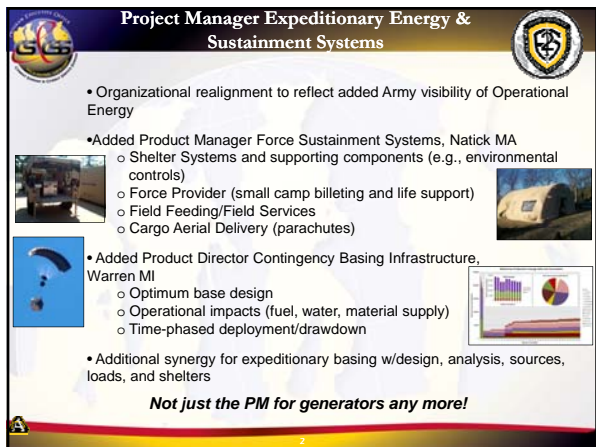




Update to Industry Project Manager Expeditionary Energy & Sustainment Systems

Electrical Generating Systems Association
Fall Meeting
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PM E2S2



Project Manager Expeditionary Energy & Sustainment Systems

- Organizational realignment to reflect added Army visibility of Operational Energy
- Added Product Manager Force Sustainment Systems, Natick MA
 - Shelter Systems and supporting components (e.g., environmental controls)
 - Force Provider (small camp billeting and life support)
 - Field Feeding/Field Services
 - Cargo Aerial Delivery (parachutes)
- Added Product Director Contingency Basing Infrastructure, Warren MI
 - Optimum base design
 - Operational impacts (fuel, water, material supply)
 - Time-phased deployment/drawdown
- Additional synergy for expeditionary basing w/design, analysis, sources, loads, and shelters

Not just the PM for generators any more!



Update on Specific Projects

- Base Camp Integration Laboratory
- AMMPS Microgrid
- Industry Opportunities



**Base Camp Integration Lab
Fort Devens, MA**


- Rapidly assess and integrate new technologies, materials, and methods related to expeditionary basing in a realistic environment
- Active training site provides Soldier feedback
- Baseline and assessment 150 man camps side by side; fully instrumented
- PM support required for new equipment evaluations
- Evaluations to date include microgrids, insulating liners and shades, rigid wall shelters, shower water reuse, TRICON-based hygiene systems



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AMMPS Microgrid

- Advanced Medium Mobile Power Sources family of sets from 5-60 kW, manufactured by Cummins Power Group
- All units have interchangeable Digital Control System (DCS)
- New software and CANBus connector added to standard DCS are only changes for microgrid capability; currently 30 and 60 kW models only
- New distribution boxes required to link 4-6 generators on common bus
- Distribution boxes contain contactors to isolate generators from bus when not operating
- Also added bus-connected battery chargers to system as set DCS are always "on"; also looking at battery charging algorithm to start sets
- Extensive fault analysis and fail-safe planning incorporated in controls (loss of comms, unexpected shutdown, improper setup, etc).
- Goal is Soldier-proof!



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AMMPS 60 kW Microgrid



4x 60kW sets on M1061 5-ton trailers

Results After 60 Days

BEFORE: Self-powered ECUs; 12 generators with 315 kW installed
AFTER: 4 generators with 240 kW installed

- 1 mechanical failure (broken belt) without loss of power
- 33 instances of low fuel shutoffs, 1 loss of power
- Fuel savings estimated at 20-30%
 - Lack of real baseline data
 - Heavily dependent on environmental conditions (ECU load)
 - Changing layout/operations
- 513 Hours on 4 sets versus 2660 hours on baseline; 74% reduction
 - 3 week subset
 - Hour meters record DCS on, not actual power generation
- Maximum power observed ~158 kW; minimum power ~60 kW

Lessons Learned

- Automatic matching of generators to load can produce significant savings in both fuel and maintenance, given wide load variations
- Microgrid can significantly improve availability of power/grid robustness
- Extensive training required, especially in grid setup
- Training still insufficient for operators with no electrical background
- Future controls will incorporate start-on-warning vs start-on-fault
- Need to simplify connections and setup



Industry Opportunities

- **Small Tactical Electric Power (STEP)** Development and Production;
 - RFP in 2QFY15
 - 2kW and 3kW sets
 - Lighter, more efficient, more reliable
 - Remote start capability to enable hybrid systems
- **Improved Power Distribution and Illumination Systems, Electrical (IPDISE)** Development and Production; RFP in FY16
 - Updates of PDISE family; 400A to 40A distribution components
 - Multiple-input boxes to support microgrids
 - Possibly some level of intelligence for load shedding
- **Advanced Medium Mobile Power Sources (AMMPS)** Production Rebuy (build to print); RFP in FY16
 - 5kW, 10kW, 15kW, 30kW, 60kW family of generators
- Follow-on families of future power sources in the 2025 time frame
 - Army desires out-of-the-box solutions