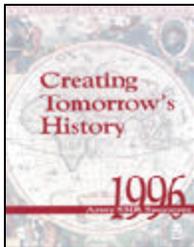


# U.S. ARMY SBIR Commercialization 2000





Our Nation's 5.5 million small business employers are indispensable to America's economic strength and success. Small business owners create 80 percent of the new jobs in our economy. Last year, they generated 51 percent of our Nation's gross domestic product.



In America's Army, small business is big business. Last year, the Army awarded nearly \$29 billion to all businesses. Of that amount, small businesses received more than 27 percent. The Army consistently meets or exceeds every small business category goal assigned us by the Department of Defense.

We are very proud of our success with the Small Business Innovation Research (SBIR) Program. As our Nation's largest source of early-stage technology financing, this billion-dollar program enables hundreds of small businesses to move ideas from drawing boards to the marketplace. Through SBIR and other similar programs, we now know that the best ideas don't necessarily come from the labs of large corporations or even our government labs. Most often, innovative technologies are invented by creative individuals at small, entrepreneurial companies.

The future readiness and effectiveness of our armed forces will be determined by our investment in relevant technologies. We know that tomorrow's battlespace will be different than any we've encountered. We must make sure that tomorrow's warfighters are prepared to meet future challenges. Without the expertise and dedication of America's small business community, we will not be able to get the job done.

The Honorable Paul J. Hoyer  
Assistant Secretary of the Army  
(Acquisition, Logistics and Technology)

*Excerpt from the 2000 U.S. Army Phase II Quality Awards Ceremony  
August 22, 2000*

# Army SBIR Pro

**A**rmy scientists and engineers develop SBIR solicitation topics that address current and anticipated warfighting technology needs. While DoD publishes two solicitations annually, the Army participates only in the second, or spring solicitation. Small businesses enter the SBIR process by submitting concepts in the form of Phase I proposals against these topics.

Successful SBIR projects move through three phases. As already mentioned, Phase I is the entry point where a company proves the feasibility of its concept in six months for up to \$70,000. An option for up to \$50,000 funds interim Phase I-Phase II activities if the project is selected to receive a Phase II award. Phase II is a substantial R&D effort, up to \$730,000 over two years, which results in a dual-use technology, product, or service. SBIR is very competitive – about one in ten Phase I and one in three Phase II proposals are selected for award.

Phase III, the commercialization phase, is the goal of every SBIR effort. In Phase III, the successful company markets its dual-use product or service either to the Government, the private sector, or both!

The Army is proud to present to you the following SBIR success stories. They describe some of the benefits that the Army, the small business community, and our nation have received through this dynamic program.

gram



- ◆ \$350,000 in revenues for ground based systems
- ◆ \$580,000 in contracts for Navy shipboard systems
- ◆ \$4M in long term contracts with Maritime Telecommunications Network, Inc. for commercial shipboard systems
- ◆ Two Patents Pending

Austin Info Systems, Inc., Austin, Texas  
Sponsored by the U.S. Army Communications-Electronics Command Research, Development and Engineering Center



**P**owerful, uninterrupted communications are vital for effective command and control. Traditional multi-band antennas require multiple antenna feeds that must be mechanically changed on the reflector system to change bands. This process often requires antenna refocusing, which reduces reliability and the life cycle of the antenna, and can also require special operator expertise and training. This inevitably translates into communications down-time. Austin Info Systems, Inc. (AIS) has developed a single-feed technology that operates in multiple bands, eliminating the problems associated with multi-band, multi-feed systems.

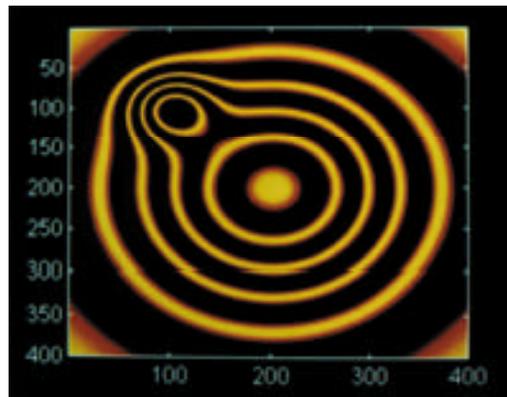
In addition, AIS has also developed an RF Lens technique to shape the beam of the feed for any reflector system. This innovative technology allows satellite terminals to operate in multiple bands without any mechanical changes or re-focusing of the feed. It allows for simultaneous operation in multiple bands, which is a requirement for Wideband Gapfiller Satellite terminals.

