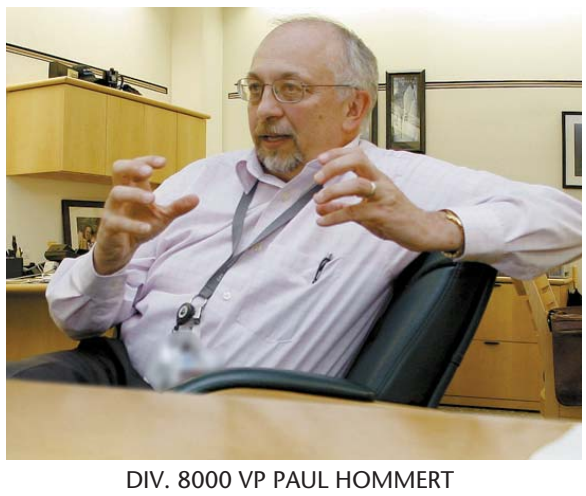
# Paul Hommert talks about stability, consistency, strategic vision for Sandia's California site

Sandia Lab News *California team members Mike Janes and Patti Koning (both 8528) sat down recently with Div. 8000 VP Paul Hommert 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. The interview took place in Paul's office.*

* * *

***Lab News:*** *Let's begin with your vision for the California site. Can you describe how you're going about developing that vision?*

**Paul Hommert:** Since being in California, I've encountered a lot of uncertainty on behalf of the staff. There are many turbulent issues, such as the change in Lawrence Livermore National Laboratory's contract, RRW [Reliable Replacement Warhead], the future of the weapons' program, and others. In light of that, I felt it was particularly important to point to a time that bridges a fair amount of turbulence in the next five years



DIV. 8000 VP PAUL HOMMERT

and articulate to our staff, "Here's what we see this site working on, looking like, and emphasizing during that time," and that we [leadership] will work to achieve that. Will things change between now and then? Of course, and we'll reevaluate when the time comes. But I felt a need for consistency as to what that picture will look like.

We're taking an approach that is rooted in our competencies — what is our organization good at? How should it evolve to meet what we think are the logical, national security imperatives we face? It's a combination of looking inwardly and outwardly, through the lens of our SMU structure, and saying, "Here are the things we think we'll be working on, and here's how our competency base has to evolve."

Another important aspect is what I might call "quality of work life" — our infrastructure, hiring practices, and tackling the always challenging bureaucracy in our daily work environment. We're trying to bring together these components this summer and communicate the vision site-wide in

*(Continued on page 6)*

***This game's for real . . . almost***

If Sandia computer scientist and software engineer Donna Djordjevich has her way, perhaps today's video game-loving youth will become the next generation's terrorist-fighting scientists, thanks in part to game development skills he or she will have learned at Sandia. Find out more in the story by Mike Janes on **page 9.**

Sandia LabNews

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*Managed by Lockheed Martin for the National Nuclear Security Administration*

Sandia National Laboratories

## *Computational modeling of RRW*

By Patti Koning

As the first new weapons program in more than 20 years, the Reliable Replacement Warhead (RRW) program has generated a lot of interest and controversy.

The controversy centers on what role nuclear weapons should play in today's world and what the nation's strategy regarding nuclear weapons and the nuclear stockpile should be. Many expect the national debate to last through the 2008 election.

RRW work is currently in Phase 2/2A, which includes program feasibility, design definition, and cost study. Congressional approval is required to move to Phase 3, development engineering. Despite the delay, the debate is something that Div. 8000 VP Paul Hommert describes as necessary and healthy for the country.

"Winning the [RRW] bid was pretty exciting, especially because of the intense effort in putting forward the design in a short period of time," says Corey Knapp (8200), director of National Security Engineering. "The opportunity to work with the Navy is fantastic. They are an engaged, demanding, and knowledgeable customer."

*(Continued on page 7)*

# FEMA, Sandia announce new integrated public alert and warning capability

## *Next-gen system to help ensure effective communication to citizens in the event of hurricanes, other potentially catastrophic events*

By Mike Janes

In partnership with the Federal Emergency Management Agency (FEMA), Sandia is designing and deploying a pilot alert and warning system that will provide a means to ensure effective public communications during a federal, state, or local emergency.

Known as the Integrated Public Alert and Warning System (IPAWS), the program, which began piloting on August 1 in the midst of the 2007 hurricane season, is administered by FEMA for the Department of Homeland Security and is initially supporting several states and local jurisdictions in the US Gulf Coast region. IPAWS addresses the mandate and vision of Executive Order 13407 to ensure that the president can rapidly and effectively address and warn the public over a broad range of communications devices and under any conditions.

### Transforming emergency alerts

IPAWS is designed to transform national emergency alerts from audio-only messages delivered over radios and televisions into a sophisticated, comprehensive system that can reliably and efficiently send alerts by voice, text, and video to all Americans, including those with disabilities or who cannot understand English. FEMA's aim is to deliver targeted alerts and warnings over more communications devices to more people, anywhere, and at any time a disaster strikes.

### System to offer broad connectivity

FEMA's current Emergency Alert System (EAS) has been in place since 1994, replacing the Emergency Broadcast System (EBS) that launched in 1963. The EAS allows the president to transmit a national alert within 10 minutes to citizens, and it allows state and local government officials to send messages during nonfederal emergencies.

The IPAWS system will include an enhanced Web Alert and Relay Network (WARN) that provides emergency operations staff with collabora-

*(Continued on page 5)*

***Inside . . .***



Sandia CaliforniaNews

By the mid-1950s Sandia's mission responsibilities required a critical presence in Livermore, Calif., to work closely with the new Lawrence Livermore lab. Over more than 50 years, Sandia/California has evolved into a facility with a broad suite of capabilities that touch on virtually every aspect of Sandia's national security mission. This special edition of the *Lab News* is dedicated almost entirely to the work being done today at Sandia/California. The issue's guest editors, Mike Janes and Patti Koning (pictured at left), have spent the past several weeks crafting the stories and arranging the photos that offer this in-depth portrait of Sandia's California laboratory.

# What's what

America truly is a land of many greats: great people, great national parks, great achievements, and great industries. One can wander all over North America and be dazzled daily by great sights, great sounds and great eats. And great states. Like California.

Despite the decades-old onslaught of drivel and diatribe directed at the Golden State, mostly proffered by those too envious, too innocent, or too devious to be taken seriously, the planet's eighth-largest economy thrives, prospers, and continues to generate greatness just about everywhere.

It's great that we now have a post-partisanship era of state governance. It's great that the venture capital community is pouring money unrestrained into solar projects over in Sunnycon, née Silicon, Valley. It's great that we just opened our 110th community college.

JIM SIMMONS

We are producing great mayors, great actors, great technologists, great farmers, great nurses, even great robber barons and great eccentrics. We have great town names like Edison, Cool, Dunmovin, Monolith, Weed, and Pumpkin Center. We possess the greatest potential for greatness in geothermal, wind, wave, biomass, and nuclear energy. And with all due respect to the great New Mexico Governor Bill Richardson, we are the home to the great new private commercial space industry.

We also pretty much seem to have a great time.

So, with all of this greatness, why is it that our truly great six national laboratories in the state don't seem to make everyone's A list of great things on the Left Coast?

Is it the same syndrome that affects other properties, plants, and installations? After all, who knows we have 63 military bases and 13 oil refineries, some very great, or 77 fairs, some even with the word "great" in their names?

We could just have fine national laboratories. Or dandy ones. Or serviceable. But check the record. They're great.

And even if we've been greatly modest, or great at keeping a low profile, the things we're great at turn out to be of some interest. To say the least.

America, its people and places, its friends and neighbors, its interests and values, all have been well served by these great places. To say the least.

Sometimes there comes a time when it would be great for all of our national laboratories to get a little more general acknowledgement, especially those who provide exceptionally great service in the national interest. To say the least.

And maybe, we hear tell, that the great state of California, is getting ready to do just that. To brag a little bit about "its" national labs. To say . . . well, maybe a little bit more than just the least.

Now that would be great!

*— Jim Simmons (925-294-2912, MS 9114, jamsimm@sandia.gov)*

Jim is the Community Relations and Advocacy Officer at Sandia/California.


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# Saying goodbye is hard to do . . . but a new website makes it simpler

## *New separations process streamlines departures*

By John German

So you've opted for that career change, or you're taking a personal leave of absence, or you've lined up a great new job . . . watching your grandkids.

Whatever your reason for leaving, remember this: Before you've achieved a clean break with Sandia, you are required to attend to dozens of details, from a hazardous chemicals assessment to a records retention review, and the list differs depending on your situation, says BJ Jones (3500), director of Human Resources.

In the past the complexity of the process has left some departing employees and contractors, and their managers, befuddled, she says.

Now a new separations procedure and exit website — http://exit.sandia.gov/ — clarifies the steps a person needs to take to check out. Together, the consolidated process and site are expected to reduce by 20 percent the time required to complete a termination.

### 2,200 separations a year

What many people don't realize, says BJ, is although Sandia's attrition rate is about 400 FTEs annually, in practice some 2,200 people administratively separate from the lab each year, including summer students and other temporary hires, contractors, and employees taking leaves of absence.

*"This is important stuff from an HR perspective."*

**Human Resources Director BJ Jones**

"People were just leaving, and in some cases checkout wasn't happening," says BJ. "This meant we weren't getting paperwork done, or we weren't getting people's badges back, and we were investing a lot of time and energy tracking people down."

The new exit website begins with a set of five questions to assess the type of separation and direct the user to the appropriate checklist. HR has simplified the termination process as well, and for the typical separation of a regular, full-time employee, many steps have been consolidated down to a four-phased departure.

There still are some 50 actions on the checkout checklist, but the process is now more clear and linear, says BJ. If a separating employee begins the process (as is recommended) three weeks before the last day of work, most checkouts should go smoothly and with little follow-up.

Development of the consolidated process and website was coordinated with line customers and representatives of Sandia's various locations, the Security organization, the HR systems group, and Sandia's division human resources consultants (HRCs), says BJ. A team led by Ramona Cordova (3515) developed the new separations process, and Tara Camacho-Lopez (3654) designed the new site.

### Why people leave

The simplified process is helpful both to departing employees and the Labs, says BJ. Because Sandia is a national security facility, it is important to demonstrate that badges are turned in when people leave and that access authorizations are turned off in a timely manner.

It also is important that departing employees with clearances get their required security briefings so they know what their continuing national security responsibilities are after they leave.

Finally, the site includes an improved exit survey that allows management to better understand and track why people leave and what their feelings are when they do.

"This is important stuff from an HR perspective," says BJ.

# e + PMF = less paper, less time spent on process

## *New electronic performance management process to launch Sept. 1*

By Julie Hall

The performance management process for regular nonrepresented employees may involve a little less paper and a little less time next fiscal year.

