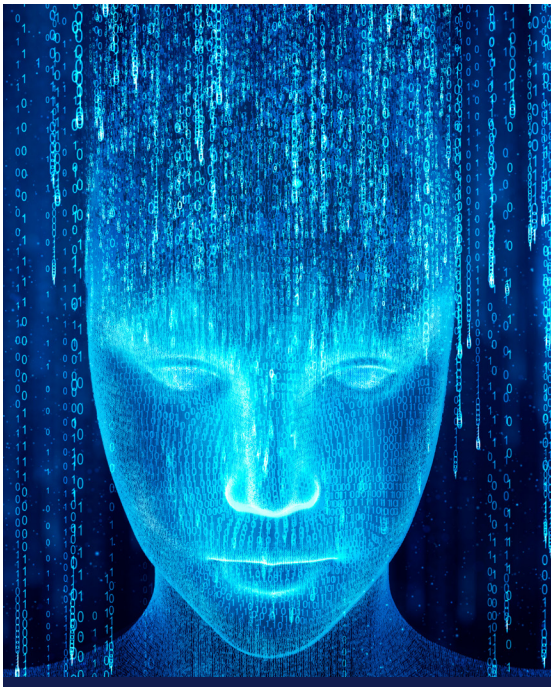
Tyfast Energy Corporation; *San Diego, California*
"Ultimate 6T Battery for Future Army Vehicles"

WingXpand; *St. Louis, Missouri*
"8ft Backpackable Autonomous UAS"

SMART ON THE FLY

The CORE Toolset allows existing systems to add artificial intelligence capabilities

Imagine what you could do with technology that utilized artificial intelligence to make smart decisions. Now imagine that you could take systems you already have and easily make them that smart. With the help of the Army Small Business Innovation Research (SBIR) program, Andy Bevilacqua has been working on creating that future, and has found unexpected bonuses for DoD along the way.



> *"The SBIR program gave us the seed funding necessary to establish ourselves as the leader in AI/machine learning technology in the United States."*
>
> — Andy Bevilacqua

Say your unmanned aerial vehicle (UAV) is on a mission and its communication system jams—what does the UAV do? Choose among its available options or turn around and go home? With artificial intelligence (AI), the UAV can make instantaneous decisions based on surveillance, firing, or combat scenarios. The mission can be saved without a human present. Or let's say your space vehicle is on Mars and about to wreck itself on an obstacle. Would you rather have it phone home and ask what to do or have it make the best choice available to save itself? That said, you still want boundaries. You want a system that can make decisions that will preserve the mission (semi-autonomy), but you don't want it making decisions on its own (emergent behavior) which can lead to unintended consequences.

Smart is hard. Responsiveness to quickly changing situations or needs is one of the major challenges facing anyone creating an AI system. You have to be able to adapt your smart system on the fly, which means your system has to be easy to change, all without an army of AI experts or months of testing time. For example, if you're simulating a battle scenario, you might need to change the strengths or weaknesses of your simulated opponent to match those of a real potential opponent.

The CORE (Cognitive Object Reasoning Engine) toolset now offers an elegant solution. CORE was born when the Army awarded Alabama-based Bevilacqua Research Corporation (BRC) a Small Business Innovation Research (SBIR) contract to add AI to a threat system being used in distributed simulation environments. While the purpose of the initial SBIR work was to add AI to an existing system, a subsequent Army SBIR award enabled BRC to create the CORE toolset that allows AI to be quickly added to any system, in a format that can be validated.

Using the toolset does not require knowing AI or even computer programming—you just create a graphic representation of what you want to do. The toolset then translates that into code, which your existing system can use when it needs to make a decision.

Andy Bevilacqua, CEO of BRC and a cognitive psychophysicist, used his knowledge of how humans think to create a system that makes decisions similar to the way people do. "It can't be any better than the best experts," he said, "but it can be millions of times faster." Like humans, the software can even learn from its own mistakes.

In developing the system, BRC made another crucial discovery. The technology used by the toolset to create AI can also be used to store information—which in turn led to a better way to send information. It's an entirely new communications paradigm that provides secure, lossless compression far better than anything currently available on the market.

