Portable Power Sources: One Size Fits None
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Outline
- Introduction
- The “Typical Mission”
- Active Power Management
- Fuel Cell Technologies
- Battery Technologies
- Mission Profiling
- Summary

Who Is Protonex?
- Supplier of Military Portable Power Systems
  - Fuel Cell Systems: PEM & SOFC
  - Fuel Processing: Chem. Hydride, Methanol, Propane, JP-8
  - 50W, 75W, 150W, 250W...
- Military Fuel Cell Contracts
  - AFRL, NRL, ARO, ONR, etc...
  - Power Management: AFRL
The “Typical” Mission

- Tactical UAV – 8 lbs
- GPS 2 lbs
- Beacons 1-12 lbs
- Notepad Computer 3 lbs
- Thermal Video 5.5 lbs
- Laser Target Designator 12.1 lbs
- Laser Rangefinder 4.2 lbs
- Pointers and Scopes 1-4 lbs
- UHF/VHF Radio 10 lbs
- Interteam Radio 2.2 lbs
- Spare Batteries ~25 lbs
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The “Typical” Warfighter

Typical Portable Power Scenario

- BA-5590, BB-2590, LI-145, AA, Others...
- Need spares for all – no sharing or weight/cube optimization
BA & TACP Learnings

- No two soldiers carry an identical complement of equipment
- A single warfighter varies his gear depending upon the mission
- Every soldier carries “too many batteries”
- Much carried energy remains unused – spares needed for all gear to ensure mission success

Active Power Management
Active Power Management

- Radio
- Radio
- Night Vision
- GPS
- Ranging
- Laser Des.

Protonex Power Manager

- Enables Single Energy Source
- Routes Power To Devices
- Wide Range Scavenger
- Mission Profiler

Power Scavenger

- Input: 1.5V to 36V
- Direct Solar Blanket Support
- Maximize Rate / Maximize Efficiency
- Additive to Fuel Cell
Mission Profiling

Fuel Cells: One Size Fits None
- Fully integrated power systems – fuel in, power out
- Supporting multiple fuel types
  - Hydrogen, Chemical Hydrides, Methanol, Propane, JP-8
- Hydrogen PEM fuel cell technology
- SOFC technology

Batteries: One Size Fits None
- High Energy vs. High Power
- Medipak Warrior-Pak
- MicroSun
- Li-145
- PTX-A123
- AA
Summary

- Active Power Management Reduces Battery and Mission Weight Without Reducing Soldier Options
  - Shares power among multiple devices
  - Reduces wasted redundant “spares weight”
  - Incorporates wide range scavenging capability
  - Provides mission profiling and planning capability
- Compatible with multiple fuel cell and battery technologies
- Being Demonstrated in Protonex Booth

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