

# *Minutes of the NDIA Power Sources Committee*

**Meeting Dates:** 25 January 2017

**Location:**

**Aberdeen Proving Ground  
Building 5100, Room 128  
5100 Magazine Road,  
Aberdeen, MD 21005  
US Army CERDEC Host**

**Attachments:**

- A. Attendees
- B. Meeting Agenda
- C. Replacement of Electro Mechanical, Thermal and Magnetic Circuit Breakers with Smart Circuit Breakers
- D. Manufacturing Improvements for DLA Lithium Batteries SBIR
- E. Direct Recycling of Lithium-ion SBIR
- F. DLA Battery R&D Network
- G. Scalable Adaptable Solar Charging for Every Warfighter
- H. Domestic Production of Lithium Ion 18650 cells
- I. Forge Nano Precision Nano-Coatings
- J. Current and Future Thrusts for Dismounted Warrior Power

**Attendees:** See attachment A

**Agenda:** The agenda for this meeting is provided as Attachment B.

## **NDIA Power Sources Committee meeting**

### **Replacement of Electro Mechanical, Thermal and Magnetic Circuit Breakers with Smart Circuit Breakers (David Thomas, Mistral Inc.)**

1. David provided an overview of circuit breakers and how new developments (called Power Rider) provide significant improvements
  - a. Power Rider technology, insures switch transistors survivability under any short situation.
  - b. Power Rider' circuit breakers are designed to disclose a short circuit in a Nano- seconds time frame, and shunt the short circuit current to a charge reservoir while disconnecting the switch transistors.
2. A copy of the presentation is provided as Attachment C.

### **DLA Battery R&D Program (Matt Hutchens, DLA)**

1. Matt provided a brief overview of The DLA battery initiatives

2. This included the BATTNET program, which is a technology Implementation project to lower costs, enhance manufacturing, and advance technology for DLA's battery supply chain (which are based on Service requirements).
  - a. DLA R&D is accepting BATTNET white papers for five (5) years
  - b. The SBIRs for DLA R&D were also discussed
    - i. One of particular interest was Improvements for Military Lithium Batteries Attachment D, which would create open standards & enable competition.
    - ii. Another of the SBIRs deals with the direct recycling of Lithium-ion batteries and is provided as attachment E.
3. A copy of the DLA presentation is provided as Attachment F.

**Scalable Adaptable Solar Charging for Every Warfighter,  
(Richard Schilke, Nishati Inc.)**

1. The mission of Nashati is to manufacture, tailor and sell high performance photovoltaic solar modules, compact rugged solar racking systems that require no assembly, and complete solar energy systems for portable, semi-permanent, and fixed applications. These panels are
  - a. High Efficient (3.5 - 5% more power output)
  - b. Glass-free
  - c. Lightweight composite that is roll-able
  - d. Rugged
    - i. Complies with Mil Standards
    - ii. 5X increase in tolerance to micro-cracking
    - iii. 10X improved Flex tolerance
    - iv. 100X increase in Fatigue resistance
2. A copy of the Nashati presentation is provided as attachment G.

**Domestic Li-ion 18650 Production, (Mark Matthews, Enersys)**

1. Mark provided an overview of the Li-ion 18650 production capability at Enersys
  - a. A domestic 18650 line has been installed giving complete vertical integration from raw material to pack manufacture.
  - b. Prototype cells have been produced and the following cycle life have been demonstrated.
    - i. At 3000 cycles to 100% DOD, cells still deliver >75% of their initial capacity (test ongoing) at 25° ± 5°C.
    - ii. After 6400 cycles to 40% DOD, cells have shown no significant degradation in end-of-discharge voltage, or capacity (test ongoing) at 25° ± 5°C.

- c. Long life cell qualification is in process
  - d. UN 38.3, IEC 62133, and UL 1642 have been completed
  - e. An initial 2Ah cell design is undergoing testing
2. A copy of the Enersys presentation is provided as attachment H.

**Engineered Materials for Next Generation Batteries, (Bill Flecky, Forge Nano)**

1. Forge Nano's proprietary technology and manufacturing processes make angstrom-thick coatings fast, affordable and commercially viable for a wide range of materials, applications and industries including Lithium Ion batteries.
2. When applied to lithium Ion batteries the following results may be achieved.
  - a. 100% Increase in Charge/Discharge Cycle Life
  - b. Lower Cost of Ownership
  - c. Reduced Maintenance
  - d. 20% Energy Density Increase
  - e. Weight Reduction
  - f. Greater Electrification
  - g. Increased Safety
  - h. Reduced Internal Side Reactions
  - i. Stable Operating Envelope
3. A copy of the Forge Nano presentation is provided as attachment I.

**Energy Informed Operations (EIO), (Mike Brundage, US Army CERDEC)**

1. EIO is an automated system for controlling power input and demands on a micro grid application thereby improving efficiency and performance.
2. Mike played a video of how the EIO program provides an intelligent micro-grid solution for the warfighter. This video is available upon request.
3. Following the presentations, a tour and demonstration was provided of an EIO that had been set up in the lab.

**Current and Future Thrusts for Dismounted Warrior Power, (Mike Brundage, US Army CERDEC)**

1. Mike provided an overview of the Army's power program.
2. The big goals for Army power is to provide warfighters with power to meet their need with less (Less weight, less volume and less cost).
3. The focus at CERDEC has been on batteries, small generators, fuel cells, renewables and power distribution for the dismounted soldier.
4. Power challenges or the way forward for Army power are in the following areas
  - a. Batteries (particularly materials)
  - b. Hybrid power (ie super capacitors with a battery)
  - c. Energy harvesting

- d. Wireless power (high power mobile or micro grid- soldier charging has already been demonstrated in vehicle to soldier)
- 5. The following resources are useful to get information about Army power needs
  - a. FedBizOpps <https://www.fbo.gov/>
  - b. Cooperative research and development agreement (CRADA)
  - c. Test Services Agreements
  - d. CERDEC website <http://www.cerdec.army.mil/> (provides additional information on CERDEC opportunities and services)
- 6. A copy of the presentation is provided as Attachment J.