

# Air Force SBIR/STTR ADVANTAGE

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Succeed with the U.S. Air Force Small Business Innovation Research and Small Business Technology Transfer Program

FALL 2017

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*“Innovation is a constant process.”*

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Personnel from the 724th Special Tactics Group at Ft Bragg recently tested new navigation technology developed by Echo Ridge, a small business, in partnership with the AFRL Sensors Directorate. (Air Force photo)  
Insert: The hand-held prototype developed by Echo Ridge. (Courtesy photo) See story on page 2.

## VIEWPOINT

### A Noteworthy Change in the Topic Release Process

By Heather Gudorf, Air Force SBIR/STTR Operations Manager

The latest Broad Agency Announcement from the Air Force SBIR/STTR Program signals a major shift.

With the release of the 18.1/18.A BAA, which goes into pre-release on November 29, the number of topics being published by the Air Force should now be fairly consistent throughout all three BAA cycles during the year. Traditionally, the Air Force had most or all of its topics in the first cycle.

Spreading out the topics – to roughly 70 or so, per cycle – has advantages for all of our stakeholders.

The change will provide more stable business opportunities across the entire calendar year. Companies working hard to develop solutions for the Air Force will have a more favorable environment for planning and proposal submissions as well as delivering technology and achieving commercialization.

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**AIR FORCE SBIR/STTR  
PROGRAM OFFICE**

Air Force Research  
Laboratory  
AFRL/SB  
Building 15, Room 225  
1864 4th Street  
Wright-Patterson AFB  
OH 45433

**1-800-222-0336**

e-mail

**afsbirsttr-info@us.af.mil**

web

**www.afsbirsttr.com**

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*This publication provides Air Force, DoD and other government leadership insight into the valuable contributions the SBIR and Small Business Technology Transfer (STTR) programs make to Air Force research and development activities.*

*The goal for the Air Force SBIR/STTR Program is to help small businesses develop and integrate affordable Air Force technologies for the air, space and cyber domains. This is accomplished through AFRL's integrated science and technology mission.*

*The contents of this newsletter are not necessarily the official views of, or endorsed by, the U.S. Government, DoD or Department of the Air Force.*

SPOTLIGHT ON  
**INNOVATION**

**New Technology Shows Promise for Ground Ops to Sidestep GPS Jamming Threats**

By Joe Cogliano

Ground forces may soon be getting a new tool to find their way around hostile territory.

With support from the Air Force Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Program, Virginia-based Echo Ridge LLC is developing a process to overcome GPS-contested environments by using radio frequency signals as a source of positioning information. The solution is designed to fit in a small package that can be carried by ground operators.

GPS has revolutionized warfighting by providing a ubiquitous, all-weather, absolute positioning, navigation, and timing capability that is unrivaled. However, many Department of Defense platforms have become overly dependent on GPS, making the signal a prime target for the enemy.

Under a special type of SBIR/STTR contract – known as a Direct-to-Phase II award, offered by the Air Force Research Laboratory Center for Rapid Innovation – Echo Ridge is working with the AFRL Sensors Directorate to solve this pressing issue.

**BEHIND THE TECHNOLOGY**

Adversaries use GPS jammers to disrupt allied operations as well as to protect themselves from attack by aircraft-launched precision weapons. These jammers deny access to the GPS signal for our ground forces in the region, making it difficult to navigate.

Echo Ridge developed and applied its technology to build a hand-held device that can provide navigation information to ground forces, according to Mark Smearcheck, an electronics engineer with the AFRL Sensors Directorate. The company worked to provide a complementary, backup source of positioning, navigation, and timing by creating an algorithm to aggregate signals of opportunity from various radio frequency sources. The algorithm is used to determine a position based on the time difference of arrival of those signals, which do not operate on the same frequency as GPS.

By receiving and processing various radio frequency sources not designed for navigation purposes, the new system can pinpoint a user's location without relying on GPS. The device connects to a smart phone running the Android Tactical Assault Kit, a device typically carried by Air Force ground operators, to display the navigation solution on a map.

With the process developed by Echo Ridge, the errors do not accumulate over time, as they might with a traditional dead-reckoning approach, so a valid position can be produced indefinitely. Additionally, multiple signal sources are used simultaneously, which provides redundancy and increased immunity to adversarial attack.

"We're measuring signals that have known or discovered geographical locations," said John Carlson, chief technical officer at Echo Ridge. "Because we're able to precisely measure those signals, we can accurately estimate position without error growth over time or distance traveled."

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# Technology Acceleration Program Supports Development for Commercial and Defense Markets

By Tim Anderl

Businesses rise and fall based on their discipline in commercializing technology, but bringing sophisticated products to market is not a purely intuitive process.

To address this, a joint program between the Air Force, the Wright Brothers Institute and The Entrepreneurs Center will provide 30 to 40 SBIR award recipients with a customized support program designed to accelerate the commercialization of technologies into new market spaces. Beginning in October, participants will use proven tools and business models to clearly identify the value inside their innovation.

The program, also known as SBIR TAP is provided by the Air Force SBIR/STTR Program at no cost to participants.

