

DHS changes tack on radiation detection

Homeland Security unveils new policy to use off-the-shelf systems in preventing the smuggling of nuclear materials.

The US Domestic Nuclear Detection Office (DNDO) has terminated a seven-year effort to develop next-generation radiation monitors for screening cargo at US ports of entry. The Advanced Spectroscopic Portal (ASP) system, a sodium iodide-based monitoring system that was first proposed in 2004, failed to attain its design specifications after multiple rounds of testing and software tweaking. Conceived to be capable of discriminating nuclear materials from harmless radioactive sources that are often shipped in cargo containers, the ASP system was claimed by vendors to reduce by 80% the number of false alarms that occur with today's polyvinyl toluene (PVT) portal monitors. Unlike the scintillator-based PVT, ASP technology allows the specific isotopic source of radiation to be identified by its characteristic emission spectrum (see PHYSICS TODAY, June 2010, page 22).

Warren Stern, DNDO director, announced ASP's termination in testi-

mony to the House Committee on Homeland Security on 26 July. Stern said the agency has no current plans to develop another portal monitoring system. Instead, the DNDO is adopting a "commercial first" approach that will make use of commercially available detection equipment, he said. The agency also is focusing on developing radiation detection standards and testing devices against those metrics.

The DNDO did not respond to requests for details of the commercial systems mentioned by Stern. But SAIC, TSA Systems, Canberra Industries, Berkeley Nucleonics Corp, Princeton Gamma-Tech, and Tetrax Systems all advertise spectroscopic radiation portal monitoring systems. Such monitors are already in use at major non-US ports as part of a nonproliferation program operated by the Department of Energy's National Nuclear Security Administration. In July, Barcelona, Spain, became the 38th port to install portal monitors



with funding and technology supplied by NNSA's Megaports program. More than 100 ports, handling 50% of the world's global shipping traffic, eventually will be covered.

To replace with ASPs the more than 1400 PVTs now in operation at US ports of entry would have cost up to \$2 bil-

Thailand hosts international physics competition

The five-member high school teams from China, Singapore, South Korea, and Taiwan each took home all gold medals from this year's International Physics Olympiad, which was held 10–18 July in Bangkok, Thailand.

Taiwan's Tzu-Ming Hsu was recognized for the best overall score, and competitors from China and Kazakhstan tied for best theoretical score. The Thai home team garnered three golds. A record 393 students from 84 countries participated this year.

The US team earned the fifth-best aggregate score. Brian Zhang of Palo Alto, California, and Ante Qu of Princeton Junction, New Jersey, each won golds. Lucy Chen of Ames, Iowa, Andrew Das Sarma of Silver Spring, Maryland, and Eric Spiegler of Naperville, Illinois, garnered silvers. US team expenses not paid by Thailand were covered by the American Institute of Physics, the American Association of Physics Teachers, and the American Physical Society.

The theoretical questions this year involved gravitational perturbations in a three-body system; electrified soap bubbles; and Rutherford scattering by a neutral, polarizable atom. Both experimental problems challenged participants to analyze black boxes. In one, the geometry of sliding capacitor plates had to be determined; in the other the location of a ball inside a tube had to be pinpointed by measuring pendulum behavior and the center of mass.

"The questions were simple and short, but at the same time quite demanding,"

says Sirapat Pratontep, a lecturer at King Mongkut's Institute of Technology Ladkrabang in Bangkok, who, as a member of the olympiad's academic committee, helped design the competition problems. The recent trend toward open-ended and less-guided problems continued, says US team coach Paul Stanley of Beloit College. "The experimental problems were 2 pages long as opposed to 20." And although the average scores on labs were lower than with more structured exams, he says, the labs that require students to think more on their own "do a better job of distinguishing the good students from the phenomenal ones."

Princess Maha Chakri Sirindhorn presided over the opening and closing ceremonies. She handed the students their medals—for which students had practiced bowing.

Next year's olympiad will be held in Tallinn, Estonia.

Toni Feder



High school olympians on a sightseeing trip to a rose garden near Bangkok, Thailand, between tackling physics problems.



Radiation portal monitors
are installed at all US seaports
and vehicle border crossings.

lion, according to a 2009 Government Accountability Office report. Even a scaled-back acquisition the Department of Homeland Security proposed last year would have cost \$350 million, said Representative Brad Miller (D-NC), the former chairman of a House subcommittee that held two hearings on the ASP program. Miller said ASP was "one of the most technically troubled, poorly managed programs I have ever seen." He welcomed its termination.

