New Div. 8000 VP Rick Stulen reflects on opportunities at California site

Sandia Lab News California team members Mike Janes and Patti Koning (both 8529) sat down recently with new California Laboratory Div. 8000 VP Rick Stulen to discuss the state of the California site, the challenges it faces, and the opportunities it has to evolve its competencies to meet a broad range of emerging national-security imperatives. Rick spent nearly 30 years at the California site before leaving for Albuquerque in 2005 to serve as chief technology officer and VP of Sandia’s Science and Technology & Research Foundations Div. 1000. Rick returned to California to New Mexico and back to California led Rick himself to wonder out loud: “Does this make me the ‘new old guy,’ or the ‘old new guy’?”

Lab News: How does it feel to be back in California?

Rick Stulen: It feels terrific — pure and simple. I had a very large organization with extremely high-hazard facilities; operational complexities; and terrific science, technology, and engineering activities. One fascinating aspect was the engagement with the state and the New Mexico delegation to Washington. I had been on the job for less than a month when Tom Bowles, the governor’s science advisor, approached me to discuss possible areas of focus for the state’s S&T plan. We identified three initiatives: high-performance computing, nanotechnology, and biology. We developed a strong friendship and worked together to get the other institutions in the state appropriately engaged. It was a delightful opportunity to make a difference in the state and develop a network with S&T leaders across New Mexico.

I’d like to do something similar in California. It is going to look different here, but there are ways for us to play significantly in the state. We should be maximizing our connections with the other national labs.

(Continued on page 6)

JBEI fires ‘opening salvo’ with paper on deconstruction of switchgrass

Technology breaks down plant wall to access sugars needed for ethanol

By Mike Janes

If a tree falls in the woods and no one is there to hear it, does it make a sound? One of the more profound (or silly) questions of our time, yes, but Blake Simmons (8625) might rephrase the question as only a biochemist can: “If a tree falls in the woods and no technology is in place to uncover the hidden sugars from within, will it deconstruct and produce clean-burning ethanol all on its own? The answer, of course, is no, but the question drives home a larger point. “Trees,” says Blake, “don’t just fall apart at the whim of man. You have to do something to them to get them in the state that you want them to be.”

That ideal “state” — at least for biofuels researchers such as Blake and others working at the DOE’s Joint BioEnergy Institute (JBEI) in Emeryville, Calif. — would be one in which lignocellulosic biomass (such as trees, switchgrass, and other plants) could be efficiently and affordably processed in a way that will liberate the sugars needed to produce fuel.

There is a great need to improve the deconstruction of lignocellulosic biomass, says Glenn Kubak, director of Sandia’s Biological and Materials Sciences Center 8600. “Why do we want to convert that biomass into a liquid form of energy?” asks Glenn. “The biomass itself already possesses a large amount of energy, available through combustion, so why invest a large R&D effort to transform, or deconstruct it, into fermentable saccharides?”

In answering those questions, Glenn points out the need to convert the biomass into a form of energy that burns more cleanly, and also to convert it to a portable, easily transported and stored liquid fuel, suitable for transportation applications.

Enter Seema Singh (8625), a Sandia biofuels researcher and lead author on a paper that currently appears in the online edition of Biotechnology and Bioengineering. Titled “Visualization of Biomass Solubilization and Cellulose...” (Continued on page 6)
It's hard to shake thoughts in the Sandia/California edition of the Lab News without saying something about the state of California, as well as the state of the nation. Many, including the late night comedy shows, have had their laughs lately, especially about the issuing of IOUs and the inability to get anyone here to agree on anything. To close a $60 billion gap over two budget years is a daunting effort.

Rather than recount the bad choices we've made and the bad luck we've endured, better to provide a look into the future. Astute observer of the California scene and noted scholar on urban development Joel Kotkin sums up the problem as an excess of narcissism. At the same time, he notes, "The beat great hope for California's future does not lie with the narcissists of left or right but with the newcomers, largely from abroad. These groups still appreciate the nation of opportunity and aspire to make the California — and American — Dream their own."

It's a sense of opportunity and the extremely open society that attracted me to the state over 30 years ago. The feeling that "almost anything is possible" continues to energize me, my family, and most of the Sandians I work with day to day.

I experience this energy most strongly when I attend the Foreign Nationals Picnic held each year. Having been an FN myself (although I prefer to call us International Laboratory) as a postdoc in France, and grateful to this great country and use the picnic both as a chance to view America through other eyes, as well as to get a sense of what is really happening in the rest of the world. Sandia is a rich institution, both in California and New Mexico, by having these international scientists and engineers working alongside us. I hope they remain in the US and if not that the country's same sense of optimism and opportunity they experience while here.

