

FINAL REPORT – EXECUTIVE SUMMARY



Project Number: R-032-041

Recipient: Packet Digital

Award Amount: \$500,000

Total Project Costs: \$1,093,076.88

Goal of Project:

To develop and commercialize transportable solar power generation modules capable of delivering up to 1kW of power for remote military installations, emergency shelters and camps, and a variety of commercial uses, as well as to reduce/eliminate the fuel requirement and reduce the life cycle cost of standard electromechanical power generation, and the noise associated with it.

Significant Findings:

This Phase I research and development project has created and demonstrated a portable solar power generation system for providing DC and AC power to the end users. This has been achieved by harnessing solar energy with high-efficiency, durable photovoltaics technology along with advanced Maximum Power Point Tracking (MPPT) and power management algorithms. The highly efficient MPPT converts solar power with above 97% maximum efficiency.

Under this project, we have created a hybrid solar power harvesting and power distribution system, combining the portability and durability of BB2590 military smart batteries as the energy storage mediums, and solar energy through efficient power conversion circuitry to provide continuous power to the user.

During winter in late 2018 and early 2019, individual electronics that we designed and built were tested several times with the solar panel outdoor and despite the extreme cold temperature, they performed well.

Field tests have been executed and significant additional features such as the following were implemented in the design, tailored towards the customer's end use (currently for military):

- Battery energy conservation algorithm;
- Battery usage balancing;
- Battery charge balancing; and
- Night time LED indicator dimming and synchronization.

Next Steps:

In Phase II Packet Digital will enhance the design of the portable solar power generation system for production readiness with the goal of simplifying the manufacturing/assembly process, refine the system to comply with the customer requirements, and perform industry and military standard tests (FCC and MIL-STD).