The technology is applicable to all uses of communication equipment, particularly maritime applications, where it is impractical and hazardous to climb up the mast of the ship to change bands.

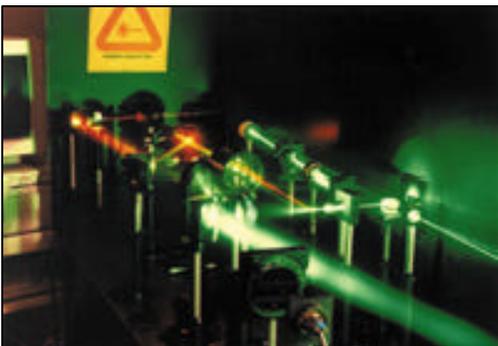
Physical Optics Corporation, Torrance, CA  
Sponsored by the U.S. Army Research Office

- ◆ \$90,000 in sales to date
- ◆ \$525,000 in external funding
- ◆ Customers include Holonix Corporation, Kulicke & Soffa Industries
- ◆ Tremendous market potential for wafer inspection in the rapidly growing semiconductor industry
- ◆ Greatly enhanced aircraft safety

**T**o detect defects in military and commercial composite materials, Physical Optics Corporation (POC) has developed a new holographic nondestructive evaluation (HNDE) system, based on holography autonomous neural network software and fast laser scanning. The HNDE system works by illuminating an object with a laser. The object's surface scatters the laser light, which is recorded in a double-exposure hologram which precisely reveals any surface deformation. Stimulating the back of the object - using a hot air gun, high power lamp, or an infrared laser pulse - creates time-varying material



deformations which in turn cause surface deformations in accordance with internal material structures. The holographic sensor captures these surface deformations and then reconstructs them on a computer monitor. This method can aid detection of internal defects that are invisible to current inspection methods. The HNDE system can find during and after manufacturing in such critical items as aircraft components, bridges, and nuclear power plant walls.



## Buried Landmine Detection

- ◆ \$800,000 contract with U.S. Army Communications-Electronics Command
- ◆ \$100,000 in development funds from the University of Mississippi

Planning Systems, Inc., McLean, VA  
Sponsored by the U.S. Army Communications-Electronics Command Research, Development and Engineering Center

**U**nexploded Ordnance (UXO) detection and clearance are difficult, dangerous, and complex technical problems. Countermine operations – detecting and dealing with landmines in a combat environment – continues to be an important force protection issue for the Army in peacetime, in combat operations, and in operations other than war (OOTW). In order to accurately detect buried mines in “noisy” electronic backgrounds,

Planning Systems, Inc. developed the Ground Penetrating Synthetic Aperture Radar (GPSAR). The system operates over the frequency band of 500 MHz to 1.8 GHz. GPSAR uses multiple transmit-and-receive antennas to acquire stepped-frequency data at 26 cross-track focal locations, each separated by 1.38 inches. The system uses multiple radar channels and high-speed radio frequency techniques to accelerate the data acquisition process, thereby increasing the system detection rate. Synthetic aperture and near-field beam-forming techniques also reduce clutter. GPSAR is optimized for mine detection but can also detect deeper buried objects. Tests against actual mines on U.S. Army ranges indicate that the system can detect plastic and metallic anti-tank mines as well as anti-personnel mines. The system has great potential in Humanitarian Demining – the detection and neutralization of UXO scattered indiscriminately by warring parties in many nations of the world, as well as the clearance of active DoD test ranges and the environmental remediation of closed DoD ranges.



Cybernet Systems Corporation, Ann Arbor, MI  
Sponsored by the U.S. Army Test and Evaluation Command

- ◆ Over 15,000 units sold
- ◆ \$900,000 in sales to date
- ◆ Patent Pending

**C** ybernet Systems Corporation has developed an Internet Appliance software product called NetMAX™. The key networking components of NetMAX™ were originally developed to capture and share radio and video data and to control robotic devices attached to a network. In its commercial form, NetMAX™ is a comprehensive product line which allows users to secure, connect, and share their networks through a variety of customizable features. These software solutions, based on the Linux operating system, dramatically simplify installation, configuration, and management while delivering the well-known power and reliability of Linux.