Not only will the Performance Management Form (PMF) go electronic next year, but so will the entire review process from planning to final evaluation. However, it does not replace the required one-on-one employee-manager meetings.

*"Electronic archiving eliminates the risk of a PMF being misplaced when a person changes jobs."*

The new ePMF will be launched Sept. 1 and will replace the paper form. New features include automated reminders for employees and managers throughout the process and a new "electronic signature," eliminating the need to print, copy, sign, and file paper copies of PMFs, saving time for employees and managers, says Yvette Plasencia (3511), team lead for the ePMF project. Under the old PMF process, managers and employees were spending about two hours per employee in preparing and processing paperwork, the team estimated.

Now, once employees submit their PMFs electronically, managers will approve and "sign" them by clicking an "approve" button, generating an electronic copy to be retained in Human Resources' database.

"Electronic archiving eliminates the risk of a PMF being misplaced when a person changes jobs," says Melissa Eakes (3511). Under the old process, an employee's current PMF was retained by his or her Center office. If the employee changed jobs, the Center was responsible for archiving the PMF in the employee's personnel file, then forwarding a copy to the hiring organization.

The new electronic form and process came about to address feedback from line organizations and a Labs-wide effort toward improved efficiencies and operational excellence, Melissa says. Compensation and HRIS staff have been working with the Process Efficiency Transformation Project team — which focuses on increasing efficiencies in corporate policies and processes — on the ePMF process.

The ePMF application itself was developed by Jessie Black and Lori West of HR Information Systems (HRIS) Dept. 9544 and has undergone thorough user testing.

### How it will work

Employees will receive emails notifying them of the start of each phase of the review process, which are as follows:

- Planning phase: Sept. 1 – Nov. 30, 2007
- Interim phase (mid-year): Dec. 1, 2007 – May 30, 2008
- Final phase: June 1 – Oct. 31, 2008

During the planning phase, employees fill out their PMFs and review them with their managers. The ePMF allows up to nine objectives with corresponding results and contains a field for career development plans.

Employees can work on their ePMFs over time, saving them for future additions and editing. However, once an employee submits the PMF to his or her manager, the employee can view but cannot change it until the manager reviews it. Managers receive an email notification that action is required. If a manager wants additional information or revisions, the ePMF can be sent back and forth between employee and manager as needed. A manager-employee meeting is to take place during the planning phase and each subsequent phase.

At the start of the interim phase, managers will again receive an email reminder to meet with their staff to review progress toward employees' annual goals. (Employees can add results corresponding to their goals at any time after their initial ePMF is approved.) The manager will be required to enter interim feedback before being able to approve the ePMF. The process is the same for the final review phase, with the addition of customer feedback, value of contribution, and a final evaluation.

A feature of the new system is that managers can easily determine who has or has not completed their ePMF. For privacy purposes, managers can only view the PMFs of their staff, senior managers can view PMFs of their direct reports, and so on.

### Help available

A Job Aid and training video are available to help guide both employees and managers in using the new ePMF:

**Employees:**
http://ln.sandia.gov/pmf-emp
**Managers:**
http://ln.sandia.gov/pmf-mgr

CCHD personnel (845-2243) and the Compensation team can also provide assistance. "We want to ensure that everyone using this new application has adequate support," Yvette says. "The performance management process plays an integral role in employees' professional development and career advancement at Sandia and we want to encourage employees and managers to use it to its fullest."

**Sandia NewMexicoNews**

# Discovery Channel sings its way through filming of Stirling solar-dish engine units at Sandia

Singing. That's what Chris Burroughs, Sandia media relations specialist, will remember most about the media visit by a crew from the new Discovery Channel show *Really Big Things*.

"It was remarkable," Chris says. "As the crew were setting up their cameras or just before shooting, the host and one of the crew members would break out in song."

Both had good singing voices. In fact, the host, Matt Rogers, was one of the top 10 finalists on Season 3 of *American Idol*. When she met Rogers, Chris asked him to sing her a song. He turned on the car radio and serenaded her on the spot.

The 6-foot-5-inch, 290-pound Rogers was also an offensive lineman for the University of Washington Huskies when the team won the Rose Bowl in 2001.

The crew filmed the six Stirling Energy Systems Inc. (SES) solar-dish engine units at Sandia's National Solar Thermal Test Facility — the same dishes that President George W. Bush visited two years ago when he signed the Energy Policy Act of 2005.

During an interview with Rogers, Bruce Osborn, Stirling's CEO, said that while the individual dishes may not be big, what is planned for them fits the "really big" category. Over the next year four more dishes will be added at the Albuquerque site. Eventually these same types of collector dishes will be part of a 20,000-dish array in the Mojave Desert near Victorville, Calif. SES has already signed agreements with San Diego Gas and Electric and Southern California Edison to sell them power once the dish farm is constructed.

*REALLY BIG THINGS* Discovery Channel host Matt Rogers, right, washes a Stirling solar-dish engine mirror during a recent taping of the show at the National Solar Thermal Test Facility. With him is Gerry Rodriguez, Stirling Energy Systems Inc. (SES) engineer. The show is scheduled to air on the Discovery Channel Aug. 22. (Photo by Chris Burroughs)

The video crew, which consisted of Rogers, a field director, field coordinator, two cameramen, audio coordinator, and assistant, were all big men, not quite as huge as the former football player — but nearly. When the crew was first introduced to Osborn, the CEO joked with Rogers, asking him if he "brought his whole football team with him."

On average Sandia hosts two to three media visits each week and receives 75 media calls a month. Most are the "big guys" like ABC, NBC, or CNN. Less frequent are visits by local media, but they are always more than welcome, Chris says. Usually crews visiting Sandia are small, maybe just one reporter or a reporter and a cameraman. A seven-person crew, like the one from *Really Big Things*, is unusual.

Also unusual about the visit was Rogers' desire to be "hands on." He wanted to be filmed washing the mirrors, inspecting the top of the mirrors in a man lift, and touching an engine, Chris says.

While Rogers wore a pair of shorts and an SES shirt for the filming, the rest of the crew was dressed even more casually in order to be comfortable in the 100-degree sun. Producer/director Eric Weingrad, described by Chris as "brilliant and spontaneous," wore oversize plaid shorts, a white and blue T-shirt, and unmatching green flowered bandana. The SES secretary on hand, who took care of everything from ordering lunch to making sure everyone had water on the hot day, noted that "Eric sure doesn't believe in dressing up, does he?"

But that didn't stop him from running a tight ship and making the filming look easy, says Chris.

The crew unanimously agreed that one of the best parts of the visit was climbing to the top of the solar tower where they filmed Rogers introducing the story with the six dishes in the background.

The show is expected to air on the Discovery Channel Aug. 22.

# Radiation detection on the high seas

## *Project for Domestic Nuclear Detection Office tests deployment of rad detection equipment on ships*

By Patti Koning

George Lasche (6418) never imagined his career as a physicist would take him into the shipping business. On Oct. 6, 2006, he stood on the Golden Gate Bridge and watched proudly as the SS *Lurline* of Matson Lines passed underneath. On the ship were four containers prominently marked with the Sandia thunderbird logo.

"The captain and crew waved when they saw me on the bridge and saluted with a long blast of the horn," George recalls. "I saluted back. It was gorgeous, a wonderful moment."

This departure was the first of eight planned round-trip voyages for a project testing the Experimental Limits for In-Transit Detection of Radiological Materials, funded by the Domestic Nuclear Detection Office within the Department of Homeland Security.

The goal of the project is to determine if it would be feasible to deploy on-ship systems that can reliably detect radiological/nuclear materials while at sea with an extremely low probability of a false alarm.

"These two goals require that we learn as much as possible about the environment in which these systems are being designed and deployed," says George.

The approach is to ship a selected variety of advanced radiation detection equipment amongst a large sampling of actual cargo in container ships while at sea. These include high-purity germanium (HPGe) gamma-ray detectors, bonner-spheres neutron spectrometers, a fission meter multiplicity detector, muon-neutron correlation detection suites, and environmental detection suites.

In some shipments, selected radiation sources also are shipped to characterize radiation transmission through cargo at a range of energies spanning the natural radiation spectrum.


THE SS *LURLINE* of Matson Lines passes Alcatraz on its way out of the Port of Oakland enroute to Hawaii. The ship is carrying several containers filled with radiation detection equipment and radiation sources for the in-transit radiation detection project. Look *very* closely for the Sandia thunderbird on one of the containers. (Photo by John Didlake)

Radiation detection at sea is, in a sense, uncharted territory. While much research has been done detecting radiation on land, the sea presents an entirely different environment — one with significantly less background noise.

Detection at sea is also unique because constraints on size and weight may not apply. Land-based detection systems are typically embedded into some physical aspect of a port, such as a drive-through portal or crane. A detector enclosed in a container could weigh up to 40,000 pounds.

Time is another factor. While land-based detection usually happens within a few seconds, ship-based detection has days in which to seek out a source. The project uses the longest domestic route available, from Oakland to Honolulu, which takes four days.

"The ability to detect and interdict nuclear material on ships could keep such threats from ever reaching our shores," says Bill Ballard

*(Continued on next page)*

# Sandia's 'micro' terminal processes shipping containers for tests

By Patti Koning

About two years ago the high bay in Building 942 at the California site, in the group of buildings known as the Micro and Nano Technologies Laboratories (MANTL), faced an uncertain future.

The building's interior was demolished in preparation to become a facility for LIGA (a lithography, electroplating, and molding technique). When the LIGA project was canceled abruptly, the space lay empty for quite some time.

Early last year, John Didlake (8229) began looking at the space for Work for Others projects such as SNIFFER and the Explosives Detection System. Then in June 2006, George Lasche (6418) won funding from the Defense Nuclear Detection Office for an in-transit radiation detection project that would require a lot of space.

### A perfect fit

George needed to load and unload up to eight 40-foot shipping containers for a total of eight round-trip journeys from Oakland, Calif., to Honolulu. Originally, he considered renting space close to the Port of Oakland, which is what is done in Hawaii.

John saw a perfect fit between the empty building and George's containers. The space is unique in that it is a large indoor space in an unclassified area and close to a major port.

"This would be a difficult project to do outside in someone else's parking lot," says John. "We have the space to accommodate the containers and are located 30 minutes from Oakland."

In about July 2006, discussions began about changing the purpose of the MANTL high bay into Sandia/California Container Terminal (SCCT). At that point the building had no electricity and mothballed cranes with a 6-ton capacity, which is only adequate to lift empty containers.

