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Air Force SBIR Advantage

Offering a brief look at the vital research and development contributions made by the Small Business Innovation Research (SBIR) Program in direct support of the Air Force mission.

2nd Quarter 2006

Air Force SBIR Update

by Stephen Guilfoos, Air Force SBIR Program Manager

STTR – A Closer Look

The Small Business Technology Research (STTR) Program

Over the past year we have been focusing on the Small Business Innovation Research Program (SBIR). Whereas this program is certainly important, we wanted to refocus for a minute on STTR.

STTR plays a vitally important role in the Air Force. Because STTR public law 102-564 (codified at 15 U.S.C. 638) requires the small business to team with non-profit research institutions, the Air Force chose to focus its program on basic research.

AFOSR

Within the Air Force Research Laboratory (AFRL), basic research is managed by the Air Force Office of Scientific Research (AFOSR). According to their website, http://www.afosr.af.mil/:

SBIR SPOTLIGHT

Impact Technologies, LLC, Rochester, NY

Impact Technologies develops and fields software and algorithms for Prognostic and Health Management (PHM) and Condition Based Maintenance (CBM) solutions for a number of critical military systems and vehicles. Their systems are used to assess, detect and predict failure in both electrical and mechanical systems. Formed in April 1999, the company has grown from five people to 88 over the past seven years. Over that same period the company workload has shifted from 70-80% SBIR work to about 50% today. The company's projected revenue this year is approximately $12 million.

"AFOSR's mission is to manage the discovery and initial development of the leading edge of research while identifying potential new concepts and opportunities that will serve the Air Force in the future. To accomplish

continued on page 4...

SBIR Tech Issues

Tech Issues is intended for personnel directly involved in the operation and support of the AF SBIR program.

SBIR/STTR Web Mall

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Earlier SBIR Tech Issues articles highlighted Small Business Area features relating to firm profiles, summary reports, and impact/transition stories. Listed below are some more entryways behind this password-controlled area.

Proposal Status/Debriefing
For access: (www.sbirsttrmall.com/Firm/login.aspx …then, a login password is required)

The Proposal Status/Debriefing area provides a listing of SBIR/STTR proposal submissions against Air Force topics within the last 12 months. Small businesses can track the progress of their proposal submissions through this link. Status update intervals are: Proposals Received, Evaluation Started, Evaluation Completed, Selection Started, and Selection Completed. A date will be displayed in the appropriate column indicating when this stage has been completed. Once the "Selection Completed" date is visible, it could still be a few weeks (or more) before you are contacted by the Air Force with a notification of selection or non-selection. If no date is present, the proposal submission has not been completed at that particular stage. Small businesses are encouraged to check this site often as it is updated in real-time and provides the most up-to-date information available for all proposal submissions.

Phase II/Fast Track Information
For access: (www.sbirsttrmall.com/Firm/login.aspx …then, a login password is required)

The Phase II/Fast Track Information area provides Fast Track guidance and instructions specific to the Air Force technology directorates or centers that your company is interested in submitting a Fast Track application. The Fast Track process is applicable to selected SBIR/STTR projects that attract outside investors who will match Phase II funding, in cash, contingent on the project's selection for Phase II award. In addition to the guidance and instructions, a link is provided to the DoD submission site where the Phase II proposal and Fast Track application are submitted, as well as additional guidelines provided by DoD. Also, detailed instructions on the Air Force Phase II program and notification of the opportunity to submit a Fast Track application are forwarded with all AF Phase I selection e-mail notifications.

SBIR SPOTLIGHT

Caviton, Inc., Champaign, IL

Exhaust composition can indicate performance and health of the engine, as well as quantifying pollutants that may be generated by the engine. Using SBIR contracts, Caviton developed a novel sensor for measuring jet engine exhaust. Additionally, this work has lead to chemical warfare agent detection work for DARPA, emissions monitoring work for the U.S. Environmental Protection Agency, and process control applications for the Department of Energy. These low-cost sensors will have a myriad of future applications where small-size, rugged design, and sensitive detection is required.

