

FLC Northeast Region Newsletter – Winter 2008

ARDEC Selected as 2007 Baldrige Award Winner

The Armament Research, Development and Engineering Center (ARDEC) in Picatinny, New Jersey, became the first Department of Defense organization in history selected to receive the prestigious Malcolm Baldrige National Quality Award.

President George W. Bush and Secretary of Commerce Carlos M. Gutierrez announced ARDEC's selection in the nonprofit category on November 20.

"I am pleased to join President Bush in congratulating the five outstanding organizations that have been named to receive this year's Baldrige Award," Gutierrez said. "The organizations we recognize today have given us superb examples of innovation, excellence and world-class performance. They serve as role models for organizations of all kinds striving to improve effectiveness and increase value to their customers."

Named after the 26th Secretary of Commerce, the Malcolm Baldrige National Quality Award was established by Congress in 1987 to enhance the competitiveness and performance of U.S. businesses. Leadership, strategic planning, customer and market focus, information and analysis, human resource focus, process management and business results are among the criteria for the award. The program was expanded in 1998 to include education and health care organizations. Starting in 2007, the award was presented to six types of organizations: manufacturers, service companies, small businesses and education, health care and nonprofit organizations.

"We are absolutely thrilled by our selection as a 2007 Malcolm Baldrige National Quality Award recipient," ARDEC Director Dr. Joseph Lannon said. "Each member of our workforce is responsible for bringing this honor to our organization."

"The men and women of ARDEC earned this award as a direct result of what they are doing for our warfighters," he said. "I couldn't be prouder of each and every ARDEC employee."

ARDEC officials will accept the award at a ceremony in Washington, D.C., in early 2008.

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Brookhaven Researchers Discover Surface Orbital "Roughness" in Manganites

Researchers at Brookhaven National Laboratory have shown that in a class of materials called manganites, the electronic behavior at the surface is considerably different from that found in the bulk. Their findings, which were published online in the November 18 issue of *Nature Materials*, could have implications for the next generation of electronic devices, which will involve increasingly smaller components.

As devices shrink, the proportion of surface area grows in comparison to the material's volume. Therefore, it's important to understand the characteristics of a material's surface in order to predict how those materials behave and how electrons will travel across an interface, said Brookhaven physicist John Hill.

Hill and his fellow researchers at the Upton, New York, laboratory were particularly interested in how the outer electrons of atoms in a so-called manganite material are arranged. Manganites—consisting of a rare-earth element such as lanthanum combined with manganese and oxygen—show a huge change in electrical resistance when a magnetic field is applied. Taking advantage of this "colossal magnetoresistance effect" could be the key to developing advanced magnetic memory devices, magnetic field sensors, or transistors.

The research team, which also includes scientists from KEK (Japan), CNRS (France), Ames Laboratory, and Argonne National Laboratory, used x-ray scattering at Brookhaven's National Synchrotron Light Source and Argonne's Advanced Photon Source to study the orbital order—the arrangement of electrons in the outermost shell—of the material at the surface and in its bulk.

"When you cool down the bulk material to a particular temperature, all the orbitals arrange themselves in a very particular pattern," Hill said. "The question is, does the same thing happen at the surface? And if not, how is it different?"

The authors found that at the surface, the orbital order is more disordered than in the bulk material. And, even though the manganite's crystal surface is atomically smooth, the orbital surface is rough. These characteristics could affect the way electrons are transferred across a material's surface and provide fundamental information for future research and development. Next, the researchers plan to look for this surface orbital "roughness" in other materials and test its effect on magnetism.

Funding for this research was provided by the Office of Basic Energy Sciences within the Department of Energy's Office of Science.

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SSC Technology Touted During Visit by Army Chief of Staff Casey

Army Chief of Staff Gen. George W. Casey recently visited the U.S. Army Soldier Systems Center (SSC) in Natick, Massachusetts. His first stop was a meeting with soldiers, from both the U.S. Army Research Institute of Environmental Medicine (USARIEM) and the Headquarters Research and Development Detachment.

Gen. Casey noted that in the future the Army will be in many different places due to persistent conflicts and many complex environments; and the work being done in Natick will ensure that future leaders have the best equipment and protection. "If we give you the right tools, we will make you adaptable and give you a decided advantage to be successful in the asymmetrical battlefield," he said.

Gen. Casey then heard overview briefings on the Land Warrior program and SSC. A display on some of the future technologies that are being worked on at SSC followed, with body armor advances, clothing collaboration, joint precision airdrop and combat feeding highlighted.

While learning about the technological advances for the next generation of body armor, Brig. Gen. R. Mark Brown, SSC commanding general and host of the visit, told Gen. Casey that there have been nine improvements to body armor and three improvements to helmets over the past three years. Uniforms for the Marine Corps, Army, Navy, Coast Guard and Special Operations Forces were shown as an example of how SSC performs joint work for all military services. Brig. Gen. Brown mentioned that one of the future projects the clothing team will be working on is a uniform for civilians who get deployed.

During a briefing on precision airdrop, Casey learned how the technology is minimizing risk for both the Air Force and soldiers on the ground. Richard Benney, division leader for the Aerial Delivery Equipment and Systems Division, said the technology makes it possible to drop bundles very accurately so soldiers don't have to leave a protected area in search of supplies.

