Mobile Solar Power

AT A GLANCE

WHAT IS IT?

- Development of advance photovoltaic technologies for portable power applications. The current status of the project is producing approximately 0.5 W/g, at $350/W with 30 percent efficiency. The goal is 1 W/g, at $50/W, while maintaining efficiencies of greater than or equal to 20 percent.
- Lightweight, High-efficiency PV (HEPV) can displace batteries at individual Marine and squad level.
- HEPV can displace generators at forward operating base level.

HOW DOES IT WORK?

- Flexible solar cell development
  - Increase efficiency, decrease cost
- Solar panel development
  - Durability and System integration
- Power system development
  - Decreased size, weight and power (SWAP); increased efficiency
- Field testing and demonstration
  - Limited Objective Experiement's with U.S. Marine Corps and Army

WHAT WILL IT ACCOMPLISH?

- Decrease in both fuel and battery resupply.
- Lighten the load for dismounted Marines.
- Increase combat effectiveness and decrease vulnerability.

POINT OF CONTACT:

Billy Short
Logistics Thrust Manager
billy.short@navy.mil

Constructed of ultra high-efficiency triple-junction gallium arsenide photovoltaic cells, these solar panels offer efficiencies in excess of 25-30 percent. Each of the three 5-micron-thick gallium arsenide layers are "tuned" to a different wavelength of sunlight, offering superb tactical flexibility, durability and efficiency.

The cells are roughly the size of a sheet of paper, and have been tested in the U.S. Marine Corps Mountain Warfare Training center. The panels can be plugged into power management systems that trickle-charge batteries while on the go, or "daisy-chained" together to charge a 5590 battery in a matter of hours.

Also being investigated is the application of crystal silicon in the use of high-efficiency photovoltaics. Equally flexible, far cheaper and with efficiencies slightly lower than gallium arsenide, the use of crystal-silicon photovoltaics offers an inexpensive alternative to conventional high-cost gallium arsenide cells.

Research Challenges and Opportunities:

- Durability of connected layers
- Inexpensive manufacturing of high-efficiency solar cells
- Tactical camouflage of exposed photovoltaic cells that does not impair performance.