The NetMAX™ server software products leverage browser-based interfaces, tight integration, and custom intelligent configurations, while enabling installation of a functional server in under 15 minutes.

## PHASE III IMPACT

# Remote Sensing Using a Laser Vibrometer

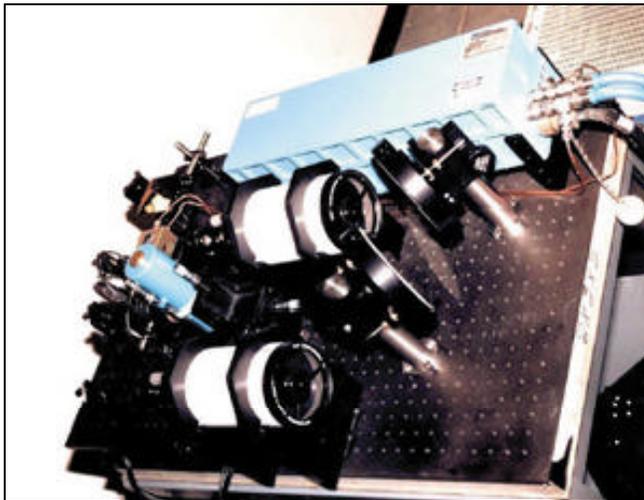
- ◆ 20 systems sold to date
- ◆ \$300,000 in sales to date
- ◆ \$100,000 in commercial contract work
- ◆ \$5,000,000 in contracts with the Air Force Remote Sensing Program

MetroLaser, Irvine, CA  
Sponsored by the U.S. Army Missile Research, Development and Engineering Center

**T**he Laser Doppler Vibrometer, developed by MetroLaser, measures the velocity and vibration frequency of objects in the vicinity of a concealed helicopter. The system, which is based on a continuous wave CO<sub>2</sub> laser, allows measurement of the vibration of remote objects by illuminating the objects with the laser and comparing the radiated and reflected light. In various field



experiments, frequencies from relatively few Hz to hundreds of Hz were measured for hovering helicopters and for ground vehicles such as tanks. This system has also been used in monitoring the vibration patterns of bridge supporting columns as well as for vibration studies of hearing aides, musical instruments, and golf clubs. The latest application for this system is in buried landmine detection by exciting the ground with sound waves and subsequently measuring the velocity of the ground with the laser vibrometer. Anomalies denote buried landmine locations.



# Force Feedback Hand Controller

PHASE III  
IMPACT

Cybernet Systems Corporation, Ann Arbor, MI  
Sponsored by the U.S. Army Tank-Automotive Research, Development and Engineering Center

- ◆ Over \$500,000 in sales to date
- ◆ Seven patents issued
- ◆ Commercial customers include Ford, McDonnell Douglas, BMW, INCO Limited, and S.A. Sodetek

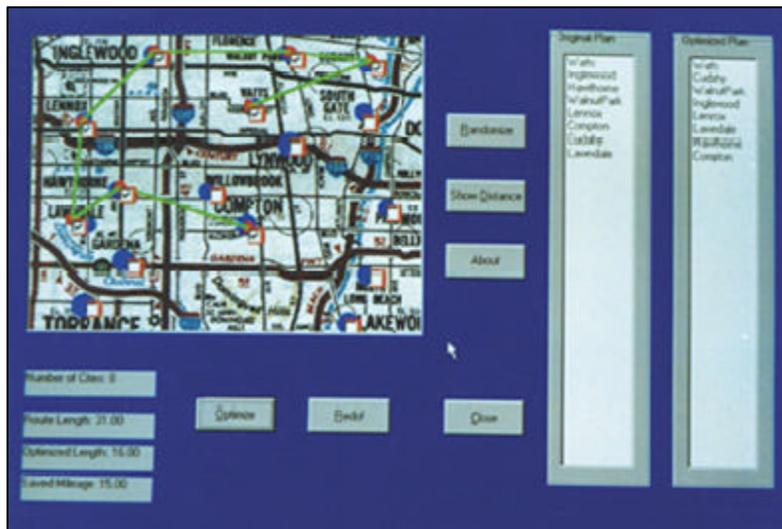


New generations of military robotic vehicles will be operated by man-portable command systems and thus will require a high level of interaction with and feedback from the user. Cybernet's Force Feedback technology has revolutionized user interaction with computer-input devices and game controllers. Their Force Feedback controllers use intelligent robotics to dramatically enhance the interaction between

