Z produces fusion neutrons, Sandia scientists confirm; announcement to be made Sunday at APS meeting

Labs' huge pulsed-power machine enters fusion arena with creation of neutrons from fusion reactions

By Neal Singer

Throwing its hat into the ring of machines that offer the possibility of achieving controlled nuclear fusion, Sandia's Z machine has created a hot dense plasma that produces thermonuclear neutrons, Labs researchers will announce in a report Sunday (April 6) and a news conference Monday at the April meeting of the American Physical Society in Philadelphia.

The neutrons emanate from fusion reactions within a BB-sized deuterium capsule placed within the target of the huge machine, says Ray Leeper, Manager of Diagnostics and Target Physics Dept. 1677.

Compressing hot dense plasmas that produce neutrons is an important step toward realizing ignition, the level at which the fusion reaction becomes self-sustaining.

SANDIA'S Z machine in action.

The amount of energy a larger successor to Z could bring to bear offers the still-later possibility of high-yield fusion — the state in which much more energy is released than is needed to provoke the reaction initially to occur. The excess energy could be used for applications such as the generation of electricity, says Tom Mehlhorn (1674), a project leader on the machine.

Z causes reactions to occur not by confining low-density plasmas in dimensionally huge magnetic fields or by focusing intense laser beams on or around a target, but simply through the application of huge pulses of electricity applied with very sophisticated timing. The pulse creates an intense magnetic field that crushes tungsten wires into a foam cylinder to produce X-rays. The X-ray energy, striking the surface of the target capsule embedded in the

(Continued on page 4)

Sandia LabNews

Vol. 55, No. 7 **April 4, 2003**

Managed by Lockheed Martin for the National Nuclear Security Administration

Sandia National Laboratories

Sandia's top two officials discuss issues, future

STATE OF THE LABS — Sandia President C. Paul Robinson and Executive VP Joan Woodard discuss a wide range of topics of interest to Sandians in the annual *Lab News* State of the Labs interview. Read the interview on **pages 8-12**.

New Sandia-developed process holds promise for brighter green, blue, and white solid-state lighting

Patented cantilever epitaxy growth process overcomes previous problems that have limited LEDs' performance

By Chris Burroughs

A new Sandia-developed process of growing gallium nitride on an etched sapphire substrate, called cantilever epitaxy, may help light up the world with brighter green, blue, and even white semiconductor light-emitting diodes (LEDs) — solid-state lighting.

Colored LEDs are of interest for displays and even higher-powered lamps like traffic lights. A national initiative is beginning to develop solid-state sources for high-efficiency white lighting.

"Our new process eliminates many of the problems that have limited the optical and electronic performance of LEDs previously grown on sapphire/gallium nitride substrates," says researcher Carol Ashby (1744).

Over the past several years LEDs have been grown with various combinations of gallium nitride alloys on sapphire substrates. However, the atoms of the two materials do not line up perfectly due to differences in the natural lengths of the bonds in their respective crystal lattices. Regions of imperfections, called dislocations, accommodate this lattice mismatch. These dislocations limit LEDs' brightness and performance.

The new cantilever epitaxy process developed by a team of Sandia researchers (see "Cantilevers, posts, and pyramids . . ." on page 4.) reduces the numbers of dislocations, giving the potential for longer-lived and better performing LEDs. It also means that LEDs grown on the patterned sapphire/gallium nitride substrates can produce brighter, more efficient, green, blue, and white lights than previously accomplished.

CHRISTINE MITCHELL looks through a substrate that was made for the new cantilever epitaxy growth process. (Photo by Randy Montoya)

Christine Mitchell (1126), a researcher investigating cantilever epitaxy as her thesis

(Continued on page 4)

Paul Robinson details concerns with lab security management

Labs President C. Paul Robinson directly addressed some serious Sandia security management concerns during a March 20 news conference.

"I have asked for this press conference to give me a chance to acknowledge what I think are some disturbing concerns that have come to light about management of the security force here at Sandia," Paul said.

John German's story on **page 6** reports on the announcement and the aftermath.

Labs-designed inspections help Forest Service get grounded tankers flying

Planes being reactivated in time for 2003 forest fire season

By John German

The US Forest Service (USFS) reactivated the first two of many large firefighting air tankers last week using an improved aircraft inspection and certification program designed at Sandia's Airworthiness Assurance Center (AANC).

The large air tankers — including P-3 Orions, DC-4s, DC-6s, and DC-7s, and P-2V Neptunes — are owned and flown by private companies under a contract administered by the Forest Service and used by several firefighting agencies.

The planes were grounded after two fatal accidents involving C-130A and PB4Y air tankers last summer. Following findings of the Blue Ribbon Panel on Aerial Firefighting commissioned by the Forest Service and the Bureau of Land Management (BLM), USFS and BLM officials had pledged that none of the large air tankers on contract would be returned to service until an enhanced inspection program was in place.

On Monday last week, using an enhanced inspection program recommended by Sandia for Lockheed P-3 Orions, the USFS certified that a contractor had met all inspection requirements for two P-3s and returned them to service. Five more P-3s are undergoing certification procedures now.

(Continued on page 5)

What's what

Nobody wants to hear bad news, and when Labs Director Paul Robinson stood before reporters and news photographers a couple of weeks ago to announce that Sandia had discovered some serious problems in its Security group, that was bad news. We all cringed when we saw the subsequent reports on television screens and newspaper pages. But we should also remember the old saw about the glass being half empty or half full. In our case, it's half full — *way* more than half full, as a matter of fact. And Paul pointed that out last week in a message to Sandians. In case you missed it then, you'll find it along with John German's story about the security issue beginning on page 6.

* * *

We can be certain that much of the technology at war in Iraq came from Sandia, and that more is in the pipeline for that and future conflicts. National security is our reason for being. But the brainpower that produces unique weaponry sometimes turns out cookie-cutter solutions — literally, in one case. When the wire on the machine that cuts cookie dough at Joseph's Lite Cookies bakery in Deming, N.M., kept breaking, chief cookie maker (and owner) Joseph Semprevivo got in touch with the machine's Italian manufacturer. After looking at Semprevivo's videotape of the problem, the manufacturer could only shrug and throw up his hands with an apologetic, *"Spiacente. Non possiamo aiutarli."* So, after one inquiry led to another — and the cookie cutter wire kept breaking — Semprevivo got in touch with Gilbert Benavides of Sandia's Mechanical Engineering Dept. 14184, who studied the problem and came up with a solution: Coat the wire with teflon.

Mama mia! Semprevivo said the reduction in wire breaks saves about $200,000 a year. (Less the cost of cookies for Gilbert, maybe?)

* * *

New, improved coffee makers showed up around the lab campus several weeks ago. Now from Mark Koch (15352): "I've noticed the new coffee makers put out a noticeable amount of heat when plugged in, but not turned on. I'm not sure why; maybe to keep the water hot for the next pot of coffee? I've been wondering how The Energy Nag is going to handle this threat to his hard-won energy statistics."

We'll surely hear from The Nag about this.

* * *

A recent What's What blurb about dummy thermostats brought a response from retiree John Kirkland. "I know of two thermostats that worked," he e-mailed. "When we moved into the new Bldg. 890 in 1989, there were a couple of offices in the southwest corner of the third floor with temperature problems. One was always too hot and the other was too cold. Thermostat adjustment didn't seem to work. You have probably guessed the answer: The controls were cross-connected in the ceiling."

Well, being technically challenged, I hadn't guessed, but even though they didn't work in the *right* places, at least they *worked*. It might have been a mistake, but maybe the heating contractor got a secret chuckle later, imagining the building's future human residents scurrying around like lab rats trying to figure out the problem.

— Howard Kercheval (844-7842, MS 0165, hckerch@sandia.gov)

14 Sandians called to active military duty so far

Labs Director Paul Robinson sent the following message to employees in recognition of Sandia colleagues on active military duty:

* * *

"Over the past several months, as the nation's military has geared up to carry out its mission to force an end to Saddam Hussein's regime in Iraq and to dismantle his arsenal of weapons of mass destruction, 14 of our Sandia colleagues have been called to active duty in the armed services. In the finest Sandia tradition, they are truly providing an exceptional service in the national interest.

"Now that the shooting war to disarm Saddam and liberate the Iraqi people has begun, our thoughts and prayers turn to all the brave American men and women in harm's way, and especially to our Sandia colleagues far from home. They represent the best we have to offer, and we are very proud of them. Let us each keep them in our thoughts as we wish them a swift victory and a safe and swift return home to their loved ones."

Women's History Month

MARGIE TATRO, Director of Sandia's Energy and Transportation Security Center 6200, discussed the career challenge of "following your passion" and spoke of her passion for energy technology at the Kirtland Air Force Base Women's History Month breakfast on March 20. Margie spoke as part of a panel of women leaders including Lt. Cmdr. Paula Travis, US Navy; Kate Fry, Test Program Integrator at the Albuquerque office of the Defense Threat Reduction Agency; and Yolanda Ruiz, EEO and Diversity Program Manager with the Office of Equal Opportunity, NNSA Service Center. (KAFB Photo)

Sandia LabNews

Sandia National Laboratories

http://www.sandia.gov/LabNews
Albuquerque, New Mexico 87185-0165
Livermore, California 94550-0969
Tonopah, Nevada • Nevada Test Site • Amarillo, Texas • Carlsbad, New Mexico • Washington, D.C.

Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a subsidiary of Lockheed Martin Corporation and a prime contractor to the US Department of Energy.

Ken Frazier, Editor **505/844-6210**
Bill Murphy, Writer. **505/845-0845**
Chris Burroughs, Writer. **505/844-0948**
Randy Montoya, Photographer **505/844-5605**
Nancy Garcia, California site contact. **925/294-2932**

Contributors: Janet Carpenter (844-7841), John German (844-5199), Neal Singer (845-7078), Larry Perrine (845-8511), Howard Kercheval (columnist, 844-7842), Will Keener (844-1690), Iris Aboytes (844-2282), Rod Geer (844-6601), Michelle Fleming (Milepost photos, ads, 844-4902).

Lab News fax **505/844-0645**
Classified ads **505/844-4902**

Published on alternate Fridays by Media Relations and Communications Dept. 12640, MS 0165

LOCKHEED MARTIN

Van pools easy solution to driving, parking woes, not to mention $2-a-gallon gasoline

In the early 1970s the energy shortage prompted many Sandians to explore ways to offset the cost of getting to and from work. Dividing the cost of fuel, maintenance, and insurance and sharing the task of operation all made economic sense back then when the push was to reduce our reliance on foreign oil and its ever-increasing cost.

For those Sandians living out of town, van pooling was their answer. Numerous members of these different commuter co-ops have logged many hundreds of thousands of miles and worn out several generations of passenger vans in the past 30 years. Moriarty and Edgewood, North and South 14, Belen, Los Lunas, and Rio Rancho are all hosts to this sensible alternative to the daily drudgery of commuting to work.

If reading a good book, dozing, or just watching the sights as you visit with colleagues sounds to you like an easier and less hazardous way to get to work, you're right.

We are still confronted with ongoing crises, not so different from decades past and perhaps with even greater impacts to our lives each day. Many wonder how they might reduce the stressful frustrations of waiting in the long lines of gridlock, weaving through orange barrels and lane changes, and idling or moving only feet per minute as security performs their necessary duties. How do you reduce the thousands of miles and the associated wear and tear each year on a personal vehicle, not to mention shave the expense required to take yourself daily, individually, to the oh-so-distant parking lot?

Sandia gives preferred parking to van pools. If reading a good book, dozing, or just watching the sights as you visit with colleagues sounds to you like an easier and less hazardous way to get to work, you're right. If you think this change in commuting practices will help solve some of the congestion at the entry gates, relax the worries our stressful world places upon us each day, and even make a difference in our reliance on foreign oil . . . you are right again. Van pools save everyone time, reduce parking congestion, and reduce exhaust pollution.

Many commuter van pools have openings and welcome commuters who wish to give this alternative a try. Van pool monthly dues range from $32 to $75, depending on individual van pool operating costs. Please contact Debbie Moore, Sandia Labs Van Pool Coordinator (844-7433), for available van pool contacts.

