



# Energy & Power Community of Interest



The Energy and Power COI's purpose is to provide technologies to enable intelligent power & energy management to enhance operational effectiveness.

### What's driving E&P S&T?

- Greater electric power requirements for advanced weapons and sensors
- Unique military systems not supported by commercial R&D require dedicated DoD S&T; DoD S&T essential to leverage emerging commercial R&D
- Demand to enhance mission effectiveness and reduce operational risk through more effective and efficient use of operational energy

### Enduring S&T Challenges:

- Thermal limitations on capabilities, efficiencies, power densities
- High voltage, high frequency, high rate pulse power
- Extend duration to reduce energy resupply
- Power distribution flexibility
- Autonomous energy harvesting in operational environments

### External OGA/Foreign Coordination & Collaboration:

#### DoD/DOE Memorandum of Understanding (MOU)

- Hybrid Energy Storage Module (HESM)
- Advanced Vehicle Power Technology Alliance (AVPTA) activity

#### Technical Cooperative Program (TTCP)

- Operational Power & Energy Research & Analysis (JSA AG-16; OPERA)
- Naval Power & Energy Group in the Maritime Systems Group (TP-4, KTA-4)

#### US/UK Stocktake

- Joint Technical Demonstrator (JTD) on Dismounted Soldier power & data

#### D3 Innovation Summit

- Microgrids to remote areas in Africa

### Industry Engagement Opportunities

1. Defense Innovation Marketplace
2. NDIA Annual Science & Engineering Technology Conference
3. ARPA-E Annual Energy Innovation Summit
4. Army-TARDEC/DOE-VTO AVPTA
5. Army Warfighting Assessment (AWA)
6. Annual Army Expeditionary Warrior Experiment (AEWE)
7. Navy Energy System Technology Evaluation Program (ESTEP)
8. Marines Expeditionary Energy Concepts (E2C)
9. Air Force Basic Expeditionary Airfield Resources (BEAR)
10. Air Force Annual Energy Optimized Aircraft Steering Committee Meeting

### Technology Taxonomy

Power Generation/Energy Conversion

Energy Storage

Power Control and Distribution

Thermal Transport and Control

Electromechanical Conversion

### Future COI Focus Areas

- High repetition rate, very dense power and energy networks for next generation directed energy weapons and high power sensors
- Materials & manufacturing for thermal management
- Power for UxV and loitering/reconfigurable munitions capabilities
- Power for Warfighter wearable augmentation

### Current Warfighter Opportunity Focus Areas:



### Technology Development Success Stories:

#### S&T Gaps and Initial Projects:

#### Operational Energy Capability Improvement Fund programs

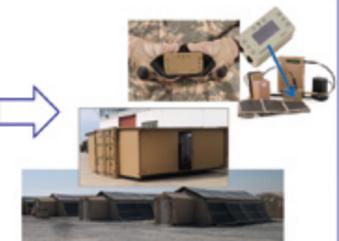
- Funded by DASD(OE), formerly ASD(OEPP)
- Research programs to improve operational energy performance

#### COI Joint Management Activities:

**E&P COI advises on S&T needs**

- 2016: Energy for unmanned platforms for the Pacific
- 2015: Improving fuel economy for ground tactical fleet
- 2014: Analytical methods and tools for operational energy in DoD planning and decision processes
- 2013: Energy S&T consortia
- 2012: Reducing energy load at expeditionary outposts

#### Products:

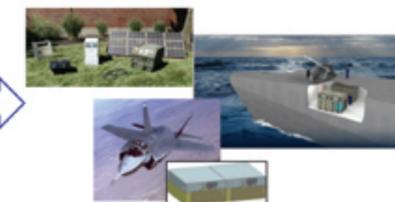


#### Hybrid Energy Storage Module

- Army: batteries
- Navy: generators and energy storage
- USAF: Electrical Accumulator Units program

**2012 Hybrid Energy Storage Module**

**E&P COI Initiative with OSD and ARPA-E**



#### Wide Bandgap High Efficiency Power Switches

- Army: ManTech in SiC WBG materials and devices
- Navy: SiC materials research, device optimization, packaging & system level testing
- USAF: SiC materials, devices, and packaging

**2014 Power America Institute**

**E&P COI drove joint DMS&T Initiative by leveraging services, which helped bootstrap DOE Institute**