Is there an iconic figure that embodies the spirit of Sandia? The US Postal Service has its mail carrier who endures rain, snow, heat, and often gloom of night to complete his/her appointed rounds. We should have a write-in contest for the Sandian who best represents the expertise, daring, and dedication to mission and sets an example for all of us. I'll vote for those who helped engineer and execute the nuclear tests in the 1950s and early 1960s. I'm particularly drawn to the story of the test engineer who drove out to the tower and helped reset the connections when the device didn't fire. The story and the image are both riveting.

In addition to a write-in contest, we could also have a Sandia Book Club with suggestions for good literary fiction to read and discuss. My neighborhood school read about three dozen books over the past few years. My top choices are: All the Names by Jose Saramago; Body and Soul, by Frank Conroy; and White Tiger, by Aravind Adiga. Each features a rugged individual who triumphs in an uncertain and chaotic world. Maybe there's a message here!

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Ron Stolz has been with Sandia since 1976. His early career was in materials R&D and nuclear weapons component design. At mid-career Ron began to focus on the needed planning at the labs. He worked as Sandia/California's Government Relations manager for eight years, helped the Homeland Security and Defense Energy, Resources, and Nonproliferation SMEs develop programs with federal, state, and local agencies, and maintains a network of lab supporters in the government, think tank, Wall Street, and nonprofit communities.

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**That's that**

By Ron Stolz

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**Employee death**

**Greg Long got more out of life than most people twice his age**

Greg Long (2554) died July 24. He was 42 years old and had been at Sandia eight years. Greg worked in the Explosives Technology Group. He worked with a team of scientists to develop a novel field in explosive science, referred to as microen-...
Energy Bowl 2009

Technology showcase may be ‘defining moment’ for mid-school students

By Rachel Kolb

In every engineer’s past there is, perhaps, a single defining moment in which science first seemed fascinating and irresistible. For a group of middle school students, that moment may have come at a Junior Leadership Camp on June 16, when Sandia employees presented an interactive exhibit showcasing cutting-edge technologies from the Integrated Technologies and Systems Group.

The camp took place June 14-20 on the New Mexico Military Institute (NMMI) campus in Roswell. “Its intent was to provide junior high school students with the experience of working in teams and individually to learn about the fundamentals of leadership, learning styles, and how to handle themselves in challenging environments,” says Molly Glen (5223), who presented the Sandia exhibit to five groups encompassing 105 students and instructors.

Other than the Sandia exhibit, camp activities included leadership exercises, physical fitness training, and problem solving. The camp also conducted more carefree activities like cookouts, swimming, and field trips.

The exhibit, which showcased some technologies with an attendee at June’s Junior Leadership Camp.

To make the exhibit interactive and interesting, we invited the students to handle the numerous hardware items and ask questions about how each of the technologies was developed and how it is used in the real world,” Molly says. “We talked about the connection between science and engineering and real-world solutions to problems that we as a nation and as individuals face.”

The exhibit, according to Molly, was a popular success, but it wasn’t all about fun and games. Molly explains the significance, emphasized by Sandia upper management, of exposing students to science at a young age.

Both Center 5200 Director Dori Ellis and [Executive VP] Joan Woodard think it is important to reach the younger generation coming up through the schools and let them know that science and engineering are fun and exciting careers and also to tell them a bit about the work Sandia does to keep the country safe,” she says.

MOLLY GLEN discusses Sandia technologies with an attendee at June's Junior Leadership Camp.

THE STUFF THAT DREAMS ARE MADE OF — Molly Glen (5223) tells an audience of middle school students about many ways that science and technology can be applied to solve urgent national problems. The presentation, intended to interest students in math and science careers, came during a Junior Leadership Camp at the New Mexico Military Institute in June.

SANDIA LABS DIRECTOR Tom Hunter, left, and Kirtland Air Force Base Commander Col. Mike Duvall at the 2009 Energy Bowl awards ceremony. The two agreed to continue the friendly competition to encourage energy conservation. (Photo by Lloyd Wilson)
Livermore Valley Open Campus (LVOC) proposal gets green light from NNSA

Initiative will pave the way toward easier access, open collaboration at Sandia/California and LLNL

By Mike Janes

Livermore Valley Open Campus will maximize the return on our nation’s investment in nuclear security. By leveraging the ground-breaking research of our nuclear security labs through private sector collaborations, we will bring breakthroughs to the market faster and find new solutions to the energy problem.”

Those words of support came from DOE Secretary Steven Chu in an Aug. 4 news release issued by NNSA. Chu was referring to the Livermore Valley Open Campus (LVOC) concept that is being jointly proposed by Sandia and Lawrence Livermore National Laboratory (LLNL)

In parallel with the news announcement, NNSA Administrator Tom D’Agostino and DOE Under Secretary for Science Steve Koonin signed off on a “mission integration concept” document that authorizes Sandia and LLNL to move forward on developing a detailed plan for the LVOC effort. With NNSA authorization in hand, both labs will now create “phase one” of the LVOC, which will include examination of its initial infrastructure, analysis of “brown fielding” (redevelopment of land and/or facilities) needs, and creation of an operating environment to enable open operations.

