

TAKING WING — The wing assembly of the B-52 aircraft that stood sentry in front of the original National Atomic Museum location on Kirtland Air Force Base is hoisted away from its fuselage. The B-52, along with many other large static displays of Cold War-era rockets and aircraft, is being moved to the new museum location on Eubank Boulevard, SE.
(Photo by Randy Montoya)



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Tom Hunter's all-hands meeting: Change, uncertainty, opportunity

By Stephanie Holinka

The all-hands happened this year, quite deliberately, on Nov. 4 — election day. “Election day is an exciting time in our country,” said Labs Director Tom Hunter. Regardless of who wins the presidency, Tom said, election day ushers in a time of great change and “a change of thought.”

Tom began the meeting by highlighting some of the Labs’ accomplishments of the past year, including the Shingo Prize received by the Responsive Neutron Generator Product Deployment Center. He praised the successful completion and dedication of the MESA complex, and discussed the Sandia’s work with the Missile Defense Agency.

Tom also recognized this year’s R&D 100 award winners and discussed ongoing work with DOE on the determination of the FY09 forecasts and the preparation of the PER.

Uncertain economic times

Tom characterized the fragile and uncertain economic time we live in now, and said that our nation was “a community in stress.”

(Continued on page 4)



TOM HUNTER

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Ensuring the safety, security, and reliability of the nation’s nuclear weapons stockpile

New evaluation approach provides predictive assessment capability

By Bill Murphy

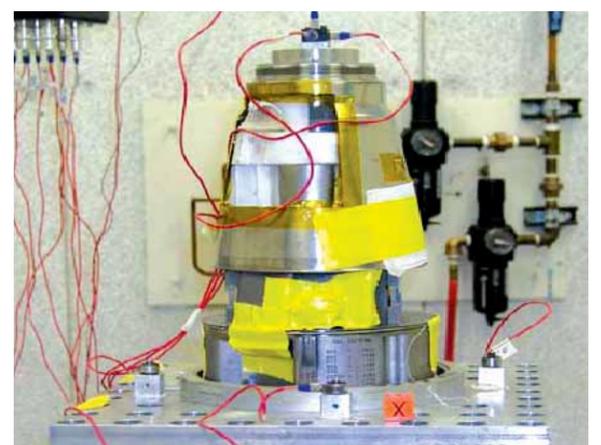
One of the most important functions — arguably, the most important function — performed by Sandia and the other NNSA weapons labs is the ongoing evaluation of the safety, security, and reliability of the nation’s nuclear weapons stockpile. To perform this function, the three labs (Sandia, Los Alamos, and Lawrence Livermore) maintain stockpile surveillance programs that have served the nation well for many years.

Now, as the nation’s weapons stockpile ages and with no new weapons introduced since the late 1980s, the way the labs evaluate the stockpile is changing, too.

Sandia has called its new surveillance approach “Integrated Stockpile Evaluation.” NNSA has embraced the new Sandia model and applied it across the weapons complex; as an NNSA initiative, the approach is called the Surveillance Transformation Program. The program’s emphasis has changed from primarily detecting defects to both detecting defects and providing a predictive assessment capability.

The new approach to surveillance has been developed and refined over several years, and a lot of Sandians have had a hand in the process. Organizations 2900, 2100, 8200, 1800, 2800, 8400, and 12300 were instrumental in defining and overseeing the early implementation of the Integrated Stockpile Evaluation program. They, along with many other organizations, including 1100, 1500, 2500, 2600, 2700, and 5300, will play critical roles in the successful execution of the program.

Integrated Stockpile Evaluation differs from the traditional surveillance approach in some fundamental ways (to be discussed below), but regardless of the shape a surveillance program takes or the approaches it uses, its purpose remains the same: to detect defects so they can be corrected, and to provide a sound technical



VIBRATION TEST — Instrumented W88 arming, fuzing, and firing test assembly undergoing mechanical preconditioning (vibration) at the Weapons Evaluation and Test Laboratory at the Pantex site in Amarillo.

basis for the assessment of stockpile safety, security, and reliability, says Stockpile Resource Center 2900 Director Larry Walker.

A bit of background: Each year, based in part on the findings of their surveillance programs, the three lab directors individually submit letters to the Secretaries of Energy and Defense reporting on the assessment of the stockpile. The Secretaries, in turn, forward those letters to the president. (Sandia’s responsibility for this annual assessment of the stockpile comprises the nonnuclear subsystems, designed by Sandia, that control the operation of a nuclear warhead.)

So how do the lab directors have the confidence to put their signatures on these very consequential assessments?
(Continued on page 5)

That's that

I've been done in by painted ladies. But it's not what you think. I better explain. In the Oct. 24 issue of the *Lab News* we published a gorgeous color photo on the back page. The photo, taken by Randy Montoya, showed five beautiful orange and black monarch butterflies perched on a vivid yellow chamisa out near the solar tower facility. I wrote a caption describing the monarchs' annual migration from the Rocky Mountains to a refuge in southern Mexico. As I wrote, I conjured up in my own mind a picture of the heroic butterflies, flying in their tens of thousands as they braved the elements to complete a process wired into their DNA.

Just one problem. The butterflies weren't monarchs. The day the newspaper hit the stands, I started getting emails and phone calls from Sandians and retirees to set the record straight. So did Randy. The notes, almost without exception, were cordial in the extreme. Here's an example:

"I enjoyed the beautiful photo on the last page of the Lab News this week; and monarchs are astounding butterflies. One tiny nit, though: the butterflies in the photo are American painted ladies (Vanessa virginiensis), not monarchs. I grew up on a farm in Missouri and we had both types of butterflies in our fields, and with both parents in the biological sciences, it was required that we kids 'know our flora and fauna.'"

Some correspondents were more matter of fact, but they all seemed to agree: The butterflies in the photo are indeed American painted ladies. A couple of folks even sent me side-by-side photos to prove their case. If you look at the photos side by side, you can certainly see a difference. But they're both primarily orange and black and to the untrained eye, working under the pressure of a hard deadline, they do – at least to me – look something alike.

In any case, sorry for the error, but I still stand by a response I wrote to one of my more gracious correspondents: "They may not be monarchs, but I think we can all agree that they're regal."

* * *

One quick lesson learned here, and perhaps a cautionary note: Don't try to put anything over on Sandians. It doesn't matter what the subject is, they'll call you on it. And they'll be right.

* * *

I've had the pleasure over the past few years of corresponding from time to time with retiree Matt Roach. Not long ago I got a nice note from him describing how he got interested in science: "While growing up in southern NM," Matt writes, "I got to watch the launch of a V-2 rocket at White Sands in the summer of 1947. Also, we would lay out on a blanket at night and watch for UFOs. We had a large meteorite come over one night in 1951 and Dr. Lincoln La Paz of UNM asked people to write him with their observations. I did and was really surprised when he answered me with a very large envelope filled with a lot of scientific information on meteorites. That really helped stimulate my interest in science."

What struck me about Matt's note is how that letter from Dr. La Paz was able to capture a boy's attention and redirect his life. It tells me there really is a lot of value, value we can't even calculate, in making sure we as a laboratory continue to reach out and touch kids with the wonder and beauty of science.

* * *

Speaking of Matt, let me brag on him for a minute: His son, Jay Roach, is a successful movie director. *Meet the Parents*, among other fun and wonderful films (the Austin Powers series) is his work. Well, back in September Jay took home an Emmy award for directing *Recount*, an HBO miniseries about events in Florida after the 2000 presidential election. Congratulations to Matt and his wife Peggy – and to Jay, of course, who's done New Mexico proud.

See you next time.

– Bill Murphy (505-845-0845, MS0165, wtmurph@sandia.gov)

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Bill Murphy, Editor 505/845-0845
Chris Burroughs, Writer 505/844-0948
Randy Montoya, Photographer 505/844-5605
Mike Janes, California site contact 925/294-2447
Michael Lanigan, Production 505/844-2297

Contributors: John German (844-5199), Neal Singer (845-7078),
Stephanie Holinka (284-9227), Iris Aboytes (844-2282), Michael
Padilla (284-5325), Julie Hall (284-7761), Patti Koning
(925-294-4911), Michelle Fleming (Ads, Milepost photos, 844-4902),
Dept. 3651 Manager Chris Miller (844-0587)

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BJ Jones wins N.M. Distinguished Public Service Award

By Iris Aboytes

"Your dedication to public service and to the betterment of life in New Mexico has been recognized and you have been selected to receive the 2008 Governor's New Mexico Distinguished Public Service Award," says the congratulatory letter received by BJ Jones (3030).

"I was truly surprised, honored, and humbled by the recognition," says BJ. "I appreciate everyone in my life who has supported my public service opportunities."

The primary objective of the awards is to recognize outstanding contributions to the public service. The awards heighten awareness and appreciation of public service achieving President Kennedy's goal of drawing the "best and brightest" to all levels of public service. Distinguished Public Service Award programs exist in most states across the nation. The award is considered the highest award presented by the governor in each state.

BJ currently serves as president of the New Mexico BioPark Society and as a trustee for Bosque School. She is also a member of the Human Resources Planning Society and the Human Resources Management Association of New Mexico. She has served on the boards of All Faiths Receiving Home Foundation, United Way of Central New Mexico, Explora Science Center, and Leadership Albuquerque Alumni Association. BJ has also been a volunteer in many other organizations.

She has served as a gubernatorial appointee to New Mexico initiatives dealing with issues in Health Care and Workforce Development.



BJ JONES

"You never know what a difference your time, talent, or treasure can make, but know it will change lives, including yours, for the better."

BJ is currently the Human Resources Programs senior manager. She came to Sandia in 1984. Her responsibilities have included serving as the HR director for Sandia.