user and device. In fact, Cybernet's Force Feedback technology represents the first commercially successful attempt at having a computer or gaming console give tactile feedback to the user. The system incorporates a 3-DOF (Degree of Freedom) reflective joystick and an advanced video capture display screen. Potential commercial applications include robotic building construction, operations involving earth moving equipment, and toxic waste clean up.

- ◆ \$170,000 in sales to date
- ◆ Customers include U.S. Army, Ensure, Inc., Raytheon, Epson
- ◆ Compatible with any Windows application

Physical Optics Corporation, Torrance, CA  
Sponsored by the U.S. Army Research Office



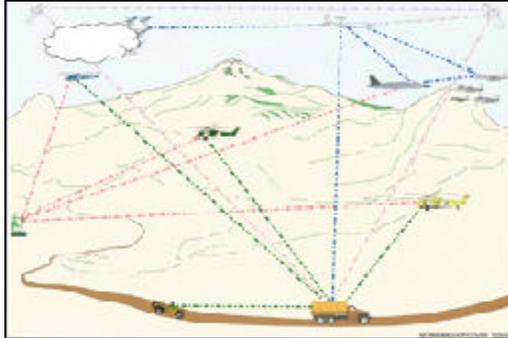
Delays in detecting, identifying, and tracking potential threats can be fatal on the modern battlefield. Physical Optics Corporation has developed an automated decision making system for reliable and fast multisensor fusion, automatic target recognition, and communication network routing. The Fast Evolving Parallel Genetic Algorithm (FEPGA) maximizes speed, robustness, and adaptability for optimal decision making. FEPGA integrates a genetic algorithm with fuzzy logic to

perform real-time decision making in high Operations Tempo (OPTEMPO) environments. Information is optimized based on intelligence to evaluate data in many dimensions. The FEPGA can be integrated with a conventional neural network to greatly increase accuracy. Physical Optics has developed a family of optimization modules that can be accessed from any Windows application, and that can be integrated with a neural network for network topology optimization.

# General Simulation System (GSS)

## PHASE III IMPACT

Prediction Systems, Inc., Spring Lake, NJ  
Sponsored by the U.S. Army Research Laboratory



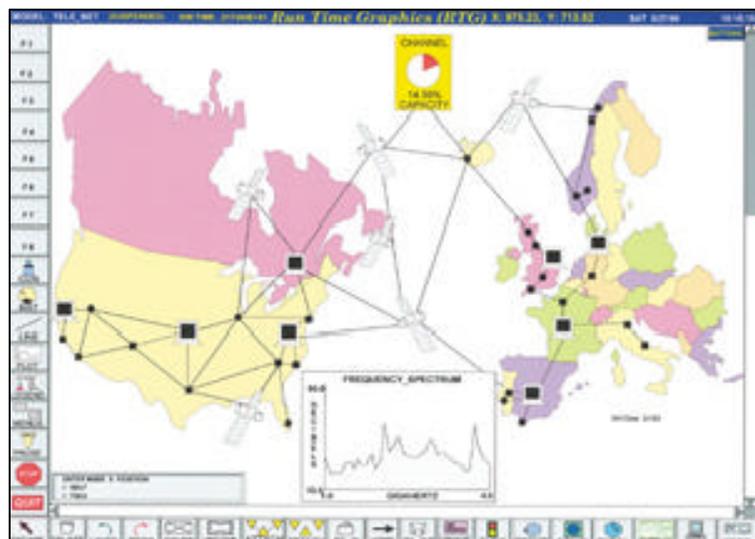
Hierarchical icons permit thousands of entities without screen clutter. The ability to modify the network while the simulation is running represents a significant breakthrough. GSS addresses the technology issues necessary to support U.S. Army mission rehearsal and training exercises.