Led by Sandia’s Bob Calhoun (8500) along with counterparts at LLNL, the Open Campus initiative is conceived as an “enabler” that will provide expanded opportunities for research collaborations between Sandia/California and LLNL and their external partners. As currently envisioned, it will consist of an approximately 50-acre parcel along the eastern edge of the LLNL and Sandia sites along Greenville Road, with LLNL’s National Ignition Facility (NIF) and Sandia’s Combustion Research Facility (CRF) serving as anchors at each end.

Easier access, greater collaboration

A more open sector, one with fewer security restrictions, says Bob, will benefit a wide range of energy-related companies, including those that focus on high-performance computing, life sciences, optical sciences, and biotechnology, which is especially important as Sandia continues to focus on transportation energy programs.

“If we wanted to arrange a visit to Sandia/California next week for Toyota’s top executives from Tokyo, for example, we simply couldn’t make it happen due to the bumbling processes that are in place,” Bob says. Though such processes are clearly necessary for both labs’ NNSA missions, Bob says, Sandia and LLNL both are moving in directions that will require more flexibility, particularly when foreign nationals and other uncleared visitors are involved.

The LVOC proposal is being developed in parallel with Sandia’s Hub for Innovative Transportation Energy Community (HITEC) program (Lab News, March 13, 2009). More effective access to the international science community and greater collaboration with industry, Bob says, are both essential to the advancement of HITEC and will be more easily achieved with a successful open campus.

‘Technotourism’ and economic impact

A number of other benefits will be derived from a Livermore Valley Open Campus, says Bob, including a potential increase in what he calls “technotourism” and economic development around the Livermore region.

“Nearly 200 scientists from around the world already visit Sandia and LLNL each year, and hundreds more would likely do so if we had an open campus in place,” Bob says. “Those researchers might have access to certain facilities for days, weeks, or months at a time, likely stimulating the regional economy when they’re here.”

The city of Livermore, Bob says, is developing strategies for increasing the technology “footprint” in the area and would like to establish the Livermore Valley as a high-tech anchor for the region. An open campus, he says, will offer more direct access to both labs’ facilities, researchers, collaborators, and technologies. Even LLNL and Sandia researchers themselves who are interested in starting spinoff companies of their own might be more inclined to remain in Livermore when an open campus is established.

Other elements of phase one of the LVOC will include evaluating alternatives, obtaining necessary approvals, and executing infrastructure modifications.

One site, two labs (Continued from page 1)

Sandia/California and LLNL also convened a governance board, whose responsibilities include determining the target areas that will be implemented. The board consists of senior management from both laboratories. According to Linda Houston (8530), implementation plans for shared or joint services are being written for the following areas:

- Technical writing and editing
- Graphic design
- Photography
- Video production
- Animation
- High-volume printing
- Custom printing
- Scanning
- Mail services
- Phone switch emergency support
- Bicycle shop operations
- Shipping/receiving/traffic

Leaders for each of these areas will meet with employees at a later date to discuss in detail how these areas will share operations.

“We are sharing operational functions to improve business efficiencies.”

The way the services are shared or consolidated between sites will vary, Linda says. In some situations, both sites will share their capability to accommodate surge capacity. In others, the function would primarily reside at one site, where it has been determined that either Sandia or LLNL alone has the ability to provide the service to both sites.

Under the “one site, two labs” effort, current NNSA prime contracts for Sandia/California and LLNL will remain intact, and each lab will continue to control its own funding for operations — even for those that are provided jointly, Linda says.

There is precedent for sharing some infrastructure services between both labs, Linda says. LLNL currently provides utility services such as power and water, as well as emergency response and East Avenue security access.

The joint operations project is important strategically, Linda says, because it also can pave the way toward increased work for others, including a jointly managed open campus between the two laboratories.
Rick Stulen (Continued from page 1)

natories in the state and the incredible university community.
A new national laboratory would kill for a location in California, and we’ve got one. You couldn’t ask for a better place to be. California is a major player in all the new thinking around problems like energy consumption, transportation, immigration, and ports — everything comes together here in a way that can be a tremendous asset and learning opportunity for Sandia’s missions.
I am also interested in developing more management experiences in both locations. My four years in New Mexico were a great learning experience and enabled me to bring different thinking back to California. I will be more intentional in creating temporary assignments so people can get this experience without turning their lives upside down.
I’ve had a number of profound safety experiences, so I have a lot of passion for the safety culture of the Labs. This site will see energy from me in that area. I plan to spend a couple of hours relating the sled track story — it’s very interesting, poignant, and difficult.

