CURRENTS





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March 2008

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My View

Thoughts on complex transformation

Editor's note: The National Nuclear Security Administration recently announced its proposed plan for the transformation of the nation's nuclear weapons complex that calls for a "nuclear weapons infrastructure that is smaller, safer, more secure, and more cost effective." In the following, Joe Martz, the nuclear weapons program director in the Principal Associate Director for Weapons Programs, shares some of his thoughts on the proposed complex transformation with Currents.



About the cover: Dennis Montoya of Explosive Applications and Special Projects prepares for an experiment (inset) at the Lower Slobbovia firing site. See Page 4 for story. Photo by Dixon Wolf

Currents: How do you see stockpile stewardship evolving and relating to complex transformation?

Martz: I was raised in Los Alamos, and it is really the whole reason I came back after college. My senior year of high school in 1983 also was the 40th anniversary of the Laboratory. There was a reunion of Manhattan Project scientists, and many of the great names of 20th century science had come back to Los Alamos-Richard Feynman, I.I. Rabi, Edward Teller, Hans Bethe, I was one of about 30 science-minded kids who were invited to three days of talks. The one I'll never forget came from Hans Bethe. He talked about how stars die, the physics of supernovas.

Then he talked about the obligation that his generation had created, and he said to us, "It is up to your generation to find a way out of this problem that we created—nuclear weapons."

I believe there now exists a means to protect our national security while lessening the cost of nuclear deterrence, and the Laboratory sits at the heart of that means. It's the idea of a capability-based deterrent. *Currents*: What do you mean by a "capability-based deterrent?"

Martz: If we are extremely competent and demonstrate the capability to reconstitute nuclear weapons, convincing both allies and adversaries that the capability is assured and agile—that capability in and of itself becomes a component of deterrence. It's a compelling idea. Our security rests not so much on the products of our work, but on our work itself.

Currents: What do you see as the most important factors in achieving complex transformation?

Martz: Transformation of the complex comes down to one key thing: timing. If you're going to rely on capability to protect your security, you have to be so agile that no adversary can surprise you. That means that timing counts, months and years matter. Being able to do what's required in 12 to 14 months compared to three years makes a big difference.

Currents: Does that kind of agility exist today?

Martz: Some of it does. A good example took place during the Reliable Replacement Warhead competition. The typical historic weapons hydrodynamic test took between 18 and 24 months, with existing designs and parts. During RRW, from the time we conceived the design to the time we were ready to conduct the first hydrodynamic test was less than 12 months. That is a direct demonstration of the agility needed in complex transformation. *Currents:* Do you think complex transformation also might enable non-weapons science?

Martz: Yes. One example is MaRIE. The development of this new fundamental science facility, Matter Radiation Interactions in Extremes, will bring to bear experimental tools that will allow us to measure areas where in the past we were just taking a pretty good guess.

Currents: On a personal note, what do you consider to be one of your main contributions to science?

Martz: No one accomplishes any important element of their career alone. There is nothing I've done that I can say I did by myself. The successes that I've been part of have all come about because I've been able to work with some of the best and brightest people at the Laboratory throughout my career. I've been part of incredible teams conducting the Octave test series, the RRW competition, bringing pit surveillance to Los Alamos, and many others. Seeing and appreciating the genius of John Pedicini's incredible ideas in RRW was probably the highlight.

'I believe there now exists a means to protect our national security while lessening the cost of nuclear deterrence, and the Laboratory sits at the heart of that means. It's the idea of a capabilitybased deterrent.'

Public hearings on draft Complex Transformation SPEIS

The National Nuclear Security Administration is holding public hearing at locations across the country on the draft complex transformation Supplemental **Programmatic Environmental** Impact Statement (SPEIS). NNSA officials will be available to discuss the draft and answer questions. The public also will have an opportunity to provide oral and written comments. Five public hearings are scheduled in four New Mexico cities — Socorro, Albuquerque, Los Alamos, and Santa Fe. An additional meeting may be held in Española. For dates and times, go online to http://www. complextransformationspeis.com/ news.html). NNSA distributed more than 2,000 copies of the draft SPEIS, and the public has until April 10 to review and provide comments.