— Rik Holman (6532)

Symposium shows Sandia biotech research ramping up

Labs' scientists present their research results, progress so far in biological arena

By Nancy Garcia

Saying "we are beginning to come of age in the biological arena," Julia Phillips (1100), head of the Biotech Council, capped a two-day symposium about Sandia biology research by anticipating this field will come to be articulated as a core capability that fits Sandia's larger national security mission.

"I'm really looking forward to the next chapter," Julia told the 60 Sandians who had gathered at a hotel conference room to present their research in the third annual event. "More than half of you were not here three years ago," remarked Len Napolitano, acting director of Exploratory Systems & Development Center 8100, who organized the event. "All Sandia provided you was a sheltered place to do work and the freedom to make it happen, and you've made it happen."

For instance, two speakers described securing difficult-to-obtain grants from the National Institutes of Health. Another two are creating new analytical tools. Four speakers described Laboratory Directed Research and Development projects initiated in the preceding year. Other speakers discussed opportunities funded through Department of Energy competitive proposals or potential sponsorship from the new Department of Homeland Security.

"There was an expectation that DHS would sort of be like the Department of Energy," commented 8100 Deputy Director Duane Lindner, although this hasn't been borne out. He recently returned from helping transition planning this month, in which activities of 22 agencies are being brought under the new department. Duane said the Homeland Security Advanced Research Projects Agency has $350 million and "people are beginning to talk about programs and processes." One start was his work defining program areas with New Mexico colleagues and 8100 Director John Vitko. John is on assignment to DHS, where he manages a portfolio of research in chemical or biological defense. (See related article on page 13.)

Duane helps the interface and coordination of chem/bio programs at Sandia and within the Tri-Lab Council, scheduled to meet for the first time later this month on proposed homeland security plans. So far, Duane said, the budget, process and schedule are very uncertain, but it is clear that detection capability, such as Sandia's µChemLab, is robustly supported within DHS.

BIOSYSTEMS — Len Napolitano, who organized the conference about Sandia biological research, prepares to introduce Grant Heffelfinger as a speaker on the second morning of the off-site symposium, held in Sonoma.

Sandia CaliforniaNews

Also desired, he added, would be biological detectors that can provide results within one minute, rather than hours or days. In fact, John ran a National Research Council panel to explore how that might be accomplished.

With the DHS stand-up, Sandia's chem/bio program has now moved out of the DOE, where it experienced proposed-budget vagaries of being zeroed-out, then restored.

Under DHS, Health and Human Services in particular has experienced "phenomenal" budget growth, Duane added. In one talk at the symposium, Victoria VanderNoot (8130) described how she and Anup Singh (also 8130) received what appears to be the first Sandia-led competitive research grant award from the National Institutes of Health.

This fall, the pair was awarded $1 million annually for four years to develop and test a portable microfluidic system for oral diagnostics. The device will analyze saliva samples using chip-based separations and immunoassays to find biomarkers for periodontal disease caused by gingivitis. The potential markers also are important in pathogen or toxin exposure, such as following attack by a biological agent.

Analyzing saliva has a few advantages, including ease of sample collection and potential for tracking other conditions, such as stress hormone levels, drug exposure, or HIV status.

Qualifying for the grant involved a couple of instances of working all night, Victoria pointed out. Danny Rintoul (9212), who with principal investigator Grant Heffelfinger (1802), is participating in a University of New Mexico-led NIH-funded project, agreed the award process is difficult. "It's sort of like brain surgery," he said about his grant-writing experience (more have been submitted). "It takes you years to learn how to do it well, but even when you do it well, it's still hard."

The joint UNM-Sandia project, with matching funds, will run up to $600,000 a year in the planning stage prior to conversion to a fully funded research center. In it, biologists and computer scientists will collaborate to observe in living cells how cell signaling occurs over time and within specific locations. Among other skills, Sandia brings to the work the ability to make a spectrum of specially shaped gold nanoparticles for microscopic labeling, Grant said, akin to exceedingly small "Lucky Charms."

Diagnostic capabilities at the Combustion Research Facility are creating a couple of tools for use in biological research. Gary Kruppa (8361) described the ability to identify "molecular machine" protein complexes using mass spectrometry in a way that may eventually be automated. Very small protein samples, separated in seconds in channels on chips, would be directly analyzed to determine their identity. "We're going to have a world-class mass spectrometry capability here soon," Gary remarked.

David Chandler (8350) and Carl Hayden (8353) are adapting a system they used to research individual molecules so that small-scale cell features, labeled with colored dyes, can be visualized as they function and decay. By attaching a detector that senses multiple colors to their fluorescence-imaging device, the system will become what they term a "cellular observatory."

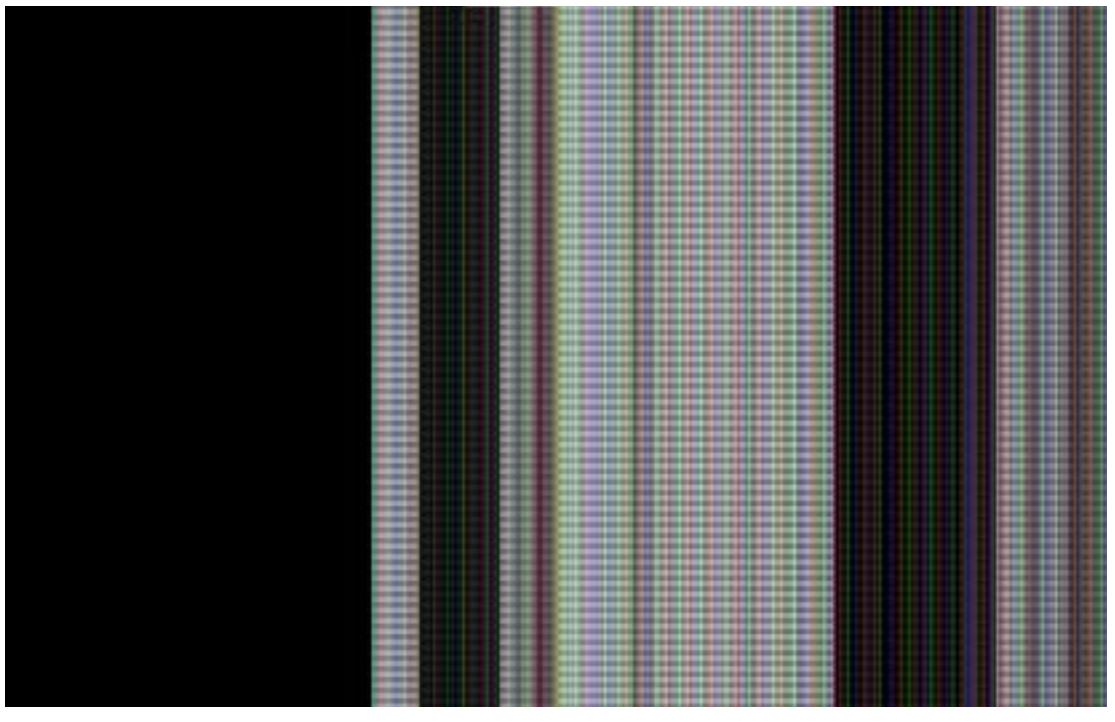
Computations are also being applied to biological problems at Sandia. Genomes-to-Life projects presented at the conference, described in previous issues of *Lab News*, link experiments examining "molecular machines" of microbes important to the environment and data analysis. Jean-Loup Faulon (9212) described using computational tools to predict interactions between small molecules in cells that are involved in immune response. The team was able to infer a network of interactions with 77 percent accuracy, a result he said "we are pretty happy about." The information can be used to tailor a peptide, too, for a specific interaction.

Mark Stevens (1834) described modeling of biomembranes whose function is equivalent to the flow of goods across a border. Understanding the dynamics of this porous boundary will be important later, he said, to overseeing the assembly of molecular machines.

Looking to the future, Paul Dressendorfer (1141) reiterated that understanding how biological systems actively assemble materials will also be important in synthetic systems. Sandia is participating in three projects exploring this interface. The activities here are funded, altogether, at about $2 million annually. A DOE-supported basic research project looks at how self-assembly might be programmable; an LDRD project explores creating functional nanostructures using active biomolecules; and a Defense Advanced Research Projects Agency project is evaluating the robustness of biomolecular motors.

Taken as a whole, the work spans such a broad cross-section of sites and divisions that two additional centers have been added to the original three members of the Biotech Council, Julia said. "It's really very ecumenical," added Mike Cieslak (1800), telling the group in his closing comments, "What you bring is critical to us moving forward as a national resource for the future."

Sandian featured on 'New Faces' web site



HOW 'SWE' IT IS — Daphne Joachim (8725), left, chair of the Mt. Diablo Chapter of the Society of Women Engineers, congratulates Chrisma Jackson (8226), right, who was nominated by SWE to be featured on a "New Faces in Engineering" web site popular with students during National Engineers Week in February (www.eweek.org/2002/engineers/newfaces/swe.shtml). Chrisma, a mechanical systems engineer, recruits for Sandia at her alma mater, Texas A&M University. The two are pictured attending the SWE Region A conference in Stockton in early March.

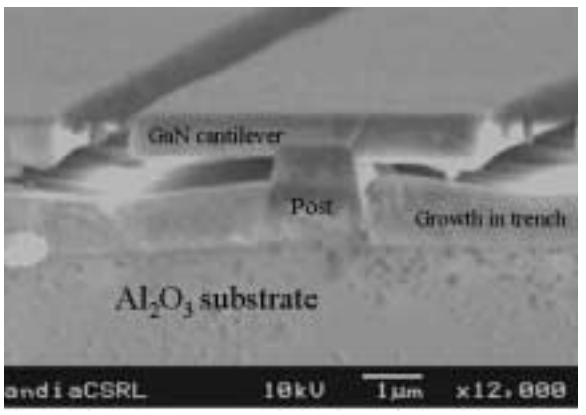
LEDs

(Continued from page 1)

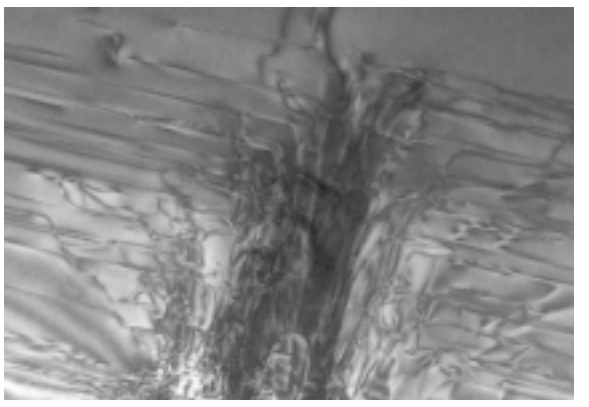
project for a master's degree in electrical engineering at the University of New Mexico and involved in just about all stages of the process, notes that a lot of background research has made the improvements possible.

"At Sandia we have four years of experience studying the fundamentals behind gallium nitride growth," she says. "We took data from basic science work and transitioned it to this."

Two methods using transmission electron microscopy (TEM) and scanning electron microscopy (SEM) have been developed to determine the amount of dislocations eliminated through the cantilever epitaxy process. David Follstaedt (1126) slices the material and looks at it "end on" using cross section TEM. (The TEM is a high-voltage microscope that looks through specimens only tenths of microns thick.) These images showed that facets developed early in the cantilever growth process can turn dislocations very effectively when they are grown to full pyramids.



A CROSS-SECTION scanning electron microscopy (SEM) image shows a cantilever epitaxy growth that has been stopped before the cantilevers coalesce. The growth started on top of the sapphire post and proceeded laterally over the trench. If growth had been continued, the cantilever sections would touch and form a smooth film.



CROSS-SECTION transmission electron microscopy (TEM) image of cantilever epitaxial gallium nitride. Dislocations growing vertically over the sapphire post at bottom are turned to horizontal in the gallium nitride by the 950° C growth step so that only a few percent of them continue to the top surface.

Because of the reduction in dislocations, the cantilever epitaxy process shows "great promise for making a superior substrate for light-emitting devices. It also has potential for applications to a wide variety of electronic devices and GaN integrated circuit technology."

Another TEM imaging orientation is called plan view. Most of the bottom of the sapphire substrate and some of the gallium nitride are removed and the TEM looks through the remaining gallium nitride at the top.

