Army 2008

SBIR ACHIEVEMENT AWARDS

United States Army Small Business Innovation Research

SBIR
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US ARMY RDECOM

SBIR ACHIEVEMENT

SBIR Achievement Awards

I would like to thank all the small businesses that participated in the 2008 Achievement Awards Program. The nominations were exceptional and were evaluated based on four criteria: originality and innovation of research; relevance of the research to the Army mission; immediate commercialization potential of the research, reflecting the primary goal of bringing technology and products to the marketplace; and performance of the project.

The Achievement Awards Program is competitive. This year, 755 projects were eligible to compete of which 41 nominations were forwarded to the Selection Committee. Ten projects were selected, one from each Army SBIR technology area, that represent the best in small business research and development.

In recognition of this achievement, the winners and their projects are showcased at small business conferences and symposia throughout the year via this brochure. For more information on the Army SBIR program, please visit www.armysbir.com

Thank you again for your participation in the 2008 Army Achievement Awards and your continued interest in the Army SBIR Program.

Sincerely,

Christopher S. Rinaldi, P.E.
Program Manager
Army Small Business Innovation Research (SBIR) Program

Advanced Materials and Manufacturing

Universal Display Corporation
Ewing, NJ

Army Research Laboratory

Flexible and Conformal Environmental Barrier Technology for Displays

A low-cost, high performance thin-film oxygen and moisture permeation barrier remains a critical issue for the successful commercialization of flexible organic light emitting diode (OLED) displays. Most approaches today involve a multi-layer thin film design. Universal Display Corporation, together with Princeton University, has developed a radically different approach with a novel single layer transparent flexible permeation barrier using only non-toxic materials. The non-toxic materials provide organic properties to afford a flexible and low stress barrier, as well as the permeation barrier. In addition its design is much simpler and more cost-efficient than previous complex multi-layer approaches. Environmental barrier technology on flexible substrates offers significant commercialization potential for novel display and other electronic devices. Environmentally protected OLED displays, with Universal Display Corporation's world leading low power consumption phosphorescent (PHOLED™) technology, will enable lightweight, low power, novel form-factor information systems to view full-color, streaming video for UAVs. This barrier technology can reduce the display costs by more than 15%, and will impact broad commercial applications for the gaming, TV, and computer industries.

Small Robot Infrastructure Toolkit

Military and law enforcement increasingly rely on small robotic Unmanned Ground Vehicles (UGVs) to assist in mission critical operations. Many currently fielded UGVs only perform well when employed on tasks that constitute their core competencies. RE2, Inc. has designed a Small Robot Infrastructure Toolkit (SRIT), which features a manipulator arm, plug-n-play end-effectors (the device at the end of the arm), and an adaptive Operator Control Unit (OCU) with a disposable game controller. The SRIT increases the capabilities of currently fielded robotic UGVs by increasing the number of tools available to them. As tools are changed, the OCU interface automatically updates to match the current tool. Unique to the SRIT is the ability to easily change tools in the field. This allows Soldiers or law enforcement officials to successfully complete complex missions requiring multiple types of tools. The most significant benefits of SRIT include the intelligent motion control algorithms and the interchangeable robotic components. These innovations significantly improve operator performance and enable the operator to perform multiple missions.

RE2, Inc.
Pittsburg, PA

Tank Automotive Research, Development and Engineering Center

Microelectronics and Photonics

Sensors and Information Processing

Migma Systems, Inc.
Walpole, MA

Communications-Electronics Research, Development and Engineering Center

Robust Improvised Explosive Devices (IED) and Landmine Detection

Traditional landmine detection techniques are dangerous and time consuming because of the plethora of shapes, sizes and composition of landmines. Migma Systems, Inc. has developed new methods that improve the performance of both surface and buried mine detection. Migma's technology focuses on the development of two algorithm suites, one used to detect IEDs and mines acquired by a vehicular platform and the other to detect landmines via airborne platforms. The algorithms enhance images produced by existing hardware and sort through the resulting data. For vehicle-based systems, Migma Systems' IED and mine detection algorithm suite is able to cue at a safe standoff distance of 200 feet with a high detection and low false alarm rate. For airborne-based systems, the developed algorithm suite is able to cue scattered and buried mines at a safe standoff distance of several thousand feet. Commercially, the system can be adapted for outdoor surveillance using video cameras to detect intruders and for the oil and gas industry the system will be used for gas pipeline leak detection.