Commitment



Eric Sanders, left, and Joe Lloyd, both of Explosive Applications and Special Projects, review data gathered from an explosives experiment while inside a bunker at a Laboratory firing site.

It takes a village ... safe and successful explosives testing requires group effort

Each year, the Laboratory conducts numerous explosives experiments at its firing sites for a host of customers. On average, between 16 and 20 shots take place a week, weather and other factors permitting. With the quantity and nature of the work, it is essential that these experiments are meticulously planned and safely executed. And thanks to some of the best teaming in the Laboratory, that's exactly what routinely happens.

Employees like Ken Uher of the Weapons Facilities Operations (WFO) Division know firsthand how much teamwork goes into projects at the firing sites.

"It's a different group of people out here. It's really a tight group. There's a lot of trust," he said. "I've been here 25 years, and I'm still impressed with the technical capability and the professionalism of the people who do this work."

"We all keep each other's back," said Tommy Herrera of Explosive Applications and Special Projects (DE-6). "We double check each other. I've been at almost every firing site, and I've learned a lot from my co-workers over the past 28 years."

An enhanced-blast explosives experiment currently being conducted at the Laboratory for a federal agency epitomizes the amount of teamwork it takes to get the job done. Project leaders and firing technicians started planning the experiment last fall.

Chemist Bryce Tappan of DE-6 is the primary investigator on the project, whose goal is to characterize the TNT equivalence of new

Explosives testing

materials he developed. Tappan began work on this experiment more than two years ago. "It's a rigorous process," he said of explosives testing. "It's a new learning experience every few months. I think it's very academically stimulating."

The initial ideas behind explosives experiments may come from individuals, but the evolution from idea to actuality requires the efforts of an entire team. "The scientists come up with the concept; they have the theory behind what they're hoping to accomplish. But it's really the technicians who take it from conception to reality," explained Victor Sandoval of WFO Division.

One such team member is explosives technician Joe Lloyd of DE-6, who scales up the energetics of an explosives shot, starting with very small amounts (milligrams) of materials and scaling them up to grams and eventually to pounds. "We want to find out what defines a specific explosive as compared to other explosives," he said.

A team also might include Lee Gibson of DE-6, who runs the Cooke camera, which captures video of an explosion, and Dennis Montoya of the same group who operates the mega-sun lighting system that acts like a giant flashcube to backlight the explosives. Montoya also does explosives safety testing.

"It's important to get data, but we want to do everything safely," said Montoya. "The work we do can be hazardous, but because of training and the strict procedures that we follow, the work is conducted in a safe manner."

The crucial person who took the aforementioned enhanced-blast explosives experiment from concept to reality is Eric Sanders of DE-6, who has been doing energetic material characterization and testing at the Laboratory for five years. He was in charge of designing and fielding the experiments.

Being team oriented, having a good attitude, respecting co-workers, and being willing to ask questions are important personal traits required to do this type of work, notes Mike Montoya of WFO Division. "I've been involved in explosives operations for 39 years, and I've found that having the right attitude is key. If a person works well with others and doesn't mind being checked, double checked, and triple checked, that's the kind of person we're looking for," he said.

"This is really, exciting challenging work," said Sandoval of WFO Division. "Everyone who works [at the firing sites] feels that the work we do is extremely important. A lot of what gets done here is in support of our national defense. It ensures that our arsenal is safe."

Eric Sanders, kneeling, and Tommy Herrera align data-gathering equipment in preparation for an explosives experiment at the Lower Slobbovia firing site.

-Steve Sandoval



'It's important to get data, but we want to do everything safely. The work we do can be hazardous, but because of training and the strict procedures that we follow, the work is conducted in a safe manner.'

Focal Point The handwriting's on the wall Lab researcher leaves his mark among the greats

It's not often a researcher is remembered in the presence of Albert Einstein, Enrico Fermi, J. Robert Oppenheimer, Ernest O. Lawrence, Max Planck, John von Neumann, or other titans of science who have left their mark on human understanding during the past century. Along with their mark on physics, these scientists literally left their mark on a wall—the wall of Leiden University.

