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TOPIC TITLE:
Medium Caliber Gun
Barrel Bore Coatings

**CONTRACT
NUMBER:**
FA8222-15-C-0009

**SBIR
COMPANY
NAME:**
Advanced Global
Services
Sanborn, NY

**TECHNICAL
PROJECT
OFFICE:**
Warner Robins Air
Logistics Complex,
Robins AFB, GA

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Gun barrel coating machine "MAGGY-5" in operation at the Advanced Global Services facility. (Courtesy photo)

SMALL BUSINESS GETS COST-SAVING, HAZARD-REDUCING GUN TECHNOLOGY INTO AIR FORCE HANDS

A new generation of less expensive, better performing and more environmentally-friendly guns is likely coming soon because of work being performed by a small business in partnership with the Air Force.

Through research conducted under the Air Force Small Business Innovation Research (SBIR) Program, Sanborn, N.Y.-based Advanced Global Services made big strides with its patented gun barrel erosion coating process, Electromagnetically-Enhanced Physical Vapor Deposition, also known as EPVD. Many attempts have been made to replace traditional chromium electro-plating, an environmental hazard, but EPVD has been documented by Department of Defense programs as a viable substitute for coating gun barrels.

Dean Silver, a program manager and mechanical engineer with the 409th Supply Chain Management Squadron, said the EPVD technology introduced by Advanced Global Services will allow end users to fire rounds up to 10 times longer with better accuracy and velocity, employ more advanced munitions that current barrels cannot use, and reduce the amount of replacement barrels in the field significantly.

The estimated Air Force savings for medium caliber guns alone could exceed \$20 million annually, Silver said.

THE IMPACT OF SBIR

With a technology transfer plan in place and help from an Air Force SBIR Commercialization Readiness Program transition agent, the company has attracted millions of dollars in Phase III funding – investments that come from outside the SBIR program – for a limited-rate, initial production machine. That machine is expected to ramp up to full production for Air Force Materiel Command's Armament Directorate in six months, or less, after delivery.

The Air Force SBIR award gave Advanced Global Services the boost it needed to transition the technology from a research and development platform to an industrial operation.

"The SBIR program allowed our company to employ more professional experts and invest more resources into advancing development of the EPVD technology further in order to meet specific requirements of the military customer," said Gennady Yumshtyk, CEO and lead scientist for Advanced Global Services. "The program was very instrumental in bridging the gap between research and development and industrial scale operation, creating a true partnership between a small woman-owned technology developer, the end-user (the government) and industry (original equipment manufacturers)."

BEHIND THE TECHNOLOGY

The EPVD technology is based on principles of converting the coating material from its solid state into vapor state in a vacuum environment, then uniformly depositing it on surfaces of complex-shaped components.

One of the unique advantages of EPVD is its ability to apply metals and create alloys on internal surfaces of cylindrical objects, such as gun barrels, Yumshtyk said. It is suited to conventional applications, but unlike other processes, is a major leap in the area of non-line-of-site component configurations. Additionally, this "green" coating technology does not generate by-products or use health-prohibited materials, making it an excellent candidate as a substitute for the traditional plating processes, he added.

A PATH TO COMMERCIAL SUCCESS

Advanced Global Services plans to work with the North American manufacturers of small and large caliber weapons to make adjustments that will allow it to commercialize EPVD technology even further.

Company officials also hope widespread implementation of the EPVD process by the military will lead to new applications in other industrial areas such as nuclear, oil, gas and petrochemical sectors where erosion, corrosion and high temperature are present. Advanced Global Services is already working with a large petrochemical company to commercialize the technology for high-temperature applications.



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