LOAD 'EM UP — At the Sandia/California Container Terminal, a shipping container is loaded onto a truck chassis for transport to the Port of Oakland. (Photo by Randy Wong)

John describes the process of transforming the SCCT into a port of call as a "just-in-time" endeavor. The electricity was restored on a Saturday, the retrofitted 10-ton cranes were certified on Monday, and container assemblies began on Tuesday.

With a lot of coordination and teamwork led by Scott Keith (85141), Lynn McClellan (8523), Terry Spraggins (8523), Grace Miranda (8523), and the receiving staff, George was able to hit his Oct. 6, 2006, deadline for the first shipment. The project has been extended to at least two more shipments beyond the original eight.

Nicholas Mascarenhas (8132) has a neutron scatter project funded by the Department of Homeland Security (DHS) that will be on later shipments. John is hopeful DHS will continue using the SCCT for container research projects.

The irony of a facility filled with 40-foot shipping containers in a site known for micro- and nano-scale work is not lost on John.

"Actually, we are 1.8 x $10^{-6}$ the size of the Port of Singapore," he says. "So we really are a micro terminal in comparison with a real port."

# Rad detection

*(Continued from preceding page)*

(8100), Radiological/Nuclear Countermeasures Program manager. "We don't know if this is the final answer — this project is examining the feasibility of such detection on a large scale."

This project is a collaboration on many levels. Though Sandia leads the project, the detectors come from Sandia, Lawrence Livermore National Laboratory (LLNL), Pacific Northwest National Laboratory (PNNL), Los Alamos National Laboratory (LANL), and the Environmental Measurements Laboratory.

The equipment, George says, is far more costly than anyone could afford to deploy in regular commerce. But using such sophisticated, highly sensitive equipment will enable the researchers to characterize the radiation environment at sea and properly design less expensive detectors.

At the same time, LLNL and PNNL are using data collected by Sandia to develop and test computer models for radiation detection at sea.

"Few people believe computer models until they have been proven. If we get similar answers using two different approaches, it will build confidence," says George.

He recently launched the seventh round-trip voyage of his special containers. Each voyage begins at the high bay at Sandia/California's Micro and Nano Technologies Laboratories (MANTL), which last year was retrofitted to accommodate up to six 40-foot shipping containers and everything being loaded into them. Once loaded, the containers are trucked 30 minutes west to the Port of Oakland.

So far the project has run extremely smoothly with very intriguing results, George says. He attributes a good part of that success to the strong partnership with the shipping company.

"Matson Shipping Lines responded with a wholehearted commitment all the way from the vice presidents to ship electricians in the spirit of helping us solve our problems, instead of just figuring out how to deal with them," he says.

Every ship's captain volunteered to carry GPS equipment in the bridge, allowing the researchers to coordinate where the ships were at every moment in time. Those locations could then be correlated with any phenomena shown in experiments.

George recalls that one captain was so concerned the GPS equipment had failed that he had his first mate write down by hand every position recorded during the voyage.

This data on location proved invaluable when all of the detectors registered a gain drift. On the voyage west to Hawaii, the line of potassium moved slightly up and then fell slightly on the return trip.

According to George, his team determined the gain drift was driven by temperature. As a result, any instrument deployed would have to be calibrated enroute. If done computationally, this is feasible because measurements were taken every 15 minutes and the gain drift showed itself over a longer period of time.

The significance of this project lies in the fact that all experiments are conducted in a real shipping environment.

"We're testing among what people actually ship, which is not always what one would expect to see," says George. "A lot of manifests simply read FAK, for Freight of All Kinds."

For example, a huge signature of potassium 40 was detected on one of the more recent shipments. With the help of Matson, the Sandia researchers discovered that the detector picking up the signature was nestled between two containers filled with fertilizer composed of potassium nitrite.

Another surprise was the detection of a weak signature of uranium in all of the first shipments. George says the uranium signal was so pure it appeared to be inside Sandia's own containers. It turns out the background environment at sea is so quiet compared with that of land that the detectors were sensing the minute amount of natural uranium found in most aluminum.

"We've gotten rid of the aluminum in our containers, so now I expect we'll see all the uranium in beer cans traveling from Oakland to Hawaii," says George. "Any instrument in a real deployment must be able to discriminate innocent uranium from threatening uranium."

Originally eight round-trips were planned, but the Department of Homeland Security (DHS) has added several more trips so that a neutron scatter camera can be included with the experiments. This is a testament to the success of the project and the value of the neutron scatter camera, which was developed at Sandia/California.

"It's so good to be out with the public doing something for the national defense — working with real instruments in real environments is a refreshing change from office work," George says. "This is one of the most rewarding projects of my life."


T-BIRD GOES TO SEA — One of Sandia's containers is moved in preparation for loading at the Port of Oakland. (Photo by Randy Wong)

# IPAWS

*(Continued from page 1)*

tion tools, public access websites and alert and warning notification facilities. WARN also features an "opt-in" capability that allows citizens to sign up to receive alert messages via pagers, cell phones, email, and other communications devices. The WARN system includes an Emergency Telephone Notification component that provides automated calling of all residents in a selected geographic area, and a Deaf and Hard-of-Hearing Notification System that provides information to the hearing impaired using American Sign Language videos on the Internet and on personal communication devices. Each of the pilot program technologies will be installed and tested through December 2007, while FEMA will seek additional funding for further piloting in 2008.

## Develop and deploy

"At Sandia, IPAWS is a clear New Mexico/California collaboration," says Ron Glaser (6464), who is serving as the Labs' program manager for IPAWS. Technical teams, led by Ron's Systems Engineering group, with expertise from 5610, 6320, 6450, 6460, 8110, 8520, 8960, and 9510, are working together to develop and deploy the initial IPAWS capability.

Specifically, says Ron, Sandia is creating the secure architecture, standards, protocols, and methodologies for message security and distribution of alerts and warnings. Sandia is also developing the certification program for companies to qualify for access to the IPAWS communications framework. The architecture and messaging standards developed through this program will be fed back to standards-setting organizations, such as OASIS (Organization for the Advancement of Structured Information Standards).

## Pilot activities this summer

The lab will be demonstrating and evaluating IPAWS components during pilot activities this summer. WARN, the first IPAWS component, integrates existing vendor-supplied technologies to provide a warning capability that could be used during this year's hurricane season. The initial rollout, led by Jeff Jortner (8962), became operational August 1.

"Because Sandia doesn't have a technology dog in this fight, we're seen by FEMA as an honest broker," says Jeff. "We understand the technology that we're integrating, but at the same time we have no product or service we're trying to sell. That gives us unique credibility in the eyes of our sponsors." Sandia has selected several subcontractors to assist in technology deployment for the IPAWS WARN system, including MyStateUSA, NuParadigm Foundation, Warning Systems Inc., and others.

Lab analysts at Sandia are also working with emergency management staff in Alabama, Louisiana, Mississippi, and New Mexico to understand specific message targeting capabilities and needs, and various public alert and warning communication options for multiple communities of interest across federal, state, local, and tribal organizations.

"Our discussions with the New Mexico-based communities of interest, which have included emergency operations managers from Bernalillo County, the city of Albuquerque, and the state of New Mexico, have been particularly valuable," says Heidi Ammerlahn (8962).

Those jurisdictions have raised several issues that researchers otherwise may not have been aware of, she says. Some local officials, for instance, may not think so much about technology itself but rather about whether individuals without technology training will be able to take advantage of IPAWS features and actually use the system properly.

Sandia enjoys a long history in the design and development of command, communication, and control systems. Its federal customers include the US Northern Command, the Defense Threat Reduction Agency, and the Department of Defense.

Jill Hruby (8100), who directs the Labs' Center for Homeland Security and Defense Systems, says Sandia's work on IPAWS may be a harbinger of things to come.

"Though this the first major project on communications architecture and information surety for DHS, it likely won't be the last," says Jill. "If we continue to be successful with this project, I think there are other opportunities to use this same architecture for other complex communication systems that require a high degree of interoperability and a high degree of data validation."

# Paul Hommert

(Continued from page 1)

the fall. Right now I am engaging our first level of management in recognition of the need to reflect their views and the views of staff about important issues that should be embedded in this vision.

*". . . my long-term view is tied to the transformation of all of the national laboratories into true, broad national security laboratories. That's a much larger issue and not the direct focus for us between now and 2012."*

It's a five-year time frame. Obviously, we need to think longer term as well, but my long-term view is tied to the transformation of all of the national laboratories into true, broad national security laboratories. That's a much larger issue and not the direct focus for us between now and 2012.

## Biggest challenges for site

*LN: What's the biggest challenge facing the California site?*

PH: It's hard to capture in a single word, but I would say it's a sense of stability. This site has already had to face underpinning questions like, do we really need a California site? What's going to happen to us? So it's a question of stability, but stability based on evolving and changing in a way that we intentionally influence and direct. The question of stability is applicable not just around the site, but also around our mission projects. This means working with our customers to try and increase the fraction of our work that brings with it the possibility of stable, multiyear funding.

## A uniquely 'national' lab

*LN: Where do you see this site in 50 years?*

PH: What happens to Sandia/California is a piece of the larger question of what to do with national laboratories that are really Cold War entities. They have demonstrated their ability to impact national security in the post-Cold War era but have not really transformed themselves into post-Cold War institutions.

Our future is tied up with how the nation chooses to make that transformation. That said, I think we in California offer an intriguing model for how one of those labs — Sandia — can work across sites.

The Joint BioEnergy Institute (*Lab News*, July 6, 2007) is a good example of the value of the window to the dynamic environment of California that we provide to the broader lab. This state has outstanding institutions and is poised on the leading edge of carbon tax, global warming, transportation problems, energy efficiencies, etc. Roughly one-third of JBEI work will happen in New Mexico. That never would have happened without a presence in California. We simply wouldn't have even been able to compete. Our strong presence in this state makes Sandia uniquely national in its character.

## Current projects and programs

*LN: What are some of the current projects and program activities that this division is currently engaged in?*

PH: RRW [Reliable Replace Warhead], of course, despite the present turbulence surrounding it. We're very excited about our bioenergy efforts such as JBEI. This innovative and unique program plays to the strengths and core qualities of this organization.

Related to, but broader than, the weapons program, this organization is the heart and soul of the Labs' efforts in weapons surety, not just strictly with nuclear weapons but also the weapons complex as a whole.

As part of the Homeland Security & Defense Strategic Management Unit [SMU], we are immersed in a very broad range of activities [see next two questions]. We've also taken on new work in physical security of weapons systems.

Terry Michalske [director of Biological & Energy Sciences Center 8300] is engaged broadly throughout the organization to develop bold initiatives for how we take the CRF [Combustion Research Facility] forward. Some traditional areas in which we've worked, like materials science, engineering science, and hydrogen, continue to have new, exciting directions, rooted in our traditional strengths.