Condensed-matter theorist Alexander Balatsky recently joined a handful of Los Alamos researchers who have had the privilege of signing their names alongside signatures of preeminent scientists who have given colloquia at the Lorentz Institute at Leiden University in the Netherlands.

"It is quite an honor to speak at the Institute," Balatsky said. "The colloquia was started by Austrian physicist Paul Ehrenfest back in 1912, when he joined the Leiden faculty, and is very highly ranked in Europe."

The Colloquium Ehrenfestii transformed into regular public lectures on theoretical physics in 1921. The university has drawn presentations on the leading edge of physics ever since. To commemorate each talk, presenters are invited to sign a wall at the Institute. After the Institute was rebuilt in the 1960s, the original wall, which contains signatures of Einstein and similar luminaries, was retained and incorporated at the Institute's present location. Los Alamos researchers Kevin Bedell and Wojciech Zurek are among more recent signers.

In the tradition of colloquium founder Ehrenfest, speakers are asked to present their subject matter so anyone in attendance can easily understand it. To do so was not such an easy task for Balatsky, who was refining ideas about how certain types of crystals don't necessarily transform from one state to another—such as from an electrically conducting state to an electrically resistive one—in a smooth, homogeneous fashion. His research into this inhomogeneity was part of a recently published paper in *Nature* that helped view a Mott metal-insulator transition in a vanadium crystal, something that had never been witnessed before.

"As I was preparing my talk, I attended a banquet held in the cafeteria, and I noticed that some of the faculty members were, you know, looking at me. It was kind of like they were thinking, 'Well, we will see how good a speaker he is." Balatsky said. "Of course, I could not eat very much, as the pressure was on."

Some time later, during the questions and discussion that followed the colloquium, several people came up to Balatsky and said they enjoyed his talk very much. "I didn't see anyone out in the halls laughing, so I guess I did okay," he said with signature good humor.

"Then Jan Zaanen, the organizer, comes over with this very fancy screwdriver and leads me to the wall," Balatsky recalls. "They have glass over the wall, and the glass is held in place with these special screws. He removed the glass, I signed the wall, and he put the glass back up. Even though it happened very quickly, one has a sense of touching something important . . . a piece of science history."

Alexander Balatsky of Condensed Matter and Statistical Physics

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Focal Point



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High-flying support for first responders teamwork key to ASPECT's success

Within 48 hours of the September 11, 2001 attacks on the World Trade Center, Bob Kroutil of Biosecurity and Public Health knew he'd have a role to play. Just how much that role would take over his career, however, was a surprise.

Kroutil was recruited to Los Alamos from the Department of Defense Chemical Research, Development and Engineering Center in Edgewood, Maryland, by Bioscience Division Leader Gary Resnick and former Laboratory staffer Bill Earl some five years ago.

Having worked for 18 years in the field of chemical sensing for battlefields, Kroutil's skills were tapped for a project known as ASPECT, the Airborne Spectral Photometric Collection Emergency Response Project.

Operated by the Environmental Protection Agency (EPA) and supported by the Laboratory, ASPECT deploys chemical- and radiologicaldetection equipment in an aircraft-system platform to emergency first responders. Cruising back and forth over crashed trains, burning chemical facilities, even California wildfires, the airborne platform provides essential information to the Department of Homeland Security as to the safety of their response teams on the ground and in harm's way. Kroutil and the EPA pilots and crew have mobilized on more than 60 emergency response efforts since the 9/11 days, with about a dozen other special assignments for high-profile events, such as national political conventions. But it's definitely a team effort, he notes. "There are capabilities at LANL we've been able to pull in to assist us."

On a daily basis, Kroutil works to upgrade the sensors that fly aboard the EPA plane and tweak the software. "As we migrate to more and more planes, we'll continue to improve the sensors and upgrade the software," he said.

"Most of the data analysis and software development occurs at Los Alamos, and the CTN-5 [Network Engineering] folks who run the servers at the Lab have been very helpful in providing servers for this capability. The video conference team also has been extremely helpful. We video link to Washington, D.C., or to a state during an emergency, and they've been really forward looking to integrate their technology and the knowledge base so we can provide this capability for first responders. This thing would just not go without the support of the Web, server, and telecon teams."