Engaging with the state of California
LN: Can you go into more detail about engaging with the state of California?
RS: We’ll start with Congress. We’re focused on this district and nearby districts, but we need to expand to the whole state. Our state legislators can give us access to the governor’s office to get a handle on the problem areas that touch our national-security mission. California is a terrific playground for working on issues associated with national security, particularly homeland security.
LN: How do you see Div. 8000 fitting into Sandia’s four major components of national security — energy, security, cyber security, and science and technology (S&ST)?
RS: We play pretty well in all four. Nuclear weapons will continue to be a core function of this site and a core reason for having this site here. We have a strong partnership with Lawrence Livermore, and we serve as the engineering window into the non-nuclear part of that program. Part of my job is to continue what Paul (Hommert) has done in strengthening that relationship and making sure that Sandia remains a trusted partner and developer for the nuclear weapons complex.
In terms of energy, clearly the Combustion Research Facility (CRF), Livermore Valley Open Campus (LVOC), and the Hub for Innovation in the Transportation Innovation Facility (CRF), Livermore Valley Open Campus (LVOC), and the Hub for Innovation in the Transportation (LDRD) program?
RS: I may be paranoid, but I’m concerned we may be losing our edge in innovating and bringing forth new, exciting science. This is not just my opinion alone — I’ve heard similar concerns from managers and scientists within the LDRD program. In the Grand Challenge program this year, nine grants went forward in the final selection process, and only one survived. We need to be doing better and will need to look at both the process and also the ways in which we stimulate innovation. We need to ensure that our managers are setting the bar high and encouraging creativity from our staff. An important ingredient in connection to the outside. New ideas don’t come from sitting alone in your office and telling yourself, “I’ve got to think of a new idea today.”
New ideas come by reading and connecting with other people at your own institution, cross-disciplinary, and with outside universities and industry.

A journey of discovery
LN: Do you have any thoughts about our main partnership with Lawrence Livermore?
RS: LDRD will continue to be a major partner. I will work to further connect Sandia to the NIF (National Ignition Facility) community. Over the past four years, I’ve been responsible for pulse power, Z machine, and high-energy-density physics. We’re already doing work in this area with LANL, but we need a step up for a larger engagement. For the next four to five years, NIF will be on a huge journey of discovery, and we should be part of that. And the feeling is mutual — they are very interested in tapping into our talent as well.
LN: On a personal level, what are you looking forward to now that you are back in California?
RS: I’m an avid road biker. I won’t be riding with the “peloton,” but I’ll be chasing them. I’ll also ride my bike into work from time to time.
LN: Conversely, what will you miss about Albuquerque?
RS: Over the past four years, I have fallen in love with New Mexico. The culture, people, the art scene, and diversity are all pretty special. And I’ll definitely miss the roasting green chiles. We’ll be traveling between the sites quite often.
RS: I’ve been away for four years, and the site is a different place. I’ve become very familiar with many new staff members we’ve had since I left — I’m guessing about 20 percent [according to HR, Rick’s guess is correct]. To get reacquainted, I’m sitting down one-on-one with the directors to learn about their concerns, worries, and the opportunities they see. I’ll follow up with a director-off-site meeting to discuss where we are and collectively brainstorm opportunity areas. For example, what do we mean when we say the site is a window to California, and what should we be doing differently?
At the annual off-site with directors and senior managers, we can put some of these ideas on the table to throw rocks at and debate. I don’t see a huge departure from where Paul has positioned the site. He broadened our work in energy and ensured a robust nuclear weapons program. The site has gone through some tough times, but Paul really took on those challenges.
So I come into this role with a lot of confidence.

Weapons work, LVOC, and hiring
LN: You’ve alluded to a number of challenges that we will need to take on. Does one or two stand out in your mind?
RS: Continuing the course in nuclear weapons and ensuring the gas transfer mission are significant challenges. The Livermore Valley Open Camp is another, but a positive one. A huge amount of work remains to make it a reality. Hiring has always been a challenge because of the cost of living and competition. If we don’t get hiring right, we don’t have a future. So hiring is vitally important.
LN: In terms of strategic partnerships, are there examples of specific programs, customers, organizations, or industry that you think will help us in the future in terms of alliances or partnerships?
RS: We need to determine how to position the

PASSING THE BATON  — Rick Stulen (left) and Paul Hommert share the stage during a town hall meeting that marked the transition of the California VP job from Paul to Rick. Paul recently became Executive VP in charge of the Labs’ weapons program.

“I’ve got to think of a new idea today.”

New ideas don’t come from sitting alone in your office and telling yourself, “I’ve got to think of a new idea today.”
New ideas come by reading and connecting with other people at your own institution, cross-disciplinary, and with outside universities and industry.
Regeneration During Ionic Liquid Pretreatment of Switchgrass, the article entitled, "JBEI's footprint on the use of ionic liquid pretreatment technologies.