Earlier in her Sandia career she served as HR customer service manager, staffing manager, and benefits manager.

BJ earned a BS in medical microbiology, and an MBA from Stanford University.

"Marriage to Orlando Lucero brought this California girl to New Mexico — a great place to live," she says.

BJ and Orlando, a real estate lawyer, are the parents of Estrella (star). If you have ever been to BJ's office, you know her daughter is the Estrella in BJ's life.

"My parents instilled in our family a deep-seated value about being involved and giving back to the community," says BJ. "We have continued that ideal in our family, with all three of us actively involved in many community endeavors."

BJ stresses the importance of work-life balance, including a ritual of nightly family meals that BJ enjoys planning and cooking. Her planning and cooking earned BJ a Spirit Award from Betty Crocker in 1996. It was her No. 1 fan Orlando who nominated her.

As proud as she is of receiving Distinguished Public Service Award, BJ will not be attending the award festivities. She and Orlando recently celebrated their 25th wedding anniversary and he is taking her to New York to see a Broadway play and then on to Montreal.

"There are many at Sandia who help make our community a better place," she says. "I just want to say 'Thank you.' You never know what a difference your time, talent, or treasure can make, but know it will change lives, including yours, for the better."

Retiree deaths

Harold H. Brueggemann (age 90) Sept. 1
Winford G. Mabery (94) Sept. 2
Gerald A. Zawadzka (62) Sept. 3
Walter R. Roose (86) Sept. 3
James A. Hay (92) Sept. 6
Raymond H. Schultz (89) Sept. 8
Donna S. Rix (72) Sept. 17
Carol Rosalie Spencer (70) Sept. 19
William M. Whalen (81) Sept. 19
Granville L. Dourte (88) Sept. 20
Eugene Polito (79) Sept. 24
Joe Salas (81) Sept. 24
Osborne Milton (87) Sept. 27



CALIFORNIA SITE employees gather for a photo in September during a team celebration.

(Photo by Randy Wong)

A forward vision for Div. 8000

By Patti Koning

Sandia's California site is an important component of the overall strength of the corporation; its relationship with Lawrence Livermore National Laboratory (LLNL) and its ties to Bay Area companies and universities help the Labs broaden its national political constituency.

As Sandia always strives to be the best, so too, is the California site leadership striving to optimize its unique assets. "I asked myself how the division could best implement Sandia's overall strategic plan and the specific directives of the strategic management units," says Div. 8000 VP Paul Hommert. "The motivator is to structure this site to optimize its value proposition as part of the overall laboratory."

The plan for Div. 8000 has four key goals: to pioneer a new approach for weapon system engineering; broaden engagement with defense and homeland security missions; grow energy programs with an emphasis on transportation; and model a 21st-century national security laboratory in terms of operations and infrastructure.

A new approach for weapons systems engineering

No program at the California site has been through more ups and downs in the past year than weapons, with the initial assignment and the subsequent cancellation of the Reliable Replacement Warhead (RRW) and NNSA's Preferred Alternative for Complex Transformation threatening to significantly reduce the size of the program. "However, now that we've stabilized the Preferred Alternative outcomes, we have an opportunity to think about weapons differently, about how we want to do things," explains Paul.

To that end, four groups from Center 8700 (Physical & Engineering Sciences) have moved into 8200 (California Weapons Systems Engineering): Analytical Materials Science (8758), Materials Chemistry (8778), Multi Physics Modeling and Simulation (8774), and Mechanics of Materials (8776). "This will enhance the tie between science and components and give us an opportunity to do systems in a new way that is better and faster," says Corey Knapp (8400).

Corey has changed roles, moving his director's chair from 8200 to 8400, Weapons Engineering Program and Strategic Surety Center. While Corey is staying within the weapons program, his new position has a decidedly broad focus — to unify surety programs and objectives across Sandia and the nuclear weapons laboratories.

Taking over the helm of 8200 will be Art Ratzel, who was most recently director of Engineering Sciences Center 1500. Art brings to the job 30 years of experience in both theoretical and experimental work in the areas of

fluid/thermal sciences and energetic materials. Art served as chief of staff to Tom Hunter when he led the nuclear weapons program, and since 2007 has directed the Advanced Simulation and Computing Codes and Applications program element.

Broaden engagement with defense and homeland security missions

"We are looking to broaden our impact on homeland security and defense (HSD). Sandia has a strong program in counter weapons of mass destruction (WMD) defense, but there is limited growth in that area," says Jill Hruby, director of Center 8100, Homeland Security and Defense Systems. "However, the HSD SMU is experiencing significant growth in the area of physical security. This is an area where we think Sandia can make a significant contribution moving forward. We have a chance to move more of our engineering

cybersecurity," explains 8900 director Len Napolitano.

Len is also part of the director team leading cyber initiatives on behalf of Sandia as a whole, particularly with the HSD and Defense Systems and Assessments (DSA) SMUs. "We want to direct our computer science capabilities toward new national security challenges," says Paul. "National attention to cyber security is growing and matches our competencies."

Grow our energy programs with an emphasis on transportation

For Div. 8000 to realize its potential growth in energy, especially transportation energy, Paul says that significant changes were needed in Biological & Energy Sciences Center 8300, home of the Combustion Research Facility (CRF). For starters, the center has a new name — Transportation Energy — which reflects the tighter focus.

Sandia California News

talent into that mission space."

Jill adds that physical security maps very well to the skill sets of Div. 8000. "We need more engineers, ones who can move between our programs in broader national security and the weapons program. Div. 8000 work in physical security will be tightly integrated with the efforts in 6400, Sandia's lead organization for HSD physical security work."

The changes are also designed to move science and technology closer to the demonstrations and applications. Moving into 8100 are Telemetry Systems Engineering (8227), JTA & Mechanical Systems (8228), Sensing & Energetic Materials (8368), and Radiation Detection S&T (a portion of 8772).

As a result of the reorganization, Center 8900 will play a larger role in homeland security and defense (HSD) work. The structure of 8900 is largely unchanged, but there is a one-word change to its name: Computer Sciences and Information **Systems** (instead of Information **Technology**).

"We are moving from a supplier of core capabilities for all programs to an emerging area of information science as applied to national security, particularly in

"This organization will lead transportation energy work for the Laboratory as a whole and bring forward the energy innovation hub," says Bob Carling, who is now director of the new 8300. "We will take advantage of the Combustion Research Facility and Sandia's 'R to D to D,' which is research to development to demonstration, capability."

Bob will work closely with the Energy, Resources, and Nonproliferation (ERN) leadership on transportation energy and, with the help of senior manager Andy McLroy, deliver the Hub for Innovation in the Transportation Energy Community (HITEC).

The new 8300 gained one department, Thermal/Fluid Science & Engineering (8757), while two biology groups (8330 and 8320) left to form the core of 8600, a new organization called Biological and Materials Sciences.

A new model for biological and materials sciences

The new structure effects big changes in how the site conducts its basic science research. Biology and materials

(Continued on 6)

Decade of the Mind

Sandia hosts fourth Decade of the Mind symposium

Hundreds of scientists to converge on Albuquerque for January event

By Chris Burroughs

Reverse engineering of the brain will be the focus of a two-day symposium — Decade of the Mind IV — Jan. 14-15 in Albuquerque. Hosted by Sandia, the symposium will be attended by some 200 to 300 internationally respected scientists and decision makers.

The symposium, subtitled “Reverse Engineering the Brain: Sowing the Seeds for Technology Innovation,” will explore recent scientific advances in brain science and application of this science to create new technologies.

“This will be a very interesting two days of discussions that will reach across disparate fields such as cognitive science, medicine, neuroscience, psychology, mathematics, engineering, neurotechnology and computer science,” says John Wagner (6341), manager of Sandia’s cognition department and symposium chairman. “We at Sandia are honored to host a symposium of this magnitude.”

Discussions at the symposium sessions will cover potential benefits and hurdles of reverse engineering of the brain, computational neuroscience, cognitive modeling and massive neuronal simulations. Scientific breakthroughs in these areas are believed to offer insights that will spawn a wave of innovative new technologies promoting US competitiveness across nearly every sector of the economy.

The symposium will be held at the Tamaya Resort north of Albuquerque and is open to the public. Registrations are accepted at <http://dom-4.org>. Cosponsors include the Krasnow Institute at George Mason University, Los Alamos National Laboratory, Santa Fe Institute, the University of New Mexico, and the Potomac Institute for Policy Studies.

For more information about the Decade of the Mind symposium, contact Kevin Dixon at 505-284-5615 or krdixon@sandia.gov.

About Decade of the Mind

Initiative focuses on four broad areas

Recent advances in brain research, in combination with the scientific consensus that mind emerges as a result of the activities of the brain, has led to the notion of a new Decade project — one dedicated to understanding the phenomenon of mind within the context of neuroscience.

In May 2007 a group of leading scientists met at George Mason University’s Krasnow Institute for Advanced Study to map out what such a national initiative might look like. The starting point was the earlier Decade of the Brain initiative during the 1990s, which set the stage for today’s accelerated understanding of the operations and diseases of the brain.

The Decade of the Mind initiative is transdisciplinary and multiagency in its approach. Success will require research that reaches across many disciplines.

The Decade of the Mind initiative focuses on four broad areas:

- Healing and protecting the mind: This is the notion of improving the public health by curing dis-

eases of the brain that affect the mind. An example of such a disease is Alzheimer’s disease.

- Understanding the mind: This aspect of the initiative seeks to understand how mind actually emerges from brain functional activity. Some of the key characteristics of the mind that are still not understood include consciousness, memory, and dreams.

- Enriching the mind: Improving learning outcomes in education is a key component of the initiative.