“The success of a research program, and of a small business, is important to the Air Force,” said David Shahady, director of the Air Force SBIR/STTR Program.

According to Shahady, the SBIR TAP assists businesses in assessing the commercial viability of their technology, creating actionable commercialization plans, and preparing them to seek investment capital. The experiences, tools and skills they develop are expected to be valuable well beyond the duration of the program. Plans also will be aligned with existing support services and organizations, so that commercialization assistance will continue after the program ends.

The SBIR TAP will consist of two consecutive phases, with the program concluding in May, 2018.

The first phase is a training component, which is delivered over four consecutive weeks in three locations including Washington, D.C., Dayton, Ohio, and Denver, Colorado. Participants are eligible for a \$2,000 stipend to offset travel costs.

The second phase of the program is opportunity discovery. During this phase, participants will regularly consult with experienced entrepreneurs and subject matter experts to develop plans including technology value propositions, one page opportunity summaries and “pitch decks” to be used in seeking external sources of capital.

For more information about the SBIR TAP program, visit <http://www.sbirtap.com/> or <http://www.afsbirsttr.com>.

## New Testing Technology Removes Barrier to Exploiting Improved Smart Weapons Capabilities

The next generation of smart weapons is a step closer to the warfighters’ arsenal because of a partnership between a Delaware-based small business and the Air Force Research Laboratory.

With support from the Air Force SBIR/STTR Program, Chip Design Systems LLC and its team of experts worked with AFRL’s Munitions Directorate to bridge the gap between newer smart weapon sensors and the ability to fully exploit those improved capabilities.

Smart weapons use infrared imaging seekers to detect and hit targets. In recent years, the infrared scene projectors used for testing infrared imaging seekers have seen only modest improvements in brightness, spatial resolution and frame rate. Meanwhile, those sensors have improved at a much faster rate, so the ability to test them has been severely limited.

The Night Glow Short Wave Infrared LED Image Projector Development – also known as NSLEDS – was intended to demonstrate an infrared scene projector that used the newest micro-infrared light-emitting diode array technology. This concept is similar to the visible LEDs in today’s light bulbs, but producing infrared light images on a high-resolution, micron-size scale.

By offering at least twice the frame rate and higher brightness, with the same image resolution of current micro-resistor based arrays, NSLEDS allows infrared scene projectors to keep up with newer imaging performance. As a result, the Air Force now has a means to test next-generation smart weapons that are able to detect smaller, faster moving targets in increasingly complex backgrounds.

## New Testing Technology

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Chip Design Systems handled the tasks of read-in integrated circuit design, package design and thermal modeling, while leading a team of experts including: The University of Iowa and Firefly Photonics – micro-infrared LED fabrication; ON Semiconductor - CMOS chip fabrication; Teledyne Scientific - hybridization; and The University of Delaware - system and CSE design.

In early 2017, the NSLEDS project delivered a first prototype to Eglin Air Force Base for further technical evaluation and has already logged several hundred hours of operation. This prototype paved the way for Chip Design Systems to receive a contract to create an even higher resolution device for smart weapon testing by the Air Force.



**U.S. AIR FORCE**

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# VIEWPOINT

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Additionally, this is consistent with better business principles by allowing us to be more agile in responding to critical warfighter needs.

By going to a more consistent number of topic throughout the year, we also avoid the issue of releasing BAAs with only a few topics resulting in less attention from small business. Having fewer participants in the second and third BAA cycles of the year means we were less likely to find partners that could provide the best solution to our problems.

SBIR/STTR is touted by the U.S. Small Business Administration as America's Seed Fund, and we are trying harder than ever to think and act more like a traditional venture capital fund.

Innovation is a constant process. By addressing what is known as the "Three R's" – Responsive, Relevant and Revolutionary – the Air Force SBIR/STTR Program and its small businesses partners strive for advancements that support major commands and meet near-term critical needs while filling the pipeline with potential game-changing technologies.

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## New Technology Shows Promise

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Funding provided by the Air Force SBIR/STTR Program allowed Echo Ridge to turn a laboratory concept into a prototype device in a small, low-power package.

Echo Ridge and the AFRL Sensors Directorate recently completed a field test and demonstration at Fort Bragg in North Carolina. The company is working to improve its usability and address ruggedness issues that would position the device for wider use in the field. While still in the development phase for the Air Force, this technology has sparked interest from other potential federal customers.

"The Air Force SBIR/STTR Program really helps take some of the risk out of developing technology like this," Carlson said. "The funding was absolutely critical to our efforts."

## FALL EVENTS

*Conferences, workshops and exhibitions of interest to SBIR/STTR personnel and program participants*

### *SBIR/STTR Innovation Summit*

3-5 October | Tampa, FL

<http://www.defenseinnovation.us/sbir.html>

### *National HubZone Conference*

12-13 October | Chantilly, VA

<http://www.hubzonecouncil.org/clubportal/ClubStatic.cfm?clubID=528&pubmenuoptID=29484>

### *Air Force Small Business Industry Days (hosted by the Air Force Test Center)*

7-9 November | Las Vegas, NV

<https://afconference.brtrc.com/AFSBID/2017AFTC/>