**T**he General Simulation System (GSS), developed by Prediction Systems, Inc., allows users to interact graphically with complex simulations. The system builds icon models, in real-time, to create and change complex simulated scenarios.

Users can assemble networks from icon libraries and simulated traffic. They can respond to changing conditions, devise plans for courses of action, then simulate network operations.

Currently, information operations planning and real-time control tools are being developed for three DoD organizations using the GSS technology.

- ◆ \$850,000 contract to Air Force Research Laboratory - Rome Research Site to develop a defensive information warfare planning tool.
- ◆ \$375,000 in contracts to Air Force Information Warfare Center to develop a information operations planning tool.
- ◆ \$100,000 initial contract to Air Force Research Laboratory -Wright Patterson to develop a Link 16 network planning tool.



- ◆ \$100,000 in revenues to support National Ground Intelligence Center efforts
- ◆ Additional revenues expected from Office of National Drug Control Policy, Drug Enforcement Agency, and National Law Enforcement Communications Center

Austin Info Systems, Inc., Austin, Texas  
Sponsored by the U.S. Army Communications-Electronics Command Research, Development and Engineering Center



Recent Army peace-keeping and other operations have underscored the need for real-time situational intelligence, and often gathered from open sources. To fulfill this requirement, Austin Info Systems, Inc. has developed the Open Source, Automated Link Analysis Tool (OSALAT). The system is comprised of two underlying technologies: the Knowledge Based Discovery Tool (KBDT) and the Warfighter's Rapid Intelligent Information Support Tool (WRIIST). KBDT provides the capability to retrieve open source information and extract key entities. WRIIST provides the capability to convert a higher-level request for information into the appropriate query or queries, schedule the queries; and identify, categorize, and send the

information to the appropriate requesting application or user. Building on these technologies, AIS integrated a variety of new software technologies to automatically analyze text to extract summary descriptions of people, organizations, events, and the relationships among them. In addition, OSALAT provides graphical tools to allow the user to visualize these entities (people, organizations, events, etc) and their inter-relationships.

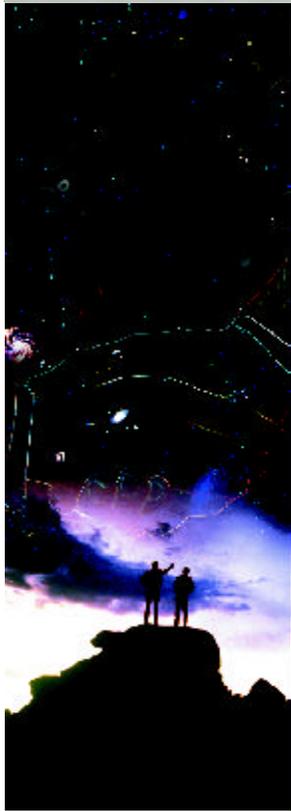
OSALAT allows users to:

- ◆ Refine searches
- ◆ Cluster/filter and score results
- ◆ Continue searching and monitoring over time
- ◆ Analyze and extract information from material
- ◆ Offer various visualizations of the overall dataset



# Opportunities

# Army STTR Program



**T**he Small Business Technology Transfer (STTR) Program funds innovative technologies developed by small businesses partnering with universities, federally-funded research and development centers (FFRDCs), and other non-profit research institutions. Congress established STTR in 1994 as a companion program to SBIR. It is currently authorized through FY 2001. STTR shares the SBIR Program's objectives and processes with a few important differences:

- ◆ STTR provides an incentive for small businesses and researchers to move emerging technologies from the laboratory to the marketplace
- ◆ STTR Phase I efforts can be up to one year in duration, for a maximum of \$100,000
- ◆ STTR Phase II efforts are two-year efforts for up to \$500,000

The U.S. Army Research Office (ARO) is the lead execution agent for the Army STTR Program by virtue of its broad basic research mission within the Army. ARO has developed numerous strategic partnerships with industry and academia to develop new technologies with applications in future Army systems. ARO manages and executes the Army STTR Program while maintaining the dual-use focus mandated by Congress.