- Modeling the mind: A key approach to understanding the mind is to model it either analytically or using computers. Such models of mind may facilitate the creation of new hypotheses that can then be tested in the laboratory or clinic. Modeling the mind may also allow for the creation of new applications, technologies, and inventions.

The Albuquerque symposium is the fourth in a series of Decade of the Mind conferences.

— From Wikipedia entry on Decade of the Mind

Symposium speakers

The symposium will include keynote addresses by Rick Stevens, senior vice president of Human Resources and Administration for Boeing, and George Johnson, *New York Times* science writer. Also presenting will be Jim Olds, George Mason University; Jim Giordano, Georgetown University; Christof Koch, Cali-

fornia Institute of Technology; Bob Shulman, Yale University; Jim Albus, National Institute of Standards and Technology (NIST); Jay McClelland, Stanford University; Jeff Krichmar, University of California, Irvine; and Gert Cauwenberghs, University of California, San Diego.

All hands

(Continued from page 1)

“The stock market didn’t halve,” he said, “but it made a good start of it.” Though some signs of improvement are visible in the market, Tom said that public funds are currently keeping the American economy viable, which changes the nation’s priorities. He noted that the national debt may soon equal the country’s GDP, almost \$13 trillion. “Recessive times break economic cycles,” he said.

Tom expressed hope that the economy would improve with help from stable government programs until the economy as a whole stabilizes.

Budget, pension and hiring

Sandia’s new FY09 budget will be \$2.2 billion, roughly equal to what it was in FY08. But because of a number of factors, including higher salaries, the Labs will still have to tighten its belt, Tom said.

Budget concerns may lead to new austerity programs and continued examination of costs for many functions and programs. He described the current budget climate as a “competition of essentials.”

Another concern is the pension. During the worst loss period, Sandians lost almost \$600 million in their 401(k) investments this past year.

Though that situation has improved since then, Tom explained that it may mean that Sandia will need to contribute to the pension fund soon. That money would have to come from somewhere, and the already-strained budget would strain further. There are no immediate plans for employees to contribute to the pension fund as well.

Tom observed that some Sandians may need to put off retirement due to the financial uncertainty, possibly impacting Sandia’s ability to hire. Normally Sandia loses about 400 people every year and hires 300. However, in these fiscally hard times, that may change. “Hiring depends on retiring,” he said.

In terms of FTEs, Sandia finished off FY08 with 8,300 employees. Tom said he anticipates that number to be cut by 250 people in FY09. He hopes most of those

reductions will be taken care of by attrition. Hit hardest again will be the indirect side of the Labs.

Sandia’s role supporting community

Tom characterized Sandia as having an important place in the economy of New Mexico, not only for the work the Labs does but for the people it employs and the businesses in New Mexico that rely on Sandia as an important customer.



TOM HUNTER

He described how the economic changes such as the stock market downturn and the credit crisis are forcing charities to struggle to raise resources at a time when the needs are greatest.

He characterized Sandia as a “privileged community,” with its employees enjoying a higher average salary than many

other workers in the state enjoy.

Tom said Sandia employees already support their community by generously supporting charities with donations and with volunteerism, but he encouraged Sandians to try do even more. “We do much,” he said, “but in this uncertain economy much more will be expected. In these times of uncertainty it’s important that Sandia steps up.” He thanked Sandia members of the workforce and retirees for their strong support of United Way again this year.

Role in nation’s economic growth

Tom also discussed the changes that an election brings to Washington, D.C., and explained how some of those changes would impact Sandia. “Elections change priorities,” he said. He added that he hopes the nation will see investing in science as a way to build intellectual infrastructure and help create new business development.

Energy security will remain a focus at Sandia, Tom

said, adding that he believes Sandia should play a vital role in helping the country be more energy independent. He said he is concerned that “urgencies in the economy are monopolizing the scene.” He expressed concern that the recent drops in gas prices may discourage urgently needed funding for energy research.

And then there is cyber security, an area in which Sandia “does a lot of work,” he said.

“Everyone now is web-centric,” he said. “But how do you know it’s real?”

As an example, he noted that Sandia’s web is a constant target for hackers. He said he believes the solution is to have dedicated people to keep it from being attacked. Those people can pass that knowledge on to other vulnerable systems.

New faces at national level

Tom also noted that the Nov. 4 election will bring new people into Washington. “People who have worked with Sandia for many years may no longer be in their positions next year,” he said. He described how transition teams from the president-elect would quickly move their people into positions in Washington over the next few months. Tom noted that Sandia interacts with many people in Washington, and there may be many new faces in that group in the months ahead.

“The nation needs our help,” Tom said, but added that the type of help the Labs will be asked to give is uncertain as the presidency changes hands and new priorities are established.

Goals and hopes for next year

Tom charged Sandia with becoming more agile, and to find ways to simplify what it does. He also reminded Sandians to care about the people. He says that in these stressful times Sandia needs “everybody caring about everybody,” and that at Sandia “all jobs are important.”

Tom emphasized that Sandia’s mission and its people are bound together by the Labs core values — integrity, excellence, service to the nation, each other, and teamwork. If Sandia remains true to those values, he said, it can continue to provide exceptional service to the nation regardless of the challenges it faces.

Stockpile

(Continued from page 1)

ment letters? That's where a robust stockpile evaluation program comes in. Stockpile evaluation is an essential element of a broader set of activities that provide the technical basis upon which those assessments rest.

Historically, the number of weapons to be pulled from the stockpile to undergo surveillance testing was driven by the so-called 90-10-2 rule: Statistically, randomly pulling approximately 11 weapons (of each weapon type) out of the stockpile each year provides a 90 percent confidence level that within two years you'll sample a weapon with a defect, *if* such a defect is spread through 10 percent of the stockpile. Of course, Larry adds, your surveillance program then needs to be robust enough to actually identify the defect, if it is there.

'Birth defects' vs. effects of aging

Larry says that approach — think of it as the Labs' traditional approach — was well-suited to the Cold War-era stockpile. Weapons were pulled from the stockpile, put through a battery of tests, and evaluated on a pass-fail basis against a clearly defined and well-understood set of parameters. Based on the results of the tests, Sandia used the data to: 1) determine warhead reliability; and 2) if called for, determine actions to correct defects.

The traditional surveillance method, Larry says, was excellent at finding so-called birth defects (i.e., flaws in the design not detected prior to fielding the weapon or manufacturing defects in a particular lot of weapons). After many years of sampling according to the traditional method — the 90-10-2 rule — there is a very high statistical likelihood that any significant birth defect would have been present in at least one of the sampled systems. Over time, the incremental value of continuing to sample and test in such a manner goes down, assuming the stockpile isn't changing with time.

"What we're looking for now," Larry says, "is things that *do* change with time."

How do aging materials degrade over time? (Or do they?) How do materials interact with each other as they sit in close proximity for year upon year? (Or do they?) What are the reliability trends? Are the performance margins or uncertainties changing with time? What's happening to the weapon? These are the questions the new surveillance program, Integrated Stockpile Evaluation, is designed to address. "To answer these questions, we need to be able to detect very subtle changes in materials and to assess and anticipate their

New stockpile evaluation approach provides more knowledge per sample

TRADITIONAL SURVEILLANCE PROGRAM	NEW STOCKPILE EVALUATION PROGRAM
Pass/fail data analysis	Detailed analysis of variables data to establish margins & distributions, look for trends
Nominal test conditions	Testing for margin and robustness across the stockpile-to-target environments
Aging detectable only through test failure	Aging precursors detectable through new diagnostics and computational simulation
Routine sampling and test regime	Adaptive sampling and testing to address knowledge gaps

impact on weapon performance," says Duane Dimos, director of Materials Science and Engineering Center 1800.



B61 FLIGHT TEST UNIT — a Joint Test Assembly — being preconditioned to cold temperature before flight at the Tonopah Test Range in Nevada.

under the pass-fail approach, as long as a weapon system or component performed within its design parameters, it passed. Now, we want to see trends. We want to know, even if it is still performing within specs, if its performance or response is beginning to show signs of degradation, which could be indicators of problems in the future." To identify trends and tendencies, Larry says, Sandia is devising new and different tests. New capabilities have been added at WETL, notably for testing at extremes — and beyond — in the areas of temperature and shock/vibration (see photo on page 1).

Assessing the margin

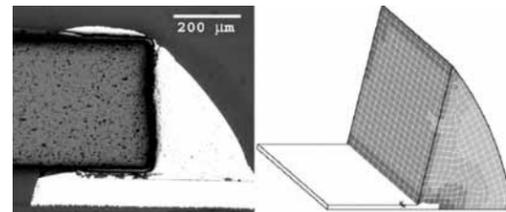
The goal is to gather more detailed information to assess the margin (i.e., the difference between the actual measured value for a performance parameter and the established requirement for that parameter) and to quantify the uncertainty in the assessment of the margin.

"Sandia is implementing an approach known as quantification of margins and uncertainties, QMU, as a means of comparing the assessed margin and uncertainty and then conveying the confidence in a system or component's ability to meet a particular requirement," says Bob Paulsen, technical assistant and deputy to Div. 2000 VP Steve Rottler. The detailed information to support QMU analyses will come from both physical simulations (tests and experiments) and computational simulations (model predictions).

For future weapon system development or refurbishment efforts, Sandia is also investigating technologies that will provide a capability for embedded surveillance and built-in-test, which is intended to further increase the effectiveness and efficiency of stockpile evaluation.

The new stockpile evaluation regime brings to bear knowledge Sandia has gained over the decades in the areas of materials science and computational simulation, which in turn enables a deeper capability to evaluate the long-term prognosis of components, materials, and systems.

