

**Energy Management
Briefing for the JOINT
Committee on Tactical
Shelters (JOCOTAS) Nov
17, 2014**

**Team Leader
Collective Protection
Systems**





Prototype 2KW PowerShade in use @ Ft. Bliss, TX (2006)



Balance of Systems – Provides: Battery storage, Distribution, and Grid tie capability

Purpose:

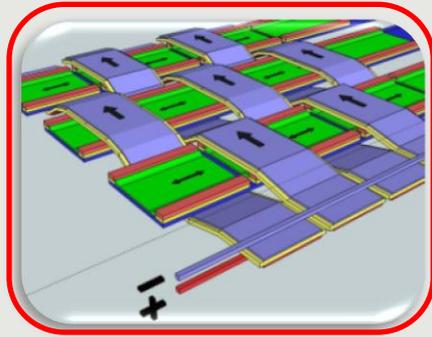
- Deliver an alternative energy based electrical generating capability that offers as attractive option /supplement to traditional fuel fired electrical generators.

Product (current):

- Textile based mesh sections with integrated flexible solar modules provides shaded area of 22' x 40'
- All poles, straps, stakes, and ratchets required for installation
- Full electronics package including energy storage charging, 120V AC on site inversion, and grid tie capability

Payoff (future):

- Reduction in solar loading via inherent shading resulting in reduced HVAC requirements for shelters set-up under PowerShade
- Reduction / elimination of fuel required for power generation - (dependent on site electrical demand)
- No MHE required for installation or strike
- Minimal maintenance requirements



Woven PV concept



Woven PV that offers improved flexibility over planar versions



Dual Use Energy Harvesting Fabric

Purpose:

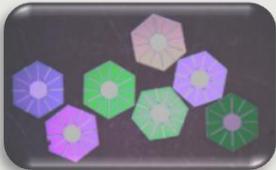
- Develop a more flexible format of an alternative energy technology that more closely mimics the drape and 3D curvature capabilities of a traditional military textile.

Product (current):

- Working photovoltaic (PV) “textile” of ~4’ square that mimics the physical flexibility characteristics of a standard tarpaulin.
- Improved PV tapes with increased conversion efficiency, and improved environmental & physical durability.

Payoff (future):

- Power producing PV in a tarpaulin or patch type format that offers improved flexibility over traditional planar flexible PV.
- Reduction in primary batteries needed by enabling in-situ charging of rechargeable variants.
- Enablement of commercial and military concepts that require a more flexible alternative energy source.



Individual PV Cells



*Multiple cells =
PV Camouflage*



*Multiple cells = PV that mimics
naturally occurring color patterns*

Purpose:

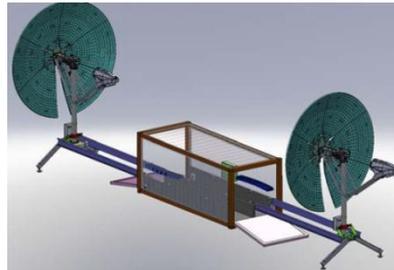
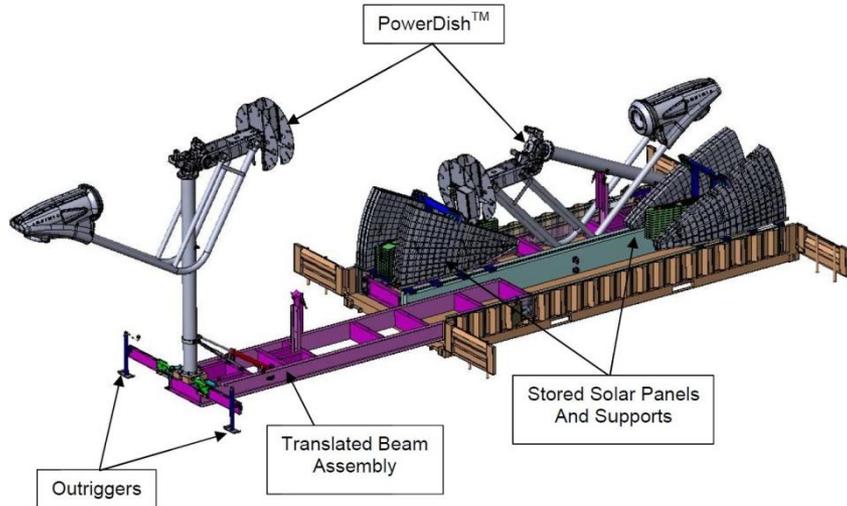
- Deliver a colorized version of an alternative energy electrical generating technology that offers the potential to mimic traditional military camouflage and naturally occurring color patterns.

Product (current):

- Colorized photovoltaic PV cells that can be combined to mimic traditional camouflage patterns or naturally occurring color patterns.
- Expect small (<2" square) working colorized PV modules as output of FY14 planned effort.