Breaking down cell walls

Ionic liquids are those that essentially act as solvents. Ionic liquids are inorganic, highly viscous liquids that are stable at room temperature, and are particularly useful in biological applications. Ionic liquids have many applications in medical science. In the field of biofuel fermentation, ionic liquids are used to convert biomass into biofuels. The use of ionic liquid pretreatment is a promising technology that can significantly improve the efficiency of biofuel production. The JBEI research is the first to examine switchgrass and its interactions with ionic liquids, making it a very attractive feedstock for biofuel production.

"The pretreatment process we looked at was remarkably stable in its ability to solubilize the plant cell wall," says Blake. "Instead of increasing the surface of the cell wall or just realigning or reorienting it, the ionic liquid process completely transforms the plant cell wall into a polysaccharide form.

Floating in ionic liquid

Essentially, that means the three main elements of the biomass — the cellulose, hemicellulose, and lignin — are broken apart and floating in the ionic liquid, which makes those elements (once water or another solvent is added) much easier to access. The all-important polysaccharides can thus be recovered.

This process, Seema says, demonstrates an exciting new method for converting polysaccharides into sugars in a way that is much more efficacious in terms of both yield and time. Other researchers around the world are also examining ionic liquid pretreatment technologies, but those efforts are primarily focused on processing microcrystalline cellulose, says Lilake, but those efforts are primarily focused on processing microcrystalline cellulose, which is a low-pulp biomass. The JBEI research is the first to examine switchgrass and its interactions with ionic liquids, making it a very attractive feedstock for biofuel production.

New computational labs building to enhance CRF theory and modeling work

By Mike Janes

"Combustion," senior manager Andy McIlroy (8350) remembers, "will almost certainly be part of our energy future for decades to come." So it should come as no surprise to anyone that the DOE's Office of Science (SC) and Office of Energy Efficiency and Renewable Energy (EERE) are cofunding a new, $5 million building at the Combustion Research Facility (CRF) that will enhance the computational and modeling efforts that are such an important part of the CRF's work portfolio.

The new 9,800-square-foot computational laboratory building, says 8300 and 8600 mission partner Neal Forecast, will offer offices, visualization equipment, collaboration space, and a large room to house high-performance computing clusters. It is slated to begin construction in or around March 2010, with a ribbon cutting ceremony scheduled to occur by August of that year. "Both SC and EERE view predictive modeling as a key enabler for industry," says Andy.

The facility, a General Plant (GP) building, will employ a cadre of staff members like Jackie Chen and Joe Oelewine (both 8351), each of whom perform high-fidelity numerical simulations and verification work that require highly intensive computational capabilities. The new building is also viewed as essential to the advancement of HITEC, the Hub for Innovation in the Transportation Energy Community (Lab News, March 13, 2009). A newly established Energy Frontier Research Center Combustion Science (EFC) from Fundamentals to Multi-Scale Predictive Models for 21st Century Transportation Fuels, "addresses many of the multi-scale predictive modeling challenges outlined in a report that came out of an Office of Science workshop cochaired by Andy. The Center involves several Sandians from the CRF, including Jim Miller, Nils Hansen, (both 8353) and Jackie. The new building will be a key resource for this effort.

Chuck Mueller earns prestigious Horning Award for paper on diesel combustion

Sandia's Chuck Mueller (8352) recently received the 2008 Harry L. Horning Memorial Award for his 2007 paper entitled, "Diesel Engine Utilizing a 15-Hole, Dual-Row, Narrow-Included Angle Nozzle." Since Sandia's Combustion Research Facility (CRF) opened its doors in 1981, CRF researchers have captured the award seven times, which is more than any other institution. The Horning award annually recognizes the author(s) of the best paper relating to the better mutual adaptation of fuels and internal combustion engines presented at a meeting of the Society of Automotive Engineers (SAE) or any of its sections during any calendar year. The award preserves the name of the late 1925 president, Harry L. Horning, to the pursuit of improved mutual adaptability of engines and fuels. It serves as a motivation for others to follow in his footsteps. The award was established in 1938.

Chuck coauthored the diesel combustion paper with several other CRF researchers on biomass pretreatment. "This is the first significant step in biomass pretreatment for us and is indicative of what is sure to be an exciting, challenging, and productive period of scientific discovery by researchers at JBEI," says Blake.
Complexity research offers new design methods to strengthen cyber security

By Mike Janes

Computer viruses, spam, and computer hacking are so common that keeping computers and networks safe from attack is a billion-dollar industry. But if some Sandia researchers successfully change the way software is written, the antivirus industry will become obsolete. By "embracing" the complexity that characterizes computer systems, the new software will render computers much safer from cyber attacks.

A complex issue

A Laboratory Directed Research and Development (LDRD) study guided by Jackson Mayo (8963) and Rob Armstrong (8961) is applying complex-system theory to computer science to make computer systems exceptionally difficult to attack successfully. Complexity, the concept that emergent behaviors outstrip the sum of their parts, is derived from redundant array of independent disk (RAID) theory — using distributed redundancy to achieve computing efficiency. In-depth robustness can be created in software by partially overlapping calculations and distributing multiple cross-checks within a program.