As an example, "We have developed validated models to predict important changes in material performance, such as cracking of solder connections due to temperature fluctuations," says Dick Salzbrenner, senior manager for Materials Performance and Aging (see image below).



A MATERIALS MODEL, based on fundamental understanding, successfully predicts the cracking of a weapon electrical connection.

Larry repeats his original point: Regardless of the methods you use, the intent of a surveillance program is to provide an extremely high confidence level in the safety, security, and reliability of the nation's nuclear stockpile.

"And we are confident that our Integrated Stockpile Evaluation approach meets that intent more effectively for the current stockpile," Larry says.

Evaluation for the 21st century stockpile

The Integrated Stockpile Evaluation approach, Larry says, is specifically designed to provide the answers we need for assessment of the 21st-century stockpile. No longer is it sufficient to take the 11-weapon, pass-fail approach. Today, he says, "the number of samples will change from year to year; sometimes we may sample more than 11, sometimes fewer. We will continue to do some random baseline sampling as before,

particularly for systems that have been in the stockpile a relatively short time, but the number of weapons pulled from the stockpile and the types of tests conducted on those weapons will vary, based on our understanding of potential aging or margin issues. Presumably we will usually test fewer weapons, but the point is, we're more flexible now.

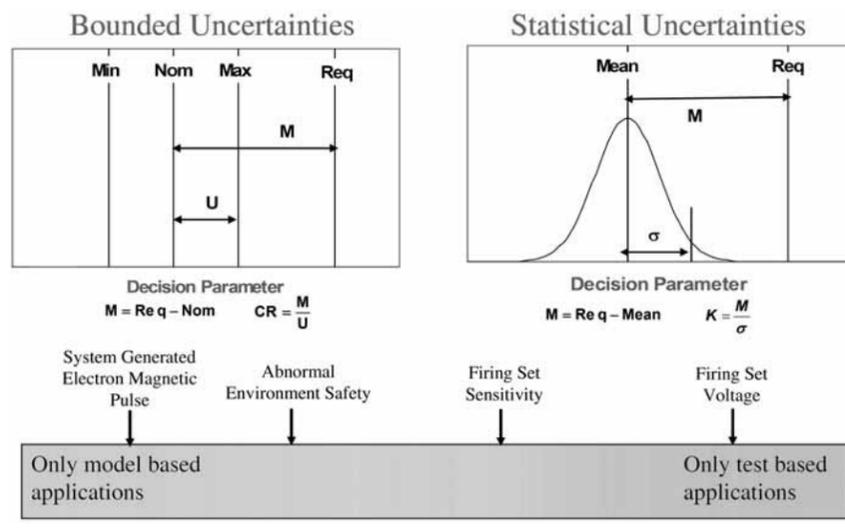
"We will learn more from each weapon we pull from the stockpile," Larry says. "Some will still undergo flight testing; for the rest, they'll go to Sandia's Weapons Evaluation and Test Laboratory (WETL) at the Pantex site in Amarillo, or, in some cases, components may go to other NNSA sites. With those, we'll dig deeper, in part by conducting in-depth component and material evaluations, known as CMEs.

"We're no longer just looking for pass-fail responses. Under that approach — and I don't want to undersell it; it served us well — but

Quantification of margins and uncertainties

The Sandia QMU methodology must allow for analyses that incorporate both uncertainties that can be well characterized statistically and uncertainties that can only be bounded due to lack of specific knowledge.

The figure below shows simplified examples of both cases along with the margin vs. uncertainty metric employed for each case. In the case of margins with bounded uncertainties, the best comparison of the two is by means of a confidence ratio (CR in the figure). In cases where the uncertainty can be statistically characterized, margin and uncertainty can be stated in terms of a "K" factor or the ratio of the margin to one standard deviation of the uncertainty. Model-based QMU analyses are more likely to be used for evaluating bounded uncertainties and well-characterized distributions are more likely to arise from test-based data. In the evaluation of nuclear weapon performance, Sandia spans the range from entirely test-based QMU analyses to largely model-based analyses. Examples across this range are referenced in the figure.



A forward vision for Div. 8000

(Continued from page 3)

science are moving in opposite directions, with biology being consolidated into one center and materials science moving into multiple directorates.

“Biology is a less mature capability for the Laboratory than materials science. By keeping biology under the leadership of one director, we can ensure that Sandia biology matures and grows in a focused, coherent manner,” says Glenn Kubiak, acting director of 8600. “Two additional key objectives are to ensure that biology is balanced in its engagement across nonnuclear weapons programs, and to further develop the natural synergies that exist between biology and materials science — biofuels is a good example.”

The new center will focus on strengthening the biology competency across both the California and New Mexico sites in support of the HSD, DSA, and ERN SMUs. This also includes management of Sandia’s Joint BioEnergy Institute (JBEI) team.

Moving across from the old 8700 to the new 8600 are three materials science groups: Energy Systems (8755), Materials Physics (8756), and parts of Engineered Materials (8772). Other materials science groups are moving into 8100, 8200, and 8300.

Maintaining a strong materials science capability is a priority in the new organization. “The best way to support the corporation is to grow connections between materials science and three different centers,” says Paul.

“Biology is a less mature capability for the laboratory than materials science. By keeping biology under the leadership of one director, we can ensure that Sandia biology matures and grows in a focused, coherent manner.”

— Glenn Kubiak

Model a 21st-century national security laboratory

Center 8500 remains structurally the same, but is increasing its emphasis on ensuring a mission-focused and integrated infrastructure. “We need to model a 21st-century laboratory,” says 8500 Director Pat Smith, “by partnering even more directly with our customers and providing efficient and effective services, no matter where those services are located. For instance, services may be provided directly from 8500, or from our New Mexico colleagues, or even from outside Sandia.” A few 8500 managers will be designated as “mission partners” for the centers. As Pat explains, “by partnering explicitly with the centers, we can ensure that we are not only providing the right set of common infrastructure services, but also understanding and supporting what might be different across the businesses. Senior Manager Linda Houston, who has been on special assignment to 8000, will move back into 8500; a major part of her role will be to continue leadership for California transformation, including interfaces across NNSA, Sandia, and Lawrence Livermore National Laboratory.

Paul acknowledges that it will take time to adapt to many of these changes. But he is confident the reorganization will only strengthen Div. 8000.

“The site leadership is as aligned as any leadership team I’ve ever worked with,” says Paul. “This is a real positive. I have a lot of confidence in this team going forward.”

“We need to model a 21st-century laboratory by partnering even more directly with our customers and providing efficient and effective services, no matter where those services are located.”

— Pat Smith

Materials science

Bill Even, a senior manager who is moving from nuclear weapons into 8600 to oversee the division’s materials science capability, describes the new model as a “grand experiment.”

“I have no doubt that this new model, which is very different from how things have been done, will reinvigorate the application of science disciplines to the development and application space — and we’ll get a big payoff,” he says. “My concern lies in the very basic research area. How do I successfully integrate research aspects horizontally across many organizations?”

Bill envisions several mechanisms to maintain a horizontal materials science capability. The easiest is a division Materials Science and Technology (MS&T) council, which would facilitate program development, LDRDs, and regular technical seminars across diverse business units.

The greater challenge, he says, will be maintaining a feeling of ownership for the S&T mission and its execution when such responsibilities will likely lie beyond the purview of a particular SMU. Also, bringing in new hires will require new and different strategies, as there will be fewer mentors available in any given organization.

“I have no doubt that one of our chemistry groups moving into the Nuclear Weapons SMU will still provide key impact and output to our energy arena,” says Bill. “Maintaining that breadth of vision when you are embedded within an application-driven organization is going to be a challenge. It will require the involvement of the directors, myself, and various staff to be sure we don’t let this capability slip through the organizational cracks.”

“I have no doubt that this new model . . . will reinvigorate the application of science disciplines to the development and application space — and we’ll get a big payoff.”

— Bill Even

Current center configuration

8100	8200	8300	8500	8700	8900
Jill Hruby	Corey Knapp (A)	Glenn Kubiak (A)	Pat Smith	Bob Carling	Len Napolitano
Homeland Security & Defense Systems	CA Weapons Systems Engineering	Biological & Energy Sciences	Site Operations	Physical & Engineering Sciences	Computer Sciences & Info Technologies

Center configuration after reorganization

8100	8200	8300	8500	8600	8900
Jill Hruby	Russ Miller (A)	Bob Carling	Pat Smith	Glenn Kubiak (A)	Len Napolitano
Homeland Security & Defense Systems	CA Weapons Systems Engineering	Transportation Energy	Site Operations	Biological & Material Sciences	Computer Sciences & Information Systems
<p><u>From 8200</u></p> <ul style="list-style-type: none"> Telemetry Systems Engineering & JTA & Mechanical Systems (8227, 8228) <p><u>From 8300</u></p> <ul style="list-style-type: none"> Sensing and Energetic Materials (8368) <p><u>From 8700</u></p> <ul style="list-style-type: none"> Radiation Detection S&T (parts of 8772) 	<p><u>From 8700</u></p> <ul style="list-style-type: none"> Analytical Materials Sciences (8758) Materials Chemistry (8778) Multi-Physics Modeling & Sim (8774) Mech of materials (8776) <p><u>From 8900</u></p> <ul style="list-style-type: none"> Design Definition (8948) 	<p><u>From 8700</u></p> <ul style="list-style-type: none"> Thermal/Fluid Science and Engineering (8757) Metal Hydrides Center of Excellence (parts of 8772) 	<ul style="list-style-type: none"> Internal 8500 reorganization to support NW, energy & broader national security areas 	<p><u>From 8300</u></p> <ul style="list-style-type: none"> Biology (8330 & 8320) <p><u>From 8700</u></p> <ul style="list-style-type: none"> Energy Systems (8755) Materials Physics (8756) Engineered Materials (8772) 	<p><u>From 8200</u></p> <ul style="list-style-type: none"> Special Programs (8234)

Sandia's FACT site goes big

Site increases footprint, reaches out to sensor researchers involved in proliferation detection, other work

By Stephanie Holinka

Most Sandians will never find themselves anywhere near the Facility for Acceptance, Calibration, and Testing (FACT). The facility sits far southeast of the tech areas, down several winding dirt roads. Researchers at the remote site prefer their neighborhood quiet.