-Nancy Ambrosiano

Focal Point

Clearing the way It's been a busy winter



The U.S. Postal Service has nothing on these guys. Neither rain, nor sleet, nor gloom of night stops KSL Services grounds crews from making sure Laboratory roads, sidewalks and parking lots are cleared of snow. And they've been especially busy this winter.

In this photo, Rodger Martinez uses a fourwheel drive, all-terrain vehicle to clear a sidewalk leading into the National Security Sciences Building. Martinez is one of about 100 KSL Services employees who work in shifts plowing Laboratory roads and removing snow from sidewalks, walkways, and parking lots.

KSL conducts snow-removal operations on 161.2 miles of roads and streets around the Lab and nearly 25 miles of sidewalks, including handicap accessible ramps. In addition, KSL crews clear 10,528 parking slots, including the open-air slots at the two parking garages at Technical Area 3.

"Any way you want to serve it up, for motorists, for pedestrians, it's all about safety," said John Keene of KSL Services. "Everyone who is out there shoveling snow is doing so to prevent someone from slipping and falling.

"The guys on the plows are looking to prevent traffic accidents. They really take ownership of the snow-removal operations. They take personal responsibility."

Dixon Wolf

Alexander new HX Division leader

Kathleen (Kathi) Alexander is the new Hydrodynamic Experiments Division leader. Alexander joined the Laboratory in 1998 as deputy group leader in the Materials Science and Technology Division.

Before coming to the Laboratory, Alexander worked at Oak Ridge National Laboratory for more than 11 years, conducting materials science research focused on electron microscopy and high-resolution chemical analysis and mapping.



Los Alamos Wins 2008 Pollution Prevention Awards

The Laboratory is a 2008 winner of two Best-in-Class Pollution Prevention awards and six Environmental Stewardship awards from the National Nuclear Security Administration. The competition for these awards included more entries this year than ever before from across the NNSA complex, and Los Alamos has more winners than any previous year.

- The Laboratory's 2008 Best-in-Class winners:
- Wastewater Recycling Saves More Than \$1 Million Annually
- Ultrapure Carbon and Carbon-Nitride Nanomaterials

2008 Environmental Stewardship awards:

- More than \$900,000 Saved with Steam Generator Optimization
- Perchloric Acid Exhaust System Saves \$750,000 Annually
- Recycling of Soil, Asphalt, and Mulch Saves \$1.7 Million
- Mixed Office Paper Recycle
 Program

- Integrating Safety and Security into the Environment Management System Life-cycle: A Body-contact Sport
- The Uninterruptible Power Supply Project

For descriptions of the winners, see the news release at *www.lanl.gov/ news/index.php/fuseaction/home. story/story_id/12530.*

Picraux elected chair of AAAS section

Tom Picraux of the Center for Integrated Nanotechnologies is the incoming chairman of the American Association for the Advancement of Science section on Industrial Science and Technology. Picraux began his term as chair-elect last month. His duties include organizing and sponsoring technical symposia and topical lectures at the AAAS annual meetings and encouraging AAAS fellowship nominations. Picraux is a Fellow of the American Physical Society and the AAAS. He also is a recipient of DOE's E.O. Lawrence Award.

Laboratory wins Awards of Excellence in Technology Transfer

Three Laboratory technologies won 2008 Federal Laboratory Consortium Awards of Excellence in Technology Transfer. Technologies included Attila, High Definition Laser Scanners for Surveying, and Second-Generation High Temperature Superconducting Wire.

The FLC is a nationwide network of federal laboratories that links mission technologies with the marketplace. For more information about the winning technologies, go to *www. lanl.gov/orgs/tt/awards/flc/flc_awards. shtml* online.



LANL Stars named

As part of the celebration of Women's History Month, the Women's Diversity Working Group each year recognizes women who have achieved scientific or technical success, women who make important contributions to the Laboratory or community and touch the lives of those with whom they interact, or women who go above and beyond the call of duty and shine brightly: The "LANL Stars."