Manned/Unmanned System-Mission Planner and Controller

The Future Combat System (FCS) and Future Force Warrior (FFW) rely on multiple unmanned vehicles (UVs) to perform focused missions including Networked Fires and Effects and reconnaissance. Kutta has developed a Multi-Mission Planner and Controller Tool (MMPACT) and built a one-of-a-kind man portable controller to control Unmanned Aerial Vehicles/Unmanned Ground Vehicles teams. This controller allows collaboration and coordination among the manned and unmanned systems, and adjustment of plans in real time. This system assists UV operators in mission, planning, operation, and information gathering, and gives the users the ability to apply lethal force if needed, all while running on a PDA-like platform for enhanced portability. There are many applications of this underlying multi-platform mission planning and control architecture and information-processing infrastructure, which can be readily adapted to support homeland security, law enforcement, border patrol and search and rescue. This technology will provide leaders with the ability to plan, manage, control and coordinate actions of both manned and unmanned assets in real time and in a distributed, networked environment.

Kutta Technologies, Inc.
Phoenix, AZ

Armaments Research, Development and Engineering Center

Simulation and Modeling for Acquisition, Requirements, and Training

Advanced Propulsion

Precision Combustion, Inc.
North Haven, CT

Tank Automotive Research, Development and Engineering Center

Diesel/JP-8 Gasifier and Pre-Reformer for Solid Oxide Fuel Cell

Military fuel cells must be able to use available liquid fuels such as JP-8 jet fuel. Precision Combustion, Inc. developed a breakthrough fuel processor reformer that is compact, efficient, fast starting, and sulfur tolerant. This reformer is designed to convert high-sulfur diesel and JP-8 into sulfur-free hydrogen-rich gaseous fuel usable by solid oxide fuel cells. This offers practical, highly efficient JP-8 reforming to hydrogen in an ultra-compact package with rapid transient response, minimized coking, and low cost. The result addresses key issues with conversion of logistic fuel to fuel cell reformate, applicable to multiple fuels and suitable for use with other fuel cell types. This technology will have broad applicability across the Department of Defense, including use on vehicle auxiliary power units (APUs), robotics, portable electronics, gensets, and shipboard fuel cells. Commercial applications include fuel cell APUs on class eight trucks, RVs and commercial marine APUs, as well as non-fuel cell applications where a compact syngas source is desired.

Bio-Battery System: A Novel Micropower Source for Soldier Power and Portable Electronics

The need for a renewable micropower source has long been recognized and is increasingly relevant in today's mobile, energy hungry world. Conservative estimates of the power market, based on microelectronics needs alone, exceed several hundred million dollars. Applications are also foreseen in the life science area with implantable monitors and therapeutic and drug delivery systems. CFD Research Corporation is designing, fabricating and demonstrating a working Bio-Battery system to extract energy from biofuels that can power applications for both military needs such as Soldier power systems and civilian needs including cell phones, laptops, biomedical devices and environmental sensors. This Bio-Battery design will satisfy the need for a sustainable, renewable, lightweight power source to support an individual Soldier sensor suite. The Bio-Battery outperforms conventional fuel cells and batteries in weight and sustainablility. It also greatly improves on these micropower sources with a greater range of operating conditions (high temperature, acidity, toxicity), substantially reduced waste, and enhanced logistics. Additional funding of ~$2M has been secured for continued development and commercialization of the Bio-Battery Technology.

CFD Research Corporation
Huntsville, AL

Communications-Electronics Research, Development and Engineering Center

Power and Directed Energy

Chemical and Biological Defense

Ten Bar Mfg, LLC
Golden, CO

Natick Soldier Research, Development and Engineering Center

LightSeam® Stitchless Seaming

Ten Bar Mfg, LLC has developed a remarkable stitchless garment assembly process using "Laser Enhanced Bonding" (LEB) that is capable of hermetically sealing any type of material offering parent material strength using dissimilar materials. Typical textile manufacturing methods require specific manufacturing steps. Complex garments using three-dimensional seams can require fifty steps, any one of which could fail quality control. LEB allows modular manufacturing with higher throughput speeds, fully automated manufacturing and higher performance seam construction. This system will achieve instant commercial value with materials and products such as neoprene wetsuits, byutal rubber, bio suits, tyvek, hazmat, and protection uniforms of all kinds. LEB can improve numerous military and commercial applications to achieve environmentally protective, impermeable, stitchless seams. Leading manufacturing companies have previewed the LEB seam and are currently in talks with Ten Bar for manufacturing of high altitude aircraft, clothing, and automobile side airbags. Further, Ten Bar has spun off a spoke company, Colorado Glove Company that offers LightSeam® robotic manufacturing of gloves targeted for the military and private sectors.