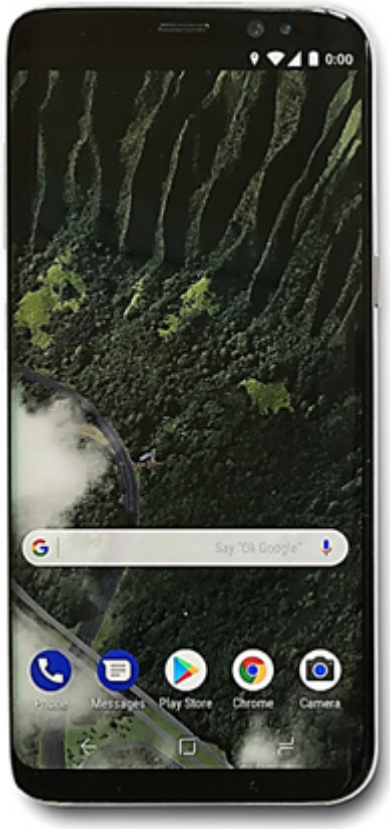
Besides potentially saving DoD millions of dollars in development costs for its new intelligent systems, BRC's CORE toolset is at the center of an emerging market that could be worth millions of dollars to the small company. As Bevilacqua said, "The SBIR program gave us the seed funding necessary to establish ourselves as the leader in AI/machine learning technology in the United States."

BRC has established a new human and machine learning laboratory at their headquarters in Huntsville, Alabama, to be ready for the growth expected from demand for the CORE tools that grew out of the SBIR program. Nearly half of the work BRC does is directly associated with using the CORE toolset to create AI- based products for DoD, including organizations within the Army, Navy, Air Force, and Space and Missile Defense Command. These include human behavioral models, automatic target recognizers, and decision aids, to name a few. The future of DoD is bright— and smart—thanks in no small part to the Army's SBIR program.

Powering the Smartphone Revolution

DARPA contract helped develop the integrated networking chips that still drive today's wireless technology

Innovations supported by a DARPA Small Business Innovation Research (SBIR) topic have vastly increased the capabilities of the ubiquitous smartphone. A single, inexpensive chip in our phones now connects via WiFi, Bluetooth, and GPS, allowing users to browse the Internet, provide driving directions, and beam music to wireless headphones.



"Before, [these technologies] were not in all phones because they added more space and cost," said inventor Ahmadreza "Reza" Rofougaran. "The integrated chip allowed a cost, size, and power advantage." A small business contract funded by the Defense Advanced Research Projects Agency (DARPA) helped commercialize Rofougaran's inventions.

Rofougaran was working on his PhD at UCLA when he became involved in efforts to convert the complex and costly frequency-hopping hardware found in military radios to a single-layer silicon chip. This transformation reduced cost, physical size, and power consumption. It also opened the door for potential consumer applications. "We converted a very expensive solution to a tiny, inexpensive chip," Rofougaran said.

Rofougaran's prior academic advisor, Dr. Henry Samueli, went on to cofound Broadcom, which had until then focused on wired networking solutions. Rofougaran continued his research, consulting as part of a company called Physical Research, Inc. He had his eye on the potential commercialization of wireless technology in small, low-cost, integrated chips made using complementary metal oxide semiconductor (CMOS) technology.

In 1998, as a post-doctoral student, Rofougaran took on a DARPA SBIR topic. The research facilitated by the contract introduced a new wrinkle: adding GPS (Global Positioning System) functionality to a single-layer silicon chip. For Rofougaran, the SBIR contract highlighted the potential value of using the same kind of radio connectivity to communicate with nearby devices. "GPS talks to satellites, but all [wireless communication] has to do a lot of handshaking and frequency hopping," Rofougaran said. "I realized the real application is in short-range communication. The world without wires is going to be huge. I knew if I started this, it would lead to product after product."

Following the DARPA award, Rofougaran and his sister, Maryam, formed their own company, Innovent Systems, which developed a proof-of-concept RF CMOS chip that could wirelessly transmit data to nearby devices. Encouraged by his former advisor, Innovent merged with Broadcom in 2000.

After releasing Broadcom's first single-chip networking technology in 2002, Rofougaran led continued developments in integrated chips which accelerated the explosion of the wireless networking and mobile phone markets during the first decade

of the century. Broadcom's initial integrated chips captured most of the pre-smartphone mobile market, while the company's WiFi technology became nearly universal in laptop computers. The introduction of Apple's iPhone in 2007 ushered in the consumer smartphone era. Within a few years, integrated chips that included WiFi, Bluetooth, FM, and ultimately GPS, made the technology inexpensive enough for smartphones to become nearly universal.

"Basically, they have revolutionized the whole field by completely integrating [these technologies] onto a single system on a chip," Frank Chang, chairman of the UCLA electrical engineering department, told the Orange County Register in 2012.

Today, technology developed by Rofougaran and supported by the SBIR program is found in virtually all smartphones and computers, and Broadcom's annual revenues now exceed $18 billion, of which wireless technology is a significant amount. Samueli has called Rofougaran's contributions "immeasurable".

In 2018, for his work in RF-CMOS and the industrialization of the technology, Rofougaran was awarded the IEEE Circuits and Systems Society Industrial Pioneer Award, which recognizes groundbreaking innovations in circuitry engineering and related disciplines. The 2018 UCLA Engineering Alumnus of the Year award and recognition as both a Broadcom and IEEE fellow are among the many other awards Rofougaran has received for this work.