Exponential increases in effort required

The potential benefits are great, Jackson and Rob say, because the effort required for a hacker to exploit such an ensemble grows exponentially with the number of software versions. "The hacker essentially has to look for a very tiny point in space where everything magically falls apart, and that's very hard to do," says Jackson. A key advantage of diversity, he notes, is that it offers protection even if the attacker knows exactly how the system is constructed.

Robustness and RAID

A key tenet in Jackson and Rob's work is "robustness" — the concept that compromise of a single component should not trigger complete system failure. An ensemble of replicas doing the same job in tandem is one generic way to achieve robustness. But multiple computers running identical software will encounter the same bugs and produce the same faulty or even dangerous output. Because different software versions run simultaneously, the chance that a single vulnerability can lead to a massive shutdown is much lower.

"Complexity is the problem, but it's also the solution. By studying complexity, we will be ahead of the curve."

— Jackson Mayo
Got pics?

Project team looks to archive historical Sandia photos for quick-and-easy access

By Mike Janes

A

s Sandia celebrates 60 years of existence, one can only imagine the number of old pho
tographs from throughout the decades, scat-
tered in various places, that tell the Labs' story. While many historical photos have been archived, still more, particularly those from the California site, reside in offices, homes, and personal archives, unscanned and unavailable for broad Sandia consumption.

But if a current project led by web developer Norm Zabolocki (8944) and graphic designer Ken Hall (8531) unfolds as expected, that will all change one day soon.

Norm, largely driven by her and her graphic arts/web development colleagues’ ongoing image needs, has instated a project that aims to unearth every Sandia-related photograph taken prior to 1980, scan each one electronically, and place them in an easy-to-access archive. Already, Norm and her col-
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“Quite frankly, we’ve wasted a lot of time over the years hunting down image files,” says Norm. Adding to the problem is the fact that even electronic files are typically stored in wide variety of media, including CD, DVD, Jaz files, Adum folders, and so on.

The project will be part of CSandia, the relatively new online collection of Sandia-related, unclassified, high-resolution digital images that resides in Web File-Share. CSandia allows users to search for historic and contemporary photographs, artwork, Lab News images, PowerPoint presentations, templates, logos, and videos, but the latest enhancement will result in far more avail-
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Sandia managers and staff, Ken says, constantly need photos for various presentations, program reviews, retirement celebrations, internal and external publications, and other projects. “The goal is to put all of this content into a repository where everyone has quick and easy access,” he says. Those who need pho-
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While the project is funded for the current fiscal year, Norm says she hopes it can be continued into the future to add even more (post-1980) images into the archive.

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Sandia in the blood

By Patti Koning

Growing up, Shirley Johnson (8822) knew what was expected of her: that she become an engineer and work at Sandia. She was raised in Albuquerque and her father, Cecil Tucker, worked as an engineer at Sandia. He retired in 1997 after a 38-year career.

“I wound up doing the opposite of what he wanted, both in my career and where I worked,” she says. “But somehow I came full circle, and here I am at Sandia.”

Shirley studied accounting in college and moved to Colorado for her first job. When she moved to Califor-

New drafting quarters in 1959 were in the east wing in Bldg. 912 (upstairs). The sections in the big, open room included mechanical and electrical drafting, plus the tool and gauge sec-
tion. The sections were originally scattered in quarters in LINL and in the 916 warehouse building before 912 was completed.

George McCarthy, left, William Little, and Frank Thomas calibrate test equipment at Sandia/California (c. 1958).

Shirley Johnson and her father, Sandia retiree Cecil Tucker, prepare for the 2009 Employee Recognition Night. Shirley was the team representative for the Sandia/California Complex Transformation Future Studies Team. Cecil was her guest.

In 1976, Sandia designed, built, and tested the engine that, according to computer projections, would have averaged 40 percent better gas mileage than a conventional engine of equal performance.

The B83 was the first megaton-class bomb to be specifically designed for laydown against hard, irregular targets. From left to right: Jim Muir, Gordon Vangundia, Bill Morehouse, Bob Milby, and Elwood Ingledue.

Alternatively, Shirley’s brother Wesley did become an engineer and he lives in Albuquerque — but he works at Kirtland Air Force Base. So her father realized his dream, split between his two children.

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No brakes on Sandia/California networks

By Patti Koning

- Faster than a speeding bullet . . . more powerful than a locomotive . . . Look at your desktop: It's not a bird, it's not a plane, it's the network!
- To access Sandia/California, a visitor needs a new Secure Networks badge.