Noninvasive Treatment of Hemorrhagic Shock

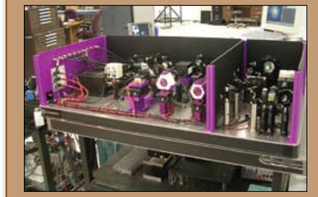
Hemorrhagic shock remains a significant cause of death for our Soldiers. Additionally, dehydration can compromise the performance of our warfighters. The reduction in central blood volume caused by either of these can result in cardiovascular collapse, especially in operations in extreme environments. Maintaining vital organ perfusion when more sophisticated intervention is inaccessible remains a critical challenge. Advanced Circulatory Systems, Inc. has developed an inspiratory impedance threshold device called the ResQGard. The ResQGard counteracts the effects of severe hypotension that result from hemorrhagic shock, heat shock, and dehydration. Applying ResQGuard during the early stages of controlled hemorrhage can help to restore central blood volume, cardiac output, and blood pressure thereby reducing the threat of shock and cardiovascular collapse. Commercially, the ResQGard technology will help patients "buy time" until advanced care is available. The successful development and deployment of a new device designed to immediately increase blood pressure following the onset of shock is an important advance in treating battlefield casualties and will ultimately save the lives of military and civilian personnel.

Advanced Circulatory Systems, Inc.
Eden Prairie, MN

Medical Research and Materiel Command

Life, Medical, and Behavioral Sciences

Environmental and Geosciences



Double Pulse Laser

JMAR Technologies, INC.
San Diego, CA

Army Research Laboratory

Laser Source for Real-Time Spark Spectrochemical Hazard Analysis

The Army's ability to detect chemical, biological, radiological, nuclear and explosive materials (CBRNE) remains vital in countering threats to the Soldier. At large standoff distances of 100+ meters, the Warfighter gains significant protection using this double pulsed laser for enhanced Laser Induced Breakdown Spectroscopy (LIBS) sensor performance. JMAR Technologies has developed an innovative and unique small, lightweight double pulse laser system that can generate microplasmas for LIBS hazard detection using a single-resonator laser cavity design. This all solid-state laser system has multiple advantages over current laser technologies including ruggedness, compactness, efficiency, as well as precise beam co-propagation with exceptional beam quality for tight focusing at large standoff distances. Successful fielding of this product will provide standoff detection capability for IEDs and other threats whereas such capability currently does not exist. JMAR Technologies' laser technology has numerous applications for not only the military and homeland security, but also the civilian marketplace where it can be deployed for IED and explosive detection, drug interdiction, environmental hazard analysis, materials identification, geology and geochemistry.

Miniature Explosive Pulsed Power for Missiles and Munitions

Modern munitions rely on blast and fragmentation as their kill mechanism. Loki, Inc. has successfully developed three different types of ultra compact pulsed power supply systems for use in multi-functional warheads and munitions. This technology is unique because it directly transforms high-voltage and high-current pulses into ultra-wideband microwave radiation, without electron beam-based microwave devices. These systems can be used to construct small to medium caliber munitions that produce effects in addition to blast and fragmentation. Highly innovative designs were built and explosively-tested in an aggressive development cycle. The technology is intended to assist Soldiers to counteract enemy weapons that employ electronic systems for guidance and initiation. Commercial applications include power generation for rescue systems in remote areas, oil and mineral exploration, propulsion systems and electromagnetic launchers, rapid charging of capacitors, destruction of chemical and biological agents, power for the initiation of other reactions (fusion, chemical, etc), power for burst signal transmission and vehicle disablement in force protection.

Loki, Inc.
Rolla, MO

Space & Missile Defense Command

Engineering Sciences

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Note:
This brochure, and the information contained within, does not obligate the Army or indicate Army advocacy of the firms or technologies featured.

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