This year's winners are Leilani Conradson of the Lujan Center, Brenda Dingus of Neutron Science and Technology, Patricia Nelson of Space Management and Facilities Planning, Alyson Niemeyer of Sensors and Electrochemical Devices, Belinda Padilla of the Technology Transfer Division, Katherine Prestridge of Neutron Science and Technology, Ann Rafferty of Information Resources Management Division, Evgenya Smirnova of High-Power Electrodynamics, Felicia Taw of Inorganic Isotope and Actinide Chemistry, Alyson Wilson of Statistical Sciences, Mary Anne With of the Education and Post-Doc Office, and Fatima Woody of Departmental Computing.

The LANL Stars will be recognized at a ceremony March 17.

Notebook -

Proper use of portable space heaters

Portable space heaters take the chill out of the air on cold days. However, it is important to use these devices properly. A report from the National Fire Protection Association shows that 73 percent of deaths, 64 percent of injuries, and 57 percent of direct property damage in home fires involved stationary or portable space heaters. For more information, go to *www.nfpa.org//assets/files//PDF/ heatingfull.pdf* online.



LANL now on You Tube

Los Alamos has made a small advance into the world of "new media," with the establishment of a page on the popular Internet video site, YouTube.com (*www.youtube*. *com/LosAlamosNationalLab*).

With the creation of a Los Alamos National Laboratory page and three initial short videos, the Laboratory joins other entries in the site's science and technology category, such as the University of California (UCTV); CERN, the European Organization for Nuclear Research (CERNTV); and Sandia National Laboratories (SandiaLabs).

The Laboratory site and videos are coordinated by the Communications and Government Affairs (CGA) Office, with assistance from Records Management/Media Services and Operations (IRM-RMMSO) and the Laboratory's science and technology staff.

Distinguished Performance Awards call goes out

Nominations are sought for 2007 Distinguished Performance Awards, which recognize individual employees, small teams of six or fewer people, and large teams of up to 75 members. Peers or supervisors may nominate, and nominees may be regular or limited-term Laboratory employees. The deadline for nominations is March 28. For more information, see a memo from Laboratory Director Michael Anastasio online at *int.lanl.gov/memos/2008/02/ LANL_ALL2198.PDF*.

Annual lock and key inventory under way

The Laboratory's annual lock and key inventory is under way. A completed inventory of Level I, II, and III keys is due by March 21. Please, assist lock and key custodians in verifying the keys, cores, and locks in your area.

Nominations sought for Heller Postdoctoral Publication Prize

The Laboratory seeks nominations through March 11 for the Leon Heller Postdoctoral Publication Prize, which recognizes the single best article in theoretical physics published or accepted for publication after January 1, 2006. This biennial prize is sponsored and funded by former Laboratory scientist Leon Heller and administered by the Laboratory's Postdoctoral Program Office.

For more information on award criteria and required documentation, see the February 20 *Daily NewsBulletin* at *www.lanl.gov/news/index.php/ fuseaction/nb.story/story_id/12599/* online.

Applications wanted for Machinist Apprenticeship Program

Applications are being accepted for the Machinist Apprenticeship Program sponsored by the Laboratory and Northern New Mexico College.



The program

provides apprentices with classroom instruction and on-the-job experience in machine tool operations. The deadline to apply is April 25.

For more information about the program, see the *Daily NewsBulletin* at *www.lanl.gov/news/index.php/ fuseaction/nb.story/story_id/12514/*. For information on application requirements and processes, contact Melanie Martinez of Deployed Shops (PF-DS) at 7-0360, or write to *map_@lanl.gov* by e-mail.

Avoid identity theft

Protect yourself from identity theft by creating unique passwords and personal identification numbers. Avoid using easily available information.

In Memoriam

- Lynn Ann Pruvost, 66, died November 2, 2007
- Lois Godfrey, 79, died November 26, 2007
- Margaret Hemmendinger, 85, died December 10, 2007
- Maria Viola Sanchez McTeigue, 76, died December 14, 2007
- Maxwell Goldblatt, 91, died December 18, 2007
- Richard Gotti, 84, died December 24, 2007

Communicate effectively with our employees, customers, community, stakeholders, and the public at large

2007 Community Leaders Survey shows improvement *More work to be done*

Ever wonder what your neighbors really think about you? For the past nine years, the Laboratory has done more than just wonder. It has commissioned an annual survey by Research and Polling Inc. in Albuquerque to find out what leaders in Northern New Mexico have to say about their community's relationship with the Laboratory.