## **Participating in Army STTR**

For more information about the Army STTR Program, including upcoming opportunities for participating in the program, visit the Army STTR Web Site at:

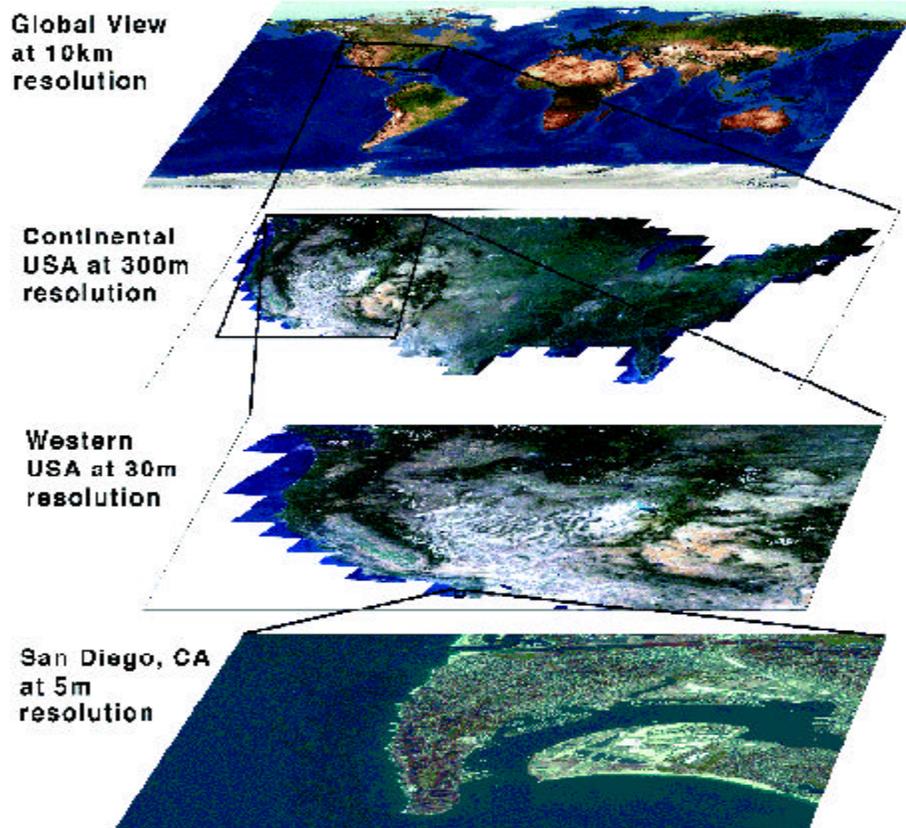
<http://www.aro.army.mil/arrowash/rt>

## **STTR Success Story**

While most STTR-funded projects are still too new to have achieved significant commercial success outside the program, the following page provides a recent success story:

Dubbs & Severino, Irvine, CA  
Sponsored by the U.S. Army Research Office

- ◆ Contracts worth \$377,000 with U.S. Special Operations Command, U.S. Navy, BAE, and Litton
- ◆ Support to military deployments around the world



**D**ubbs & Severino, Inc. developed a web-enabled map and imagery distribution technology that has been proven invaluable in military operations around the world. The Geographic Tagged Image File 2 (GeoTIF 2) format combines maps, terrain, and imagery data at several scales into a single composite file for planning, executing and controlling military operations. Military, scientific and commercial users who rely on geospatial

information can access these nested multi-scale databases from high speed, ultra-wide-bandwidth web servers using their own computers' browsers. The GeoTIF 2 database supports simultaneous viewing, roaming, and zooming of multiple geo-referenced map layers. GeoTIF 2 enhances situational awareness, providing quicker and more decisive decision-making.

# SBIR Phase II Quality Awards

## The 2000 Phase II Quality Awards Winners are:

**Better Communications**  
Cree, Inc.  
*Army Research Laboratory*

**Student-Centered  
Learning System**  
Farance Inc.

*Army Communications-  
Electronics Command Research,  
Development and Engineering  
Center*

**Detection of Mosquito-  
Borne Pathogens**  
Medical Analysis Systems, Inc.  
*Walter Reed Army Institute of  
Research*