*LN: Do you think Sandia has responded to the national need for homeland security, and how do you think our role might evolve?*

PH: Unquestionably, I think we've responded. Our diverse set of programs touch many aspects of homeland security, from core science and technology in the chem/bio and rad/nuc areas to the fact that we're broadly engaged with various parts of the Department of Homeland Security (DHS), such as FEMA (Federal Emergency Management Agency), Customs and Border Protection, and the Domestic Nuclear Detection Office. These programs reflect the importance of Sandia's science-to-engineering ability in this arena.

Having said that, this area remains very challenging for Sandia and the country. Each day brings new threats. The challenging immediacy makes it difficult to apply sustained, game-changing science and technology. The mentality is "solve this problem"— a shoe-bomber today, a liquid explosive or a hurricane tomorrow. We've been nimble in responding to some of those needs, while working to ensure we bring long-term, fundamental technology changes to bear. We need to get the balance right, which is related to the question of the stability discussed earlier. I'm confident we'll have a sustained, long-term contribution to the nation's homeland security with even greater future involvement.

*"Each day brings new threats. The challenging immediacy makes it difficult to apply sustained, game-changing science and technology. The mentality is 'solve this problem'— a shoe-bomber today, a liquid explosive or a hurricane tomorrow."*

## Challenges in Homeland Security SMU

*LN: How about our own Homeland Security & Defense SMU? What would you identify as its biggest challenge?*

PH: The SMU is still new, with less than two years in its current construct. We need to give the broader lab staff a sense that the HS&D SMU is a great place to work and an outlet for their creativity and skills. Another challenge is to continue adapting internally to the external volatility of DHS, which demands a different structure and different leadership assignments. We [HS&D SMU leadership] expect this fall to revisit our strategy and structure approach from a discretionary investments standpoint. My hope is that in three to five years, the laboratory will view the SMU with a sense of maturity and understand the key ways in which this lab interfaces with the demands of homeland security. We're not at that sense of maturity yet; that's a journey we're still taking.

*"My hope is that in three to five years, the laboratory will view the [Homeland Security] SMU with a sense of maturity . . . We're not at that sense of maturity yet; that's a journey we're still taking."*

*LN: How do you balance the several leadership hats you wear at Sandia: Div. 8000 VP, HS&D SMU lead, and a role within the weapons program?*

PH: Every job has its own natural scope, and I'm still discovering the scope of this job. When I look at my three primary roles, I recognize a natural interplay. Homeland security and the weapons program comprise a major part, perhaps up to 75 percent, of what this division does. To move the site and organization forward and appropriately contribute to the corporation, I need to be working all three of those areas. There's a great team of people working with me on each — otherwise it wouldn't be possible.

## Future impact of RRW

*LN: With RRW, there was a lot of excitement initially, followed quickly by some uncertainty due to the political landscape. What do you see as the future impact of RRW?*

PH: The excitement surrounding RRW is justified. We need to learn to be both excited and uncertain at the same time. Our technical role is important, but we shouldn't lose sight of the other purpose the program is serving. RRW has catalyzed what will now be, for the first time since the end of the Cold War, a national debate on the role of nuclear deterrence.

Obviously with that debate comes some uncertainty. I'm confident that as the debate progresses and more of our national leadership studies the issues, they'll find that RRW is the right path forward. And, important for us, they'll find that the key component of RRW — strengthening the safety and security of our weapons systems — involves technologies strongly rooted in what Sandia and Division 8000 bring to the table.

## Broad weapons lab experience

*LN: You've worked at three of the four English-speaking nuclear weapons labs [Sandia, Los Alamos, and the UK's Atomic Weapons Establishment]. Does that broad experience give you some added insight?*

PH: Each of those institutions is very different, yet very similar. They're similar in the high quality of the people and their passion for national security, but unique in either their mission space or business approaches. I think the breadth of perspective — seeing how you can come at problems from different angles — probably helps me provide a fresh outlook to approaching situations and challenges. I personally found these experiences very enriching and hope that I'm a better leader for having had them.

## Public perceptions

*LN: What do you think is the public perception of this site in the local community?*

PH: We're often combined with our sister lab across the street [LLNL] and viewed as one lab entity. That's okay because we're both important contributors to national security. Yet at an appropriate level it's important that the community understands the nuanced difference we represent at Sandia/California as an engineering laboratory and as a window to a larger laboratory in New Mexico.

I don't feel the difference is well understood. You have to be realistic — we're a small organization when you look at the totality of the Bay Area from an employment standpoint. We are making

(Continued on next page)

# Paul Hommert

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concerted efforts to address this — Jim Simmons (8528) is working on outreach and Karen Scott (12122) works with our local legislative people at the state and national level.

We need to illustrate to those key constituents the role, strengths, and difference we bring. But we shouldn't ever lose sight of the broader connectivity we have with LLNL as we work together.

We also have a great work force that is very engaged with this community, particularly in the area of education. I'm continually impressed with the individual efforts of community involvement, and commitment and giving that come from our staff.

## Strategic partnerships

*LN: What customers, constituents, or programs might help us in the future in terms of strategic partnerships?*

PH: Within DOE, the Office of Science has been a long-term, sustaining customer with an important role to play going forward — as indicated by the recent JBEI exercises and in our efforts toward the CRF's future. We want to continue cultivating that relationship.

Within the weapons program our core NNSA customer remains critical to our organization and mission. This organization has done an outstanding job of developing and evolving entrepreneurial, innovative relationships with industry, most recently with the automotive industry. My hope is for more relationships rooted in homeland security business because industry will play a significant role as a technology provider to first responders and other end users.

*LN: How do you think our relationship with LLNL will change with their management change?*

PH: Obviously, there is a bit of uncertainty. They have uncertainty themselves as they transition to new leadership. In the programmatic space — weapons, homeland security — the character of our partnership and mission roles will remain very much the same. Some homeland security leadership will change, but their leadership in weapons will make the transition across the new contract.

In other areas it is only logical that with their new contract we explore ways to be as efficient as possible in our partnership across East Avenue. We will look at shared services such as security and emergency response. We look forward to engaging with the new leadership once they've gone across their contract change and are stable.

## Sandia/California's unique culture

*LN: What are your impressions of Sandia/California staff and researchers and the California site's culture, particularly in light of your previous experience in New Mexico?*

PH: When I get out and talk to staff I find the innovation, teamwork, dedication, and enthusiasm to be really exceptional. This is very energizing — the most enjoyable thing I can do is to sit back and be amazed by the work and talent here.

All of the national laboratories are characterized by talented and dedicated people, but this site has a different and unique feel. The interconnectivity allows the organization to respond quickly and innovatively.

This is a function of the size, physical layout, and the fact that we manage our infrastructure and mission pretty much sitting around the same table. The sense of community is unique compared with anywhere else I've been. We need to maintain that special character.

## Hiring foreign nationals

*LN: What is your position on hiring foreign nationals and what are your plans to address this issue?*

PH: Taking a broad view, we must ensure we are bringing the best of science to bear on our national security problems and that we are challenging our staff to be competitive on an international level. That said, although we have hired foreign nationals in the past and do so now as limited term and postdocs, I recognize that this is a complicated employment issue.

I'm pleased that Sandia is considering this with an effort led by Pat Smith (3000), who will report to LLT later in the summer. We must continually examine this and look to leverage the foreign national community to the benefit of our site and laboratory. My view is this should encompass permanent hires, but we will take that decision as a laboratory.

## Dealing with difficult issues

*LN: From a leadership and management standpoint how would you like to deal with the difficult issue of staff layoffs?*

PH: Despite all the uncertainty, I remain confident that the broad base of our mission provides a stable basis for moving the organization forward. Could I be wrong? Clearly we see one possibility with the initial House appropriation for the weapons program, which would have an impact, if it were to go through unchanged.

We must continually examine how efficiently we deliver our product to our customer base. Those efforts can, in limited situations, result in transforming part of the organization. I envision this happening occasionally in the future, but a broad-based impact is extremely unlikely. In any difficult employment situation, I would hope we always approach it in a way that reflects our corporate values.

## Life in the Bay Area

*LN: What kinds of things have you been enjoying in the Bay Area?*

PH: I'm making a deliberate attempt to enjoy the area as much as possible. I've been to the San Francisco Opera, Monterey Bay Aquarium, Napa Valley, and Oakland A's ballgames (you can't see a major league baseball game in New Mexico). This month my wife and I are spending a long weekend in Mendocino and, time permitting, in September we'll attend the Shakespeare Festival in Ashland, Oregon.

# RRW

*(Continued from page 1)*

Another reason to get excited about RRW is the opportunity to fully embed computer modeling and simulation into the weapon lifecycle engineering process, says modeling and simulation lead Artie Ortega (8244). For RRW, computer modeling is an integral part of the design and development phases.

"There is a lot of opportunity to make use of new modeling tools and drive tool development," says mechanical analysis lead Jay Dike (8774). "On the mechanical side, we've been able to leverage ongoing work and computing resources funded by the Advanced Simulation and Computing (ASC) program."

## Faster meshing, multiple codes

Among the advances are faster model meshing and new capabilities for using one analysis model in multiple codes. The work of Sandia's Design through Analysis Realization Team (DART) has resulted in improved quality assurance and model management.

"The use of computer modeling and simulation will have a transformational effect on RRW," says Artie. "In FY07 and FY08 the emphasis is scoping and design trade-off studies as well as specification of component environmental requirements with uncertainty quantification.

The ability to rapidly develop and execute models for design studies is critical and QMU has been implemented at the very start."

QMU (Quantified Margins and Uncertainties) is the application of science-based testing, together with modeling and simulation, to quantify design margins with consideration of known variabilities and uncertainties in the underlying systems, models, and databases. In other words, QMU tells you how close or far away you are from meeting the requirements.

"The goal is to have some impact up front, instead of assessing the design after it has been built," says Artie. "We are already seeing this in the mechanical area, where decisions are being made based on the computational data provided by Jay's team."

## A critical role in qualification

Modeling and simulation will also play a critical role in qualification, supplementing the body of evidence for qualification, which has historically been based on testing and engineering judgment.

Models will be used to make quantified statements of margins and uncertainties across a broad environment space — performance, survivability, and surety.

"For certain environments, most notably hostile environments where there is no adequate high-fidelity test capability, we anticipate that modeling will provide qualification evidence. Modeling will complement physical testing, resulting in a stronger qualification statement," says Jay.

## *RRW brings about a new paradigm for leadership*

Sandia is applying many new tools and technologies to the Reliable Replacement Warhead (RRW) program, the first new weapons program in more than 20 years. A new paradigm for leadership — a shared role between Sandia/California and Sandia/New Mexico — is an important aspect that will enable success.