Bevilacqua Research Corporation, Huntsville, AL

Bevilacqua Research Corporation (BRC) is a Native American, Woman-Owned Small Disadvantaged Business [SDB 8(a)] enterprise located in Huntsville, Alabama. Using SBIR contracts, the company developed an innovative software program that provides Cognitive Battle Damage Assessment (CBDA) tools for Nuclear and Chemical (NBC) Threat Data Analysis. This technology automates the military combat assessment process using cognitive processing schemes. Bevilacqua's technology will serve the Air Force and the rest of the Department of Defense (DoD) as a contributor to the Joint Targeting Toolbox (JTT) being developed under the auspices of the Office of the Secretary of Defense (OSD). This program represents the first time a BRC SBIR product has been transitioned into an operational DoD system for use by soldiers in the field. As a part of the JTT program product development team Bevilacqua hopes to realize increased sales as a result for many years to come.

AF SBIR Feature Spotlight

Sensors System Detects Combustion Instability During Engine Testing

Air Force Requirements
Fighter aircraft operating with afterburners (augmentors) can experience combustion instabilities. The instabilities (oscillations) can be a major source of acoustic waves. If the phase relationship is suitable, the acoustic waves gain energy from interaction with the ongoing combustion. This can cause damage to the aircraft if the resonant amplitude levels are excessive. Waves in the frequency range of 20-150 cycles per second (Hertz) are generally referred to as "rumble," whereas higher frequency oscillations, up to and above 600 Hertz, are referred to as "screech." The current method of controlling the potentially devastating combustion instabilities, after they have begun, is to reduce the fuel flow to the augmentor.

The Air Force wanted to develop a simple, rugged, low cost sensor system that could detect combustion instability at very low levels during development testing of augmentors in altitude-simulating facilities of the Arnold Engineering Development Center (AEDC) at Arnold Air Force Base. In part, the Air Force wanted real-time feedback for combustion control. A non-intrusive stand-alone detection system was preferred over an on-the-augmentor sensor so that the new sensing capability would be available for every augmentor test period without requiring special hardware or bore-holes for mounting.

SBIR Technology
Using support from the Air Force SBIR program, Advanced Fuel Research, Inc. (AFR) has been developing and demonstrating the non-contact, passive optical approach to measuring rumble and screech at the exhaust plane of military engine platforms undergoing testing at AEDC.

Air Force Technology Payoff
The new sensor system provides improved event-detection capability for benefit to advanced engine/augmentor development programs such as F135, F119 and VAATE/IHPTET. Improved capability expedites advanced engine development, bringing new military aerospace capabilities for national security to bear sooner by the Air Force and other branches of the Department of Defense.

AFR
Advanced Fuel Research, Inc.

Company Impact
Opportunities provided by the Air Force SBIR program led to Advanced Fuel Research's (AFR) collaboration with two U.S. manufacturers of gas turbine engines, one a major supplier of aircraft engines to the Department of Defense, and the other a major, world-wide supplier of land-based engines for electric power generation. AFR anticipates providing both markets with sensor products. According to AFR these SBIR collaborations provided significant insights for future product development. James Markham, CEO for Advanced Fuels Research said, "Afterburners are unique to fighter aircraft, so to benefit our vision into the private sector the Air Force SBIR at AEDC supported our demonstrations on non-afterburner engines. The character and progressiveness of the Air Force SBIR at AEDC is highly regarded."

- Fighter aircraft operating with afterburners can experience combustion instabilities that can damage the aircraft
- Non-contact, passive optical sensor system developed to detect combustion instability at low levels during engine testing
- New system will provide improved testing capabilities to advanced engine/augmentor development programs like the F119 and VAATE/IHPTET

SBIR Topic Number:
AF00-298

Title:
Jet Engine Afterburner Combustion Instability Sensor System

Contract Number:
F40600-01-C-0014

Company Name:
Advanced Fuel Research (AFR), Inc.,
East Hartford, CT

Technical Project Office:
Arnold Engineering Development Center (AEDC), Arnold AFB, TN

Transition Office:
AEDC, Arnold AFB, TN

Continued from front page...

