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Office of Nonproliferation Research and Engineering (NA22)
National Nuclear Security Administration

22NEWS

Dr. Jan Cerveny is the Assistant Deputy Administrator for Nonproliferation Research and Engineering (NA22). Prior to joining the NNSA, Jan worked in a number of challenging scientific and technical assignments for the U.S. Air Force, including the Air Force Research Laboratory in Arlington, Virginia; Materiel Command / Science and Technology at Wright-Patterson Air Force Base; the Office of Scientific Research at Bolling Air Force Base, and the Armed Forces Radiobiology Research Institute in Bethesda, Maryland, to name a few. In addition to her experience with the Air Force laboratories, she worked closely with a number of U.S. government agencies including the Department of Energy, National Science Foundation, National Academies of Sciences, Environmental Protection Agency, and the National Institute of Standards and Technology before retiring recently from military service as colonel.

Welcome to the inaugural newsletter, 22News!

NA22's mission includes the development of advanced remote sensors and ground-based technologies to address the most challenging problems related to the detection, location, and analyses associated with the global proliferation of weapons of mass destruction. Our work has always included (since before 1955) R&D of equipment to monitor nuclear explosions. We build the nation's operational treaty-monitoring space sensors and produce and update regional geological datasets to support the nation's ground-based, treaty-monitoring networks. We also are committed to working with the Department of Energy's Small Business Innovative Research program and associated efforts and with the nation's universities. In these newsletters, we will highlight the important and exciting work sponsored by NA22.

Jan Cerveny
Assistant Deputy Administrator

Research Highlight

NA22 has sponsored groundbreaking research in the development and manufacture (in this case, "growth") of large, high-quality crystals for radiation detection systems. Today, the standard detector material is sodium iodide (NaI). NaI detectors are limited in their ability to resolve higher energy radiation, particularly gamma radiation from special nuclear materials. It is therefore only possible to determine that a radioactive source is present, while the specific threat may not be identified correctly. Another material, cadmium zinc telluride (commonly abbreviated as CZT), resolves the higher energies, but because current processes produce CZT crystals in such limited numbers and of insufficient quality, commercial manufacturers needed ways to improve both.

Traditionally, the manufacture of CZT crystals involves a high pressure and high temperature method that is complicated and very expensive. The quality of crystals grown by this process is not uniform and the output itself is quite small. Using a low-pressure technique not only results in increased product yield (larger crystals), but also it is more manufacturer-friendly and less expensive. The product is also more deployable because detectors made with such crystals do not need to be cooled (either with liquid nitrogen or a mechanical cooler). Because the detectors operate at room temperature, they require less power and less maintenance. Additional improvements are being researched to improve the quality of the crystals being grown because both size and quality are necessary, first to simply detect the radiation and then to successfully characterize the high-energy gamma spectra.

NA-22 has brought together researchers from the DOE community (Los Alamos National Laboratory, Lawrence Berkeley National Laboratory, and Pacific Northwest National Laboratory), the academic community (Washington State University, University of Michigan, and Fisk University), industrial partners, and the Department of Defense to collaborate on a single, next-generation radiation detection system that will not only detect but also identify radioactive materials to meet the needs of civilian and defense agencies and the public against radiological threats.

Recent Events

NA22, along with NASA, Motorola Labs, Inc., and the Department of Homeland Security, sponsored the *Intelligent Sensor Systems for Remote Monitoring Workshop* in April 2004. This workshop was the second of in a series whose goals are determining technology shortfalls in complex, broad-area remote monitoring systems. The information gained from these workshops and the many technical experts from the Department of Energy, other government agencies, university collaborators, and private industry will help develop a national remote-monitoring roadmap to aid government agencies in allocating resources for critical technology areas and in guiding industry in corresponding efforts.

Michael O'Connell

Program leader of NA22's Nuclear and Radiological National Security Program since 1995, retired in June. Mike began his federal service in 1971 as a research physical scientist with the Radiation Programs Laboratory, Environmental Protection Agency, in Las Vegas, Nevada. He researched the fate and transport of heavy elements and radionuclides; this work supported the Clean Air Act and Safe Drinking Water Act. He was an advisory panelist on low-level, waste-site licensing issues.

Mike checking out an experimental setup.

In 1984, Mike joined the Department of Energy's Nevada Operations Office, where he served with its emergency response division, and supported the nation's Nuclear Emergency Search Team as a manager.

Since 1990, Mike has served as a senior scientist in the Office of Nonproliferation Research and Engineering (NA22). Applications for NA22's research are in arms control, intelligence, defense, and homeland security. Mike has a long history of fostering innovative technology developments for the Intelligence Community. A number of these have led to important technology demonstrations for senior government officials and have found operations applications in different parts of the world.

Mike has continually fostered interagency partnerships, to benefit both the Department of Energy and to maximize taxpayer resources. He oversaw for many years the *Arms Control and Nonproliferation Technologies* publication, an outreach effort to the user community. He spent two years at the Defense Threat Reduction Agency, as liaison between DOE and DTRA. In addition, he began an innovative effort to transfer technology to U.S. law enforcement agencies. This effort continues to provide DOE support to the FBI and local law enforcement.

Mike was on the frontlines following the events of September 11th, 2001, supporting the U.S. Customs Service and the Port Authority of New York and New Jersey to rule out nuclear terrorism. These initiatives became the basis for the Department of Homeland Security's radiological and nuclear science strategy. He also provided key leadership to the newly established efforts of the National Security Council-led Counterproliferation Technology Coordinating Committee that seeks to craft a five-year, government-wide investment strategy in this area.

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