Although the bid for RRW officially was awarded to the Lawrence Livermore National Laboratory (LLNL)-Sandia/California team, Sandia/New Mexico will share in the responsibility. Sandia/California will continue to partner with LLNL on the warhead design, which includes systems qualification, surety, and gas transfer while New Mexico works on arming, fuzing, and firing.

The directors of Sandia's two weapons systems organizations — in California, Corey Knapp (8200), director of National Security Engineering, and in New Mexico, Bruce Walker (2100), director of Nuclear Weapons Systems Engineering — agreed early on that they would ensure a system leadership role for the other organization regardless of who won the competition.

"Sharing the leadership of RRW ensures that we leverage the strengths of both sites — providing the best value to the nation — and that we continue to strengthen the system engineering capabilities at both the California and New Mexico sites," says Bruce.

One reason is simple logistics. RRW is about the size of the W76-1 and W80-3 combined. The project is simply too big for California or New Mexico to execute alone.

"I expect that this will hold true for future phases of RRW, a significant LEP [life-extension program], or other future weapons program," says Corey. "We'll work hard to ensure that there is a leadership role on one site and a meaningful role on the other site."

He also thinks the shared leadership is what is right for the country.

"It's not good for anyone — the nation, Sandia, or the individual sites — to be completely excluded from a system leadership role for a number of years," he says. "We are applying Sandia's resources in the best possible way to this program." — *Patti Koning*

# 'Ground Truth' real-time strategy game is serious business for Sandia software engineer and game enthusiast

PROJECTED ON A LARGE SCREEN, Ground Truth allows emergency responders to see an emergency event as it unfolds across a city. (Photo by Dino Vournas)

By Mike Janes

Peanut butter and jelly. Wine and cheese. Dinner and a movie. Some things just naturally go together.

But national security and video games? At first glance, those two aren't exactly a soft brie and a glass of merlot in terms of compatibility. If Sandia computer scientist and software engineer Donna Djordjevich (8116) has her way, however, perhaps today's video game-loving youth will become our next generation's terrorist-fighting scientist, largely due to the game development skills he or she will have learned at Sandia.

Donna is principal investigator of a Laboratory Directed Research and Development project titled "Game Technology-Enhanced Simulation for Homeland Security," more commonly known as "Ground Truth," which immerses its users in an interactive gaming environment specifically designed as a training tool for first responders. The program was funded and started in October 2006.


SCREEN SHOTS from Ground Truth, a video game that immerses first responders in a realistic emergency scenario.

## Tapping into video gaming culture

Modeling, simulation, and, yes, gaming, have been around Sandia for years. But Donna, a self-described "obsessive-compulsive gamer," is a true believer who suggests Sandia could do even more to take advantage of the video game culture, perhaps even integrating gaming in a formal way into the Labs' homeland security program activities and elsewhere.

DURING A DEMONSTRATION to members of the Alameda County Public Health Department, researcher Donna Djordjevich makes a point about the Ground Truth simulation program. (Photo by Dino Vournas)

"Video games are progressive, intuitive, accessible, and immersive," says Donna, making them an ideal framework for training and learning. Firemen, police officers, and other first responders, she asserts, are used to being "on the scene" of an incident, so gaming mechanisms that thrust users into a "real" environment are a great fit for training purposes.

Donna started playing her first video game — Super Mario Brothers on the original Nintendo — at age six, on a system purchased by her parents but intended for her brother. She says the "interactive simulation-based" interface offered by video games is more effective than the "press play, then walk away" style of video training.

Ground Truth is part of the "real-time strategy" genre of video games and an example of the "serious games" movement. A 2006 article in the *New York Times* titled "Saving the World, One Video Game at a Time" asserts that this new generation of video games "can be more than just mindless fun, they can be a medium for change . . . [The movement] is a partnership between advocates and nonprofit groups that are searching for new ways to reach young people, and tech-savvy academics keen to explore video games' educational potential."

## Visually similar to SimCity

Visually, Ground Truth looks somewhat like the popular "SimCity" city-building simulation game, with a nameless urban environment at the center of the action.

The current scenario involves a chlorine spill; users are required to move pieces around — much like a chess game — in order to best mitigate the consequences of the incident. They can choose from various functional "pieces," including firefighters, police officers, hazmat teams, or they can activate staging and medical staging areas. If an accident scene requires a roadblock to divert traffic, for example, a user might choose to send the police to the area. Medical staging might be engaged to treat victims, though users need to keep an eye on any toxic fogs that could impact the success of the operation. A "progress thermometer" in the upper right-hand corner of the computer screen helps them gauge the success of their moves. The game takes roughly 20 minutes to play.

## Designed for incident commanders

In its current form, says Donna, Ground Truth is designed for high-level incident commanders who need to understand how to best allocate their resources (hence the "big-picture" aerial view on the screen). The game also educates users on the dangers faced by on-scene emergency responders. Those playing the game, for instance, quickly learn that only certain responders are able to wear personal protective gear, so "you don't want to be sending your police officers into an area where they might face a cloud of toxic gas." Future scenarios, Donna hopes, will aim to engage personnel who actually respond to scenes, as well as involving decision-makers at higher levels and jurisdictions.

Donna plans to incorporate feedback from authentic emergency response personnel into Ground Truth. Although details were unavailable when *Lab News* went to press, an August 8 visit to Sandia/California by members of the Alameda County Public Health Department was scheduled, during which a Ground Truth demonstration was planned.

Roughly 10 Sandia staff members, says Donna, are working on Ground Truth, with additional programming, graphics, and animation work being conducted by the University of Southern California's GamePipe Laboratory (which is hosted by the university's Viterbi School of Engineering). The project is in its first year of a three-year LDRD commitment.

Though she's focusing on the work at hand, Donna can't help but imagine bigger and better things with Ground Truth and the video gaming arena at Sandia.

While Ground Truth may one day become a licensable product that comes on DVD, she envisions DHS Secretary Michael Chertoff being won over by a demonstration and demanding that the program be endorsed, paid for, and delivered by DHS to first responders all over the country. "Then maybe we'll be ready to launch Sandia's Center for Interactive Gaming Applications," she says with a laugh.


This Month in the Past, a popular feature in the *Lab News* for several years, provides a look back at some of the Labs' notable accomplishments spanning a period of almost 60 years. This month, the accomplishments summarized here represent work done primarily at the Sandia/California site. The entries were compiled and edited by Mike Lanigan (3651).

**40 years ago . . . Frozen Peas Used in 'Squirt Gun'** — Frozen peas — without butter sauce — are being used by Livermore Laboratory engineers to measure water velocity created by Sandia's Water Pressure Velocity Generator ("squirt gun"). The peas, mixed with the water in the gun, provide a means for high–speed cameras to record the speed of the water during tests on a data-recording capsule.


WATER BURSTS from the muzzle of the "squirt gun" as the steel door is released.

Macaroni, popcorn, and plastic foam were tried before peas. But they did not travel with the water or show up in the pictures. Only peas, with a density near that of water, remained suspended and could be photographed properly.

"Firing" the test capsule diagonally across a stream of pressurized water in the barrel of the squirt gun simulates the conditions the capsule would encounter while traveling 30 miles per hour in water.

Designed [in 1964] by Ralph A. Thompson, (8147), the gun is being used to determine the capsule's performance and the specifications to which its thrust mechanism must be manufactured.

**30 years ago . . . Industry Co-Sponsors Sandia Research** — As part of the Energy Research and Development Administration's Combustion and Fuels Technology Branch Program, Sandia has responsibility for conducting research on combustion problems for current and future engines.

Now, as the result of a recent agreement, a portion of the research is being co-sponsored by industry through the Motor Vehicle Manufacturer's Association (MVMA). Funded by contributions from most US automobile, trucking, and farming equipment manufacturers, MVMA supports research of common interest to participating members.


MOTOR VEHICLE MANUFACTURER'S ASSOCIATION ad hoc committee on combustion research convened at Sandia in 1977. The committee included representatives from Sandia, MVMA, General Motors, and the Energy Research and Development Administration.

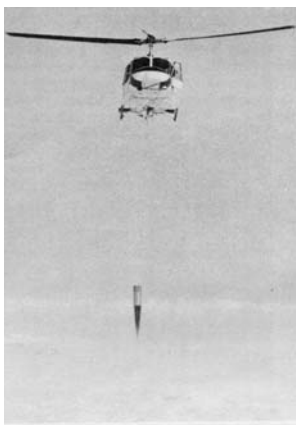
The Sandia work, supported by industry under the joint effort, is development of diagnostics for engine research. It encompasses four specific areas — engine velocity and turbulence measurements using laser Doppler velocimetry; concentration and temperature measurements in engines using laser Raman spectroscopy; stratified charge combustion experiments in a combustion bomb; and pulsed laser development.

All of the activities involve new techniques for measuring what happens inside a combustion engine — such things as how air and fuel enter, mixing processes inside the engine, and factors affecting efficient burn and pollutant formation.

**Gas Generator Emissions Proved Safe to Aircraft** — A warm gas generator developed at Sandia Livermore is used to control the orientation of the B77 after release from an aircraft. In use, the generator's propellant decomposes to (among other substances) hydrogen chloride and hydrogen sulfide. These gases corrode most metals. The Air Force was naturally concerned that these corrosive gases might damage aircraft structural members and electronics components, for in some instances the generator is ignited very soon after release from both B-52s and F-111s. In the case of the F-111, the gases might even enter the crew's air supply. Without proof that the gases weren't contaminating either aircraft or air supply, the Air Force was reluctant to utilize the weapon's full range of capabilities. Karen Pashman and Carl Schoenfelder (both 8315) devised experiments that convinced the Air Force there was no problem.

B-52s LIKE THIS, and F-111s as well, were the subject of in-flight corrosion contamination experiments by Carl Schoenfelder and Karen Pashman. Results indicated no damage to either aircraft or crew air supply.

**20 years ago . . . New Penetrator Proves Successful** — Sandia engineers have come up with a new design for a water and ice penetrator that offers greatly improved performance at reduced cost.


BELL 212 HELICOPTER was one of the aircraft used to carry penetrator units aloft. They were dropped from various altitudes into the Arctic ice pack.

The use of a pointed penetrator for water entry is something of a departure from the more traditional blunt body. Existing water entry bodies have blunt nose shapes that create a "cavity" when the missile enters the water. The new pointed nose, on the other hand, becomes fully wetted over most of its surface upon entering.

"The pointed nose means we can go in at much higher speeds — more than three times as fast, in many cases — with no increase in the load the penetrator experiences on impact," says Jack Swearengen, supervisor of Advanced Systems Division 8152. "A capacity for high-speed water entry will allow us to eliminate a retardation system usually needed for blunt water re-entry bodies, and thus reduce their cost and complexity.


DAY CAMP, on the frozen surface of the Arctic Ocean 38 miles outside Prudhoe Bay, served as a base for penetrator drop tests.