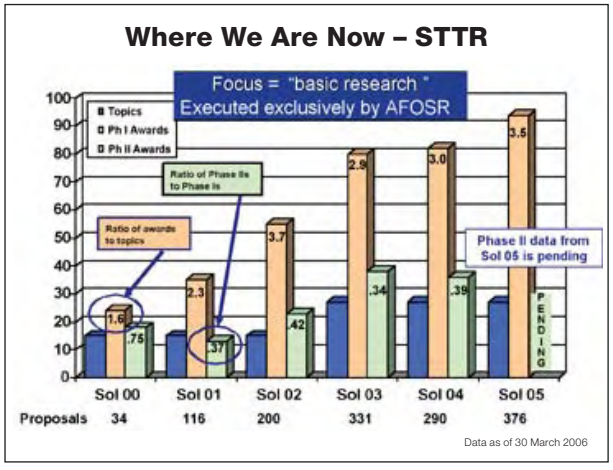
this role, AFOSR focuses the basic research community (government, academia and industry), including numerous Nobel Laureates, on the vital task of supporting Air Force warfighter requirements. Basic research provides the essential foundation for technology development and systems acquisition."

Basic Research

The Air Force investment in basic research is focused primarily on maintaining a critical scientific foundation that facilitates long-term technical opportunities. While some research work leads to results that are quickly transferred to Air Force systems, most basic research is fundamental by nature, and it may take years to be incorporated in an application.

We believe AFOSR's mission uniquely qualifies them to manage our STTR program. Their extensive work with the academic community and their world-class status in research combine to provide the Air Force the pre-eminent mixture that makes STTR as successful as it is.

By the time you read this issue of *Advantage,* the FY 2006 STTR solicitation for proposals will have closed. We should have received approximately 400 proposals against our 35 topics *(see the "Where We Are Now – STTR" chart at the bottom of the previous column).* Because of the nature of basic research, we anticipate awarding, on average, up to three Phase I awards per topic. This allows the Air Force to evaluate multiple approaches and to down select the most promising for Phase II awards.



Process and Program Improvements

The Air Force is in the midst of identifying processes and program improvements for both SBIR and STTR. If you are a small business or represent small businesses and you have ideas on how we can improve any aspect of the Air Force SBIR or STTR programs, we want to hear from you.

This is NOT an alternative way of submitting proposals for SBIR/STTR funding. This is our attempt at serving you better in the way we manage and execute the SBIR/STTR programs. All ideas will be considered and we will incorporate the best ideas. We are looking for methods and processes that reduce workload (yours and ours). Will more solicitations make sense? Will fewer topics with more awards be better? Should we increase our Phase II dollar amounts even if it means fewer companies receiving awards? How can we streamline the summary report delivery and approval to publish? How can we modify the shopping mall to better serve your needs?

E-mail your ideas to: AFSBIRProgram@brtrc.com and use "Improvement Ideas" in the subject line.

U.S. AIR FORCE

Air Force Research Laboratory | AFRL

Science and Technology for Tomorrow's Air and Space Force

Air Force SBIR Advantage

Air Force SBIR Program
AFRL/XPTT
2275 D Street
Wright-Patterson AFB OH 45433-7226

Comm: (800) 222-0336
Fax: (937) 255-2329
e-mail: afrl.xptt.dl.sbir.hq@wpafb.af.mil
www.sbirsttrmall.com

The goal of the Air Force SBIR Program is to serve the technology needs of Air Force warfighters. It accomplishes its mission as part of the Air Force Research Laboratory's (AFRL) integrated research and development (R&D) team. AFRL's mission is leading the discovery, development, and integration of affordable warfighting technologies for our air & space forces.

SBIR Advantage is published quarterly by the Air Force SBIR Program office. This publication offers an overview of AF SBIR issues and information. The purpose of *SBIR Advantage* is to provide Air Force, DoD, and other government leadership with additional insight into the vital contributions made by the SBIR program to Air Force R&D.

SBIR Advantage is available online at: **www.sbirsttrmall.com**