The new network represents a 20-fold increase in bandwidth over the legacy network, 45 million bits per second to a billion bits per second. The higher bandwidth was immediately visible in videoconferences, virtually eliminating cutouts and improving picture quality. About 18 months ago, Brien Maxwell, manager of Communications and Network Systems Dept. 8949, assembled a team to work on getting Sandia/California a seat at the DOTCOM table. Quest Communications, the provider of the site's wide-area network, installed about 1.2 million worth of telecommunications equipment. The site paid about $350,000 toward the equipment cost.

- We realized there are some important things we wanted to do as a company between the California and New Mexico sites, says Rich Gay (8949), the chief architect of the site node. Having our own node allows us to perform high-speed work site-to-site with Albuquerque and the other two labs.

Putting Sandia/California on DOTCOM creates a diverse network path that benefits everyone on the network. Previously, DOD connectivity went through Sunnyvale, Calif., creating a single point of failure.

- In addition, the western labs are backing up the south-western labs, giving each design lab automated failover, adds Rich.

The change also eliminated the legacy network that tied together the two Sandia sites. The old connection would fail up and we'd have to throttle back traffic. Now we have higher bandwidth and better cost per bandwidth, explains Brian. This enables disaster recovery between the two sites. Backups can be run overnight or even in real time, giving us strong data storage and recovery capabilities.

Another benefit of the new node is something the organizers never envisioned: the ability to create an independent network for the proposed Livermore Valley Open Campus (LVOC). “We were working on this long before open campus was a defined idea, but the timing is really fortuitous,” says Brian. “We can guarantee to NNSA that we can provide a network that is completely independent of both our network and Lawrence Livermore’s. Eventually users of open campus would get a high-bandwidth, robust network at a reasonable cost.”

Jim Handrock takes the reins of California weapons center

Says reorganization will make center more agile

By Mike Janes

- In late June, Jim Handrock was named the new director of California Weapons Systems Engineering Center 8200. Though challenges await him, Jim says the strengths of the Center — coupled with a recent reorganization — will support an effective transition.

“The near-term challenge will be realizing the vision of the California site reorganization, which is to more effectively integrate and synchronize the site’s weapons and technology activities into our nuclear weapons program,” says Jim.

The job will be supported by the fact that the Labs’ weapons-related scientific and engineering and modeling/simulation activities are embedded into the same center as core nuclear weapons work. Since all of these programs now reside in the same organization, it allows us to be more agile in terms of moving, combining, or changing programs,” says Jim. He adds that, as part of the reorganization, the Joint Test Assembly (JTA) and telemetry activities were moved to Center 8100 due to their synergistic capabilities base with homeland security and defense (HS&D) efforts. But he and 8100 Director Jill Hruby have talked at length about making sure the activities remain integrated with those in 8200 and ensuring that the systems engineering function in Center 8100 is closely coupled with the needs of the Labs’ nuclear weapons program.

Longer term, Jim says much of his center’s direction will depend on the upcoming Nuclear Posture Review, due out at the end of the calendar year. That, he says, will provide more insight into the current administration’s thinking about the future and size of the weapons complex and the number and types of weapons that will remain.

“This will drive the nature of work we do,” says Jim.

Surety team demonstrates security upgrade concept for weapons in SGT

By Mike Janes

- A cross-laboratory team made up of engineers from Centers 8200, 6400, and 2110 recently completed a demonstration of a security upgrade concept for weapons in the SafeGuards Transporter (SGT) environment known as the Integrated Security Solutions (ISS) system.
- Prior to being named director of 8200, Jim was on special assignment in Washington, D.C., where he served as deputy science advisor to Gen. Robert Smolen, previously the deputy administrator for Defense Programs at NNSA’s NA-10. Jim’s involvement in Sandia’s weapons activities spans some 20 years and includes assignments in gas transfer systems, structural analysis, reliability, electrical modeling and simulation, and scientific computing. Most recently, he served as a deputy director for Directed Stockpile Programs and senior manager of Stockpile Systems and Gas Transfer Systems. He also spent a year as the deputy to former Div. 8600 VP Mmm John.

Jim acknowledges the disappointment surrounding the recent congressional move to put the gas transfer system (GTS) design agency consolidation decision on hold (pending further review), but says he will support it as well as other direction coming from NNSA. Jim says he still believes “we’re the right lab to do the GTS work for the complex, and it remains one of Sandia’s core nuclear weapons products.” We’ll continue to do GTS work in the same excellent manner that we always have.

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50 years ago — Livermore Laboratory has arranged its parking lot with an emphasis on pedestrian safety and easier entrance and exit. The parking lot capacity will be 620 cars and is expected to be completed in late August.