False alarms were the major motive for ASP's development; according to the 2009 report, PVT monitors log up to 600 false alarms each day at the nation's busiest ports, Los Angeles and Long Beach, where nearly half of all sea containers enter the US. The detectors are triggered by naturally occurring radioactive materials in such benign products as cat litter, ceramics, fertilizers, televisions, and abrasives. Because PVTs cannot identify the radiation source, labor-intensive inspection of those containers must be performed by Customs and Border Protection agents with handheld detectors.

Impeding the flow of commerce

Virtually all cargo containers imported to the US by road and sea, and all vehicles entering through border crossings, are now scanned for radiation. But Congress has not required radiation monitoring for rail and air freight. Stern said it will be "years, not months" before those imports are routinely monitored. Railroad companies have resisted such screening, and they typically own the land where portal monitors would have to be installed. Stern said that variation among US airports makes a generic

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monitoring system for air freight infeasible. But he also said that the DNDO has five mobile radiation detection units that can be deployed quickly to railroad crossings or airports should intelligence indicate a heightened threat of nuclear materials smuggling.

A National Research Council report issued in January said that ASP vendors had not provided the modularity that was specified by the DNDO in order to match the best available hardware with the optimum data-analysis algorithms and to allow upgrades as experience was gained with the system. The report also noted that upgraded software for existing handheld detectors had improved performance to such an extent that handhelds should be evaluated as an alternative to ASPs.

Stern said the DNDO is now acquiring a next-generation handheld device called RadSeeker, which employs a "novel detection material" that he did not identify. The same technology could "in theory" be used in next-generation portal monitors, he said. The Obama administration's request for fiscal year 2012 includes \$20 million to acquire handheld units. Stern said a standard for handheld radiation detectors is now being finalized in cooperation with NIST.

David Kramer

news notes

Expanding Perimeter.

The Perimeter Institute for Theoretical Physics (PI) in Waterloo, Ontario, has set in motion plans to become the world's largest concentration of theoretical physicists. Founded in 2000, the Canadian institute quickly grew to more than 100 researchers; it plans to reach 250 in the coming years. A three-day grand opening this month celebrates a new building to accommodate the planned growth. Events will be open to the public.

The \$29 million, 5100-square-meter building hovers over a corner of the original PI facility. The new structure has been named the Stephen Hawking Centre because Hawking is "an inspirational figure for his scientific research, his mentorship of young physicists, and his unequalled communication of a love for scientific discovery to the world," says PI director Neil Turok. The institute "is similarly devoted to research, training, and outreach."

The expanded PI includes space for participants in a 10-month course of study that offers a master's degree from the University of Waterloo and a certificate from the institute. The Perimeter Scholars International program's third

entering class starts this fall with 39 students from 21 countries.

The grand opening will take place on 16–18 September. Events are free, but tickets are necessary. For more information, see <http://perimeterinstitute.ca/grandopening>. TF

Goudsmit collection online. Occupying nearly 12 meters of shelf space, including 69 000 images, the papers of Samuel Goudsmit made their digital debut in July. It is one of perhaps a dozen complete archival collections online, and the first in physics, says Melanie Mueller, who led the project at the Niels Bohr Library and Archives of the American Institute of Physics. The collection is a mix of research papers and personal reflections from the 1920s through the mid 1970s.

Goudsmit's most significant contribution to physics was the 1925 discovery, with fellow student George Uhlenbeck, of electron spin. Two years later Goudsmit moved from the Netherlands to the US. During World War II, he participated in the US Alsos mission to investigate Germany's atomic bomb project. In 1958, during his nearly quarter-century tenure as editor of *Physical Review*, he founded *Physical Review Letters*.

The collection contains sources on the development of quantum physics, Germany's failed atomic bomb project, postwar physics research,



Samuel Goudsmit at the wheel in Germany in April 1945, while serving on the Alsos mission.

and scientific publishing.

On the more personal side, in letters to Goudsmit a student who preceded him to the US described the preeminent East Coast physics departments as "sleepy affairs," and told about chaotic railroad schedules and poison oak. Later a convicted murderer sought Goudsmit's help in publishing his life story.

The digitization is part of the Niels Bohr Library and Archive's ongoing effort to put its most popular resources online. The collection is accessible free of charge at <http://www.aip.org/history/nbl/collections/goudsmit>. TF ■

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