Payoff (future):

- Power producing PV integrated camouflage textiles / swatches or add-on patches
- Recharging of batteries for extended operation of covert sensor systems
- Reduction in primary batteries needed.
- Enablement of commercial and military concepts that require a naturally blending / concealable alternative energy source.



Overview

- Development of a solar thermal energy collection and utilization solution which can generate combined heat and power (CHP) for use within base camp installations
- The system utilizes a Sterling engine with potential for total system efficiencies (CHP) of +80% and an electrical production efficiency at ~24%
- Deploys from a 20' ISO containing two Infinia 3kW PowerDish systems (6kW-electrical rated)

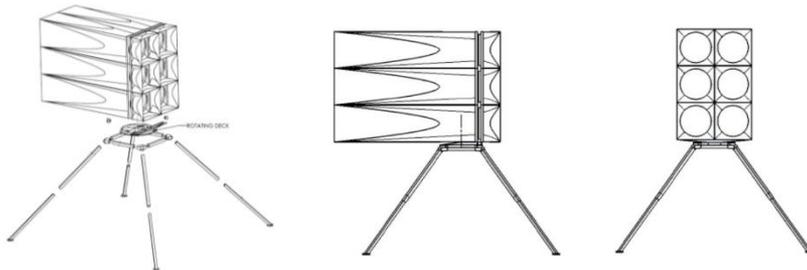
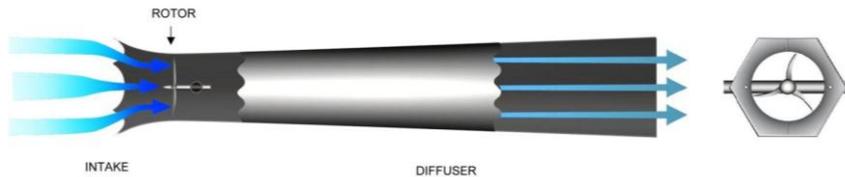
Current Status

- OSD SBIR: Infinia Technology Corp (ITC), Year 2 of Phase II
- Full scale prototype in late FY14
- Core funding for testing/analysis will be sought



Program Timeline





Overview

- Development of a rugged, redeployable, wind energy system for use in military base camp applications
- Packaged and shipped in a TRICON
- Low cost per rated watt of power production
- Production of usable electric power at low wind speeds, conducive to use in austere situations
- More annual production out of a smaller package and when compared to existing wind power systems

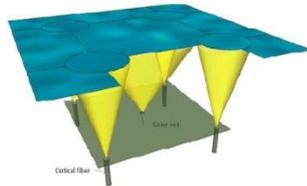
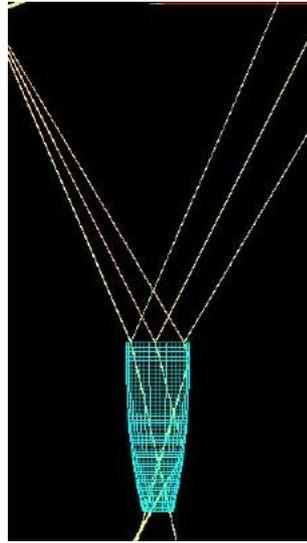
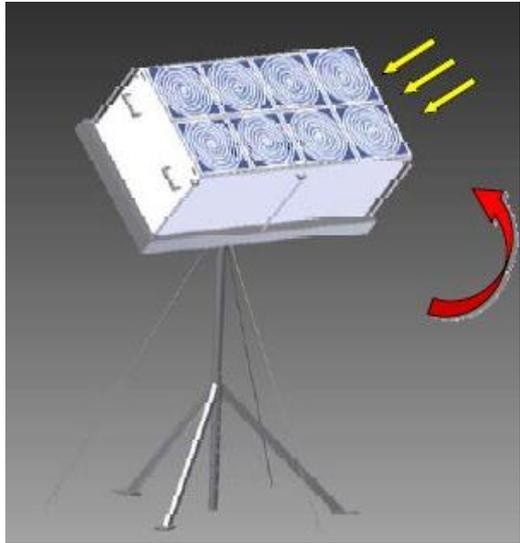
Current Status

- Army SBIR: V Squared (V^2) Wind, Year 2 of Phase II
- Full prototype delivery at the end of Phase II (3QFY15)



Program Timeline





Overview

- Objective is to develop a solar lighting system that allows the use of daylight as an interior lighting solution for expeditionary shelters
- Mitigates negative solar effects that windows or skylights experience (solar heat gain, UV damage)
- A new capability that integrates with existing (LED) lighting technologies to supplement daylight
- Daylight color temperature increases the cognitive performance and improves mood of the warfighter

Current Status

- Army SBIR: Steven Winter Associates (SWA), Year 2 of Phase II
- Full prototype delivery at the end of Phase II (2QFY15)



Program Timeline

