

CERDEC

On Energy Storage Solutions

By Mike Schena



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Mr. Jose Collazo is a Chemical Engineer at the **Communications-Electronics Research, Development and Engineering Center (CERDEC)**. He discusses with us some of the solutions that CERDEC is pioneering under the Advanced Integrated Soldier Power (AISP) and Energy Informed Operations Science Technology Objective. Mr. Collazo also explains what he believe is the best option in reducing energy demand and logistics operations.

He will be speaking at the **Operational Energy Summit on January 23-25, 2017 at the Sheraton Pentagon City, Arlington, Virginia**. His session will be on [Expeditionary Energy Sources for the U.S. Army](#).

Can you explain some of the Mobile, Modular Energy Storage Solutions at CERDEC, and how this could impact the U.S. Army?

“Some of the solutions that CERDEC is pioneering are under the Advanced Integrated Soldier Power (AISP) and Energy Informed Operations Science Technology Objective project efforts. In the past CERDEC has had some developmental effort incorporating modular energy storage for renewable micro grids and hybridized trailer systems.

Knowledge earned from these efforts have been integrated into the advancement of micro grids used in the EIO effort. AISP advances research and development of mobile solutions in the Energy Harvesting field as well as advanced electrochemical energy storage. Some of the technology that’s come out of AISP includes an energy harvesting rucksack frame that uses a spring-suspension, rack and pinion

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generation system to produce electrical energy from Soldier walking motion as well as possible ergonomic benefits.

Another solution includes an energy harvesting insole that generates power using the kinetic energy imparted by the heel-strike of a Soldier. Solar power is also another topic of interest to CERDEC as it provides yet another recharging solution to the dismounted warfighter. We are currently testing a flexible modular solar panel which is composed of ten separate modules, and can be replaced in case any module is compromised during the mission.

These energy harvesting technologies could enable Soldiers to recharge on-the-move without carrying extra battery weight as well as providing power in remote/austere locations. AISP is also developing high energy density battery chemistries to reduce mission carried weight and increase operational time without power resupply.

These solutions could impact the U.S. Army by reducing the Soldier-carried battery weight burden, decreasing the logistical burden of resupplying fuel to the frontlines, and increasing mission duration of the dismounted Soldier.”

What do you believe is the best option in reducing energy demand and logistics operations?

“CERDEC is addressing the issue of energy demand and logistics operations by developing more efficient power electronics and innovating new ways to increase the energy density of power sources or extend battery life by harvesting [renewable/alternative] energy from the environment.

AISP could provide a way for Soldiers to generate their own power and potentially attain the goal of energy independence, which would allow the Soldier to operate for an extended mission without energy resupply.”

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You will be involved in a demonstration at the summit, can you tell us what kinetic energy harvesting technology you will be showcasing, and where these energy sources will most benefit the warfighter?

“CERDEC’s Power Division will be showcasing the energy harvesting rucksack and an energy harvesting boot insole. These technologies will most benefit the warfighter in extended missions where the Soldier may be able to generate enough power from their natural motion to recharge their central battery.

The technology will also prove beneficial in scenarios where the Soldier needs to generate power for emergency communications. For example, in austere locations Soldiers may wear energy harvesting rucksacks while walking patrol or moving to an objective, then use that energy to report information to their command.”

What is CERDEC’s current budget, and what is most of that being invested in?

“CERDEC’s budget varies year by year but the ARMY’s S&T budget is 2.2 billion divided across basic research, applied research and advanced technology development.

Most of what we do at CERDEC falls into the applied research category and to fund our efforts we leverage mission dollars as well as congressional funds, Cooperative Research and Development Agreements (CRADA), and Small Business Innovation Research (SBIR).”

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Where do you see the future of energy-storage heading in the next 5-10 years, specifically as it might pertain to the military?

“I believe that in the next 5-10 years we’ll see significant advances in electrochemical storage solutions that will increase energy density dramatically. Both Energy Harvesting technologies and solar power will see improvements in component and overall efficiencies.

We’ll see advances in how power is managed and distributed among the Soldier’s peripherals. The capability to charge your central battery wirelessly and in a fraction of the time it takes now will revolutionize the way the Soldier operates in a battlefield.”

Speaking Sessions:

January 23rd: Kinetic Energy Harvesting Technology Demonstration

January 25th: Expeditionary Energy Sources for the U.S. Army



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[View Agenda](#)

“ We are excited to have an opportunity to showcase our technology and engage in conversations about providing state-of-the-art solutions to our Warfighters. ”

- Jose Collazo



OPERATIONAL ENERGY SUMMIT

January 23-25, 2017 at the Sheraton Pentagon City, Arlington, Virginia

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