"This is where the rubber meets the road," David says. "This is where you see how many dislocations remain."

In the other method, called cathodoluminescence, researcher Nancy Missert (1112) can check broad areas of the gallium nitride using a SEM equipped with a light detector. This method can survey a whole wafer in half a day and is less labor- and time-intensive than TEM. The dislocations are at points on the surface where the light is not emitted and appear dark. Counting the dark spots gives a measure of the density of dislocations.

Studies have been conducted that show good correlation between the two techniques. Both showed that the cantilever epitaxy process reduced the number of dislocations "to an order of a magnitude lower than conventional growth on planar sapphire," David says.

Carol says that because of the reduction in dislocations, the cantilever epitaxy process shows "great promise for making a superior substrate for light-emitting devices. It also has potential for applications to a wide variety of electronic devices and GaN integrated circuit technology."

Carol, David, Christine, and Jung Han (former Sandian) have recently been awarded a patent for the cantilever epitaxy process. Cantilever epitaxy substrates have been supplied to LED manufacturers for testing, which should encourage future licensing.

The cantilever epitaxy program at Sandia is part of an internal three-year $6.6 million Laboratory Directed Research and Development (LDRD) Grand Challenge. Funding for the program also comes from a grant from the DOE Office of Building Technologies for a collaborative project with Lumileds Lighting, a joint venture between Agilent Technologies and Phillips Lighting.

Cantilever epitaxy of gallium nitride is of interest for several programs at Sandia, including high-electron-mobility transistors being developed for potential use in miniature synthetic aperture radar systems (SAR) and high-efficiency solid-state lighting being investigated in the Grand Challenge LDRD. Gallium nitride can also be made to emit ultraviolet (UV) light, and compact solid-state UV emitters would be useful for detecting biological and chemical toxins for homeland security.

Team members

Andrew Allerman (1126), Carol Ashby (1744), Mike Bartram (former Sandian), Kate Bogart (1126), Ronald Briggs (1742), Guild Copeland (1112), Karen Cross (1126), Daniel Derkacs (1735), Jeff Figiel (1126), David Follstaedt (1111), Leo Griego (1742), Jung Han (former Sandian), Elmer Klavetter (11500), Dan Koleske (1126), Christine Mitchell (1126), Nancy Missert (1112), Mike Moran (1111), Adam Norman (1111), Andrea Ongstad (1742), Greg Peake (1742), Paula Provencio (1122), Isak Reines (1742), and Jeanne Sergeant (1763).

Z Neutrons

(Continued from page 1)

cylinder, produces a shock wave that compresses the deuterium within the capsule, fusing enough deuterium to produce neutrons.

"Pulsed power electrical systems have always been energy-rich but power-poor," says Ray. "That is, we can deliver a lot of energy, but it wasn't clear we could concentrate it on a small enough area to create fusion. Now it seems clear we can do that."

A partial confirmation of the result came about when theoretical predictions and lab outcomes were determined to be of the same order of magnitude. Predictions and measurements of the neutron yield were both of the order of 10 billion neutrons. The predicted neutron yield depends on the ion density temperature and volume. Those quantities were independently confirmed by X-ray spectroscopy measurements.

Neutron pulses were observed as early as last summer, but Sandia researchers were wary that the output was produced by interactions between the target and ions generated by Z's processes, rather than within the capsule itself.

(Ion-generated neutrons are not the point of the experiment because they will not scale up into a high-yield event in a larger replica of Z.)

But a series of experiments completed in late March demonstrated that the production was within the capsule itself. To show this, researchers inserted xenon gas within the capsule. The gas prevented the capsule from getting hot during compression. The neutron yield dropped dramatically, as predicted.

The action takes place within a container the size of a pencil eraser, called a hohlraum, at the center of the Z machine, itself a circular device in Area 4 about 120 feet in diameter.

Jim Bailey and Gordon Chandler (both 1677) lead the experimental team. Theortical calculations were performed by Steve Slutz (1674). Carlos Ruiz (1677) and Gary Cooper of the University of New Mexico performed the neutron measurements.

Cantilevers, posts, and pyramids: How the new process works

The cantilever epitaxy process, done at the micron level, involves two major steps. First, narrow supports are formed by etching the sapphire substrate using plasma-assisted etching. A multiple-layer photoresist mask is used to define the features to develop a post/trench striped pattern on the substrate. A gallium nitride nucleation layer is then grown on the sapphire posts at a temperature of 500-600° C. This nucleation layer helps bridge the crystal-lattice difference between the gallium nitride and the sapphire. The growth then proceeds with steps at 1050° C and then decreased to 950° C.

"At this point a very key thing happens," says Daniel Koleske (1126) who is involved in the gallium nitride growth process. "The gallium nitride grows mostly upward, forming natural pyramids that reflect the crystal symmetry of gallium nitride."

The next step is the coalescence. The temperature is increased to 1100° C, and the pyramids grow out laterally at a rate faster than they grow vertically. This produces free-hanging cantilevers over the trenches between adjacent posts.

The cantilevers first grow from adjacent posts and meet over the middle of the trench. They then grow together, producing a continuous smooth surface held up by the narrow supports. The areas over the supports have very few dislocations when complete pyramids are formed during the 950° C growth step. When dislocations growing up from the post surface encounter the angled walls of the pyramids, they are turned from vertical to horizontal so they don't reach the surface as the material continues to grow thicker.

There are some dislocations where two cantilevers grow together (the coalescence front), but almost no dislocations in the cantilever regions between the posts and the coalescence front. The final result is a continuous smooth surface area with greatly reduced numbers of dislocations. This surface can then be used like a regular gallium nitride substrate to grow LEDs and other devices on top.

Inspections

(Continued from page 1)

Sandia is nearing completion of a similar inspection and certification process for the DC-4, DC-6, and DC-7 classes of tankers. The new procedures should be available next week to contractors flying those aircraft.

Development of the improved inspection process for the Lockheed P-2V is under way. The C-130A and PB4Y aircraft are no longer being used by the agencies for aerial firefighting.

"Until we can acquire newer aircraft down the road, this partnership with Sandia is a definite step towards safer operations with the current contract fleet," said Tony Kern, Forest Service Assistant Fire Director for Aviation.

Administrative and technology changes

As part of the three-year program funded by the Forest Service, Sandia, in consultation with the Federal Aviation Administration (FAA), is evaluating each contractor's procedures for maintaining and inspecting their air tankers and is developing recommendations for enhanced procedures that would improve the contractors' abilities to find and repair cracks and other structural problems before they pose a threat to aircraft and their crews, says Dick Perry, Manager of Airworthiness Assurance Dept. 6252.

Although the final causal report has not yet been released from the National Transportation Safety Board, "fatigue cracks" growing unnoticed in the aluminum components of the center wing box are thought to be among the causes of last summer's fatal C-130A accident.

Among Sandia's recommendations will be administrative changes to formalize and improve maintenance and inspection procedures, says Dick.

Sandia also will encourage use of advanced nondestructive inspection (NDI) technologies that can identify flaws that are hidden from view or are too small to be detected by visual inspection, he says.

One such technique, called eddy-current inspection, detects sizes and locations of subsurface cracks by sensing disturbances in magnetic fields as a hand-held scanning device is applied to the metal. Another NDI technique, called ultrasonic inspection, detects flaws by monitoring sound waves as they pass through materials.

A P-3 SLURRY BOMBER taking off out of Albuquerque.

THIS P-3 ORION, a former Navy patrol plane modified to carry retardant, is part of the US Forest Service fleet of large air tankers for firefighting.

Measuring stresses

In the past, inspections of in-service aircraft were accomplished primarily by experienced personnel performing visual inspections of critical parts for cracks and other defects.

"Our initial objective is to use modern inspection technology and what we know about the aging of aircraft and materials and get the large air tankers safely back in service as soon as possible for the 2003 fire season," says Dick.

In addition, Sandia will evaluate data gathered this summer from several air tankers instrumented with sensors in an effort to characterize stresses on the planes' airframes in the unique flight environments the aircraft encounter.

"They fly at low altitudes in mountainous areas under windy conditions," says Dick. "This turbulence causes stresses on the aircraft structure, like driving down a bumpy road in a car.

"We need to know what kind of workout they get and how these loads differ from other aircraft so we can understand and control the effects of these stresses," he says.

Based on the data, Sandia also will recommend long-term inspection procedures for each class of aircraft, including determining how often each aircraft needs to be inspected to ensure cracks don't have time to grow into structural defects.

Tolerance limits

Many firefighting tankers operated by contractors are retired military or commercial transport planes designed and built decades ago. The DC-4s, for example, served in WWII as C-54 transport aircraft.

These large air tankers are considered national resources and are assigned to assist in initial attack on wildfires in different jurisdictions throughout the country, says Rose Davis of the National Interagency Fire Center in Boise, Idaho.

Although firefighting aircraft today are flown within their design tolerance limits according to strict guidelines for pilots, it is important to keep a close eye on how the normal aging processes and, in some cases, many hours of flying time are affecting the plane's structural members, says Dick.

Many of the NDI techniques used for aircraft inspection were developed or refined at the AANC near the Albuquerque Sunport, managed and staffed by Sandia for the FAA. The AANC's primary role is to develop improved inspection and maintenance techniques that safely extend the service lives of aging commercial airliners.

Reader Service information

Retirees (only):
To notify the Labs of changes in address, contact Carol Wade, Benefits Dept. 3341, at 505-845-9705, e-mail cawade@sandia.gov, or Mail Stop 1021, SNL, Albuquerque, NM 87185-1021.

Others:
To receive the *Lab News* or to change the address (except retirees), contact Michelle Fleming, Media Relations and Communications Dept. 12640, at telephone 505-844-4902, e-mail mefleme@sandia.gov, or Mail Stop 0165, SNL, Albuquerque, NM 87185-0165.

Employees:
If your Mail Stop is not receiving enough copies of the *Lab News* for everyone, please call Honario Anaya, Mail Services Team 10268-4, at 844-3796. (At Sandia/California contact the Mail Room at 294-2427.)

President of Russia's famous Kurchatov Institute visits Sandia, Atomic Museum

OVERLOOKED by J. Robert Oppenheimer and Edward Teller, Jim Walther, director of the National Atomic Museum, and Evgeny Velikhov (right), president of Russia's prestigious Kurchatov Institute, visit during a reception at the museum. Velikhov spent two days visiting with Sandia scientists in early March to work out details of a memorandum of understanding to pursue several nuclear power initiatives jointly during the next few years.
(Photo by Bill Doty)

Paul Robinson details serious concerns with NM security force, announces corrective measures

Frank acknowledgement of problems turns terrible news less sour

By John German

Bad news never gets better with time.

With that in mind, Labs President C. Paul Robinson cleared his throat and turned to the members of the Albuquerque news media gathered at a March 20 news conference at Sandia's International Programs Building.

"I have asked for this press conference to give me a chance to acknowledge what I think are some disturbing concerns that have come to light about management of the security force here at Sandia," he said. "Let me say first of all that most of what I'll have to disclose as problems are internal management issues, and we indeed are now addressing them."

With that began a difficult hour for Paul and several people who joined him at the lectern that afternoon, including Labs Executive VP and Deputy Director Joan Woodard, who stepped in several times to answer questions, and newly appointed director for security Dennis Miyoshi. Paul had flown in from Washington that morning so he could personally preside over the disclosure. (See "A word about timing" below.)

DENNIS MIYOSHI is the new director for security.

"My job has been to develop evaluation criteria and testing protocols to determine under what conditions security works well and doesn't work well."

Good news and bad news

As part of his prepared remarks, Paul told the reporters who attended that despite the management problems, "There is no evidence that at any time classified or sensitive material has been compromised. In that sense our lab is still very secure."

Then came the bad news. He said two investigations were completed recently: an internal Sandia assessment, and an investigation by the National Nuclear Security Administration's (NNSA) Sandia Site Office, which had looked into allegations within the Sandia/New Mexico security force of a breakdown of discipline, lax security, theft of government property, threats of retaliation, inconsistent and inadequate disciplinary actions, and mistrust of management to take action when problems are brought to its attention.

The NNSA inquiry did not find clear evidence of a broad pattern of abuse, a breakdown of discipline, lax security, attempted cover-ups, or actual threats of management retaliation, he said. It did not bring into question the overall effectiveness of Sandia's security operations.