The site provides testing facilities for researchers to evaluate geophysical sensor systems of all types, but primarily seismometers and infrasound sensors (for very low-frequency sound). These sensors are the most useful for detecting nuclear explosions hidden underground or near the surface. Signals from these large events can travel thousands of miles through the Earth or the atmosphere until they are picked up by a monitoring station.

Expanding its footprint

Generally, sensor system experiments usually involve laying out sensors, creating signals that are recorded by the instrumentation, and then analyzing the recorded data. Seismic equipment doesn't respond well to above-ground noise, so the facility has underground spaces and boreholes where the only vibrations the sensors pick up will be the vibrations from their tests.

Soon, FACT will expand its footprint from 40 acres to 400 acres to provide more testing space and more buffering space between its facilities and other projects.

"There are lots of different types of seismic work," says Sandia principal investigator Darren Hart (5736). "Nuclear test monitoring sensors, unattended sensors, tunnel sensors. After all, explosions are explosions."

Some sensors tested at the site can be used to monitor seismic activity related to natural geophysical events both underground and above ground. Other systems tested there will be installed at locations all over the world to alert in the event of unexpected underground

Earth's mantle and core and what they would look like in the event of a test.

Mark Harris (5736), FACT site manager, says engineers at the site test components that go into sensor systems for US monitoring systems deployed by the Air Force. Other researchers develop and test seismic sensor systems that get deployed around the world for the United Nations' Comprehensive Nuclear Test Ban Treaty (CTBT) detection systems at International Monitoring System (IMS) sites.

Mark says that nations that participate in the CTBT would want to know if anyone attempts any nuclear test. Sensor systems such as those developed at Sandia allow CTBT participants to be confident that unexpected tests can be detected and analyzed.

Two years ago, North Korea surprised the world by attempting a full-scale nuclear test. Researchers wanted to know if the test was successful and precisely how successful it was. Sensor systems such as those tested at the site are one way to collect data on such activities.

In late October, the FACT site sponsors hosted the first Rio Grande Instrumentation and Testing Community Meeting. The event brought together seismic researchers from Sandia, United States Geological Survey, Los Alamos, New Mexico Tech, and many other organizations. Mark says that one goal of the meeting

was to solicit collaborations with outside agencies to better meet future threats.

The workshop also included representatives from the Incorporated Research Institutions for Seismology (IRIS) Program for Array Seismic Studies of the Continental Lithosphere (PASSCAL) Instrumentation Center at New Mexico Tech. This consortium provides state-of-the-art equipment for many different types of seismology research. Anyone can request to use PASSCAL equipment for scientific work, provided they allow the experiment data to be freely available two years after the completion of field work.

Ultimately, researchers at the FACT site hope that expanding the site and engaging sensor researchers in other communities will allow them to share best practices and to expand work done at the site. In the future FACT also hopes to reach out to Kirtland AFB testing groups so that explosive events on base could be used as data in sensor system tests. "It would be nice to analyze the activity on base," Darren says, "so that we can compare our analysis of FACT data to the activities taking place during the tests."



BOBBY CORBELL (5736), right, explains to representatives from NNSA's Sandia Site Office Sandia's approach to testing a Chaparral Infrasound sensor system at one of the FACT drill sites.

(Photo by Randy Montoya)

nuclear tests. The sensor systems also vary in their range from "near field" sensors that monitor things nearby to those that monitor things hundreds to thousands of miles away.

"Some sensor work involves distinguishing man-made seismic events from naturally occurring events such as earthquakes," Darren says. Researchers need to know how to distinguish nuclear detonations from large explosions for industrial purposes such as mining and from earthquakes. "Earthquake signals start small and grow larger," Darren says. "Mining or other explosions create big bangs that get smaller over time. Their profiles are different."

Studying proliferation detection

Most of the Sandia researchers at the site study proliferation detection. They evaluate ways to improve our ability to monitor the Earth for underground nuclear detonations. One way researchers decide how to look for underground nuclear tests is by doing mantle and core simulations. Researchers attempt to discover what would happen to signals as they pass through the

Tom-o-lantern



BILL VANCE (9343) carved this likeness of Labs Director Tom Hunter as his winning entry in the North American Young Generation in Nuclear (NA-YGN) pumpkin-carving contest. The contest drew five entries this year; contest coordinator Jay Brown (6761) says he hopes the event becomes more popular in the years ahead. The carved pumpkins were displayed in the Thunderbird Cafe on Oct. 30-31. The winner was determined by which pumpkin garnered the most charitable donations. The proceeds, per Bill's wishes, will be donated to the UNMH burn unit to help train nurses in burn care, in response to the sled track accident. (Photo by Randy Montoya)

Feedback

What are we doing to educate customers about the difference between value and cost?

Q: There seems to be an issue related to comparing cost with value. I agree we need to reduce costs intelligently where we can. With the "products" Sandia provides the value is more important than the cost. What are we doing to educate customers (existing and future) about the difference between value and cost?

A: I think our customers are probably the best judges of whether they are getting the right value in their relationships with Sandia. But you're right, there are important differences among quality, cost, and value that all of us need to understand. I addressed these issues in my May 27, 2008, all-employee webcast, but perhaps I could have been clearer. The feedback I receive from customers in D.C. and elsewhere has a common thread: They come to Sandia because Sandia delivers, and Sandia has always been good at delivering the highest-quality solution. But ultimately what people are buying from us is value: high-end technology solutions they can't get elsewhere and at a cost they can afford. Often it may be that the customer doesn't need the highest-quality solution if that solution costs too much. So if cost of the high-quality solutions gets too high, we break the value proposition.

Another way to say this is we make Ferraris. But even people who buy Ferraris have a price limit. They are going to buy the Ferrari where it is reasonably priced. So the challenge is to provide the Ferrari at the best possible price. Further, we have an obligation to the taxpayers to be responsible stewards of the resources that they place at our disposal.

Sandia is fairly efficient now, but we must become more efficient so we offer the highest-value solution, not just the high-quality solutions. That's what the changes we will see over the next few years are all about: Getting Sandia to a place where it can continue to do amazing work as efficiently as possible.

"So if cost of the high-quality solutions gets too high, we break the value proposition."

— Al Romig

— Deputy Labs Director and Interim Chief Operating Officer Al Romig (004)

Sandia's entrepreneurial program is back

By Chris Burroughs

Sandia's Entrepreneurial Separation to Transfer Technology (ESTT) program is back as an important part of Sandia's technology transfer mission.

So says Hal Morgan (1030), senior manager for Industrial Partnerships and Strategy.

The program — one that allows Sandia employees to leave the Labs to start companies or help expand small businesses that already exist and then return to the Labs two years later if the venture doesn't work — was put on hold starting Dec. 21, 2007, to make some much needed procedural changes.

"Al Romig [Interim Chief Operating Officer] just lifted the moratorium on Oct. 15," Hal says. "We have addressed the deficiencies identified last year and believe ESTT is a lot better as a result and will be even more successful in transferring Sandia technology to industry. We will reevaluate the program in a year to make sure."

Two days after the moratorium was lifted the first Sandia employee, James Pacheco, took an entrepreneurial separation under the new procedures. He joined a small start-up company in Pasadena, Calif., eSolar, that develops, constructs, and deploys modular, scalable solar thermal power plants.

Since ESTT was launched in 1994, 137 employees have left Sandia to start up 44 entrepreneurial companies and help expand an additional 46 companies. Fifty-five people started businesses and 82 helped expand businesses. Sandia has negotiated 42 licenses with ESTT companies.

After a team spent several months evaluating the program, ESTT underwent several fundamental changes. In particular, says Dick Fairbanks (1033), who manages the day-to-day operations of the program, there was a renewed emphasis on line management responsibilities. Management must agree that the individual leaving under the program is the right person to undertake the entrepreneurial activity. In addition, the line manager will be working much more closely with the partnerships during all phases of the separation process.

Most importantly, care must be taken to ensure there is no conflict of interest while the employee remains at Sandia. The employee can't work on the new business during Sandia business hours. Also, newly added was an ESTT exit agreement that clarifies expectations for both Sandia and the entrepreneur.

"People leaving Sandia as part of the ESTT program understand that once they are gone from the Labs they become a third party. They don't have access to employees or facilities unless they make formal arrange-



JASON FINN AND GARY GALBRAITH (both 6335) check out solar photovoltaic panels employing technology developed at Sandia and now licensed to Advent Solar Inc. Sandian James Gee took advantage of Sandia's entrepreneurial leave program to help launch Advent in 2002. (Photo by Randy Montoya)

ments through a CRADA [Cooperative Research and Development Agreements], work for others agreement, or the New Mexico Small Business Assistance Program," Dick says.

Another change is the expedition of the employee's separation from Sandia. For instance, in the case of an employee seeking a license, he or she has one month to leave the Labs once the license is finalized.

Exiting Sandians can participate in ESTT in two ways. They can take a technology they developed at Sandia, have it licensed, and start a new company. Or they can leave and go to an existing small business, taking their unique experience with them.