The survey is provided to Northern New Mexico leaders in government, economics, business, education, and tribal affairs, as well as to those involved with special interest groups. The survey measures the Laboratory's perceived progress in maintaining community relationships, including listening and responding to the needs of communities in Northern New Mexico. It also measures changes in the community leaders' awareness of and satisfaction with Laboratory programs and activities throughout the year.

Input garnered from the survey allows the Laboratory to better shape and direct its contributions in Northern New Mexico.

In the latest survey, community leaders note that the Laboratory is doing a better job of communicating with local communities. Fiftyseven percent of leaders expressed satisfaction with the methods available to communicate with the Laboratory. This is an improvement from the 44 percent who expressed satisfaction in 2006.

The Lab also has improved in its efforts to respond to the concerns of the community, according to 53 percent of the leaders, who say they are satisfied with the Lab's efforts. This is an increase of 19 percent from 2006. Although the survey showed progress, the Laboratory still has some work to do in this area, according to 39 percent of leaders who express dissatisfaction with the Lab's response to community concerns. Many of these leaders say the Laboratory needs to listen to the communities and hear their voices. "Find out [the] involvement that the community would value and then work on being involved in those ways . . . instead of inventing your own ideas," wrote one respondent.

Overall, more than half of the community leaders, 52 percent, have a favorable opinion of the Lab, while 32 percent have neutral or mixed feelings, and only 13 percent have an unfavorable opinion.

Deputy Laboratory Director Jan Van Prooyen talks with Cedric Page, left, executive director of the University of New Mexico, Los Alamos at a regional community leaders breakfast in Pojoaque.



LeRoy N. Sanchez

To find out more about the 2007 survey and its results, go online

to community.lanl.gov/source/orgs/cpo/surveys/2007.pdf. To access past surveys, go to community.lanl.gov/source/orgs/cpo/survey_archives.shtml.

Spotlight **Proactive efforts yield results**

Howard Nekimken attributes improvements in snow removal across the Laboratory to the Institutional Worker Safety and Security team's working with facility operations directors to enhance and expedite the process.

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During his 12 years officiating high school football, Howard Nekimken of the Associate Directorate for Experimental Physical Sciences operations team saw his share of critics. But the skills he honed on the field—assertiveness, decisiveness, and an ability to handle detractors—serve him well in his new role as chair of the Laboratory's Institutional Worker Safety and Security Team (WSST).

With the scrutiny the Laboratory has been under, Nekimken believes it's important to be proactive and not only identify safety and security problems, but contribute to solving them.

"I understand the cynicism, based on what's happened in the past," said Nekimken, who came to the Laboratory as a postdoc in Analytical Chemistry and has been here 22 years. "We need to be patient and persistent. I encourage people to get involved in a WSST and see for themselves. The WSSTs are starting to make a difference."

In addition to the approximately 3,500

Yaktrax® ice traction devices for shoes provided to employees this winter to help reduce the number of slips, trips, and falls, the team is backing the use of cell phone detectors, which are being tested in multiple Laboratory locations and already have prevented several incidents of cell phones inadvertently being taken into areas they shouldn't be in.

Timely emergency response is another area in which the institutional WSST is investing resources.

"We identified issues and have worked closely with Jerry Ethridge [associate director for Infrastructure and Site Services] to ensure the issues get corrected. This is the way it needs to be," said Nekimken. "Management and employees need to team up to address issues. Employees need to get involved, and management needs to be committed to supporting this process."

"WSSTs recognize how important every employee's contribution is to the Lab and that people are the most important resource," he said. "Teamwork and firsthand involvement in safety and security are giving employees hope and a feeling that they are important."

For more information about the Institutional Worker Safety and Security Team, go online to *int.lanl.gov/esh/wsst/index.shtml*.

-Mig Owens

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