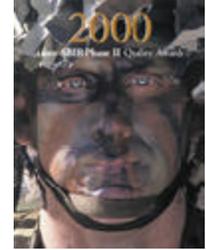
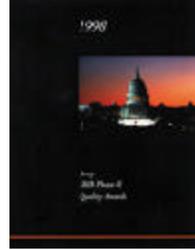
**Night Driving  
Simulator**  
DCS Corporation  
*Army Simulation, Training, and  
Instrumentation Command*

**Rapid, Effective  
Malaria Test**  
Flow Inc.  
*Walter Reed Army Institute of  
Research*

**Smart Armor Structures**  
Production Products Mfg.  
& Sales, Inc.  
*Army Research Laboratory*

**High-Speed Munitions  
Inspection**  
Skiametrics, Inc.  
*Army Armaments Research,  
Development and Engineering  
Center*

**Computer-Aided Design**  
ThermoAnalytics, Inc.  
*Army Tank-Automotive Research,  
Development and Engineering  
Center*



A panel of Army and industry experts select outstanding Phase II projects each year to receive Army SBIR Phase II Quality Awards. These awardees best exemplify the SBIR goal of developing innovative technologies and products, and moving them into the marketplace.

The Quality Awards competition is open to all companies whose Army SBIR Phase II projects conclude in a given fiscal year. Winners are selected based on three criteria:

- ◆ Originality and degree of innovation represented in their research
- ◆ Relevance of the research to an Army mission
- ◆ Immediate commercialization potential of the technology or product

The Army Research Office - Washington executes the awards program each year. Award plaques are presented to the SBIR companies as well as their sponsoring Army organizations. These outstanding projects also receive recognition in an SBIR Phase II Quality Awards Brochure, which the Army distributes at conferences and other meetings in which the Army SBIR Program participates. This additional exposure provides additional marketing opportunities for the awardees within the Army, the Department of Defense, and the private sector.

# Past Quality Award Winners

## 1999

### **Single Antenna Feed, Multiple Band Satellite Communications**

Austin Info Systems, Inc.  
*Army Communications-Electronics Command RD&E Center*

### **Remote Triage Sensors**

Empirical Technologies Corporation  
*Army Medical Research and Materiel Command*

### **Improved Decision-Making Training Aids**

Cognitive Technologies, Inc.  
*Army Research Institute*

### **Lightweight Digital Display Screen**

Diamond Visionics, LLC.  
*Army Simulation, Training, and Instrumentation Command*

### **Pressurized Airbeams**

Federal Fabrics-Fibers, Inc.  
*Army Natick Soldier Center*

## 1998

### **Two Color Per Pixel Staring Focal Plane Array**

Amain Electronics Company, Inc.  
*Army Communications-Electronics Command RD&E Center*

### **Extremely Lightweight Fuel Cell Stacks**

Analytic Power Corporation  
*Army Research Laboratory*

### **Lightweight Monopolar Fuel Cells**

Lynntech, Inc.  
*Army Research Laboratory*

### **Self-Correcting Neural Sensor Fusion**

Physical Optics Corporation  
*Army Missile RD&E Center*

### **Feature-Based Rapid Map Generation System**

Vexcel Corporation  
*Army Topographic Engineering Center*

## 1997

### **Security Using Automated Speech Recognition**

Daniel H. Wagner Associates, Inc.  
*Army Armaments RD&E Center*

### **Unmanned Aerial Vehicle Guided Landing**

Focused Energy Holding Company  
*Army Missile RD&E Center*

### **Advanced Engine Protection**

InnovaTech, Inc.  
*Army Missile RD&E Center*

### **Wear Resistant Coatings**

Materials Resources, Inc.  
*Army Tank-Automotive RD&E Center*

### **Self-Heating Foods**

TDA Research, Inc.  
*Army Natick Soldier Center*

## 1996

### **Texture True Digital Maps**

Computer Graphics System Development Corp.  
*Army Topographic Engineering Center*

### **Precision Monitoring**

J.A. Woollam Company, Inc.  
*Army Communications-Electronics Command RD&E Center*

### **Green Dirt**

Electrokinetics, Inc.  
*Army Waterways Experiment Station*

### **Virtual Infantry**

Dive Laboratories, Inc.  
*Army Simulation, Training, and Instrumentation Command*

