

Maximizing Critical Core Competencies — New Small Business Innovation Research (SBIR) Process Focuses on TARDEC Strategic Technology Thrust Areas

Jim Mainero and Martin Novak



A Beachwood, OH, company, Think-A-Move Ltd. (TAM), is developing a field-deployable prototype of its hands-free and heads-up system for controlling a military robot, the iRobot® PackBot®, with speech commands. The U.S. Army currently utilizes military robots, also known as Unmanned Ground Vehicles (UGVs), for improvised explosive device detection and surveillance in Iraq and Afghanistan. More than 1,000 PackBots have been deployed, mainly in Iraq and Afghanistan, since the war began.

TAM received SBIR contracts to develop the hands-free prototype. TAM's President Jim Harris commented that "This demonstrates the value the Army places on developing a hands-free and heads-up control system for military robots. [TAM's] system provides the robot operator with increased situational awareness and potentially decreases the size of the security detail required to guard the operator. This enables the Army to increase the number of Soldiers effectively able to engage the enemy."

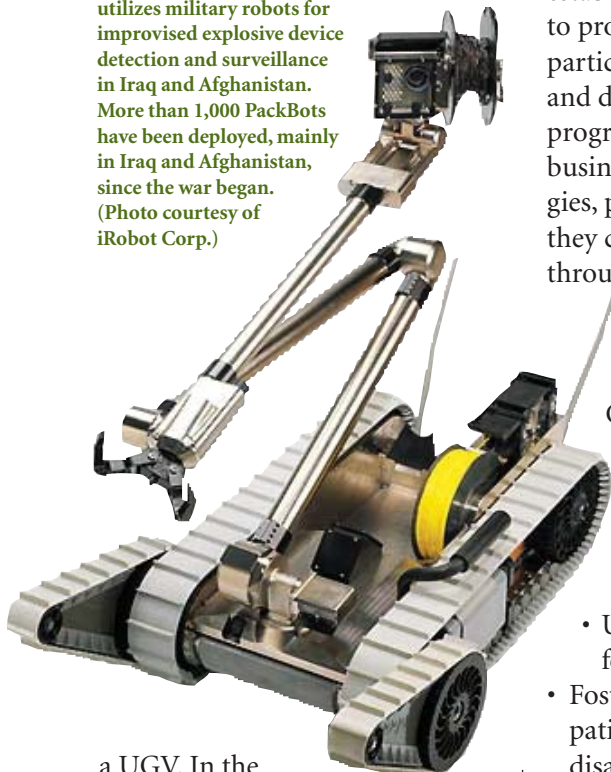
As one of the Army's participating agencies, the U.S. Army Tank Automotive Research, Development and Engineering and Development Center (TARDEC) uses the SBIR program to facilitate TARDEC transformation by filling technology gaps and identifying mature technology for possible insertion. In 2007, a new SBIR topic development process was implemented that focuses on TARDEC Strategic Technology Thrust areas to maximize critical core competencies.

The process also focuses on developing TARDEC-led SBIR topics that are aligned to support TACOM Life Cycle Management Command ground vehicle program executive offices (PEO), such as PEO Ground Combat Systems, PEO Combat Systems and Combat Support Systems and Program Manager Future Combat Systems (Brigade Combat Team). As a result, the new process ensures that the topics generated will increase technology transition and commercialization success with private industry, while also accelerating the fielding of capabilities to Soldiers that will benefit the Nation through stimulated technological innovation, improved manufacturing capability and increased competition, productivity and economic growth.

One of TARDEC's Strategic Thrust areas is Intelligent Ground Systems, which provides solutions to operational requirements that utilize intelligent, automated ground systems capable of engaging threats while interacting with an operator. TARDEC continues to push the boundary of robotic technology with developments such as a hands-free and heads-up control system for a small UGV.

TARDEC awarded a Phase I contract to TAM on Jan. 31, 2005, to investigate the development of a hands-free system for controlling

A PackBot with ICx Fido Explosives Detection Kit. The U.S. Army currently utilizes military robots for improvised explosive device detection and surveillance in Iraq and Afghanistan. More than 1,000 PackBots have been deployed, mainly in Iraq and Afghanistan, since the war began. (Photo courtesy of iRobot Corp.)



a UGV. In the Phase I effort, TAM demonstrated the feasibility of its concept. In Phase II, TAM further developed and delivered a prototype of its hands-free and heads-up system that recognizes air pressure changes within the ear canal and converts those changes into electronic signals to control tele-operated or semi-autonomous military robots. With Phase III funding of \$340,000 provided by TARDEC's Joint Center for Unmanned Systems on Oct. 24, 2007, TAM is providing further capability and beginning integration of its system into iRobot's small UGV control system. TAM has recently been chosen for further funding (approximately \$600,000) by the Army SBIR office's Commercialization Pilot Program to make its system field-deployable. The TARDEC point of contact for this technology and TAM is Dr. Robert Karlsen, Robert.Karlsen@us.army.mil.

The federal SBIR program is an extramural program reserved

for small businesses. Congress established the program in 1982 to promote U.S. small business participation in federal research and development (R&D). The program's goal is for these small businesses to develop technologies, products and services that they can then commercialize through sales in the private sector or utilize for the government.

Congress designated four objectives when establishing the program:

- Stimulate technological innovation.
- Use small business to meet federal R&D needs.
- Foster and encourage participation by minorities and disadvantaged persons in technological innovation.
- Increase private-sector commercialization of innovations derived from federal R&D.

To participate in the SBIR program, small businesses must:

- Be U.S.-based, for-profit businesses of 500 or fewer employees.
- Perform the work in the United States.
- Perform two-thirds of the effort during Phase I, the feasibility study, and half the effort during Phase II, the major R&D effort.
- Ensure principal investigators spend more than half of their time employed by their respective SBIR-enrolled businesses.

Government agencies with an extramural R&D budget of at least \$100 million must participate in the SBIR program and reserve 2.5 percent of this budget for competitively selected awards to small businesses. Each year, the Army SBIR participating organizations develop a set of research topics that represent the Army's

current and anticipated warfighting technology needs. These topics are included in the Army portion of the Department of Defense SBIR solicitation.

The SBIR program has three phases. Proposals submitted by small businesses in response to solicitation topics are competitively selected for Phase I awards. Phase I is a feasibility study in which the small business receives up to \$70,000 for a 6-month project to demonstrate the selected concept's scientific, technical and commercial feasibility. An option is available for up to \$50,000 for interim activities between Phase I and Phase II.

Companies that successfully complete Phase I are invited to participate in the next phase of the SBIR program. Phase II represents a major R&D effort, culminating in a deliverable prototype. The small business will receive up to \$730,000 over a 2-year period to develop a technology, product or software that addresses the needs of the Army and has potential for commercialization.

Commercialization is the ultimate goal of every SBIR effort. While no SBIR funding is available in Phase III, private sector funding is pursued to commercialize Phase II projects, or a federal agency may fund Phase III activities to enable its own application of the innovation.

Jim Mainero is a TARDEC SBIR Manager within the Army SBIR program. TARDEC's SBIR program is managed by the TARDEC NAC Mechanisms and Partnerships group.

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