However, the NNSA investigation did identify significant concerns in the way Sandia internally manages its overall security program. Both the self-assessment and the NNSA site office inquiry suggested some of the problems are systemic, he said.

Paying attention

Although these problems date back three years or more, said Paul, Sandia's management has become increasingly aware of potential problems over the past year. A few Sandia employees raised awareness of the severity of the issue in recent months.

Because one employee felt he was not being heard by Sandia management, he had taken his concerns to Sen. Charles Grassley, R-Iowa, chairman of the Senate Finance Committee, who had requested and conducted interviews with two other concerned employees.

"The Sandia employees who raised some of the concerns felt they were not being heard and that they saw some quite real barriers to taking their concerns to higher management through one of the more traditional routes we offer here, either the Ethics office or the Ombuds office," said Paul.

LABS PRESIDENT C. Paul Robinson addresses the media at the press conference. (Photos by Randy Montoya)

"I have asked for this press conference to give me a chance to acknowledge what I think are some disturbing concerns that have come to light about management of the security force here at Sandia."

"I want to assure those employees, members of the public, and others who have concerns that I do take these issues seriously, and that I sincerely appreciate their efforts to bring them forward by other means when their concerns were not addressed internally to their satisfaction," he said. "Clearly the healthiest of organizations provide an environment where people know real concerns are addressed. I regret that didn't happen in this case. We're going to make it happen now."

Correcting the problems

Paul detailed several measures that have already been taken to correct the problems.

- Disciplinary actions have been handed down to several security police officers and some supervisors in New Mexico, and more might be coming, he said.
- He requested the formation of a special committee of the Sandia Board of Directors to recommend necessary management changes and corrective actions at Sandia.
- In August, he initiated a thorough independent investigation of security issues by two former federal prosecutors. The results of this independent investigation are expected in late April.
- In December, he asked for assistance from the NNSA, which resulted in NNSA's Sandia Site Office findings contained in the report issued March 18.
- Sandia's waste, fraud, and abuse investi-

(Continued on next page)

A word about timing

Editor's note: Although some have suggested the March 20 news conference was timed to coincide with the beginning of the military offensive in Iraq, thereby minimizing negative press coverage of the problems, in actuality several external factors encouraged Sandia to acknowledge the issues as soon as possible.

The March 20 date was driven by the issuance of the NNSA Sandia Site Office findings two days earlier, on March 18, as well as Sandia's desire to disclose the problems to the news media as soon as possible, rather than wait until a reporter or government oversight group publicly accused Sandia of the problems, thereby putting Sandia on the defensive and calling into question Sandia's integrity.

"The public usually forgives an organization for having problems as long as its management team is honestly working to resolve those problems," says Don Carson, Director of Public Relations and Communications Center 12600. "We have a policy of being open and honest with the public, and I believe that is our duty as stewards of this laboratory. There is no situation in which we would want to see Sandia accused of concealment or coverup. That is totally unacceptable to our corporate values."

Paul's March 27 message to employees: 'Vast majority of security forces doing an outstanding job'

Labs Director Paul Robinson issued the following statement to Sandians March 27:

Most of you saw the news release that Sandia issued March 20 and subsequent media stories about concerns we have about the management of our security force, actions we are taking, and continuing investigations. While we have no substantial new information to report yet, I want to assure all Sandians that we are addressing this matter as thoroughly, fairly, and quickly as circumstances will allow.

In my press conference last week, I pointed out that the problems involved only a small fraction of employees and managers. The vast majority of the officers and managers of our security forces are not only doing an outstanding job, but they are putting in heavy overtime in order to keep us and our lab secure during the heightened security level we are working under. It is wrong that these dedicated folks are feeling the hurt and sting of this investigation into wrongdoing on the part of a small minority of their colleagues. I asked the press specifically to note these circumstances but have not seen that message yet in print.

I ask all Sandians to make an extra effort to show your appreciation for our security forces and the great job they are doing to protect us. We all should be proud of the services they provide 24 hours a day. I also would reiterate the statement I made to the press that there is no evidence that at any time was either classified or sensitive material compromised. Our lab is secure.

Labs security

(Continued from preceding page)

gators will now report directly to Sandia's executive office to provide a more rigorous and independent investigative capability.

• Dennis Miyoshi was named to lead a newly created organization within Sandia to oversee the Labs' security force and the continuing investigation. Dennis will report directly to Sandia's executive office.

• Dennis appointed Jim Larson to manage the Sandia/New Mexico Protective Force Department. Larson is a former US Secret Service special agent and has been a nuclear security systems analyst at Sandia for 15 years.

Dennis said he will focus initially on three areas: improving communications among all levels of the Labs' security force, establishing well-defined performance expectations for all members of the security force, and developing a culture of trust, respect, and integrity within the organization.

"My job has been to develop evaluation criteria and testing protocols to determine under what conditions security works well and doesn't work well," said Dennis. "I hope to apply these same approaches to listen, learn, set appropriate criteria, and evaluate what's going on here. Only then can I develop an implementation plan for the concerns that Paul has described."

Problems are with a few

Paul went to lengths to make clear the problems he disclosed were primarily management problems and behavioral problems with a few people on the security force, and that their actions should not tarnish the reputation of the entire force.

"I want to acknowledge the contributions that our security force has made to taking the extra load since September 11," he said. "Not only has the majority of the security patrol been putting in many more hours than their traditional 52-hour work week, some have been responding by taking additional shifts with the 9/11 escalation of security and putting in 80-plus hours per week."

"I think there's little doubt that the very high stress level has been an underlying factor in the problems we've been addressing, and we've got to find a way to ease those pressures," he said. "I've asked Dennis not only to rethink how we can reengineer our security, but how we might be able to include better technology support to come up with a better working schedule and working environment."

Paul also issued a statement in the *Sandia Daily News* last week and in this issue of the *Lab News* (above) praising the dedication of the overall security force.

The response

News media coverage of the problems has ranged from fair to positive. KOAT-TV, the local ABC affiliate, aired the following story on March 20, for example:

"Security concerns plague Sandia Lab: Several investigations find security breeches at the top-secret facility. The violations include officers asleep on the job, stolen computers, and keys mysteriously disappearing and reappearing. The Lab's President tells Action 7 News steps to correct the problems are in place. The lab also appointed a new security director. We should mention: There's no evidence classified or sensitive material was lost."

Although coverage continues in smaller national media, such as Washington, D.C. trade publications that cover government activity, the public reaction has been fair given the situation, says Don Carson, Director of Public Relations and Communications Center 12600.

Four days after the news conference, in fact, one local paper was giving Sandia credit for its approach to the problem. An editorial in the *Albuquerque Journal* read, in part: "The head of Sandia National Laboratories took a step toward turning a public relations mountain into a mole hill Thursday by acknowledging security problems and outlining Sandia's response. . . . By his decisive actions . . . Robinson may have headed off a torrent of criticism."

POST-PRESS CONFERENCE TALK — Sandia President Paul Robinson talks to *Albuquerque Journal* reporter John Fleck following the press conference about Sandia security management concerns. (Photo by Randy Montoya)

Paul went to lengths to make clear the problems he disclosed were primarily management problems and behavioral problems with a few people on the security force, and that their actions should not tarnish the reputation of the entire force.

Sandians watch Rudy Giuliani via satellite

RUDY GIULIANI, the former mayor of New York City, spoke on a worldwide live video link watched by Sandians in the Steve Schiff Auditorium March 19 on the topic of "Leading in Difficult Times." Giuliani, whose upbeat no-nonsense leadership in New York bolstered spirits after the Sept. 11 attacks, spoke directly and personally on qualities of leadership. He outlined six principles: Have a strong set of beliefs and principles, show courage, be optimistic, prepare relentlessly (know your subject matter), surround yourself with a great team, and show loyalty. The Giuliani talk was part of Sandia's Leadership Series Spring 2003, sponsored by Corporate Education, Training, and Development Dept. 3520. Future Leadership Series talks still ahead include "Innovation and Strategy," Gary Hamel, April 16; "FISH! Sticks, Keeping the Vision Alive," Stephen Lundin, May 15; "Leading Through Influence," Laree Kiely, June 3, "Leader as Teacher," Noel Tichy, June 11; and "A Manager's Guide to Preventing Sexual Harassment," Lynda Ford, June 19. (Photo by Randy Montoya)

From the Iraq war to the Labs' newest 1,300 employees, Sandia's top two officials discuss issues, future

Lab News *interview touches on war concerns, policy issues, strengths, joys, uncertainties, and an energized workforce*

Impending war with Iraq was much on the minds of Sandia President and Labs Director C. Paul Robinson and Executive VP and Deputy Director Joan Woodard at the start of the annual Lab News *State of the Labs interview with them on March 6. But the discussion ranged over many other topics from nuclear policy to the invigoration of the Lab's staff with 1,300 new employees in the past two years. They were interviewed by* Lab News *editorial staff members Ken Frazier, Bill Murphy, and Chris Burroughs.*

LABS DIRECTOR AND PRESIDENT C. Paul Robinson and Executive VP and Deputy Director Joan Woodard in Paul's office during the annual *Lab News* "State of the Labs" interview. (Photos by Randy Montoya)

Lab News: *Paul, at your State of the Labs talk to employees (*Lab News*, March 7) you paused to think about our military forces set for possible military action against Iraq, and you said, "A number of Sandians are in harm's way providing support to the military that we should remember as well." Can you say anything more about that and what roles they are or might be playing?*

Paul: Today we have a Sandian who's a part of the UN inspection team, Dave Kitterman [1639]. He is an expert in nuclear matters. He flew into Iraq just over a week ago. [*Editor's note*: Dave and his team subsequently left Baghdad on March 9, and he returned to work at Sandia the next week.] We cannot talk about other folks who are supporting the military, but we do have some of our experimental technology prototypes now in theater and there are some Sandians and Sandia contractors supporting that particular effort. But at the moment there is not much we can say about the technologies.

Joan: And that's natural. There have been a lot of articles, including one in *Aviation Week* not too long ago, about all the new technologies that were being brought to bear in the planning. So it shouldn't be a big surprise that some of the technologies we are involved in and working, whether a part of the advanced concepts demonstrations or whatever, are being considered and being inserted into the planning right now.

Paul: One step our board of directors took is to make a special insurance policy beyond normal Lab insurance for people who go into hostile zones, battle areas. In fact, Joan is the gatekeeper on who will be covered by that. After introducing that and gaining approval in a special phone meeting of the board last week, I got a very nice e-mail from a Sandian, Richard Hay [15406]. He recalled when he had been involved in Vietnam with some of the early sensors that we were deploying over there, and at one point lying on his back as the Chinese communist airplanes dove down close over them. He told me, "Of course we didn't have anything like that [insurance policy], and I am glad nobody had to explain to my widow such a thing." But he said, "I think it's just terrific you guys have done that now." It's nice to get positive feedback about the things we do around here. That was a notable one.

"I believe — and it's probably a good thing among humans — that the very thought of war brings up such feelings, deep feelings among people on a number of continents. I sometimes worry that the feelings are clouding the brain, particularly in this case."

LN: *Can you say how many Sandians are being covered by that policy now?*

Joan: The policy extends the insurance we previously had that covered our ARG [accident response group] and NEST [nuclear emergency search team] people to include those who are a part of things like what Richard Hay did in the past. You are covered if your name is on a list that I maintain in my office that requires that the VP submit the name and information beforehand. Right now we have David and our ARG/NEST teams on the list. The question is, if we send people to a country that is somewhat of a hotspot even though it's not really a war zone-related country, should they be covered? Or should management be a little bit more careful about our decision-making about whether they should go? I think it's going to cause us as management to step up to a new level of thinking about the judgments we make when we send people into various parts of the world when the tension is particularly high.

LN: *What other thoughts might you want to share with employees about the possibility or probability of war?*

Paul: I believe this is a very realistic time to face up to the questions, What if there are nuclear weapons, chemical weapons, or biological weapons? The responses we might be called upon to deal with include, god forbid, somebody actually using them in battle against our troops, which is clearly a real worry. The next is if they decide as Iraq did after the Gulf war to go out with a blaze, setting oil rigs on fire all around. Might they do that with their weapons stores if they haven't used them? We expect in the best case there would be an awful mess to have to deal with very carefully. The Pentagon is calling for our advice and help in preparing to deal with whatever arises.

