SBIR★STTR
U.S. AIR FORCE ★ U.S. SPACE FORCE

SUCCESS STORY

Lithium-ion Based Batteries Charge Ahead of Competing Battery Technology

IMPROVED MANUFACTURING AND DESIGN OF LIQUID ELECTROLYTE DELIVERY SYSTEMS

TOPIC NUMBER: **AF171-106**

CONTRACT NUMBER: **FA8650-18-C-5032**

SBIR COMPANY NAME: **ADA TECHNOLOGIES**

TECHNICAL PROJECT OFFICE: **2ND LT. ALEXANDER D. ORSI, RXCC, WPAFB**

SPONSORING ORGANIZATION: **Department of Defense**

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THE BASICS

- Twice the energy output of current battery technology
- Lower cost
- Matches activation time and weight requirements
- Gives weapons designers much more flexibility in meeting missions requirements
- Air Force Small Business Innovation Research funding was essential

Photo by Staff Sgt. Sarah M. McClanahan.

ADA TECHNOLOGIES HAS LEAPT WEAPON BATTERY TECHNOLOGY FORWARD WITH A LITHIUM ION BASED CHEMICAL RESERVE BATTERY THAT SIGNIFICANTLY OUTPERFORMS CURRENT BATTERY TECHNOLOGY, AND AT A LOWER COST.

With the support of Air Force SBIR/STTR, Colorado-based ADA Technologies has developed a lithium ion chemical reserve battery that exhibits twice the energy output of current battery technology, while matching activation time and weight requirements.

With the development of these batteries, modern weapon technology will be able to support additional sensor and communication assets, which are currently impossible in modern munitions due to weight and performance limitations. This will give weapons designers much more flexibility in meeting missions requirements.

With this innovation, ADA Technologies is now setting its sights on expanding its battery program to address other munitions energy storage applications, such as missiles and torpedoes.

BEHIND THE TECHNOLOGY

Before the development of lithium ion based chemical reserve batteries, the most common battery was the silver-zinc battery that is currently used in weapons technology.

Silver-zinc batteries, on the scale that it takes to power munitions, are expensive and do not hold enough charge to power both the weapon and the sensors that weapons designers need to power new smarter weapons technology. This means that designers often are limited on what they can design because they lack the battery power for their weapons systems, communications assets, and sensors to fully operate.

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Lithium ion chemical reserve batteries have the same mission capability in activation speed and reliability, but they provide twice the power and are less expensive than the current silver-zinc batteries. They remove the power limitations from weapons designers and allow for smarter munitions.

ADA Technologies developed these batteries by testing a series of lithium ion chemical reserve batteries, designing and testing fast activation electrodes, designing and testing the containment and injection system, and then scaling the system for a battery pack.

Although the technology has not yet been implemented, it is posed to address energy problems in many munitions areas where chemical reserve batteries are used, and the company intends to tailor its research toward those problems.

SBIR FUNDING AND AFRL EXPERTISE WERE CRITICAL

Air Force Small Business Innovation Research funding was instrumental in the development of this technology.

The $900,000 invested in the project allowed the company to test and develop the battery for specific munition and missile applications, as well as compare several different designs to find which was most effective.

The selected design was then demonstrated in a scaled reserve battery for a Minuteman II intercontinental ballistic missile, which would not have been possible without SBIR and DoD support.

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