### **Point and Navigate**

Point Research Corporation  
*Army Topographic Engineering Center*

## 1995

### **Optical Integrated Circuit**

Integrated Optical Circuit Consultants  
*Army Missile RD&E Center*

### **Virtual Intelligence Software**

Intelligent Text Processing, Inc.  
*Army Research Laboratory*

### **Universal Joint**

Powdered Materials Applications, Inc.  
*Army Tank-Automotive RD&E Center*

### **Soldier's Personal Adaptive Monitor**

S-TRON  
*Army Communications-Electronics Command RD&E Center*

### **High Temperature Diesel Tribology System**

Surfaces Research  
*Army Tank-Automotive RD&E Center*





**T**he DoD CBD Program was established in response to recent world events which caused intense interest in the readiness and effectiveness of U.S. Chemical and Biological warfare defenses. The DoD CBD Program enables U.S. forces to survive, fight, and win in chemical and biological warfare environments. This requires aggressive, realistic training and the finest equipment available to allow soldiers to avoid contamination, if possible, and to protect, decontaminate, and sustain operations.

The DoD CBD SBIR Program seeks to transfer innovative CBD technologies between the Services/ Special Operations Command (SOCOM) and the private sector for mutual benefit. The objective is to develop technologies for detection, identification, protection, and decontamination of chemical and biological agents.

- ◆ **Detection** includes both stand-off and point detection of agents in air, water, and soil, as well as in complex media such as food.
- ◆ **Identification** includes molecular techniques for the rapid identification of CB agents for forensics purposes.

- ◆ **Protection** encompasses all areas of non-medical individual and collective protection, including CB hardening of buildings and facilities.
- ◆ **Decontamination** focuses on non-corrosive, environmentally benign processes which can be used on equipment, weapons platforms, and personnel.

Application of CBD technologies will be on battlefield force protection, homeland defense, and treaty compliance and verification. This includes technologies that maximize a strong defensive posture using passive or active means as deterrents.

As the lead agency, the Army coordinates DoD-wide topic generation; receipt, evaluation, selection, and award of Phase I proposals; and potential follow-on Phase II efforts under this program.

To learn more about the DoD CBD SBIR Program, please visit the following Web Site:

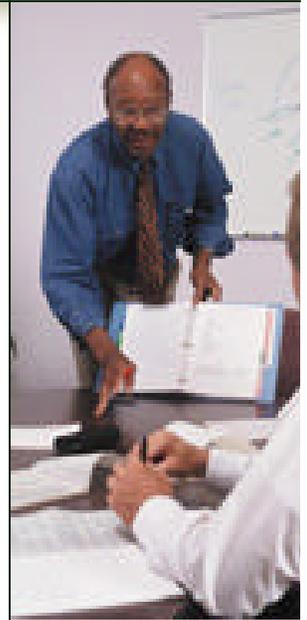
**<http://www.aro.army.mil/arowash/rt>**

<http://www.aro.army.mil/arrowash/rt>

**T**he Army SBIR/STTR Program conducts an aggressive outreach program to increase small business awareness of broad opportunities that the Army provides. Army SBIR personnel participate in national, regional, and local conferences across the country. This provides face-to-face contact for small businesses with people who are knowledgeable about Army needs and the SBIR/STTR process. The Army SBIR Web Site identifies upcoming events at which the Army will be participating.

The Army SBIR/STTR Web Site provides online access to comprehensive information about the program:

- ◆ General Information (on participating in the Program)
- ◆ Changes and New Requirements
- ◆ Points of Contact and Links (to other Army programs and related SBIR sites)
- ◆ Proposal Submission (procedures and entry points)
- ◆ Recent Army SBIR Awards
- ◆ Searchable Database of Past Awards
- ◆ Operations and Support Cost Reduction (OSCR)
- ◆ Chemical-Biological Defense SBIR Program (Joint Army/ Navy/Air Force/SOCOM)
- ◆ Phase III Success Stories
- ◆ Phase II Quality Awards Program.



# 2000 Company Points of Contact

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*Better Situational Intelligence*

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703-617-7425

703-617-8274 Fax

[www.aro.army.mil/arrowash/rt/sbir.htm](http://www.aro.army.mil/arrowash/rt/sbir.htm)

**Credits:**

**ARO-Washington Team: Kenneth Bannister, Gerry Sanz, John Ruehe, James Myers, Shirley Teo.**