Joan: NNSA is clearly the resource in the country for dealing with that.

Paul: The situation internationally has probably never been quite as confused as this morning. I believe — and it's probably a good thing among humans — that the very thought of war brings up such feelings, deep feelings among people on a number of continents. I sometimes worry that the feelings are clouding the brain, particularly in this case. The war is clearly not about oil. The US has never fought a war in which it extracted a penalty. Usually war gives us the opportunity to pay to rebuild the nation. That would be the likely outcome here as well. It certainly is the case if you read the dossier that the British put together about conditions in Iraq. I found that one of the more compelling open-source documents that I've read in years. I highly recommend it to Sandians. The weapons of mass destruction document included an appendix on human rights violations and the torturing tactics that have been used, with good documentation. I think the Brits have been masters at putting that information together. [The text of UK's dossier on Iraq, prepared by the Foreign and Commonwealth Office, is on the Web at http://www.fco.gov.uk/servlet/Front?pagename=Open Market/Xcelerate/ShowPage&c=Page&cid=1032455026312.
UK Prime Minister Tony Blair's Foreword to that document is at http://politics.guardian.co.uk/foreignaffairs/story/0,11538,797886,00.html.]

Joan: In addition to advanced technology that we've been working on with DoD, one of the things I see coming from this is a further consideration and expansion of things like the Cooperative Monitoring Center extension in Jordan. That started but has slowed down a little bit with all these activities and travel curtailments. But one can see that receiving a lot more interest and perhaps expansion.

LN: *What has been the most rewarding part of the past year for each of you? The most frustrating?*

Joan: For me the most rewarding has been the list of visitors that we've had to the Lab over the past year coming from various parts of Homeland Security and national response teams, first responders, and the top officials who are establishing NORTHCOM [the new North American Command]. Their feedback in closeout sessions — listening to them and their assessments of the relevance and the value of Sandia technology — has been exciting to hear. Every time they go through the Bldg. 810 display area, for example, they'll make comments [A selection of homeland security

(Continued on next page)

State of the Labs

(Continued from preceding page)

and counterterrorism technologies is on display in Bldg. 810.] They are in awe at what we have and the kind of potential that technology promises for helping work some of the most difficult problems, whether it be the shipping containers issue, or trying to track material moving across borders, or dealing with mitigation and cleanup — chem/bio or nuclear. It's very exciting. That to me has been one of the most rewarding things, to see the relevance and see it in the eyes and words of these visitors.

Paul: This has been a year where I thought we concentrated on the fundamentals — which has been good, to not have the disruptions of some of the previous years. I think we're still delighted with the Sandia pension proposal and how it turned out, but it sure is good to have that behind us as an issue. We can now focus more of our time on the important things we do here. For the annual Labs Accomplishments issue, we ask for a paragraph and we get quite a harvest of suggestions from people who would like to have folks know about what they've done. As I've looked throughout it this year trying to find the dominating theme, I came on "components." These small breakthroughs on which building systems eventually hinges showed a wealth of development across the board, in sensors, in mechanical and materials processes. A lot of very basic things were achieved that small teams had been concentrating on. You can just imagine where they are likely to go. When you stack them all up as we did in the final publication, they are a very impressive list.

The problems at Los Alamos

LN: *And the most frustrating?*

Paul: I think this one will be easy. Maybe we'll both have the same one. Watching at a distance — though nonetheless affected — the serious problems that Los Alamos has had to deal with has been painful. I don't know any other word than that.

Joan: Yes, that has been frustrating.

Paul: Among the obligations regardless how good the science and technology is, is that you do have to spend time making sure the trains run on time, and I believe that's the biggest problem at Los Alamos, not that the science and technology is not as well done as before. It's taken the management's attention and required them to put all their time into answering criticisms. I perhaps over-use this statement, but over my whole career I've felt the most limited resource in any organization is the time of its senior management. If you are putting your time in on other things, you won't be putting it into more strategic things, which is the real purpose of your existence.

LN: *How have these problems, if at all, affected us, Sandia?*

Joan: Instantly! As soon as an issue comes to light our first reaction is the question "Do we have the same sort of problem here?" Perhaps not the same magnitude, but we have many of the same challenges. What can we learn from what they're finding at Los Alamos as they are exploring these issues? We have a lot in common being national labs, so it would be very arrogant, very misguided for us to assume that we are clean-free with regards to each and every one of the issues that have come up. [See article about subsequent March 20 news conference on security management issues at Sandia on page 6.]

Paul: One of the things we changed, and I believe we wouldn't have been so quick otherwise to make this change had the problems not occurred there, is in our purchase cards. In the P-card environment managers and above did not have to have someone reviewing and approving the use of those cards. We changed that and said nobody is above having someone approve their actions. Because perhaps the most serious case at Los Alamos was a more senior person who had violated their trust.

LABS EXECUTIVE VP AND DEPUTY DIRECTOR Joan Woodard makes a point during the annual *Lab News* "State of the Labs" interview as Labs Director and President C. Paul Robinson looks on.

LN: *Are relationships between the scientists of Los Alamos and Sandia good?*

Joan: Oh, yes, very good. In fact, there is a lot of empathy and concern from our folks. I hear report after report in which engineers and scientists will be involved in some sort of collaborative meeting — it might be on some totally different subject having nothing to do with lab operations and governance — and the topic comes up. And so it is clearly on these folks' minds, every single one of them. They are laboring through it. And the response from our folks has been very positive.

LN: *Do you think what has gone on at Los Alamos has gotten in the way of their science? I know you've said the science there is great.*

Paul: The science *is* great. But I believe the problems have affected morale. That is probably the most serious loss. It is on everyone's mind. The other distinction is that *we* have had a very supportive community. As you know there are people who work full time as an independent oversight group of antinuclear activists who focus on Los Alamos. Now, giving those people a little bit of ammunition as has been done by the present events leads to very bad consequences. I was in Moscow the second week in January and opened up the *Moscow Daily News*, and there was a story about the problems in Los Alamos.

LN: *You have been quoted as saying you advised Lockheed Martin that if the Los Alamos contract came up for bid not to pursue that bid because of the differences between Los Alamos and Sandia in management. Why did you say that?*

Paul: What I said is, "Don't rush to do that. The cultures are very, very different." The university culture has focused much more on basic research and less on major projects, and the mismatch with Lockheed Martin's skills and experience I think could be a significant problem.

Budgets and future uncertainties

LN: *Back to Sandia. Sometimes it sounds as if we here at Sandia almost have more work than we can do, more than we have the people and time to do. Is that a correct perception?*

Joan: For every project that comes into the Laboratory there are people in this Lab who have worked very hard in establishing credibility and strong relations and good performance with the customer we serve. To imply that money is just sort of rolling in is really an incorrect impression. Right now, frankly, we are bracing ourselves. We are not sure exactly how projects will come in for the budget for this year. That's why at the State of the Labs address for the community I was somewhat cautious in saying that we were approaching the $2 billion level. I have seen over the last six or eight months or so our estimates becoming unclear — though now having the Energy & Water appropriations is helpful. Some of the customers are starting to feel the pinch, a pull-back for supporting the war efforts or expectations of what's going to happen with the '04 budget given the overall economic picture. So I feel very comfortable about maintaining some level of stability, but can't be sure we'll continue to have growth of great magnitude. I think we, like a lot of parts of the government and the country, are going to have to realize that our appetite or the nation's appetite is going to have to be managed while we deal with the country's economic problems.

Paul: One of my beliefs is that for a lab like ours we can always find money — if that's all we're looking for. But we have had an opportunity to be a lot more strategic and focus on missions, and if there is alignment with our missions, then we've said for sure, don't turn down sponsors who come to you for help; if there is not an alignment, we've suggested that we should help them to find someone who could do the work. And that's not a bad position since we don't have a way to store money for the future bad times. Maintaining good relations with all the potential customers is probably the best storehouse we can develop.

"Right now, frankly, we are bracing ourselves. We are not sure exactly how projects will come in for the budget for this year. . . . I feel very comfortable about maintaining some level of stability, but can't be sure we'll continue to have growth of great magnitude."

(Continued on next page)

State of the Labs

(Continued from preceding page)

"I said before that our focus on customers is what kept us healthier than others through the bad times. I believe that's the most potent advantage for Sandia — continuing to focus on our customers, which are still 98 percent government customers."

Political support, proving value

LN: *That leads into the next question. We've had tremendous political support for a long time, but there might be a time down the road some years when some of that goes away, if say, Senator Domenici retires and other things like that. What kind of planning can we do for that kind of long-term eventuality?*

Paul: We've had wonderful support from Pete Domenici, first of the list. I think without his hard work we would be far worse off. Similarly Jeff Bingaman, when we've called on him, has been there. He does not quite have the same role that Pete does in appropriations, but nonetheless he has always been there to support us when it was needed. One of the things we've talked about for at least 15 years is never appearing to be pork — that is, receiving your money only because of legislative support. We really do have to look at the value proposition, and what we deliver to customers. I said before that our focus on customers is what kept us healthier than others through the bad times. I believe that's the most potent advantage for Sandia — continuing to focus on our customers, which are still 98 percent government customers.

Joan: I think it is very encouraging when I look at the magnitude of our non-DOE work, because for those customers they truly have a choice, a full choice. Now some DOE customers may feel that because we are a DOE lab there's some pressure there [to use us]. But the work from the DoD and other-agency customers that come to us is approaching $500 million, and so that's a huge statement about our ability to demonstrate value.

Paul: And similarly the industrial folks who've put more than $200 million into the EUVL [extreme ultraviolet lithography] have just signed a new agreement with us to extend our participation as advisors for the next generation of electronic chips. And they had full choice in how they would spend their money.

Homeland Security, NNSA

LN: *Has DOE expressed any concern about our taking on work from DoD and now the Department of Homeland Security?*

Joan: Last Friday [Feb. 28] the Secretary of Energy and the Secretary of Homeland Security signed a Memorandum of Agreement that directed that the DOE labs and all their assets be provided on an equal basis, giving DHS an equal ability to task. Previously our Work for Others work was cast in a noninterference architecture. This is an equal footing in terms of tasking. That is a statement at the highest levels of the importance of our being true national labs, which is something we've been trying to encourage others to think about for some time. We are hopeful that others will look at this agreement and that we'll see similar sorts of things develop with other key departments.

Paul: One thing I can definitely cite as an advantage we have accrued from the new NNSA, which has a different status within the Department of Energy, is that they are much more open to partnering across the government, not only Homeland Security but the Department of Defense, the intelligence community. The intelligence community has never had better relationships than we enjoy today. Similarly, with Commerce and the State Department we are not finding the parochial attitudes of the past. In that sense, I believe homeland security, which was a wake-up call to everybody, has softened the boundaries within government and told everybody it is one government, we have to start acting more like it. And so we have had greater support from NNSA for working with the other agencies than we've ever had within my memory.

LN: *Is NNSA working out in the way hoped?*

Paul: It is taking longer, but I would have to say yes.

Joan: The vector is in the right direction. I think there is some work that needs to be done to figure out what the creators really had in mind. In fact, one of the things the Foster panel is doing as it closes out its work this month is to do just that, to talk with the key folks who were involved with the creation to see what were their expectations and what they viewed as the desired end state, and then do an assessment of how it's going.

"[T]he Secretary of Energy and the Secretary of Homeland Security [have] directed that the DOE labs and all their assets be provided on an equal basis, providing DHS an equal ability to task. . . . That is a statement at the highest levels of the importance of our being true national labs. . . "

Nuclear weapons: future needs

LN: *Despite our Work for Others and for Homeland Security, the fundamental core mission is nuclear weapons. We're now 10 to 12 years since the last full-up test. And yet you have to certify the health and safety of the nuclear stockpile. How is science-based stockpile stewardship working out? Can we continue to proceed into the future hinging everything on that, or is a point approaching where there is anxiety about whether testing is needed?*

Paul: That same question is being put on the table right now by the Nuclear Weapons Council. One of the reasons I think we have such good relations with NNSA is today they have no doubt, no doubts whatsoever, that Sandia's primary focus is the nuclear weapons program. That we haven't abandoned the nuclear weapons program in order to pick up Homeland Security or support for intelligence or DoD munitions. The weapons program remains our guide star. We talk about this frequently with [NNSA Acting Administrator] Linton Brooks and [NNSA Deputy Administrator for Defense Programs] Ev Beckner as well, such that they have no doubts but that we take care of that business first. In that sense what we do in nuclear weapons is enriched by the experiences we gain from others. One of the things we've tried to do is make sure the large missions we pursue do pay a dividend back to our ability to do the nuclear weapons program. I am convinced that because we are putting our focus as a laboratory in the right place, it is probably the most important factor in why we are being supported to do other things.