James and Randy Normann represent both types of separations. James took the expertise he gained working at Sandia in the areas of concentrated solar power and access delay technology (research and development of security systems and technology) to a small Pasadena company, the same company that recently retired Sandian Craig Tyner joined in September.

Randy left in April to start his own company, Perma Tools, a technology solutions and high-temperature electronics provider enabling new energy frontiers in ultra-deep natural gas production, steam flood assisted oil production and enhanced geothermal systems (EGS). He obtained a license from Sandia for technology he developed while he worked at the Labs and will pay Sandia a four percent royalty fee every year.

Both men say taking the plunge to leave Sandia was a difficult and risky decision. Randy worked at Sandia for 23 years, and James for 22.

They are both starting out in their entrepreneurial ventures, but the program has had many successes in its decade-and-a-half existence. Some include Tim Estes, Tom Brennan, Tom Anderson, and James Gee:

- In 1994 Tim Estes became the first to take advantage of the entrepreneurial leave program, setting up Conductor Analysis Technologies in partnership with Ron Rhodes, who left AT&T Bell Labs at the same time. Conductor Analysis Technologies is a provider of market-critical data used by designers, purchasers, and manufacturers of printed circuit boards. The data provides quantitative statistics on worldwide printed circuit manufacturing capability, quality, and reliability.

- Also in 1994, Tom Brennan, a solid-state electronics expert, started up MicroOptical Device (MODE) to commercialize products based on Sandia's Vertical Cavity Surface-Emitting Laser (VCSEL) technology. He sold MODE to Emcore in 1998 and became VP of a new division entitled Emcore Photovoltaics. Tom later became president and CEO of Zia Laser, which developed quantum dot laser diodes in 2001, then in April 2008 joined ARCH Venture Partners as a partner with a special DOE-sanctioned assignment — Entrepreneur in Residence at Sandia.

- After leading some of the first 3-D touch applications in the world at Sandia, Tom Anderson established Novint Technologies, Inc., a pioneer in haptics for consumer computing. His company's highly successful Falcon is a 3-D game interface that makes virtual objects and environments "feel real." Replacing a computer mouse or joystick, it is essentially a small robot that lets the user feel shape, weight, texture, dimension, dynamics, 3-D motion, and force effects when playing enabled games. Novint went public in June 2006, and the Falcon is available for sale at retail outlets.

- James Gee's group at Sandia broke a succession of records for solar cell efficiency before he left to help establish Advent Solar Inc. The company, a manufacturer of advanced technology solar cells and modules, has grown from two employees to 71 since it was founded in 2002. Its technology centers on an innovative back-contact cell technology and module assembly. James spent 18 years focused on various aspects of photovoltaic solar energy research during his Sandia career and is the lead inventor of intellectual property exclusively licensed to Advent Solar by Sandia.

More information about the ESTT program can be obtained by contacting Dick Fairbanks at 844-9462 or rrfairb@sandia.gov. The revised CPR that describes the new separation process can be seen at this web address: www-irn.sandia.gov/policy/customer/estt.htm.

Sandians line up to save a life through marrow donor program registration drive



KEN KEAHBONE (9342) uses a cotton swab to collect a tissue sample during the recent National Marrow Donor Program registration drive at Sandia. (Photo by Randy Montoya)

What if, with a simple swab of your cheek and a little paperwork, you could save a life? Would you do it? On Oct. 29, more than 600 Sandians — employees and contractors — said yes.

The Sandians were volunteers in the National Marrow Donor Program, which maintains a tissue type registry. That registry is used to find potential bone marrow donors for patients awaiting a marrow transplant. Matching tissue type between patient and donor is essential for a successful bone marrow transplant. Marrow transplants have proven to be an effective treatment for individuals suffering from leukemia, lymphoma, and other life-threatening illnesses.

Becoming part of the tissue type registry is simple; it involves collecting a cheek swab from each cheek and completing some paperwork about the volunteer's medical history. Most individuals between ages 18 and 60 can become members of the registry.

Representatives from the National Marrow Donor Program were at Sandia at the request of the Div. 12000 Diversity Awareness Council to support the tissue type registration drive. The group con-

ducts similar drives around the country.

Tim Knewitz (10680), cochair of the Div. 12000 Diversity Awareness Council, says the team was looking for a compelling, inclusive event. The success of a marrow registration drive at the California site, he says, inspired his group to sponsor the event in New Mexico.

A team effort, a success for life

According to Tim Knewitz (10680), many organizations and individuals helped in making the marrow registration drive a success. They are: the Div. 12000 Diversity Awareness Council; Prevention and Health Management staff; Creative Arts; Institutional Development Center staff; Corporate Diversity Program; Al Romig and staff; the National Marrow Donor Program staff; and many individual Sandians who pitched in to help.

Because of the unanticipated favorable response to the registration drive, Tim Knewitz says two more registration opportunities have been set up in coordination with Sandia Medical. They will be held at the Steve Schiff Auditorium from 10 a.m.-noon on Nov. 12 and Nov. 19. Reminders will be posted in the *Sandia Daily News*.

Tim characterizes the response of Sandians to the registration drive as "unbelievable," with the 600 new registrants far exceeding anything the national program expected.

Aubrie Vargas, from the National Marrow Donor Program says her group expected perhaps 200 new registrants at Sandia.

Vargas and colleague Pat Conlee, who conduct marrow registration drives around the Southwest, explain the challenges of finding a good tissue match for a patient. About 30 percent of patients find a good match within their own families, they say. For the other 70 percent of patients, finding a tissue match is an urgent, often life-or-death race against time. The national tissue type registry increases the odds that a patient will find a suitable donor. Signing up for the registry, Vargas says, does not compel you to become a donor; each step in the process is completely voluntary. However, she adds, "We really are looking for committed volunteers."

Race and ethnicity have a fundamental bearing on tissue type and are important factors in finding a good match. According to the National Marrow Donor Program website, the demands for marrow transplants among minority populations in the US are disproportionately high, while traditional minority representation in the donor registry is not meeting the need. That's why, Aubrie says, it's especially urgent for African Americans, Hispanics, American Indians/Alaska Natives, and Asians/Pacific Islanders to enroll as potential marrow donors.

The National Marrow Donor Program website at www.marrow.org provides a wealth of information about marrow transplants — what's involved, how long it takes, how the transplant can help a patient, and more.

Since becoming involved with the registration drive, Tim says he has learned that many Sandians already have a connection to the Marrow Donor Program — many are already on the registry, some have received marrow transplants, some have a family member who has received a transplant, and some know a person who could benefit from a transplant.

The day after the Oct. 29 drive, Vargas, the National Marrow Donor Program official who helped conduct the drive at Sandia, sent a congratulatory note to Sandians who made the event a success. She wrote, "You have no idea what you have done for families in the near future and years from now as well. All because you cared enough to stand behind our mission and give of your time and energy . . . lives will be saved."

Working with the National Marrow Donor Program, says Tim, has been surprisingly rewarding. "It really has been for me one of the more enjoyable projects I've been part of in my 20 years at Sandia."

— Bill Murphy

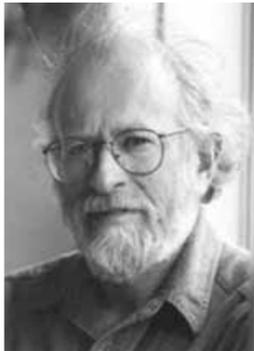
Jackie Robinson: breaking down barriers, changing the country

By Rod Geer

Alan Lelchuk, a recent visitor to Sandia, looks just as you might expect for a literature professor from Dartmouth: gray beard, tweed-looking jacket, khaki pants, sensible and comfortable brown shoes.

But his comments at a recent well-attended Diversity Leadership Program team-sponsored presentation were anything but what you'd expect. This author of six novels, numerous short stories, and essays was at the Labs to talk about baseball — well at least on the surface.

Lelchuk is a Jackie Robinson aficionado. No, it's more than that. Lelchuk calls Robinson — the person who broke Major League Baseball's "color barrier" in 1947



ALAN LELCHUK

as the first African American big leaguer when he joined the Brooklyn Dodgers — his "personal spiritual benefactor." Also, "Robinson is the greatest example of living with grace and restraint under threat of physical and psychological duress I've ever seen."

During his presentation Lelchuk spoke mainly about baseball — Robinson's differentiating skills on the diamond, some memorable plays, his two brief encounters as a 9-year-old with the future Hall-of-Famer.

But craftily woven throughout those reminiscences about afternoons at Ebbets Field where the Dodgers played home games, were strong comments about the lasting impact Robinson's presence in major league baseball had concerning the United States' ability to accept "otherness, the stranger, and difference."

In the mid-1940s before Robinson joined the Dodgers, Brooklyn — where Lelchuk was born — "was a series of neighborhoods," he explained. "It was a collection of disparate ethnicities of about three million people — Jews, Blacks, Italians.

"The borders were not marked, but the borders were clear enough when one crossed into an Italian neighborhood, into a Jewish neighborhood, into a black neighborhood. Members of these diverse neighborhoods came together only when passing through one

to the other," Lelchuk recalled.

"But when Robinson came to play at Ebbets Field curious things started happening," he continued. "These different ethnic and cultural groupings, including for the first time the Negro, started coming to the games.

"And it wasn't just a coming together of Brooklyn. People came, I recall, from Kansas, from Iowa, from Indiana.

"So Ebbets Field became a mecca for all sorts of wanderers, all sorts of pilgrims who came to see and be part of this huge social experiment," he said.

Lelchuk explained that these groups of people — The Other, The Stranger, and The Different were his terms — who mixed for the first time at Ebbets Field simply because of their desire to see an individual go to work under very trying conditions "are all necessary parts of what we mean by democratic feelings."