Noting the complexity and cost of developing new hardware-based technologies, Rofougaran credits the SBIR process with helping support him while developing technology that would ultimately transform an entire industry.

"I came here [to America] for an education. And I wanted to make something big out of my life," Rofougaran said. "DARPA helped me with my education, and the experiences I needed to build up all of these things and bring them to consumer electronics."

Outreach Events

Under Secretary of Defense for Research and Engineering and DoD SBIR/STTR Present at the Missile Defense Agency Technology Maturation Innovation Summit

The Honorable Ms. Heidi Shyu, Under Secretary of Defense for Research and Engineering (USD(R&E)) and Ms. Susan Celis, Director, Defense SBIR/STTR Program Office, participated in the Missile Defense Agency (MDA) Technology Maturation Innovation Summit in Huntsville, AL. The event, held June 5-7, 2023, facilitated interaction of DoD leadership with large and small businesses, universities, and research institutions to discuss MDA Science and Technology (S&T) areas of interest and strategic visions.

Ms. Shyu presented on the 2023 National Defense S&T Strategy, the Accelerate the Procurement and Fielding of Innovative Technologies (APFIT) and Rapid Defense Experimentation Reserve (RDER) Programs, and other specific efforts in support of missile defense.

Ms. Celis briefed on the DoD SBIR/STTR Program and met with small businesses who showcased their successful MDA SBIR/STTR-funded products. In addition, the Defense SBIR/STTR Program Office team supported a booth at the event to field questions about the Defense SBIR/STTR and OSD Transitions SBIR/STTR Technology (OTST) Programs, as well as an upcoming Small Business Data Rights Webinar to inform about SBIR/STTR data protections.

Susan Celis, Director, Defense SBIR/STTR Program, presenting at MD Technology Innovation Summit. Photo credit: Anne Neumann

Defense SBIR/STTR Program Office Hosts Small Business Data Rights Event

On June 14, 2023, Mr. Matthew B. Williams, DoD SBIR/STTR Technology Portfolio Manager, hosted a webinar on data rights specific to the SBIR/STTR Programs. This webinar, requested by Ms. Heidi Shyu, Under Secretary of Defense for Research and Engineering (USD(R&E)), featured Mr. David Metzger, a retired lawyer and former Counsel for a Congressional Small Business Committee Subcommittee, and Mr. Thomas F. Hill, a retired former Chief of the Contracting Office for the Naval Air Systems Command Lakehurst Contract Division. Mr. Metzger and Mr. Hill presented on SBIR/STTR data rights topics from a legal and contracting prospective, respectively. The event targeted Small Business Concerns (SBCs), as well as organizations that collaborate and contract with SBCs, to better inform all parties of the unique restrictions and protections afforded to data from SBIR/STTR research and development efforts. More than 750 participants registered for the webinar, with almost 72% from small businesses, over 21% from Government, and the remaining 7% from large businesses, academia, and federally funded research and development centers and laboratories.

DoD SBIR/STTR Presents at TechConnect World Innovation Conference and Exposition

Members of the Defense SBIR/STTR Program Office participated in the SBIR/STTR Innovation Summit from June 20-21, 2023 at the TechConnect World Innovation Conference and Exposition in National Harbor, MD. Ms. Susan Celis, Defense SBIR/STTR Program Director, along with representatives from the non-DoD SBIR/STTR organizations presented at the Reverse Pitch session. Several DoD Program Managers participated in the DoD Deep Dive Session, and Mr. Matthew B. Williams, DoD SBIR/STTR Technology Portfolio Manager and OSD Transitions SBIR/STTR Technology (OTST) Program Director, moderated a panel with four major DoD contractors (Boeing, Lockheed Martin, Northrup Grumman, Raytheon) in the Working with DoD Primes session.

In addition, Mr. Thomas Hill, Senior Acquisition Expert, contractor support to the Defense SBIR/STTR Program Office moderated a Phase III session with panelists from GSA, TechOpp Consulting Inc. and Innovative Defense Technologies.

The Defense SBIR/STTR team hosted a booth to field questions about the DoD SBIR/STTR and OTST Programs.

SBIR/STTR Agency Pavilion. Photo credit: Anne Neumann

Ms. Susan Celis, Director, Defense SBIR/STTR Program. Photo credit: Anne Neumann

UPCOMING EVENTS

Air, Space and Cyber Conference
September 11 – 13, 2023
Gaylord Convention Center
National Harbor, MD
afa.org

AUSA 2023
Annual Meeting & Exposition
October 9-11, 2023
Washington, DC
https://meetings.ausa.org/annual/index.cfm

Let's Connect

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