

Modernized system to manage codes for nation's nuclear weapons complete

Multiyear project delivers 14 custom products; now operational in Europe

By Ken Frazier

An ambitious Sandia-led program to fully update the code management system that supports control over use of the nation's nuclear weapons has completed a major milestone.

The Code Management Systems (CMS) project completed a multiyear, full-scale engineering effort at Sandia with its first full system delivery of all hardware and software to two Department of Defense customers. On Nov. 30 the system became operational for the first time for weapons in Europe.

Labs develops its first custom processor, the Sandia Secure Processor. See story on page 5.

Code management systems and ancillary equipment are in place at headquarters command sites and at various bases in the field. They are used in conjunction with Sandia-designed permissive action links, or PALs, inside US nuclear weapons to recode, unlock, lock, and manage the weapons, while ensuring the secrecy and authenticity of command-and-control messages.

The systems allow those having custody of

"We wanted to develop a system that was modular in nature, so that it could be maintained and upgraded in pieces as needed in the future. It was a huge team effort."

weapons with PAL systems to plan, store, change, interrogate, track, use, or otherwise manage all necessary code-related information. This is a critical part of ensuring that weapons can be used when authorized and cannot be used when not properly authorized.

The Code Management System coupled with the B61 ALT 339 retrofit enables the recoding of nuclear weapons in a fully encrypted manner. This new class of code management equipment designed by Sandia greatly simplifies use and logistics for personnel. It replaces a variety of different vintages of code-management equipment that had been produced and put into place at different times and for different weapon systems and users

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World's smallest microchain drive fabricated at Sandia

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Nine Labs teams win Sandia President's Gold Quality Awards

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Z-Beamlet

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we do that counts."

Keynote speaker Mike Campbell, former director of the LLNL National Ignition Facility and now vice president of General Atomics, headquartered in San Diego, Calif., offered the long view. "A million and a half years ago, a human ancestor — probably a woman — invented the controlled fire we all sit comfortably around today," he said. "A million and a half years from now, our descendants will recognize the contribution of the generation that brought the world the unending power supply of nuclear fusion." He praised "the Labs, DOE, and politicians who had the ability to stand up for a dream not for the faint-hearted."

Dave Crandall, director for research, development, and simulation at DOE's National Nuclear Security Administration, said simply of recent breakthroughs, "The people who made this possible are my heroes." He described Sandia as a "master of electrons," LLNL as a "master of photons," and LANL as a "master of neutrons." He said that now at Sandia, it was time to "go get those neutrons."

Said Sandia's Senior VP for Nuclear Weapons Tom Hunter (9000): "I don't think there's any better example of bringing together science, engineer-

ing, and results than what you see here today. It builds confidence in the American public, and it builds fear into the adversaries of this nation."

After a rapid tour of the large and complicated machines, Heather Wilson said, "I don't even know how you came up with the idea that this thing could be done." She said she hoped the researchers didn't lose through familiarity "the sense of how special this work is."

Domenici, who spoke last, closed on a realistic note. "I wouldn't think that the administration would choose this work as a very high-priority item. They'll go with their plans right now."

"But I do believe this work is so successful, has so much opportunity to succeed, and needs so little money in comparison with other projects in this field, that we'll get it funded, keep it going, and see it reach fruition."

"Then, perhaps, we'll have another day of celebration. And it won't matter to me where it is."

Sandia Executive VP Joan Woodard presented Domenici and Wilson with Z-Beamlet jackets — which they donned immediately — to keep them



THE WAY THINGS WORK — Sandia Z-Beamlet project leader John Porter (far left) holds forth to (in order) Sen. Pete Domenici, R-N.M., Sandia President C. Paul Robinson, and Rep. Heather Wilson, R-N.M., along with assorted Sandia High School science students, on how Z-Beamlet analyzes pellet compressions obtained by Z firings. The object on the table is one of Z's targets. The photo was taken in the renovated building housing Z-Beamlet in Area 4. (Photo by Bill Doty)

warm on the stage and in Washington, as well as to help them remember the Sandia laser and accelerator.

A video explained the somewhat complicated operation of the two machines for the benefit of guests, who included science-oriented students from Sandia High School, present by invitation.

Exceptional service? How about 50 years' worth!



HORACE POTEET, a weaponeer whose own career almost exactly parallels Sandia's entire history, retires this month after 50 years with the Labs. Read Chris Burroughs' profile of this remarkable Sandian, beginning on page 7.

Z-Beamlet celebration highlights scientific effort, political will

By Neal Singer

On a cold and windy day in a large tent put up for the occasion, Sen. Pete Domenici, R-N.M., and Rep. Heather Wilson, R-N.M., joined NNSA, Sandia, and private dignitaries behind the electronic gate in Area 4 to celebrate with several hundred Sandians and their families the successful operation of Z-Beamlet, the third largest laser in the world. Its beam recently peered into the heart of Sandia's Z accelerator to record that machine's smooth reduction in size of a prototype fusion pellet.

Sandia President Paul Robinson, who hosted the event, opened by looking over his shoulder at Domenici and Wilson and asserting coolly that the \$12 million used to dismantle, haul, store, and reconfigure the laser, discarded two years ago by Lawrence Livermore National Laboratory, was "one of the best investments you ever made."

Domenici, looking around at the billowing canvas walls, contrasted "the shiny buildings in which the breakthroughs were made" with the somewhat chilly space in which he spoke. "Remember that it's not the kind of environment in which we share our success, but what

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