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Solar-Powered Structures

Pvilion
Brooklyn, NY
718-852-2528
www.pvilion.com

Pvilion, a solar-powered fabric provider, was recently awarded a Phase II Small Business Innovation Research (SBIR) contract by the United State Air Force (USAF) to continue its development of rapidly deployable, solar-powered structures. Through a competitive awards-based program, the Small Business Innovation Research (SBIR) Program enables small businesses to explore their technological potential and provides the incentive to profit from its commercialization.

The USAF's Rapid Sustainment Office (RSO) and AFWERX have partnered to streamline the Small Business Innovation Research process in an attempt to speed up the experience, broaden the pool of potential applicants and decrease bureaucratic overhead. The RSO's goal is to increase mission readiness by rapidly identifying, applying, and scaling technology essential to the operation and sustainment of the United States Air Force.

In moments of crisis, the USAF needs to be able to deploy structures in forward areas to support personnel, equipment and operation centers. These structures need to be agile in that they must be easy to set up quickly and be independently powered. Additionally, the structures need to provide climate control. The USAF favorably evaluated the products Pvilion presented for cost, complexity, sustainability, and required manual labor, as well as for energy independence, all with the goal of maximizing mission-objective readiness.

Pvilion's solar technology is significantly lighter, more adaptable than traditional solar options, and can be integrated entirely into a system already being installed; e.g., a tent, shade canopy, hangar, etc. With fully integrated photovoltaic fabric panels, Pvilion's structures allow for the multi-capability use by providing power, shelter, lighting, and climate control. Pvilion's commercial customers typically use its solar fabric technology in structures used for events such as music festivals, in temporary industrial worksites and in structures found in parks, municipalities, universities, and corporate campuses. These solar fabric products have been commercially available for eight years.

Pvilion has also successfully developed ways to modify framing systems and fabric to be built lighter in weight with highly insulated walls. Pvilion's high-efficiency structures are integrated with solar cells for a turnkey solution that includes climate control, improved thermal performance, and increased equipment performance and they are well suited for on-site additive manufacturing. The integrated technologies reduce cooling power requirements while simultaneously generating the power needed.

This is reported to be the first product of its kind to properly align solar, energy storage, cooling and heating for a fully offgenerator expeditionary system capable of operating in most climate conditions. The lighter technology and increased thermal performance specified by the Air Force will have applications in the commercial market, as well. Pvilion's product will both reduce the manpower required to set up renewable energy and shelter solutions, while also reducing the dependency on costly, loud, and environmentally dirty diesel generators.

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