"In addition, our penetrator design should also allow us to use a single body shape for both water and thick ice penetration," Jack explains. "And the shorter time-to-target provided by faster entry may be an important capability for reaching mobile targets.

"This whole program began by bringing together the Sandia earth penetrator work and earlier work involving conical shapes at the Naval Surface Weapon Center [White Oak, Md.] — studies that resulted in a new configuration for stable water entry," Jack continues. The new pointed nose reduces the initial impact load but still allows the penetrator to remain stable."

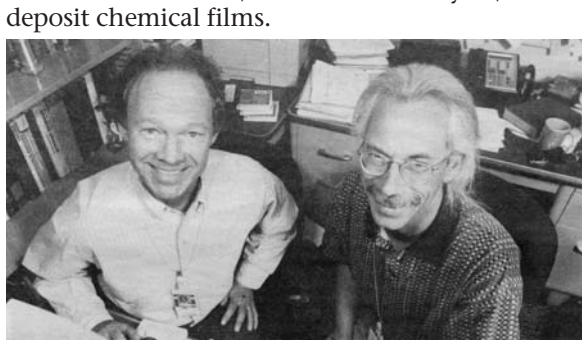
**10 years ago . . . Altitude Record Set in ARM-UAV Program** — The Altus 2 unmanned aerospace vehicle, built for the Atmospheric Radiation Measurement – Unmanned Aerospace Vehicle (ARM-UAV) program, has reached an all-time record altitude of 43,500 feet during flight demonstrations at Edwards Air Force Base in California.

Carrying a simulated payload of more than 300 pounds, this flight surpassed records of 41,600 feet set a week earlier. This milestone is just another in a series of successes for the Altus program.

Altus is being developed as a high-altitude, remotely piloted aircraft for climate research. Controlled from the ground, Altus offers the advantage of long endurance (up to 36 hours) and high altitude (up to 65,000 feet).

The ARM-UAV program is conducting a month-long series of flights at the Cloud and Radiation Testbed Site in September to take advantage of the increased altitude capability of the Altus 2. These flights will continue research on the effect of atmospheric aerosols, water vapor, and clouds on global climate change.

**Scientists License a 'Simple, Elegant' Approach to Processing Silicon Wafers** — Silicon wafers are heated to 500 and 1,200 degrees Celsius during manufacturing to anneal implants, drive in chemical treatments, oxidize surface layers, and deposit chemical films.


CALCULATING — Bob Nilson, left, and Stewart Griffiths modeled stresses experienced by silicon wafers during heat treatment and invented a better approach to thermal processing, which was licensed to industry.

Processing many wafers at once has the advantage of high wafer throughput and good temperature uniformity, but it requires long processing times and very low slow heating of the wafer stack to avoid excessive thermal stresses.

Now two mechanical engineers developing mathematical models of high-temperature thermal processes have devised a novel means of rapidly heating the silicon wafers used to fabricate microelectronic components. The new device offers the best features of traditional batch and single-wafer processors.

Rather than following a path toward increasing complexity, Stewart Griffiths and Bob Nilson of Mechanics and Simulation of Manufacturing Processes Dept. 8345 devised another approach combining the temperature uniformity and simple resistance heating of the batch furnace with the speed of a single-wafer processor.

# Sandia's Advanced Sales Training program aims to equip researchers with key 'sales' tools

By Mike Janes

Let's face it: Sales and marketing are, traditionally, unsavory concepts at Sandia. "We're scientists, engineers, and technical researchers," the argument goes. "We don't 'sell' or 'market' things."

So what is a program called Advanced Sales Training (AST) doing at Sandia?

In short, it's all about creating and maintaining a pool of skilled business developers at the Labs who are trained to win and retain significant new business for Sandia.

Says Partnerships Development Manager Mary Monson (10114), who helped start the program back in 2001 in New Mexico, "Part of Sandia's broader mission is to ensure that the nation is fully benefiting from the vast array of capabilities the Labs possesses, and AST speaks directly to that undertaking. The program is also an acknowledgement that generating new business is an actual skill, something that even the best and the brightest need to learn."

LYNN PHILLIPS, president of Reinventures, delivers a presentation to Sandia staff titled "Delivering Winning Value Propositions." Reinventures, a consulting company that works with Sandia's Advanced Sales Training program, regularly conducts workshops with organizations to train cross-functional teams in how to conduct "day-in-the-life" sessions with current and potential customers. ( Photo by Dino Vournas)

The AST curriculum consists of training classes, seminars, application clinics, workshops, and individual or team coaching. Classes are designed to teach concepts and build a common language, while seminars, clinics, and workshops expose students to broader issues, decision-making processes, and generate business-specific application discussions. Coaching is available to help participants apply skills and concepts to specific business development situations.

AST's genesis, Mary says, started with Kathleen Schulz (225) as far back as the 1990s. Kathleen, who had come to Sandia from Hewlett-Packard, saw the need for the Labs to modify and expand its mission space and slowly began to put together training classes in collaboration with the Education and Training department. Once Al Romig (00004) and Jim Tegnelia (12190) agreed to champion the concept, AST was off and running. Maria Weddige-Gurney (10114) now administers the program for Sandia/New Mexico.

The AST program, says Mary, has seen clear impacts. A 2006 report by Perspectives (a consulting company that works with Sandia), *Measured Impacts of Advanced Sales Training*, asserted that "a strong base of evidence from interviewees shows that their training led to numerous behavior changes that favorably affected business development results."

## California adds its own AST "twist"

Denise Koker (8529) serves as manager of the business development support group at Sandia/California. Site leadership, she says, has been thinking earnestly about "division development" for Div. 8000 over the past couple of years, and watching from afar the success Mary and her colleagues have had with AST. Building on that success while adding a few unique wrinkles — noting that only four Div. 8000-based staff members out of a total of 130 AST participants had gone through AST training in the past — Denise began working with California site management last year to deploy AST to small, targeted teams consisting of six staff members each. The teams are each led by a manager.

"One of our main priorities was to put together small teams that represented a good mix of technical and business expertise," says Denise. While technical savvy was a given, she says, individuals with business experience were placed on each team to ensure balance.

*"Part of Sandia's broader mission is to ensure that the nation is fully benefiting from the vast array of capabilities the Labs possesses, and AST speaks directly to that undertaking. The program is also an acknowledgement that generating new business is an actual skill, something that even the best and the brightest need to learn."*

**— Partnerships Development Manager Mary Monson**

Denise says Sandia/California's management team carefully selected the teams based on specific site initiatives. The teams include Bio-Fuels Strategic Partnership; Decision Analysis & Support; Rad/Nuc Countermeasures; Physical Protection; Information Operations & Data Analysis; and Fiber Laser-based Subsytems.

## "Business intelligence" drives AST

"At the heart of AST is the gaining of 'business intelligence,' which involves strong listening skills and a better understanding of what a potential customer really needs," says Denise. "In the past we may have gone to a customer with a bag full of ideas and capabilities that we hoped might match their needs. Today, AST shows us how to discover the customer's needs by asking the right questions, listening carefully, and crafting solutions that are specific to the problems faced by that customer."

Nathan Spencer (8774), a mechanical engineer whose department works on structural dynamics and multi-physics modeling and simulations, has been a part of the Rad/Nuc Countermeasures AST class since last September. He says the program has been especially helpful in understanding the "discovery" process that Denise describes.

"Sometimes there's a temptation to do 'technology push' with customers where we encourage them to look at those capabilities that we've historically been good at," says Nathan. "That's our usual 'comfort zone,' since those capabilities and technologies are what we do and what we feel most at ease with. But that's not necessarily what the customer needs. Instead, AST has helped me to understand the customer's own pressures and goals, which in turn can help to better apply our technologies to suit their objectives."

Nathan also indicated that presentations from Sandia/New Mexico AST programs instructors have been valuable, particularly a class led by senior manager Michael Daily (12340). "The models of program development Michael focused on paralleled with the overall business and research structure of Sandia," says Nathan. "Those processes are logically appealing, and the examples he shared of their successful implementation provided a certain level of credibility."

Nathan pointed out that because instructors like Michael share an appreciation for Sandia's unique culture and business models, they've been able to impart some telling experiences with newer students such as himself.

## More curriculum options explored

Div. 8000 has chosen to conduct fewer traditional training classes, instead focusing on more in-depth consulting to meet specific needs of each team. Other curriculum options are being explored as well; Krystal Kelley (8522), University Programs Administrator & Course Manager, is engaged with the University of California, Berkeley, Haas School of Business to develop an even more integrated and comprehensive AST initiative.

"As the business development climate continues to evolve, so will the AST program," says Maria Weddige-Gurney (10114), alluding to both the Albuquerque and California sites. "The program tailors the course offerings based on listening to the participants. We try to practice what we preach by giving the participants course offerings they're interested in and by trying to present similar information to them in different ways in order to reach different people in ways they can best understand."

"The lab is trying to incorporate best practices from industry and other labs," Maria says, "so that we can start to step outside the mindset of 'Sandia is different and what everyone else does doesn't apply.'"

Denise says, too, that her intent is for continued development of the AST program at the California site, and that she hopes AST helps increase the discipline and "intentionality" by which Division 8000 — and all of Sandia — conducts its business development activities. "Whether it's the federal sector or industry, we need to be more effective, more efficient, and more deliberate in our approach. AST can help us to become the broad national security laboratory that our leadership envisions."

*"As the business development climate continues to evolve, so will the AST program. The program tailors the course offerings based on listening to the participants."*

**— Maria Weddige-Gurney (10114)**

# Sandia data collection capability showcased during New York Container Terminal's Advanced Spectral Portals campaign

## *Contributions expected to lead to enduring partnership with Domestic Nuclear Detection Office*

By Mike Janes

Kitty litter has gotten a bad rap.

In any discussion of radiation detection technologies, the popular commercial product for feline pet owners — typically made of sodium bentonite, an absorbent clay — inevitably comes up as a menace to detectors. Like other naturally occurring radioactive material (NORM), kitty litter can be mistaken by detectors as a more sinister material, one that might be used to make a dirty bomb, for instance.

Enter the Department of Homeland Security's Domestic Nuclear Detection Office (DNDO) and its focus on Advanced Spectroscopic Portals (ASPs), considered to be a significant advancement in radiation detection and identification. DNDO is proceeding with development of ASP technology, and Sandia researchers are proud of the quiet yet pivotal role they played during the recently completed ASP data-collection and field-operation campaign at the New York Container Terminal (NYCT).

### Portal data collection

Sandia led the multilaboratory team that operated and collected data from the portals; that information is now being used by both DNDO and the commercial vendors who designed the ASP engineering development models. DNDO will consider the results when determining what ASP equipment to purchase and deploy.