LN: *But is there a time farther down the road where the aging weapons are going to be more and more difficult to certify?*

Paul: We have said by 2010 or 2015, in that time period, we will see the retirement of the majority of folks who have designed weapons in a nuclear test environment. And so it will be a huge question. Are the people who are filling all those positions, the new men and women in the program, capable of doing what was done in the past, since you have no way to give them a report card by way of a past/fail on a test. That is one of the things that nuclear tests did — they graded the designers and the design capabilities. And so we've always said for 20 years that there was going to be a crunch point before us, and we are still approaching it, which is why these questions are being asked now by the Weapons Council.

Joan: Equally important to what the Weapons Council is bringing up is the need for having a much stronger, healthier advanced concepts development activity. For us, the singular attention on nuclear testing is not nearly as important as having an accepted role in developing new concepts, producing the designs in hardware, and doing the testing. We are battling limitations in congressional language that says that you can't go this far — it's almost a law against new thought. That is a very critical issue. And it relates to the point Paul made about people. If you lose the cadre of folks who know how to develop new technology, and develop advanced concepts around that technology, we will have lost a lot.

Paul: We don't want to have people whose jobs are simply to serve as "the maintenance mechanics on the doomsday machines." We really want to have people who believe they themselves are the guardians of the nation's security, whatever it takes, whatever the threats are. Having people who go to bed each evening with that on their minds, waking up with ideas of what might be going on in some corner of the world, what might we do to counter it, what should we be doing to develop new strengths for the country — that ought to be a perpetual activity of labs such as ours. In large measure that kind of activity and thinking was cut back over the decade of the '90s, and we are working hard and asking for strong support from both the Executive Branch and the Legislative Branch to give a rebirth to that.

(Continued on next page)

"We don't want to have people whose jobs are simply to serve as 'the maintenance mechanics on the doomsday machines.' We really want to have people who believe they themselves are the guardians of the nation's security, whatever it takes, whatever the threats are."

State of the Labs

(Continued from preceding page)

Future nuclear needs: improved weapons?

LN: *Are you implying that the current nuclear weapons are antiquated, that we need new designs for the new kinds of wars we will facing?*

Joan: The Nuclear Posture Review puts that on the table, as something that needs to be debated. Absolutely.

Paul: I've gone farther in some of the things that I've written — that the arsenal built for the Cold War is not the arsenal that would work for regional conflicts. In particular, very high-yield, multiple-independently targeted re-entry vehicles, "MIRVed warheads," make little sense in trying to convince a country like North Korea to stop aggressive activities. Using such weapons becomes incredible to us. When they become incredible to us, that's when deterrence really fails. And so we believe you should always have the capability to credibly hold at risk what a nation values. I think that's becoming less and less the case. So there will have to be development of new systems. Whether new systems would require test of a warhead is not at all known yet, because the robust parts within a warhead can be repackaged in a number of ways. But we [Sandia] are responsible for all the electronics as well as the mechanical functions within warheads, and electronics change so constantly that there is no warhead out there for which you can go out and procure the components you need. They are just not available anymore. They are long-since "sunsetted" out of production. You can't just say I'll take new ones off the shelf and redesign, because you have to rethink all the intricacies of how they connected up. That's what we're doing with a number of the warheads in the stockpile life extension program — or service life extension program, the term I've seen recently in testimony.

One of them is the Trident warhead, which will be the first one. I think it is a system that we will want to maintain. It has a more moderate yield compared with some of the extremely high-yield things we have, it's the most secure warhead we have because of its submarine basing. And so we are retrofitting that completely — the electronics, the arming, fuzing, and firing systems. We have been convinced that what's happening today is going to mean that the Trident will be the best warhead ever fielded by this country. That is the other thing that should happen. Each generation should have their opportunity to improve things, not just to be the caretaker of something done 20 years ago, or in this case 30 years ago.

"I've gone farther in some of the things that I've written — that the arsenal built for the Cold War is not the arsenal that would work for regional conflicts. . . . 'MIRVed warheads' make little sense in trying to convince a country like North Korea to stop aggressive activities."

New employees, new energy

LN: *Related to that, I was very struck by the fact that, Joan, you emphasized in the State of the Labs talks that we have brought on 1,300 new Sandians in the past two years. That's almost a sixth of our workforce. What is the feedback from them? Are they happy? How do they get imbued with the Sandia culture that Paul was talking about? We haven't had this many new people for quite a long time.*

Joan: We actually have a pretty strong new-hire orientation program now that offers to all new-hires the opportunity to hear about the core mission of the laboratory and get a sense of what we are as a lab regardless of where their job lies within the organization. And the best connection in understanding the lab comes from working with the person who's in the office next to you, who's been here 20 years. The person who understands what the lab is and has had experiences of working on projects, a particular warhead design or a new sensor system, and seeing all the laboratory's resources come to bear to deliver this product for the customer.

It is exciting to me to hear from folks around the Labs welcoming these new people into the organization and recognizing that the new-hires are bringing a whole new energy level to the Lab. And in fact people who are thinking about retiring now are saying, 'Gee, I think I'm going to stay a little longer, because there's a new energy, it's more exciting working here, there are new ideas coming from this infusion of new people as well as fresh skills out of school." But, are we doing as good a job as we should in bringing folks in? No. In fact, one thing on the drawing boards right now is to see if we can tap into some of the folks who are retiring to capture, not nuclear weapons knowledge like the Knowledge Preservation Program, but some of the stories of the Lab that tell about the character of this institution. We are trying to work with the Video Services folks to see how we can capture these stories in a way that we can transfer some of that gut feeling and emotional understanding of the lab.

"For us, the singular attention on nuclear testing is not nearly as important as having an accepted role in developing new concepts, producing the designs in hardware, and doing the testing. We are battling limitations in congressional language that says that you can't go this far."

Paul: Joan and I had a chance when we did the State of the Labs out at California to spend part of an afternoon with a room full of new-hires, to just talk about things in general. They asked, "What do you think we should be doing to improve our careers within Sandia? What would you like us to do?" And I said in my job I get the opportunity to go to retirement celebrations to thank people for their service here and the things they've done. Over the years I've become an expert at retirement speeches. I've heard them all. They go like this:

"I came to Sandia with a certain interest in a technology or a particular project that was starting up. I had a great time doing that, but then something else came up, either a national crisis or somebody in the other lab asked, can you send someone who knows something about this technology? So I went over and got involved in that, and, wow!, did we really thrive. And over the years it seemed every four to seven years there was a new focus, a different project. To be able to do so many different things over a career and still work at the same place — Sandia Labs — has been the most remarkable part of it."

That's what they say. So I told the new-hires, "Start preparing yourself right now and open up to the rest of the laboratory. That's what works. Make the biggest contributions you can across the place instead of just being stove-piped into one area."

"I told the new-hires, 'Start preparing yourself right now and open up to the rest of the laboratory. That's what works. Make the biggest contributions you can across the place instead of just being stove-piped into one area.' "

Keeping it exciting

Joan: I think a lot of the new-hires are coming with that kind of desire. We've heard a lot about Generation X and the notion that people work for four or five years and then move on. They'll work for 10 different companies in their lifetime. Well, that's not what we're hearing from these folks. Inadvertently, we could drive them to that by not having an exciting place to work. On the other hand, the opportunity — if we keep our course — of their having five careers under one roof is great. And many new-hires see that. Perhaps there's a self-selection. Maybe the folks who are choosing to come to Sandia tend to think that way, but the vice presidents who do a lot of the same things Paul and I just did tell us the same thing repeatedly — that these new folks are not a whole lot different from the thinking we had when we came.

LN: *Paul talked about the Sandia culture and about a sense among Sandians of being stewards of the nation's security. Are you getting that from the new-hires or does that take a while to cultivate?*

Paul: I think we are. The folks coming in the door since Sept. 11 say, "What can I do? How can I help our country?"

Joan: You really hear a sense of service and focus on national security.

Paul: One person at that session commented about the retirement plan, something like, "Yes, I was pleased to see that you have a good retirement plan. Clearly I'm not thinking about that or devoting much time to it, because it's so far off, but I want to work at a place where somebody else is going to worry about that so I can focus my energies on the work to be done here." And that's how I think we all felt when we joined on.

LN: *When new-hires come in the door, are they able to make valuable contributions right away, or does it take five years or whatever? Are they key contributors right out of the chute?*

Paul: I think it takes five years before you're ready to *lead* a project.

Joan: In terms of valuable contribution, I think the biggest thing is just getting over the hurdle of the security clearance, which is a continuing problem. It's taking way too long. NNSA is trying to battle this hard, perhaps trying to see if they can get responsibility for doing the background checks transferred out of the FBI into OPM — the

(Continued on next page)

State of the Labs

(Continued from preceding page)

Office of Personnel Management — and tracking and prioritizing clearance requests.

***LN:** Didn't that function used to be in OPM?*

Paul: It was for a while, then after the Wen Ho Lee case it all went back to the FBI for the special personnel assurance programs, and now the FBI is overloaded, particularly so since Sept. 11 [2001].

Joan: I take it as an encouraging sign that our folks who manage the new-hire orientation and actually maintain some space out in Research Park for new-hires to sit are frustrated — but maybe this is a positive frustration — that line organizations don't want their folks sitting out there. So they're more inclined to put that extra effort in to escort them inside, to have them be part of the work team as early as they possibly can, even though there are limitations to what they can do.

The biotech connection

***LN:** We've recently done a series of* Lab News *stories about biotechnology research here at Sandia. Where do you see the Labs going with biotech? Is it going to continue to be a part of the Labs' focus?*

Paul: One concept I think is so marvelous. Richard Smalley, a Nobel laureate who gave a Truman lecture here, was talking about nanotechnology. That's an area Sandia is specializing in. We won one of the major Center grants that have been created by DOE. We're working at the atomic level; some of the things we're building are just a few atoms across. Smalley said, "As I look at it, this is the great coming together of the sciences." He said he considers biology just to be "wet nanotechnology." Is that a marvelous concept? So, all of the instruments that we've been developing, the force micrometers that can measure the force of individual atoms, for example, are crucial for people looking at biology problems and the synthesis of proteins. I read on the plane last night coming back from the APS [American Physical Society] meeting an article by a research group at the University of Illinois-Chicago with some Sandia support that is looking at a great parallelism between the spectrum of particles that are allowed and the mathematical rules that come into play. It made a complete analogy to biology and which proteins would be allowed by some similar scaling rules. Those are exciting, exciting concepts.

I believe we're already there; it's not a question of will we be there. A lot of the drug companies have come to our doors because of the laboratory on a chip. We went into that as a Grand Challenge for dealing with chemical warfare and bioterrorism, but it looks like one of the best approaches, if not the very best, to looking at how cells pass protein messages. Evidently proteins are the message traffic as cells communicate with each other. The researchers have had no way to do a quick identification and understand the language of cells, and they believe the Sandia lab on a chip may be the best approach for that. So, I think it's very exciting. I believe it's here to stay.

Joan: We've been very successful in a new program in the DOE Office of Science called "Genomes to Life." We've had successful projects chosen [to be part of the program], and there have been some pretty good collaborations developing with universities and other research institutes. Our California site is continuing to focus quite a bit on the whole area of the cell — cell-to-cell interaction, cell membrane understanding — and folks here in New Mexico are supporting them. And further, we're working in the area of bio-informatics and computational biology, which is a good marriage with our core capabilities in advanced computing. There is a clear impact in the chem/bio area, clear relevancy to very specific missions. Across the board — because of the notion of this really being "wet nanoscience"— it's not that far off in the future where we will see biological-based processes for coatings and the like. So we've got to be on top of this; we've got to be connected to this area of development.

