

CHARGE!

PRECISION COMBUSTION'S PORTABLE GENERATORS POWER
THE NEXT GENERATION OF WARFIGHTERS

The American soldier's combat superiority is supported by an increasing array of electronic devices—for communications, situational awareness, and other overmatch capabilities. But these devices all require power—and power is heavy.

A dismounted soldier can carry 16 pounds of batteries for a 72-hour mission. The fielding of the Nett Warrior Situational Awareness system improves capabilities, but doubles the battery load. Rechargeable batteries can reduce the burden, but require either heavy diesel generators (300 pounds or more) or a vehicle equipped for battery charging. These solutions limit dismounted missions.

In 2007, the U.S. Army sought to change all that, issuing a Small Business Innovation Research contract for a more efficient, effective power system for the modern warfighter. That SBIR was answered by a North Haven, Connecticut, based company, Precision Combustion, Inc., which developed a new technology that offers to eliminate most of the soldier's power load while allowing for soldier-equipped electronics support and superiority. Precision Combustion's (PCI) team has developed a compact, 15-pound, 500-watt generator small enough to be carried by a



single soldier and powerful enough that two of them can recharge batteries for a full platoon. These "Platoon Power Generators" are smaller, lighter, and less expensive than their large diesel counterparts and, despite using a small conventional gasoline engine, can run on a variety of fuels, including bio-fuels and JP-8, the military standard logistics fuel.

"It's portable power for the warrior, so a soldier could take it anywhere. It's for a more mobile, more electronics-supported platoon," said PCI president Kevin Burns. "The SBIR program gave us the chance to create this revolutionary new approach to compact power generation, and DoD's subsequent sustained support, including under the Rapid Innovation Fund and now a Platoon Power Generation program Engineering and Manufacturing Development project, are enabling transition to field maturity."

"Our robust generators include state-of-the-art microelectronics and hybridization and human factors engineering paired with advances in mechanical and chemical technology for serving warfighter requirements, improving platoon and forward operating capabilities and logistics, and filling a commercial need with its multi-fuel compatibility," added Subir Roychoudhury, PCI VP of Research and Engineering. "This is a major advance in reliable,





The fifteen-pound Platoon Power Generator is light and compact enough to be carried by a Warfighter. Two of them can power an entire platoon.

lightweight power solutions for our soldiers and first responders.”

PCI has a long history with the SBIR program. The company was formed in 1986 following two SBIR awards.

An early core innovation was a unique small catalytic reactor developed for diesel engine cold starting and emissions, and later adapted under DoD SBIR for improved combustion and to reform distillate fuels (such as JP-8) for fuel cells. In developing these spinoff applications, the Precision team created yet another new technology with SBIR support—the enhancement to operate gasoline engines with diesel fuel—that has evolved into the current lightweight Platoon Power Generation genset for soldiers. Then PCI again evolved the technology into a hydrogen augmentation component for improving auto and truck gasoline engine efficiency and emissions and is now developing hydrogen generation technology for distributed hydrogen supply.

While Precision’s earlier SBIR technologies are commercial or in advancing commercial development, newer SBIRs are tackling

such opportunities as removing copper from Navy fuels, all-electric UAVs, newer fuel cell innovations, and CO2 regenerable capture and utilization in advanced power systems and chemicals manufacture. Meanwhile the portable generator team is setting its sights on vehicular auxiliary power unit (APU) applications, where its smaller footprint can fit into available volumes.

The SBIR program has been and will continue to be part of the company’s equation, Burns said.

“For our best new technologies, because the SBIR program is highly competitive, SBIR provides seed and early-stage risk capital that we use to show promise, and begin to develop new products, with further development supported by more advanced government development dollars and industrial investment. That’s been our cycle, and it’s been successful,” he said. “We always look at something new and think, ‘How can we make this add the most value, and is there a way to get this nurtured and started and then graduate it to where it can become a product? That attitude and approach is how we’re going to continue to develop new innovations and carry them forward to market.” 🌟



Precision Combustion, Inc. • North Haven, CT

Modernization Priorities: General Warfighting Requirements (GWR), Microelectronics

SBIR contract: W911QX-05-C-0021 • Agency: Army • Topic: A03-028, Logistic Fuel Micro-Reformer

SBIR contract: W56HZV-04-C-0688 • Agency: Army • Topic: A03-238, JP-8 Gasifier and Pre-Reformer

SBIR contract: W15P7T-08-C-K401 • Agency: Army • Topic: A06-093, Efficient JP-8 Burners for Soldier Portable Stirling Power Systems