

Army harnesses sun to reduce casualties from sniper attacks

Edric Thompson, CERDEC Public Affairs



The U.S. Army is harnessing the elements to help reduce casualties from sniper attacks on forward operating bases.

The U.S. Army Research, Development and Engineering Command's research laboratory and aviation missile and communications-electronics RD&E centers -- the Army Research Laboratory, or ARL, the Aviation and Missile Research, Development and Engineering Center, and the Communications-Electronics Research, Development and Engineering Center, or CERDEC -- have integrated and deployed wind and solar harvesting systems to provide continuous energy to company-level, force protection systems used by U.S. Army combat units in theater.

A joint venture by ARL, Aviation and Missile Research, Development and Engineering Center, known as AMRDEC, and industry, the Hostile Fire Detection

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Sensor, or Firefly, is a 360-degree surveillance system that uses acoustics fused with Short Wave Infrared detectors to locate enemy shooters for more accurate return fire.

Firefly detects line-of-sight and non-line-of-sight hostile fire and classifies these as small arms, heavy machine gun or rocket/mortar. It calculates geo-location of the shot and provides self-position and heading in a standard cursor-on-target format. The Firefly can be either a mobile or fixed system, attached to the Soldier's backpack while on patrol, or mounted at forward operating bases.

The Firefly system was initially deployed to Afghanistan in May 2012 to support a fires detection requirement. However, deployment sites faced challenges in sustaining conventional power delivery to Fireflies along perimeter walls due to enemy attacks when Soldiers were above the wall line changing batteries.

"In our attempts to solve the power issue, we discovered that CERDEC had sponsored the development of RENEWS power kits, which offered more complete solutions for charging the power supplies," said William Lawler, an electrical engineer in ARL's Sensor Integration Branch. "They immediately provided us with several kits, which we sent to AMRDEC for integration with Firefly and testing. Once it was determined that this solution satisfactorily extended the power supply, CERDEC provided several solar versions of the kits for deployment."

The Reusing Existing Natural Energy, Wind & Solar system, or RENEWS, enables the harvesting and utilization of wind and/or solar power and is intended to produce up to 300 watts of energy field usage in silent, remote operations where the supply of power and fuel resupply is difficult or risky, noted Daniel Berka, an electronics technician in CERDEC's Command, Power & Integration directorate, or CERDEC CP&I.

RENEWS consists of a wind turbine, three 124-watt flexible solar panels, a power conditioner, an AC inverter, and a battery storage/charging unit that contains six BB-2590 rechargeable batteries; it can be hooked into either the solar panels or the wind turbine for continuous charging. The BB-2590 battery, which was developed by CERDEC CP&I, is lighter than the standard BB-390 battery and features better capacity.

"RENEWS offers options; solar was preferred in this case, using the solar panels to charge the six-pack of batteries during the day. We connected a cable from the RENEWS kit to the Firefly, giving them 1.2 KW of continuous energy to run the Firefly system. There still was some maintenance to check the Six-Pack and clean the dirt off the solar panels, but the Soldiers are not going up there every day because the solar panels are within the walls, so they're not exposed to enemy fire," Berka said.

Limited pairings of the two systems have gone to theater as a package, with the most recent deployment being April 24.

"Integration is absolutely a critical, relevant and priority S&T (science and

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technology) investment, and RDECOM is uniquely positioned to provide this to the Army," said Dale Ormond, director of U.S. Army Research, Development and Engineering Command, known as RDECOM. "We are the only organization that has the flexibility and technical expertise to execute the Army S&T mission across a broad portfolio of services. We can draw on a wide range of strengths and technical competencies from each of our centers and laboratories to develop holistic solutions that meet real operational needs. It provides better technical solutions for Soldiers and it enhances the Army's ability to be more flexible and adaptive against asymmetrical threats."

The integrated solution also provided an opportunity for CERDEC CP&I to gather additional operational feedback to be used in efforts to reduce Soldier load and logistical support, said Pedro Passapera, chief for CERDEC CP&I's Experimentation and Simulation Branch.

"Changing power sources and delivering fuel can be dangerous for Soldiers in the field. We are always looking for opportunities to collaborate with other organizations in order to address small unit power issues while reducing the logistics footprint," Passapera said.

"Operational feedback allows us to see areas for improvements that would make the technology more effective for mission support," Passapera continued. "Other Soldiers will benefit from this because we will use the feedback to make adjustments to the current or next generation system and provide the data back to the appropriate decision makers. This was a perfect fit." said.

CP&I has deployed 40 complete RENEWS systems and more than 60 solar systems to units, Passapera noted.

AMRDEC is seeking to transition Firefly to a program of record in late fiscal year 2013, noted Timothy Edwards, Ph.D., lead for AMRDEC's Firefly team.

RDECOM, whose mission is to develop technology and engineering solutions for America's Soldiers, is a major subordinate command of the U.S. Army Materiel Command. AMC is the Army's premier provider of materiel readiness -- technology, acquisition support, materiel development, logistics power projection, and sustainment -- to the total force, across the spectrum of joint military operations. If a Soldier shoots it, drives it, flies it, wears it, eats it or communicates with it, AMC provides it.

"This integrated solution has been very successful and is still serving the warfighters in Afghanistan. Working across RDECOM truly is the best way to support the warfighter," Edwards said.

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