Navy SBIR/STTR Success

Reduced Power Electronics Subassembly Size, Weight, and Footprint Using Silicon Carbide and AC–link Technology

Rather than tailoring the technology too specifically to a military application, we knew that finding commercial outlets would reduce costs, and this in turn would accelerate sales and product maturity, which would ultimately make our products more attractive for both military and commercial applications.

- Darren Hammell, Chief Strategy Officer & Co-Founder, Princeton Power Systems

Topic Number N07-130

SBIR Investment:
$1,277,515

Phase III Revenue:
$25,000,000

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About the Technology:

In 2009, Princeton Power won a Phase II SBIR grant from NAVSEA to develop a software system for future all-electric warships. These ships would have a greater demand for compact power conversion equipment, high conversion efficiency, and electrical system flexibility and reliability. The goal was to increase the power density of power converters without compromising its functional performance. Princeton Power achieved this goal by using AC-link power conversion technology and high-voltage silicon carbide (SiC) switches, which allowed for a smaller, more efficient and more flexible product that provided simplified ship design, improved ship efficiency, and improved electrical system control. Utilizing that same technology, Princeton continued to develop an entire platform of power conversion technology, and the research culminated into one of their most popular products today – the microgrid.

Naval Benefit

Although most of its business has transitioned to the commercial sector, Princeton Power is currently working with the Navy on several military bases to implement its microgrid technology to help establish energy independence. Solar arrays require electric grids to generate power, so users are still prone to losing power. By combining electrical energy storage, such as a lithium-ion battery system with a solar array, users have the ability to separate from the electrical grid and operate in a completely secure and reliable manner. Batteries also enable matching generation to time of use, peak-shaving, and significantly reduce the fuel and sizing for common backup diesel or biodiesel generators. Even small amounts of storage can have a major impact on reducing fuel costs, maintenance, and emissions.

Transition

The control software originally developed under this SBIR was applicable to commercial microgrids – since a shipboard electric power plant is basically a floating microgrid. The in-depth and stringent reliability testing they did with the Navy through the SBIR program allowed them to build highly reliable commercial and industrial power products, resulting in a 90% product line transition rate into the commercial marketplace. Princeton Power is currently working with Lockheed Martin and Northrop Grumman on several projects involving microgrids. There is a huge interest today for these systems all over the country, due to the fact that the solar arrays combined with a battery bank render them safe from power outages. Princeton Power also provided the technology that made Alcatraz Island run almost entirely on renewable energy. By installing solar arrays and a battery bank on the island, Alcatraz was able to cut its dependence on foreign fossil fuels and save taxpayers 80% on fuel use.

Princeton Power Systems, Inc.

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