40 years ago — The bond graph approach to the modeling of engineering systems is a recent concept based on power flow instead of signal interactions. This concept will be discussed by Professor Ronald Rosenberg at the Sandia Laboratories Livermore Colloquium on August 12. With the recent approval by the Alameda/Contra Costa Counties Joint Apprenticeship Committee, the electronic technician apprenticeship program at Sandia Laboratories Livermore has become journeymen electronic technicians. (1969.1 photo) “Probably the most significant single thing that’s happened at Sandia Livermore during the last year,” said VP Tom Cook (8000), “is that we have expanded the base of our capabilities into fields of application in the military business. We at Sandia intend to develop capabilities that will allow us to contribute in a broader way to the advancement of science and technology.”

30 years ago — How expensive is the electrical energy produced by a solar central receiver plant? And what design for major subsystems is best in the long run? The answers to these questions depend on many complex and interrelated trade-offs among performance levels and costs of the subsystems of such a plant, especially its heliostats, the most expensive components in the system. DELSOL ("of the sun") is a new computer code that helps answer the question.

20 years ago — Designers of today’s high-tech weapons try to augment or replace human operators with computer systems whenever possible. But it’s been hard to make a computer that recognizes targets with the speed, accuracy, and reliability that’s required. Now, Sandia researchers at Livermore have taken a step forward in solving this problem by developing a prototype of an on-board target recognition computer. Dubbed STARLOC (Sandia Target Location Computer), the prototype grew from an idea originated about two years earlier by Leonard Napolitano and Don Sweeney (both 8435). Their concept is based on earlier research by George Schils (8435) and Don in 1984-86 on optical processing of lock-and-tumbler filter algorithms for automatic target recognition.

10 years ago — Sandians have created a mobile device called the Explosive Destruction System (EDS) that’s both reliable and reusable to destroy deteriorated and potentially unstable chemical munitions. The EDS is a sealed unit, which offers a safe and effective alternative to open detonation of some recovered munitions. The system is designed to safely detonate chemical munitions and neutralize the chemical agents inside a sealed steel chamber. Specifically, the reusable EDS is equipped with a steel fragment shield that absorbs the impact from exploding parts of the munition and allows the system to withstand hundreds of detonations.
Rene Bierbaum (8205) says it took her about a month to stop living by her watch and calendar after arriving in the Philippines. By the time she returned home last December, she found it even harder to readjust to a life in which things happen according to schedule, not just common will. “It took some time to be flexible and understand that things would just start at the right time. Some-one would decide to have a party and I’d be asking what time I should arrive. The host would say, ‘Just come, just come.’ Sure enough, when the magic moment arrived there would be a mysterious aggre-gation of people,” she recalls.

In March 2006, Rene and her hus-band Neal set out on the adventure of a lifetime, becoming Peace Corps volunteers in the Philippines. “Volunteering in a developing country was something we had talked about for a long time,” says Rene. “In the early 1990s, we passed up an opportunity to go to Africa and regretted it. By late 2004, events were such that we really wanted to do something positive on behalf of America in another part of the world.”

“Volunteering in a developing country was something" says Rene. “It’s never too late to think about the Peace Corps.

Rene and Neal were atypical Peace Corps applicants. They aren’t concerned about the location of their assignment, just that their skills would be put to good use. Rene is an engineer with Reliability and Electrical Systems and Neal is an IT consultant. What they got was a perfect match — a rural high school on the brink of starting to use IT. Compostela is a small farming village about an hour from Cebu City. The school had DSL and about 20 computers with limited capabilities. The teachers, principal, and guidance officer performed a few basic administrative tasks on the computers and a handful of third- and fourth-year IT majors received hands-on training. For the rest of the students, computer education meant looking at pictures of a computer in a textbook. Rene and Neal focused their efforts on building up the computer infrastructure and expanding the use of IT as a teaching tool. Fortu-nately, former Sandian Mary Jewett happened to be in the Philippines at the same time and through her husband Jeff’s employer, Safeway, was able to arrange a donation of 30 laptops.

“The education department superintendent respon-sible for about 200 high schools in the region had been pushing IT education, so the teachers all had some baseline computer knowledge,” says Rene. “I was able to jump in immediately with administrative aids, like Excel templates for grades and a student information database in Access developed by another Peace Corps volunteer, and computer-based curriculum.”

Rene even picked up a few tricks that she’s putting to use at Sandia. As she was learning to use a pivot table in Excel to slice and dice data, Rene found herself thinking about how well it would work with reliability tools.

Before Rene and Neal’s arrival, a corporation had donated a small computer lab to the school. Neal wrote a proposal to the school’s version of a parent-teacher association to install wireless and purchase memory to create a centralized campus server. The proposal was modest by American standards — just $100 — but in the Philippines it meant about $200 a month. “The PTCA agreed to fund it in November of our first year,” says Rene. “This was really exciting because we knew the school community was committed to this project.”

Neal eventually installed four small computer labs on the campus connected by wireless and set up two baseline computer knowledge,” says Rene. “I was able to jump in immediately with administrative aids, like Excel templates for grades and a student information database in Access developed by another Peace Corps volunteer, and computer-based curriculum.”

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