"I don't have any definite retirement plans, but I will clearly disclose I am giving more and more thought to the question of 'leaving a legacy'. . . . I've been asking a very fundamental question. It's something that does keep me up nights, and that is: 'What kind of laboratory should the nation that is the freest nation of the earth have? And are we that laboratory, or what would it take for us to be the laboratory the nation deserves?' "

Paul: We actually have a researcher [George Bachand, Org. 1141] at the laboratory who has integrated some proteins into micromachines. He showed us an example. He said, "This would be the equivalent of you or I going out, lifting up a large telephone pole and rotating it around our head," but that's what you see under the microscope, these tiny little blobs of protein grabbing long levers and rotating them.

Leaving a legacy

***LN:** We've covered a lot of ground here; we wanted to ask a personal question or two if we may. Paul, a lot of people have asked about your future plans. You've been here a while and we've had great years at the Labs and we hope they continue, but do you have any retirement plans? Is it far down the road?*

Paul: I don't have any definite retirement plans, but I will clearly disclose I am giving more and more thought to the question of "leaving a legacy." Watching Roger Hagengruber, who I first worked for when I came to Sandia and who now is retiring, is like seeing one of the real Titans hanging up his active Sandia career. Now, as you've seen, he's found lots of other interests to occupy him [*Lab News*, March 7], and he also will be leading a program he's put together for us — to be a Sandia Emeritus — to continue to be available to support us, to give advice, and to serve on some reviews for us.

But, I've been asking a very fundamental question. It's something that does keep me up nights, and that is: "What kind of laboratory should the nation that is the freest nation of the earth have? And are we that laboratory, or what would it take for us to be the laboratory the nation deserves?"

So, I'm working maybe harder than ever to try and see if we can put into place and maybe start to write down a more thoughtful version of something Bob Kestenbaum [11000] and I and Bill Wiley, who was the former director at PNNL [Pacific Northwest National Laboratory], put together on the GOCO model — government-owned, contractor-operated laboratories. We wrote it for the Galvin commission in 1992 under duress and with only a few weekends to put it together. I believe one of the problems we've seen over the last decade or so was the number of new people who had no concept of the scope of the GOCO, what it was all about. They came into jobs, particularly in Washington, and applied something they learned in some other part of government or something out of another book, but without understanding what the balance is. So we're trying to capture that, put it down for others to see, "What are some of the secrets of success of a strong laboratory?"

In a talk I gave this week at the APS, I lamented the fact that while Sandia was very much created in the image of Bell Labs, that model is no longer available at Bell. And so we need to capture the essence of what is important to advance science on behalf of the country. We need to make sure we align the science and technology work with the missions and all the basic housekeeping chores to make a strong lab. I would like to get my arms around all that and get it written down so that hopefully none of us will forget these lessons over time.

***LN:** That would be a wonderful contribution. You're right — the GOCO concept isn't well understood at all.*

Paul: We're having a chance right now – it's something I believe is very important, and maybe this is the answer to your NNSA question. There is a major reorganization of the Department of Energy folks who are in NNSA and how they will operate with the laboratories. We now have a new [NNSA] organization called the Sandia Site Office. They will have primary contract responsibility for us — no longer off site in Albuquerque, but here on site. They are also the primary oversight, and we're in strong discussion as to what is the essence of that partnering. What should it be and how can we improve it? That's just what [acting NNSA administrator] Linton Brooks is asking for — a new way of doing business that allows this strength from the GOCO model to come through. So there really is the best opportunity we've had for perpetuating the model of the GOCO so we can keep making our labs even stronger.

Rewards, joys, and inspirations

***LN:** Let me ask you this — I suspect from the way you've answered earlier questions the answer must be yes — but let me ask: Do you enjoy your jobs? I know there must be tremendous burdens and responsibilities, but I get the sense there must be some excellent rewards.*

Joan: Oh, absolutely.

Paul: I had the privilege of receiving the [George E.] Pake Prize [presented by the APS to recognize and encourage achievement in physics and in research-related management, *Lab News*, Oct. 18, 2002] this week — that's where I've been, at the APS meeting. I said that the third part of my life and career, which was coming to Sandia, has in itself been a dream come true. It's been the best part, by far. I told that international audience some of the reasons why. I'll put it [the Pake Prize speech] up on the Web. [It's at: http://www-irn.sandia.gov/org/div1/pake.doc.]

***LN:** And you, Joan?*

Joan: I've been here almost 30 years and have seen the Lab in a lot of different eras — the energy era, the strategic defense initiative era — and at no time more than now have I felt the relevancy and the impact of this laboratory. Just the excitement of talking to people, reading notes from folks about the work they're doing, the opportunities they've had, and the impact that we're having, hearing from our customers. It's the best that it's ever been, in my mind.

In this job, you get to take pride in, applaud, and smile for and with everybody in this lab, and you couldn't ask for more.

Paul: We had a discussion last week about what will be an enduring fact of life in a classified laboratory such as ours — some of the very best work this lab has done in its history has been done recently in compartmented programs and will not likely ever be known. But we can't help but say congratulations and thanks to those people who are doing those projects on behalf of the people of the country, on behalf of the laboratory. We have an access to know about more than anybody else, and it inspires me to see what people have done and are doing. Their rewards have to come through self-satisfaction or Joan and I telling them how much we appreciate what they do.

Joan: Which is a fun job to have!

***LN:** That's a good way to end. Thank you.*

Sandia's relationship with new Department of Homeland Security begins to take shape

Dave Nokes, T.J. Allard describe tri-lab structure to facilitate contact between NNSA labs, DHS

By Bill Murphy

While some of the detail is still being filled in, the broad outlines of Sandia's relationship with the Department of Homeland Security (DHS) are beginning to be clear.

In a presentation last week at the Steve Schiff Auditorium, Sandia Homeland Security lead T.J. Allard described an evolving relationship in which Sandians — and representatives from other NNSA laboratories — are playing key roles in the formation of the new Department.

In opening remarks before T.J.'s presentation, Div. 5000 VP Dave Nokes reaffirmed the widely assumed fact that homeland security-related work "will be an important part of the Labs" for the foreseeable future.

"The eventual organization at Sandia around homeland security is unknown. That depends on a number of variables," Dave said. "The principal variable is how this game with DHS plays out in terms of applying the technologies of the laboratories to problems of the country.

"I believe there is a tension between the folks who want to do something right now and have a 'today' answer, and the people who recognize that the current answers aren't good enough in the long run and we must have a research program, we must have a technology development program to end up in homeland security down the road at a place that makes sense. If that latter group prevails so they understand the need for technology development, then I think we'll have a very major role and I think we'll end up with an organization that reflects that."

Worry about the work first

In the meantime, Dave said, "I think the Labs will be somewhat deliberate in being too organized too soon. Right now, we'll worry more about the work than about the organization. The shape of our organization [in relation to DHS] will emerge over the next weeks and months as the LLT [Labs leadership team] works through the issues."

"To make that model work, all of us have to buy into it. . . . If we can make that work — and I believe we will — it's going to be a wonderful revolution in the relationship among the laboratories."

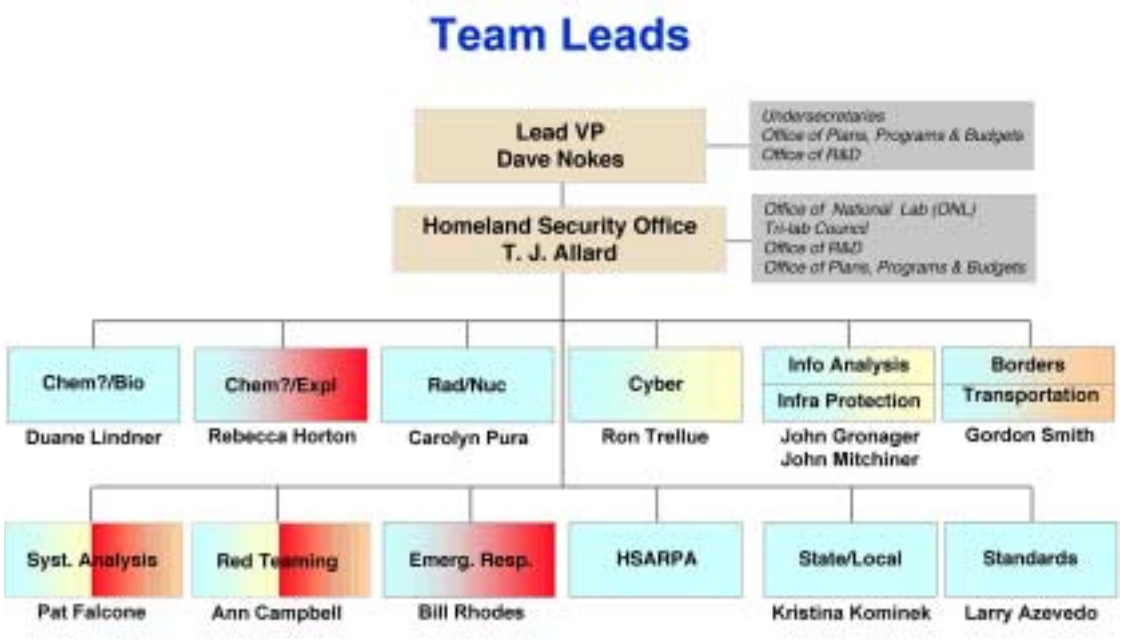
Dave said that while the organizational structure is yet to be fully articulated, one major theme has already emerged and will likely form the framework for the Labs' interactions with DHS.

The three NNSA laboratories — Sandia, Los Alamos, and Lawrence Livermore — have agreed in writing with each other and with DHS that the interaction between the labs and the department will occur through a so-called "tri-lab council."

"We're not going to be out there in a food fight trying to undercut each other, or outsell each other, or trying to position ourselves to trying to one-up the other labs," Dave said. "We are going to work together; we are going to engage our technologies together at a table and then we are going to present a plan to DHS on how to best utilize the three labs against the problems of homeland security.

"To make that model work, all of us have to buy into it. . . . If we can make that work — and I believe we will — it's going to be a wonderful revolution in the relationship among the laboratories."

You can see T.J. Allard's Homeland Security update at your desktop via streaming video. Go to Web FileShare at https://wfsprod01.sandia.gov and type in "allard" in the author box and "3/24/03" in the release date box.



SANDIA TEAM LEADERS have been assigned for interaction with Department of Homeland Security portfolio area managers. In one area, the Homeland Security Advanced Research Projects Agency, patterned on DARPA, a Sandia team lead hasn't yet been assigned. In the chart above, note that there is a question mark indicating that DHS hasn't yet determined whether and to what extent chemical weapons issues will be dealt with as part of a Chem/bio portfolio, a chem/explosives portfolio, or some combination of the two. T.J. Allard, Sandia's Homeland Security Office lead, emphasizes that the Sandia teams are meant to be inclusive — that is, if you feel you can contribute to the success of a particular team in its interactions with the Department of Homeland Security, contact the team leader to offer your services.

T.J., in his remarks, noted that Sandia's senior management has agreed on some foundational principles about homeland security work at the labs:

- Homeland security is a critical mission for the nation.
- Sandia has been and will be fully committed to mission areas critical to homeland security.
- The labs is prepared to support homeland security work as a "core mission."

Nuclear weapons work, the LLT emphasizes, will remain the Labs' primary mission.

The LLT's statement of principles, T.J. said, puts work for DHS on an equal footing with DOE, a position that was confirmed with the recent memorandum of understanding signed between DHS Secretary Tom Ridge and DOE Secretary Spencer Abraham. The secretaries agreed that the resources of the two agencies will be available to tackle new national security challenges of the post-9/11 era.

Five undersecretary-level functions

T.J. briefly described the new organizational structure of DHS. The new department is built around five undersecretary-level functions: management, science and technology, information analysis and infrastructure protection, emergency preparedness and response, and border and transportation security. Several Sandians on temporary assignment in Washington helped define some of the key DHS functions and played especially vital roles in the areas of science and technology and information analysis and infrastructure protection. It is in those two areas, T.J. said, that Sandia and the other NNSA labs will be most involved, at least in the early stages of a still-evolving DHS.