Diversity, Lelchuk offered, "is not about rules and regulations. It's about coming up close to someone who is 'The Other' and experiencing him or her firsthand and realizing that difference makes for interest and difference can make for excellence."

But he also warns that "the fear of The Other — skin color, accent, culture — is still widespread in this country."

Through his comments, Lelchuk also permitted the audience a glimpse into some personal aspects of his family life that Robinson influenced.

"My father was a Communist-leaning Russian Jewish immigrant who wasn't interested in things American. He liked soccer for sports, but he was primarily interested in me growing up a Russian boy. He taught

"Robinson is the greatest example of living with grace and restraint under threat of physical and psychological duress I've ever seen."

— Alan Lelchuk

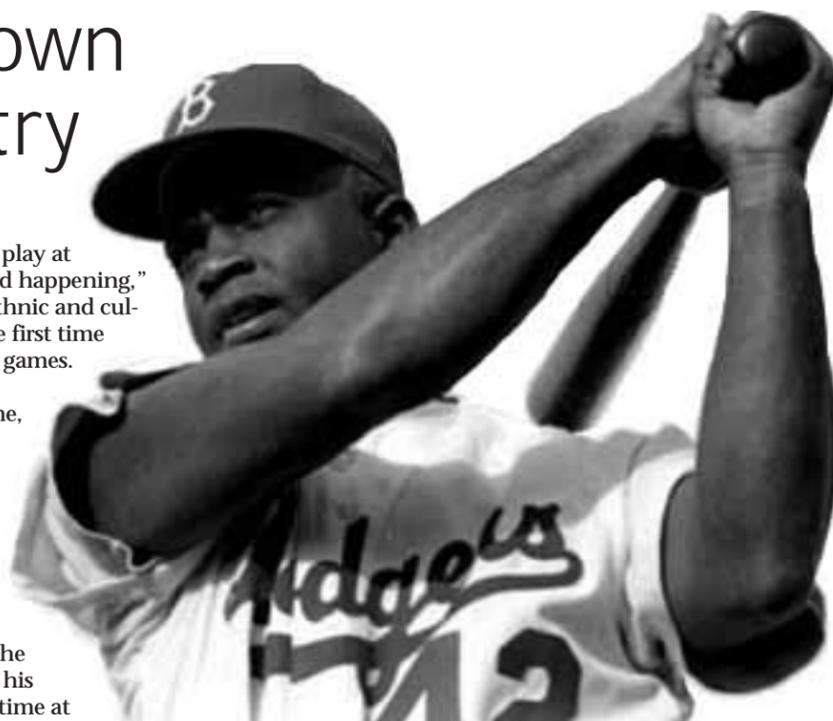


Photo courtesy of Library of Congress collection

me to speak Russian and always wanted to take me back to Russia, but my mother, a native-born American, fought against him," he recalled.

"Suddenly, I had an American hero as a wedge against his Russophile approach and when my father learned his other Jewish immigrant friends also were impressed with Jackie Robinson, my father figured the guy must not be terrible."

In addition to his writing, Lelchuk is cofounder of Steerforth Press, a Vermont literary publishing house, where he serves as an editor. He received his BA from Brooklyn College and his PhD from Stanford. He has taught at Brandeis, Amherst College, and since 1985 at Dartmouth. He spent a Fulbright year at Haifa University, 1986-87, as writer in residence. He has also been a Guggenheim Fellow in fiction.

For Jewish studies at Dartmouth, he has taught a course in contemporary Jewish fiction. Readings include Isaac Babel, I. B. Singer, Ida Fink, Saul Bellow, Philip Roth, Grace Paley, Teodor Borowski, A. B. Yehoshua, Amos Oz, Bernard Malamud, Nadine Gordimer, and others.

During the 1999-2000 academic year, Lelchuk was the Otto Salgo chair in American Studies at Eotvos Lorand University in Budapest.

Recycling activities making a difference at Sandia

IT ALL COMES BACK TO YOU

By Jennifer Jennings Carr (4110)

On Nov. 15, Sandia joins with New Mexico and the rest of the nation in observing the 11th annual America Recycles Day, the only nationally recognized day dedicated to encouraging Americans to recycle and buy recycled products. In conjunction with America Recycles Day, the New Mexico Recycling Coalition (http://nmrecycle.org/NMARAM_2008.htm) proclaims November as New Mexico Recycling Awareness Month.

Sandia/New Mexico's Pollution Prevention (P2) program, which for several years has been actively involved in promoting recycling efforts at the Labs, can point to several notable recycling accomplishments in FY08. "This year," says P2 program coordinator Ralph Wrons, "we improved the program infrastructure and the electronics recycling process, implemented a new mixed paper recycling program, and revised the recycling website to immediately reflect up-to-date information, not to mention many other activities."

The mixed paper project, launched on Earth Day

2008, is designed to divert Sandia's largest remaining solid waste stream — mixed paper — from going to the landfill. According to Sandy Paolicchi (4131), P2 program recycling coordinator, "So far we have identified 36 mixed paper building champions in 32 different buildings. Every one of these extraordinary building champions is essential for the mixed paper recycling initiative."

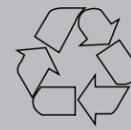
Recycling makes sense not only for resource conservation reasons, but also from a business standpoint, since recyclables have market value. During FY08, Ralph notes, materials diverted by Sandia for recycling earned \$201,500. Revenue from recycling helps pay for the purchase of new recycling collection containers, for other equipment that supports the recycling program, and for recycle streams that have a net cost.

In response to continuing requests for additional aluminum can and plastic bottle recycling collection containers, almost 200 new containers were deployed in FY08, most of them the narrow "Slim Jim" size, which

have a relatively small footprint. If your work area needs collection containers, request them at 844-3470.

Answers to Sandia-related recycling questions — including details about the new Styrofoam recycling process and the definition of what constitutes mixed paper waste — can be found at the recycling website (www-irn.sandia.gov/esh/p2/recycling).

The National Recycling Coalition (www.nrc-recycle.org/americanrecycles.aspx) website offers a recycling pledge (see below) as well as further information about recycling and recommendations.



Take the recycling pledge

I pledge to find out what materials I can and cannot recycle in my community.

I pledge to lead by example in my neighborhood by recycling.

I pledge to recycle batteries, cell phones and other electronic waste. Find an e-waste facility near me.

I pledge to email my elected officials to ask them to increase funding for my community's recycling program.

I pledge to tell five friends that recycling is the easiest thing they can do to slow global warming. Email friends.

FY08 Results and FY09 Goals

- Sandia/New Mexico recycled 14 million pounds of materials, or 56 percent, of all solid waste by mass generated in FY08, including construction and demolition (C&D) waste.
- Excluding the C&D waste, Sandia/New Mexico recovered almost 2.4 million pounds, or 53 percent, of waste materials for recycling, and reduced sanitary waste (office trash) by 16 percent.
- The P2 program has set an FY09 goal to increase recycling recovery to 55 percent of solid waste by mass while reducing sanitary waste by 5 percent. Meeting these goals requires commitment from the Labs population.

Mileposts

New Mexico photos by Michelle Fleming



Dennis Eilers
30 5550

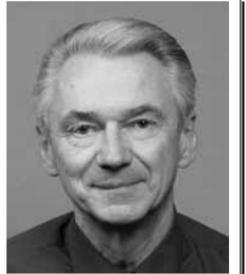


Jack Jackson
30 10012



David Trujillo
30 2667

Recent Retirees



Hank Witek
40 2900



Cynthia Kajder
25 10264



Ruby Mee Cheng Hsia
20 2542



Leonard Malczynski
20 6313



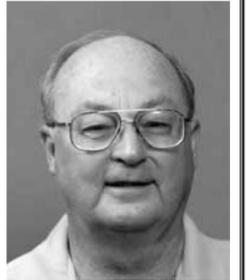
Susan Pickering
20 2010



John Vonderheide
20 2660



Jim Chapek
36 6750



Raymond Decker
36 2541



Carol Kyle
15 3002



Carole Lojek
15 1031



Mary Ellen Loran
15 1415



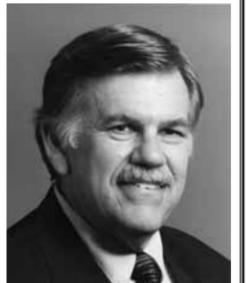
Tina Nenoff
15 1114



Elissa Thompson
15 10694



Martin Molecke
32 6763



Tom Carne
31 1525



50 years ago . . . Sandia Laboratory's observatory building on the east mesa of Sandia Base will be linked officially with "Phototrack" stations across the nation when the next Earth satellite is placed in orbit.

Sandia Laboratory has sanctioned the use of the observatory facilities during off-duty hours, for studies in connection with the International Geophysical Year. Principal responsibility of the Sandia station is to obtain photographs of Earth satellites passing over the Albuquerque area. The Phototrack station differs from Albuquerque moon-watch stations in that the latter provides only eyewitness reports of sightings.

40 years ago . . . Sandia Laboratories and the Metal Trades Council signed an agreement Oct. 16 establishing a new apprenticeship program in the Plant Maintenance area. The apprenticeship program establishes a new five-year training program affecting some 30 occupations in Plant Maintenance Department 4510 and offers an opportunity for participation to 167 on-roll employees. After a team of Sandians located on Sept. 27 the missing SNAP 19 radioisotopic fuel capsules from an aborted Nimbus B satellite launch, the US Navy had responsibility for recovery operations. Robert J. Luikens of Isotope Projects Division 9521 played a major role in the recovery of the \$700,000 capsules. Bob spent more than 32



SATELLITE SEEKERS — Dan Parsons, left, takes notes while Dale Fastle prepares to photograph a satellite. Operating the radio console, which supplies accurate time information, is Ben Benjamin, who is in charge of the Sandia Phototrack Station.