Also shown were two new concepts in combat feeding to support the warfighter on the asymmetrical battlefield. The Unitized Group Ration - Express, sometimes called a "kitchen in a carton," which provides a hot meal for up to 18 warfighters in a remote location, was displayed, down to the steam that rises from the box when it is activated. Gen. Casey sampled some of the menu items from the First Strike Ration (FSR), which is an answer to the field-stripping that happens to Meals, Ready-to-Eat (MRE) and includes all eat-on-the-go foods such as pocket sandwiches.

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SSC Technology Touted During Visit by Army Chief of Staff Casey (cont.)

A stop at the Doriot Climatic Chambers was next on the agenda. These chambers can reproduce environmental conditions occurring anywhere around the world. They can simulate temperature, humidity, wind, rainfall and solar radiation. Col. Beau Freund, commander, USARIEM, and Gen. Casey discussed Human Research Volunteers (HRVs) and how to improve recruitment for the program. Freund said that as a member of the medical community, he wouldn't be able to do his work without the HRVs.

Closing out the day was a question-and-answer session. When asked why he visited, Gen. Casey said that he was in Massachusetts to attend a leader development program for generals where they learn about industry and transformation. "The Army is going through the largest transformation, so it's important to get our leaders properly trained," he said.

Once he knew he would be in the area, he wanted to take the opportunity to visit SSC to see firsthand what was being done for soldiers. "I knew what they were doing was good," Casey said. "And this gave me a chance to see not only what they do for the soldier, but for the sailor, marine and Coast Guard."

Another topic mentioned was the Army Family Covenant (AFC), which is a commitment from Army leaders to increase the level and quality of services for military families. Gen. Casey said, "The forces are stressed, and it's affecting families. The covenant is a good way to demonstrate our support to the families."

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Seal Habitat Under Renovation at Woods Hole Science Aquarium

In September, construction crews began renovations on the seal habitat at the National Oceanic and Aeronautics Administration's (NOAA) Fisheries Service Woods Hole Science Aquarium, which is part of the Northeast Fisheries Science Center in Woods Hole, Massachusetts. Construction is expected to be completed this winter at an estimated cost of \$750,000. During renovations, the aquarium expects to remain open its usual winter hours of 11 a.m. to 4 p.m. Monday through Friday.

The project includes demolition of the 1960s-era seal pool and construction on the same site of a larger, more naturalistic habitat that can provide permanent accommodations for two or three seals. The general contractor for the project is Z Corp, a construction firm based in Norfolk, Virginia.

"The new habitat will provide the seals with more swimming space," said Rachel Metz, senior aquarist at the Aquarium and lead seal handler. "The habitat will be more natural looking, have more places for seals to haul-out, and more variety in water depths," she said.

The project also includes a new life support system that will allow better water quality control, as well as specialized husbandry facilities—a kitchen and seal food prep area, and a holding area for seals that are taken off exhibit.

In addition to federal funds, the project is also supported with donations made by the public between 2001 and 2005. The largest of these was granted by the Edward Bangs Kelley and Elza Kelley Foundation in 2002. Thousands of smaller donations were also made by visitors, local residents and businesses.

In the 1990s the Woods Hole Science Aquarium began providing permanent homes for stranded seals that cannot be re-released to the wild after rehabilitation. The renovated seal habitat is scheduled to be completed in time to house seals next summer.

The public aquarium has been part of the federal fisheries laboratory in Woods Hole since 1885. Since 2000, NOAA and the Marine Biological Laboratory have worked to jointly develop aquarium programs that increase public interest in, and understanding of, marine science and the marine environment.

The Kelley Foundation is a Cape Cod organization that provides grants to support projects that promote the health and welfare of inhabitants of Barnstable County, Massachusetts.

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PPPL Collaboration in Artificial Muscle Development Featured in Newscast

A partnership between Princeton Plasma Physics Laboratory (PPPL) and Ras Labs in the development of artificial muscle was the subject of a recent on-air segment on New Jersey Network (NJN) News. This collaboration, which was featured in the spring 2007 issue of *FLC Northeast News*, involves PPPL working with polymer chemist Dr. Lenore Rasmussen in the development of electro-responsive "smart materials"—electrically-driven polymers that are strong and durable enough to act as artificial muscles in prosthetic devices and robotics. The segment can be viewed on the NJN website at www.njn.net/newspublicaffairs/science/ (click on the video link "Artificial Muscle").

Save the Date—Spring 2008 Northeast Regional Meeting

The next Northeast regional meeting will take place in early 2008 at the Marriott Seaview Resort and Spa in Galloway Township, New Jersey. Hosted by the Federal Aviation Administration and the Transportation Security Laboratory, the event will be a joint meeting among the Northeast Region, FLC Executive Board, New Jersey Regional Homeland Security Technology Committee, and the New Jersey Regional Homeland Security Preparedness College.

Set on 670 acres of pinelands just 15 minutes from Atlantic City, the Marriott Seaview Resort and Spa boasts luxurious accommodations, two championship golf courses, and an Elizabeth Arden Red Door Spa.

Additional details on the meeting, including the agenda and special room rates, will be posted on the Northeast Region website (www.flcnortheast.org) as they become available. Information on the Marriott Seaview Resort and Spa can be found at www.seaviewmarriott.com.