A VEHICLE at the New York Container Terminal has departed the main facility and approaches a primary station for inspection.

"We collected the data necessary for DNDO's analysts to do their jobs," says Sandia's Linda Groves (8134), who led the team of some 40 to 50 lab personnel who served during the four-month operational period. "We considered ourselves the 'behind-the-scenes' people, without whom the project could not have succeeded."

"The data collection effort required more than two years of preparation and planning," says Gene Kallenbach (5935), who served as project manager and lead systems engineer. Gene points out that a wide range of organizations were involved in the process, including the Port Authority of New York and New Jersey, the site owner (New York Economic Development Corporation), Pacific Northwest National Laboratory, the Environmental Measurements Laboratory, HNTB (an architectural and engineering firm), and various construction companies.

ASPs are panel-like devices, roughly 12 to14 feet high, that contain radiation detectors. Using a sophisticated technology known as isotope identification, the portals screen cargo, trucks, and containers for illicit radioactive materials. At a press conference last year, DNDO Director Vayl Oxford said the ASP program "gives us a significant improvement in capability by allowing us to distinguish between threat and non-threat materials," and that ASP devices are expected to reduce the number of "nuisance" alarms that exist with some current systems.

The increased accuracy of the detectors, Oxford said, will reduce the number of vehicles being sent to secondary inspection stations, leading to improved commerce flow and a decreased burden on Customs and Border Protection (CBP) agents.


THE NEW YORK CONTAINER TERMINAL site configuration included several Advanced Spectral Portal primary stations, one of which is shown here.

During the NYCT campaign, Sandia personnel operated nine ASP systems developed by Raytheon, Thermo Fisher Scientific, and Canberra. Sandia's objective, says Linda, was to gather information on each of the ASP units — under real-world conditions — necessary for DNDO to make sound procurement and deployment decisions. The ASP systems had previously been tested at the Nevada Test Site (NTS), but the NYCT effort was complementary in that stream-of-commerce data were gathered to supplement the performance tests conducted at NTS.

### Isotope identification

Linda says that isotope identification, a feature of the new ASP portals, is much better at differentiating NORM — such as kitty litter, granite, and various powders and teas — from the dangerous materials of interest to port officials. But the commercial need for ASP technology, due to the emerging threat of nuclear materials, has only surfaced in the past few years. DNDO responded to that threat by putting out a call to the private sector to develop viable detection systems that use isotope identification.

Though its role during the NYCT campaign focused on data collection, Sandia has proven equally adept at developing its own radiation detection technologies. Its SMART Cart and SMART Jeep (*Lab News*, May 13, 2005), or Sensor for Measurement and Analysis of Radiation Transients (SMART), were deployed to the NYCT (previously known as the Howland Hook Container Terminal) more than two years ago in testbed mode and remain there as part of the facility's secondary screening process.

### NYCT construction work

In addition to the data collection role, Sandia spearheaded the construction work at NYCT that was necessary for the ASP portals to work. The Labs' previous work at the terminal, which gave the Sandia team an understanding of the site's infrastructure and concepts of operation, allowed researchers to effectively position and map out locations for the ASP equipment in context with existing portals, barriers, and buildings. "Our goal," says Linda, "was to create a situation whereby the vendors' technology could be thoroughly and realistically tested, thereby giving DNDO the best opportunity to assess the equipment."

Andy Vaughn (8134) was one of the Sandia researchers tasked with the somewhat grueling job of monitoring the data that appeared on computer screens every time a vehicle proceeded through an ASP portal. Andy says that although some days were slow and others were action-packed, he and his colleagues had to be disciplined and attentive. "The (rad) signals, depending on the level of activity, would occasionally come at a very brisk pace," he recalls. For example, a seemingly innocuous delivery of Home Depot ceramic tiles, which contain higher levels of radioactive material, would keep things jumping when they arrived in succession, one after the other. "Since we were responsible for collecting the data, logging it, and notifying CBP when there was an alarm, things occasionally got very hectic," Andy says.

### An enduring DNDO relationship

Sandia's effective working relationships with NYCT officials, Linda and Gene agree, played a big role in the campaign's success.

"Our knowledge of the site and our familiarity with CBP's operators was key," Linda says. Gene adds that "the effort was a vote of confidence in Sandia's ability to succeed in what they (DNDO) knew would be a difficult task. Testing new equipment is always a major undertaking, and the level of trust CBP had in us allowed us to hit the ground running."

Linda says the working dynamic with the three commercial vendors was also good. "We were there to help them succeed, which they understood and appreciated," she says.

The ASP truck portals, says Gene, are only the first such ASP systems planned by DNDO. The agency is eager to develop a mobile version of the ASP portal technology, one that could, for example, travel with law enforcement officers. Largely due to Sandia's success with SMART and the recently concluded NYCT campaign, DNDO has asked Gene to serve in a consulting role with the agency's newest development program.

Sandia is enthusiastic about establishing a long-term association with DNDO, says Gene. Adds Linda, "By contributing in a meaningful way to successful projects such as these, we can build a larger role for ourselves in the future. We've cultivated a reputation for taking our systems studies work and applying it to real-world situations, and doing it in a practical and efficient way. There's every reason to believe we'll continue to do that."

# Livin′ in Livermore

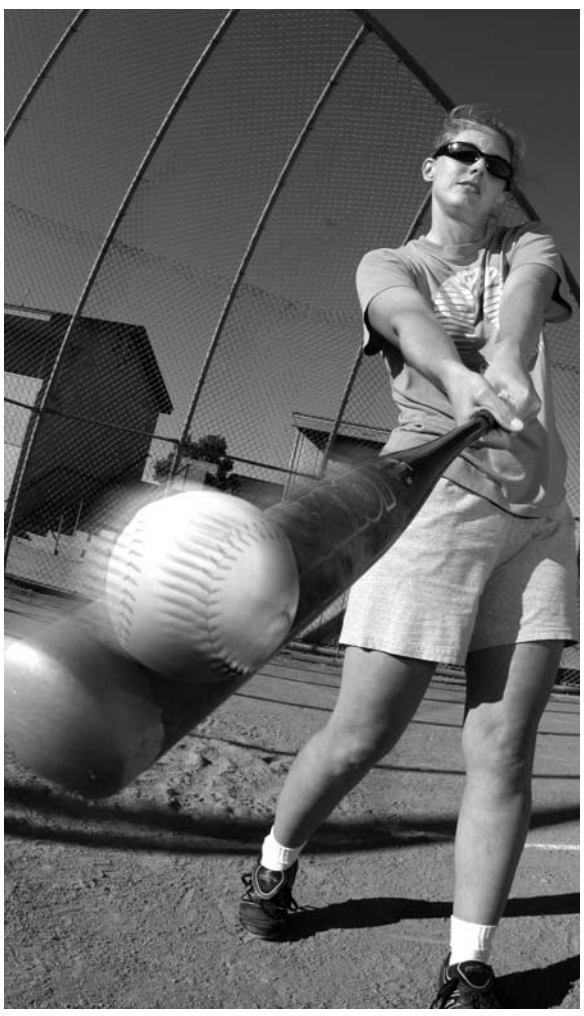
***Photos by Randy Wong***

LUNCHTIME RUNNERS — Dan Dedrick (8757), Alex Lindblad (8774), Kevin Nibur (8758), and Jeremy Templeton (8757) have been running together at lunch for several years. "Our main motivation for running is exercise and camaraderie," says Alex, "however we are all going to run a half marathon this fall." Each of the runners also has plans to either run the US Half Marathon in San Francisco or the Big Sur Half Marathon on Monterey Bay, both in November.

Summer at Sandia/California isn't the only season during which the area is packed with activities, but there definitely is a lot more going on this time of year. The consistent Livermore sunshine draws people outdoors during lunch and after work to enjoy the sun, fun, exercise and fellowship with colleagues and friends.

Sandia/California is located less than an hour away from San Francisco, tucked quietly in the Livermore Valley. The area is home to more than 40 wineries, a number of golf courses, and hiking and biking trails. The diverse landscape lends itself to many different activities, all just a short distance from the lab. Here are just a handful of the activities that California Sandians are into this summer.

SWISH! — Dave Hansen (8517) takes a jump shot over an opponent from Lawrence Livermore National Laboratory in one of the first games of the 4th Annual 3-on-3 Summer Basketball Tournament. The tournament, which is held at noon on Tuesdays and Thursdays, is sponsored by the Health, Benefits & Employee Services and Life Design Center, with eight teams participating, including two from LLNL.



BATTER UP! — Patty Hough (8962), a member of a Sandia/LLNL softball team called the Stockpilers, steps to the plate. The team is part of the Livermore Area Recreation & Park District Coed Business Softball League and has gone to the playoffs two years running.

EACH SUMMER, California Sandians attend various Chamber of Commerce events in order to build better relationships with important audiences in the community. The recent "State of the County" was addressed by Supervisor Scott Haggerty, president of the Alameda County Board of Supervisors. Sandians Karen Scott (Government Relations, 12122), Jim Simmons (Community and Civic Relations, 8528), Sean Haggerty, Supervisor Scott Haggerty, Jeff Manchester (Public Relations & Strategic Communications, 8528), Jane Ann Lamph [hidden] (Engineering Design, 8948), and Mike Janes (Public and Media Relations, 8528) took a moment before the luncheon meeting to talk about local issues with Haggerty.