SAFELY RECOVERED from the ocean floor, two SNAP 19 fuel capsules are examined by (left to right) Bob Luikens, Bill Gaines, and John Adams prior to shipment in a special container to Mound Laboratories.

hours in the Star II submersible at about 300 feet depth near San Miguel Island off the coast of California locating and identifying the capsules.

30 years ago . . . It's a maxim in missile design that the smaller and lighter your components, the bigger the payload and the greater the distance you can propel it. Which means the radar fuze developed by Electronic Subsystems Department 2340 for the Navy's Trident missile is a real winner. Radar fuzes measure height above ground and send fire signals when detonation height is reached. Earlier radars were hefty items that occupied the middle third of these missile nosecones. The new single-channel radar weighs only 1 ½ pounds and occupies 25 cubic inches. **A series of field tests of a half-scale Mars penetrator is being conducted by Sandia's Division 5624 at Tonopah Test Range and White Sands.**

NASA's Ames Research Center is considering the penetrators for use on a Mars probe sometime in 1984. Mars-orbiting spacecraft would eject several units to penetrate the Mars surface and relay seismic information and scientific data via the orbiter back to Earth.

20 years ago . . . Behold Energy II — the second installment of a series on energy (*Lab News*, Nov. 18, 1988), at 32 pages this is the largest issue in *Lab News* history — featuring Sandia's solar programs (thermal, wind, and photovoltaic, plus the programs that aim to improve the storage batteries needed when the sun doesn't shine or the wind doesn't blow). **The Air Force made a surprise announcement last week (Nov. 10) confirming the presence of a Stealth Fighter aircraft fleet, based next door to Sandia's Tonopah Test Range. The announcement was the first public acknowledge-**



GETTING SMALLER, LIGHTER ALL THE TIME — Ray Alls holds Mk4 radar fuze as he talks to George Rodgers. Earlier radars were hefty items that occupied the middle third of these missile nosecones.



MARS PENETRATOR is tail-mounted upon air gun horizontally; breech of gun is fitted over it and the assembly raised to vertical position for firing.

ment by the government that the Stealth exists. Officially designated the F-117A, the [existence of the] single-seat, dual engine aircraft has long been rumored. The Air Force announcement stated that 52 of the advanced aircraft have been delivered to date and that seven more are still in production. They are built in California by Lockheed's Advanced Development Projects group, known as the "Skunk Works."

10 years ago . . . A team of Sandia robotics experts have completed the first phase of a project to develop a robotics solution to a risky problem: disassembling fixed round munitions, such as those fired from anti-aircraft guns and other large-caliber weapons. Follow-on phases will address disassembling projectiles



SHELL GAME — Walt Wapman adjusts a World War II-vintage anti-aircraft shell in a special tool assembly on a robotic arm.

(Photo by Randy Montoya)

That's why Thermo Nutech is in town this month. The private company's Thermo Nuclear radwaste technology is being used to process the DU-contaminated soil.



A CLEAN SWEEP — Anh Lai and Fran Nimick look over plans for cleaning up a depleted uranium site in the Tijeras Arroyo. In the background is the Thermo Nuclear rig.

(Photo by Randy Montoya)

Combat tested

David Chacon becomes New Mexico's 1/200th Infantry Battalion commander

By Iris Aboytes

According to Joel McIntosh (3563), there are currently seven Sandians on active military duty. Because of privacy issues, we cannot list their names. In addition to those seven, there are several other Sandians who are war heroes. Here is an example of one of them.

David Chacon (9324) joined the New Mexico National Guard on his 17th birthday. Today Lt. Col. David Chacon is the new battalion commander of the 1/200th Infantry Battalion, the New Mexico Guard's only infantry battalion. The unit was based in Belen but has been reorganized and its headquarters is now in Las Cruces. "Becoming battalion commander is truly an honor," says David.



LT. COL. DAVID CHACON takes command of New Mexico National Guard's 1/200th Infantry Battalion.
(Photo by Randy Montoya)

His command includes six companies, about 800 soldiers. He has three infantry companies, one weapons company, one maintenance company for support, and a headquarters company.

"I spend an average of two weekends a month on the road with the Guard," says David, "about six weeks a year."

During Labor Day weekend, David and 450 New Mexico Guard soldiers went to Louisiana for two weeks when Louisiana was hit by Hurricane Gustav. They assisted in security operations, food distribution, and engineering support. "It was a great honor to be of help," says David.



Combat tested

David was part of Task Force Phoenix, a New Mexico National Guard unit sent to train, rebuild, and mentor the Afghan National Army. Much of the landscape reminded him of home.

"Kabul, in northern Afghanistan, is surrounded by beautiful mountains similar to Colorado and New Mexico, and is a city rebuilding itself," says David. "Kandahar, a city of adobe buildings, is in the desert of southern Afghanistan."

David lived, fought, and trained with the Afghan National Army. During the first three months of his tour, he and his Afghan colleagues battled determined Taliban and foreign fighters.

During the last nine months of his tour, David commanded a team of 16 Americans and an Afghan battalion of 500 men. "They were no comparison to the battalion I now command," says David. "Many of the soldiers in Afghanistan came out of farms. They were not well equipped and didn't have the discipline of American soldiers. What they did have was the heart to believe in the future of their country and a strong fighting spirit."

During a combat mission searching for a key militant, the mission was extended a week due to heavy snowfall. "We ran out of MREs [meals ready to eat] and fresh water," says David. "The heavy snowfall made air support impossible. Morale was bad. This was the lowest point of my tour. I lost 15 pounds on that mission. Compared to that, life has been a piece of cake."

There were times when David wondered if he was going to get home safely. "You have to remain focused on the task at hand," he says. "The smallest lack of attention to detail in planning will get you killed."

When David received orders to move to Kandahar and return home, he was part of a 120-mile convoy consisting of four armored vehicles. Three miles outside of Kandahar, a Pakistani suicide bomber detonated a minivan loaded with heavy explosives and fused artillery pieces after the first vehicle went by.

David's commander and gunner were seriously



injured and airlifted out. Everyone else was unharmed. "Body parts, the engine block, and vehicle chassis were visible once the smoke cleared," he says. "I will never forget the heat of the blast and the sound of shrapnel hitting my vehicle. I have a clear picture in my mind of pulling my boss out. It doesn't go away."

"It was a rough tour, but a great experience," he says.

For God and country

Close to 90 percent of his senior leaders and troops in the New Mexico National Guard have also been combat tested during deployments in Iraq, Afghanistan, and Kosovo. "The precombat training they receive prior to leaving the country far exceeds what I learned 20 years ago in preparation for a Soviet attack," he says. "The

Veterans Day came into being

President Woodrow Wilson first proclaimed an Armistice Day for Nov. 11, 1919. Congress passed a concurrent resolution seven years later on June 4, 1926, requesting the president to issue another proclamation to observe Nov. 11 with appropriate ceremonies. An act approved May 13, 1938, made Nov. 11 each year a legal holiday, "a day to be dedicated to the cause of world peace and to be thereafter celebrated and known as 'Armistice Day'."

In 1953, Al King had an idea to celebrate all veterans, not just those who served in World War I. He began his campaign to turn Armistice Day into "All" Veterans Day. King was an Emporia, Kan., shoe store owner actively involved with the American War Dads during World War II. President Dwight Eisenhower signed it into law on May 24, 1954. Congress amended this act on Nov. 8, 1954, by replacing Armistice with Veterans.

Derived from the Latin term *veteranus*, after the American Revolution, veteran came to be associated with soldiers who had fought for independence. Today veteran is used to describe any former member of the armed forces.



citizens of New Mexico can truly be proud of the men and women of the New Mexico National Guard. Not only are they battle ready, but they continue to support all state emergency missions.

"My father, Gaspar Chacon, served 37 years as an active duty National Guard soldier," says David. "Many members of my family are veterans who have served in various branches of the military."



"I could not do any of this if it weren't for the support of Sandia and my colleagues," he adds. "My coworkers carry my work load. I am extremely grateful."

David's command is for two years, just in time for his scheduled deployment to either Iraq or Kosovo in 2010.

He has been in the National Guard for 24 years and could have retired at 20. When asked why he is still in, his answer without skipping a beat — "for God and country."

Sgt. James Brasher, son of Sandian Tom Sanders, awarded Silver Star

James Brasher, 29-year-old son of Tom Sanders (6063) and his wife Barbara, was awarded the Silver Star recently for his leadership during a combat operation in Afghanistan.

"We are very proud of James," Tom says. "He is a Ranger-qualified platoon sergeant in the 82nd Airborne Division and has done two tours in Iraq and two in Afghanistan with the 82nd. He has demonstrated great leadership and has earned the respect of his men who nominated him for both the Silver Star and the Audie Murphy Award. This shows he cares for and leads his men well."



JAMES BRASHER

To Brasher, a graduate of Manzano High School, leading his platoon through a dangerous firefight is his job. However, to his country, his selfless leadership is worth the nation's third highest combat honor, 82nd Airborne Commander, Maj. Gen. Curtis Scaparrotti, said on behalf of President Bush.

On Dec. 8, 2007, a Taliban fighter attempted to ambush Brasher and his squad. Brasher killed the gunman before he could harm the paratroopers. As the squad advanced to the next compound, they came under small arms fire. Brasher threw grenades, suppressing the attack and allowing his paratroopers to maneuver to safety. Brasher's arm was shattered in a hail of bullets, but he kept shooting, hitting eight of the 20 insurgents his squad killed that day.

Brasher says he doesn't consider himself to be a hero. "If I'm considered to be a hero now, as a result of this, then I'm honored to be in such good company," he says.