# Mileposts

*New Mexico photos by Michelle Fleming*


Ronald Halbgewachs
40 5633

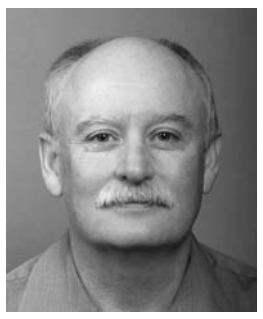

Daniel Sanchez
35 2553

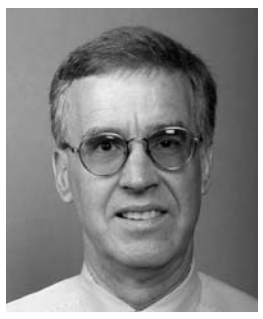

Martin Stevenson
35 2625


Allen Camp
30 310


Christopher Flores
30 2541


David Palmer
30 12800


David Stout
30 5997


Bruce Walker
30 2100


C. David Turner
25 1652


Carol Jones Adkins
20 1210


Melanie Florez
20 4221


Samuel Miller
20 5917

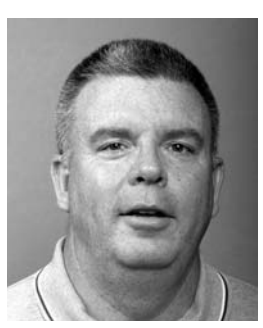

Linda Cleland-Ortiz
15 1011


Tammy Eldred
15 5055

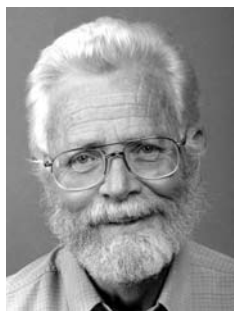

Lavender Fernandez
15 12850


Tammie Muniz
15 9543


Charles Potter
15 4121


Donald Rogers
15 9343

## Recent Retirees


Lee Cunningham
25 3655


Janet Carpenter
24 3651


Darrell Filkins
19 6453

# Feedback

## Readers want to know . . .

### *Will there be a cost-of-living increase for retirees; why are forgotten badges treated the same as lost/stolen badges in new policy?*

**Q:** *When is Sandia going to give a cost-of-living increase to its retirees? It has been so long since we've received one, we can't even recall it. The huge increase in gasoline prices and the resultant increase in food and other products are really starting to pinch.*

*The failure to give its retirees regular COLAs should be an embarrassment to Sandia. The lack of such an increase is especially galling when you realize that these retirees' contributions funded the retirement program, and the amount in the fund is huge. Also upsetting is the fact that retirees had to reduce their retirement in order to leave their spouses a 50 percent benefit of the reduced retirement amount if the retiree predeceases them, while widows/widowers of present employees receive a full benefit without any reduction in retirement pay.*

*Management's response to this question would be greatly appreciated by the retirees and their dependents.*

**A:** Sandia's Board of Directors has periodically granted ad hoc pension increases to retirees in the past, with the most recent being a 15-percent increase in 2002, along with a reduction in the cost of surviving spouse coverage. In conjunction with that last increase, Sandia announced that it had evaluated the feasibility of providing automatic cost-of-living adjustments and determined that such a provision was unaffordable. On an ongoing basis, Sandia periodically reviews the impact of inflation on retirees' pensions. I would expect that any future decisions regarding ad hoc adjustments will remain at the discretion of the Board of Directors, will be independent of past actions, and will reflect both environmental factors — such as the rate of inflation and the prevalence of similar increases by other private sector plans — and cost considerations.

Regarding your statement about the cost of survivor annuity coverage, current employees who retire or die while still employed have their pensions reduced to provide a continuation of payments to a surviving spouse. While a 100-percent surviving spouse option has been available since 1999, the cost charged to the employee for choosing that option is double the cost for a 50-percent surviving spouse annuity.

*— Mark Biggs (10520)*

* * *

**Q:** *Why are forgotten badges treated the same as lost/stolen badges in the new policy? If keeping a badge at home is considered perfectly safe and I know for a fact my badge is sitting at home where I left it, how is my neglect to pick up my badge when leaving home any kind of security issue?*

*This is particularly onerous for employees with significant commute times, for which returning back home to grab their badges is not an option. If such employees get replacement badges, they endure disciplinary actions when they have caused no security concerns. The second, more appealing, option is to head home for the day, wasting time, money, and energy and needlessly producing greenhouse gases.*

*Another side effect of this policy, in practice, is to encourage employees to leave their badges in their cars, which Sandia should be discouraging.*

*The Badge Office could supply a replacement for a forgotten badge and simply require that the old badge be produced within a specified time period to avoid further escalation. Wouldn't a process modified as such for forgotten badges be easy enough to implement and alleviate the above concerns with absolutely no effect on actual security issues?*

**A:** The new policy is based on "multiple" lost/forgotten/stolen badges. Multiple lost/forgotten/stolen security badge claims for any individual is both a security risk and a business concern.

The security concern is that lost/forgotten/stolen badges continue to be substantial issue across the DOE complex. A person is entrusted to maintain his/her DOE access authorization credential with them whenever they enter Sandia security areas, including Property Protection Areas. A level of trust is imposed upon all of us who hold a security clearance by our government. If an individual has issues with badge retention, including multiple forgotten badges, then it could potentially raise a concern of confidence by our customer, the Department of Energy. Once we reach a certain threshold we could be required by DOE to rebadge all our employees.

The business concern is that Sandia will be transitioning to one standardized security badge in the near future. The cost of this new smart card technology will significantly increase the replacement costs for badges, so we are trying to address this concern earlier rather then later. Our historical experience, upon which this procedure was predicated, informed this concern.

*— Sally Uebelacker (4230)*

# Maria Matos: A story of survival and strength

ROMAN HOLIDAY — Maria Matos, left, and Norm Zablocki on vacation in Italy, where in addition to sightseeing, Maria apprehended pickpockets. (Photo by Lynda Hadley)

By Patti Koning

Maria Matos (8528) has, in a sense, lived the American dream. She grew up on three continents, survived civil war and poverty, and immigrated to the United States at the age of 18. She has a successful career at Sandia, a caring husband and two grown children, and a rich personal life.

"When we first arrived in the United States, my dad had $50 in his pocket. There were 10 of us — eight children plus my parents," she recalls. "Now we all have our own families and own our homes. This is a wonderful country to live in. There is no need for children to go hungry or not go to school."

This year Maria was inducted into the Sandia Women's Wall of Fame in 2007 for her service work, both in her community and abroad. What drives her extraordinary commitment is a lifetime of experiences that most of us have only read about and a desire to give back.

Norm Zablocki (8944), a coworker and personal friend, says she's not surprised Maria was chosen for the Women's Wall of Fame.

"For as long as I've known her, Maria does what it takes to get the job done. She'll come into work on her Friday off or stay late if that is what it takes. She's very service oriented," says Norm. "She's the same way with her community service work."

Maria has been a leader in Our Lady of Fatima, a Catholic organization started in Portugal. She served as secretary and vice president before becoming the first woman president of the organization. She's also led fundraising efforts to build a Catholic Church in Tracy, Calif., and support a Catholic school.

She became active in the Tracy Community Band 13 years ago when her daughter played with the band. She's currently secretary and each year takes a week of vacation time to put on several fundraisers for the band.

Maria was instrumental in setting up the sister city program for her hometown of Tracy. Her daughter was one of the first ambassadors to visit Memuro, Japan, Tracy's sister city. While her two children were still living at home, Maria and her husband hosted one or two exchange students each year.

In 2003 she took a group of teenagers from Tracy to visit her birthplace — the Azores, an archipelago of nine islands located in the Atlantic Ocean about 930 miles east of Portugal. Since that inaugural trip, two more student groups have visited the Azores, in 2005 and 2007.

"I wanted these kids to see both the beauty of the Azores and the difficulty of life there," she says. The primary industry of the Azores is tourism, so natural disasters and problems in the travel industry hit hard, something Maria knows firsthand.

When she was seven years old, an earthquake devastated the Azores, damaging her family's home and the local economy. Her family moved to Angola in south-central Africa, which at the time was a colony of Portugal.

Maria recalls life in Angola as nice but lonely. There weren't a lot of families around that spoke Portuguese and she was the only Caucasian child at her school. Her family had a ranch and sold produce to restaurants.

Then, in 1975, a military coup overthrew the Portuguese government, followed by civil war. Three different guerrilla groups were fighting for control of the country, but they all wanted to overthrow the colonists.

## "A knife to my dad's throat"

"On May 25, 1975, three jeeps of heavily armed men showed up at our house, looking for weapons and money. They separated my parents from us and began questioning and then beating us. I remember seeing my younger brothers and sisters lined up to be shot. At one point I saw a man holding a knife to my dad's throat," Maria recalls. "My baby sister was asleep, but the men thought there might be money in her mattress, so they tore it up and she wound up beneath the mattress. She woke up crying, but then stopped crying. At this point my mother screamed because she thought the baby had been suffocated. I didn't know what had happened. I thought my father's throat had been cut. But my mother's cries scared the armed men and they left our house."

WEDDING DAY — Maria's wedding picture. From left to right, Joe, Lucy, Maria's husband Tony, Maria, her mother, Linda, and John. In the front row are Maria's youngest siblings Fernando and Paula.

This began a slow and treacherous journey out of the country. The family first fled to a friend's house and later moved to nearby caves when the area became too dangerous. Friends would warn them when one of the guerrilla groups was approaching.

Finally, Maria's father arranged transportation to get the family to Caala City near Nova Lisboa (now called Huambo). They left in the middle of the night.

"We had identification stickers for each of the guerrilla groups. At each checkpoint, we'd look at what they were wearing and put the right identification on our shirts," says Maria. "If you were with the wrong group, they'd kill you."

The family spent several months in Caala, living near one of the guerrilla groups. Maria remembers spending most nights sleeping on the floor because of gunfire and grenades. When the Portuguese government began evacuating its people, they moved to the airport and spent several weeks waiting for a flight.

Returning to the Azores was not an option, because the islands were already flooded with refugees. The family stayed in Lisbon, living at the airport for a month and then in a hotel provided by the government.

When their time in the hotel was up, the family moved to an olive farm. The housing they'd been promised was a barn and there was no food.

"As the oldest, I was the lucky one," says Maria. "I worked at an inn and then as a live-in nanny for the family that owned the farm. My parents were living on no food. On the weekends, when I came home, we'd go dumpster diving for scraps. I remember falling asleep to the sounds of growling stomachs."

Maria's father had family in the United States, but getting someone to sponsor the entire family was difficult. Finally she and her sister wrote letters to one uncle, who happened to be their godfather, promising they would never go on welfare once in the United States.

## Back under one roof

That uncle and other relatives agreed, and at the age of 18 Maria and her family arrived in America. At first the family was spread out with relatives in Northern California. As soon as her father landed a job in Half Moon Bay, he brought the family back together under one roof.

Maria's future husband was one of her neighbors in Half Moon Bay. They lived in Sacramento at first, where their two children were born. Eventually they moved back to Tracy, which Maria says was always her hometown because it was where she first lived upon arriving in the US.

MARIA'S FAMILY in Angola, circa 1970. Left to right: Maria, Emanuel, Joe, Linda, John, and Lucy. Her parents Arlindo and Maria are behind the children.

In 2001 she began working in the mail room at Sandia, and eventually moved to her present position running Copy and Print Services for the Design and Publishing Center (8528).

Last year Maria, Norm, Lynda Hadley (8944), Dee Dee Dicker (8516), and Maria's sister Lucy traveled together in Italy. On the trip, Maria was instrumental in apprehending pickpockets on a train and later scaring off another pair of pickpockets.

"She was the heroine of our trip," says Lynda. "At one point someone had grabbed one of our backpacks and Maria chased them down."

Norm describes Maria as an amazing lady. "I would trust my life to her," she says. "With all she's been through, I believe that makes her a truly exceptional individual."

CUDDLY CAT — Maria, holding her pet cat, and her sister Linda in front of their home in Angola. Her brother Joe is in the left background. (circa 1970)