T.J. noted that the National Strategy for Homeland Security (dated July 2002) recognizes that "In the war on terrorism, America's vast science and technology base provides a key advantage. With the Department of Homeland Security as a focal point, the United States will press this advantage through a national research and development enterprise for homeland security similar in emphasis and focus to that which has supported the national security community for more than fifty years."

To tap into the well-established national security R&D capacity, DHS intends to establish a network of laboratories — a virtual laboratory, in fact — built of pieces of existing NNSA and DOE facilities. Although the final configuration of a DHS laboratory system hasn't been determined — some in DHS want to "own" specific individuals at specific labs, while others want individual researchers to be matrixed to DHS on an as-needed basis — it is clear that the weapons labs will contribute significantly to the DHS R&D function.

Tri-lab Council will engage DHS

As DHS began to take shape, T.J. said, officials asked the three NNSA labs, "What's the best way to engage you?" The labs put their heads together and came up with the tri-lab business model. It is built on a tri-lab council. Under this approach, DHS does not engage the laboratories separately, but deals with them through the council.

"DHS would come to us as a group, and we would respond as a group," T.J. said. "We'll operate jointly; there will be no end runs allowed."

The approach, he said, enables the laboratories to focus on solving problems rather than on funding.

"It's a very different model. I think it's the right model for us to go forward with," T.J. said.

Sandia — and each of the other labs — has named team leaders in a variety of R&D areas relevant to homeland security (see graphic above). The leaders, whose teams are drawn from across the labs, will work with their counterparts from the other laboratories, with DHS science and technology portfolio managers, and with the other operational directorates in DHS.

The tri-lab structure is still taking shape, as is the Department of Homeland Security itself. Dave Nokes emphasized that Secretary Abraham and NNSA Administrator Linton Brooks have both given strong support for the labs being a fundamental resource for the DHS. "So I believe that at the end of the day . . . we'll have a very good relationship," Dave said.

"The appetite for Sandians in DHS is insatiable," Dave said. "They need technical people willing to go back and work for a year or two or so, helping them stand up the department. The folks they've gotten from the Labs have been outstanding. If you look at the names of the people who have gone back there, they're among our best. And I would offer to you, if you or colleagues of yours have an interest in a tour back in Washington, please see T.J. or myself, because there is a need and we are happy to send folks back there who can help fill that need."

Recent management promotions

New Mexico

Dorothy Rarick from Manager, CSU Operations and Development Dept. 9623, to Level II Manager, CSU Services Dept. 9620.

Dorothy has worked in computing and information systems organizations since joining Sandia in 1982. Before her promotion to Level II Manager, she served as manager of various functional areas within information systems including applications development and support, systems administration, and database management.


DOROTHY RARICK

She has a BS in mathematics from Lamar University and an MBA in Business Computing Science from Texas A&M.

* * *

Mark Biggs from Senior Administrator to Level II Manager and Deputy Director of Pension Fund/Savings Plan Management Dept. 10520.

Mark joined Sandia in 1989. His career at the Labs has been in retirement and life insurance plan design and management.


MARK BIGGS

He has a BA in anthropology and an MBA in finance, both from the University of New Mexico.

* * *

Nina Chapman from Manager, Program and Financial Management Dept. 7005, to Level II Manager and Deputy Director, Procurement Center 10200.

Nina joined Sandia in 1976, starting in the Controller's organization, and then moving to General Employment, Recruiting, and Benefits. She became personnel representative to the line and, later, an administrative assistant to the Administrative Vice President. Nina followed with assignments in Procurement, Medical, Human Resources, then out to the line again as a HR customer service manager. She next was Administrative Assistant to the Chief Information Officer. Nina was most recently the Program Manager for Integrated Enabling Services before returning to Procurement as Deputy Director.


NINA CHAPMAN

Nina has a BS in business education and an MBA, both from New Mexico State University.

* * *

James Eanes from DMLS, Manufacturing and Production Purchasing Dept. 10252, to Manager, Manufacturing and Production Purchasing Dept. 10252.

James has worked in Sandia's Procurement organization since joining the Labs in 1993.


JAMES EANES

He has a BA in operations management and an MBA in business administration, both from New Mexico State University.

Phil Gonzales from Security Police Officer III, Protective Force Dept. 3114, to Team Lieutenant, Protective Force Dept. 3114.

Phil has worked with Sandia Security's Special Response Team since joining the Labs in 1984.


PHIL GONZALES

He attended the University of New Mexico.

* * *

Julie Kesti from PMLS, Technical Library Services Dept. 9615, to Manager, Technical Library Operations Dept. 9616.

Julie has worked in Sandia's Technical Library since joining the Labs in 1992. Before her promotion, she was a reference librarian and served as the project lead for the library's Imaging Center of Excellence.


JULIE KESTI

Julie has a BA from the University of Minnesota and an MLS from the University of California/Los Angeles (UCLA).

* * *

Bill Mertens from DMTS, Enterprise Database Administration Dept. 9618, to Manager, Enterprise Database Administration Dept. 9618.

Since joining Sandia in 1984, Bill has been involved in information systems, including applications development and support, systems administration, and database management. He has a BS in business management and an MS in computer information systems.


BILL MERTENS

* * *

Brad Mickelsen from PMTS, Advanced and Exploratory Systems Dept. 2131, to Manager, Nuclear Safety Assessment Dept. 12332.

Brad joined Sandia/California in 1987 as a member of the W89 project group.

He worked as a mechanical engineer and lead mechanical engineer. From 1983 to 1998, Brad managed a remote monitoring system development project. In 1998, he assumed project lead responsibilities for Sandia/California's support of the Sea Launched Ballistic Missile Warhead Protection Program.


BRAD MICKELSEN

In 1999, Brad went on a two-year assignment at the Pentagon as Sandia's technical advisor to the Air Force. He transferred to Albuquerque following that assignment and joined the Advanced & Exploratory Systems Dept. 2131, where he assumed responsibilities for strategic planning and heavy penetrator test development.

Brad has a BS and an MS in civil engineering, both from Washington State University.

California

Mary Clare Stoddard from PMTS, Advanced Microsystems Engineering Dept. 8111, to Manager, Technology Applications Dept. 8119.

Mary Clare joined Sandia in 1980. She has conducted and managed advanced engineering development projects in diverse areas including chem/bio defense technology development, demilitarization technology development and demonstration, nuclear weapons gas transfer systems, cryocooler development, and solar energy power generation. Most recently, Mary Clare led a DoD-sponsored µChemLab project for bioagent detection.


MARY CLARE STODDARD

Previously, she managed Sandia's conventional demilitarization technology program. She led the supercritical water oxidation (SCWO) pilot plant project for the U.S. Army at Pine Bluff Arsenal and managed a collection of SCWO engineering development projects with diverse DoD and DOE sponsorship in the early-to-mid 1990s that laid the foundation for pilot plant construction.

Mary Clare has a BS in mechanical engineering from Tuskegee University and an MS in the same field from Purdue University.

Mileposts

New Mexico photos by Michelle Fleming
California photos by Bud Pelletier


Holly Stryker
25 8528


Jim Wang
25 8723


Patrick Torrez
20 9334


Paula Provencio
15 1122


Steven Schafer
15 9813


Duane Sunnarborg
15 8358

Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads

MISCELLANEOUS

GARAGE SALE, Twins Club, 50+ families, April 5, 7:30 a.m.-2 p.m., Montgomery Church of Christ, Montgomery east of Louisiana. Kane, 291-8576.

GOLD-PANNING SLUICE, w/gasoline engine, & hoses, $95. Aragon, 888-3473.

EVAP. COOLER SUPPLIES: 2-spd. 3/4-hp motor, $18; pump, $6; canvas cover, downdraft, 37 x 37 x 45, $8. Maloney, 299-4330.

GENERATORS, 3660W Honda motor, brand new, $575; 3500W Craftsman, $350; 2500W Craftsman, $250. Marquez, 228-4200.

NEW WINDOWS, 3'8" x 6'; small HWHs; 8-in. flex duct; thermal storage rods; hanging fireplace; folding doors, fiberglass wash sink. Talbert, 298-9036.

FUTON, cherry-wood frame, cover has Southwestern design, great condition, $100. Wheeler, 856-5675.

BENCH SWING, forest-green cushion & canopy, white metal frame, $90; electric chainsaw, 3.5-hp, $40. Lucero, 298-1524.

ETHAN ALLEN CHEST, 6 drawers, American Heritage, email for pic, $300. Conrad, 323-1807, edcon98@yahoo.com.

HELMET, Shoei RF900, pearl color, size small, brand new, still in box, paid $300, asking $180. Valencia, 298-9254.

SWING SET, Hedstrom, good condition, $25. Meeks, 828-9825.

APPLIANCES: matching, white, w/chrome, GE electric range, refrigerator & dishwasher, good condition, $425 OBO. McCloskey, 831-5048.

DIRT-BIKE TIRES: knobbies; Dunlop 110/90-19; Bridgestone 80/100-21; Chenshin 110/90-19, sand tire, $20 ea. or $50 all. Hesch, 350-9903.

BASS AMP, Peavey 115 combo, great condition, $350 OBO. Imbert, 294-8176, ask for Chris.

MOVING BOXES, $1 ea.; desk hutch, stand-alone, wood grain, 48" x 11" x 33", $15. Babb, 865-6843.

CAMERA, Pentax K1000, 35mm, zoom lens, accessories included (flash, extended lens, filters, manual etc.), $300. Fitzpatrick, 275-3422.

ENGINE, 360, 4-bbl Holley carb., 5,000 miles new, $700; 15-in. American Eagle racing chrome rims, tires, $100. Bogdan, 332-3179.

DIGITAL CAMERA, Sony, 1.3 MegaPixel, MVC-FD88 Mavica, 1280x960 images, Mpeg movie, internal floppy drive, new condition, $350. Weston, 350-7059.

WELDER, Lincoln SP130T wire feed, 10# spool NR-212-MP innershield wire, 12# spool .035 wire. Hanson, 299-6421.

DOGLOO, 2 large, igloo-style dog-houses, for dogs up to 100-lbs, $50 ea. Sanchez, 299-6283.

WOOD GATES, 2, 56" x 60", need work, you pick up, 2798 Alcazar NE, free. Porter, 884-4577.

MOVING BOXES, enough for 4-bdr. house, wardrobes, dishpacks, large, medium, small, $75. Radloff, 899-5286.

WALL HANGING, or room divider, custom macramé, ~8' x 8', photo at SLFCU, $75. Tate, 298-9512.

BEARDED DRAGONS (2), male & female, includes aquarium w/accessories, $275 OBO. Drebing, 830-0121.

BAUER SKATES, ice & roller hockey, both size 9, $60 ea.; 1-1/2-gal. fish tank kit, $10. Tejani, 292-4169.

XERISCAPE, w/century plants (agaves), homegrown, up to 2-ft. in diameter, $5 to $45. Bando, 856-7330.

REFRIGERATOR, GE side-by-side, water/ice in door, $279; microwave, Sharp Carousel, over range, $85. Straub, 298-9270.

CONTEMPORARY SOFA, excellent condition, $250; coffee table, solid wood , 2 end tables, $75 ea. OBO. Hassan, 822-9544, ask for Basil.

SWIMMING POOL, 15' x 42", used one season, w/complete maintenance kit, $175 OBO. Poulter, 291-0607.

BABY SWING, bouncer, Snugli, lights/sound toy, walker, bath tub, Genie+ refill, pack & play, infant boy clothes. Garcia, 319-1860.

WHEELCHAIR, 3-wheel, Amigo, self-propelled, 2 yrs. old, w/battery charger, $600 OBO. Jones, 237-2753.

BAR STOOLS, 2, 30-in., padded back & seat, neutral beige, oak-trimmed arms & legs, $25 ea. Harris, 271-2216.

CHIPPER/VAC, Troy Bilt, 4-1/2 hp, $300; Echo gas blower, $80; Stihl string trimmer, $80. Gluvna, 884-5251.

COMPUTER MONITORS: 2, 19-in., $90-$115; 17-in., $65; zip drive, $65; zip disks, $5; NICs, $10; more. Cocain, 281-2282.

WATER HEATER, good condition, $75; Nissan king-cab truck rack, $175; 6 wood kitchen chairs, $60. McKillip, 822-1756.

DOUBLE OVEN, Whirlpool, self-cleaning, 27" x 51", white, brand new, $650. Villanueva, 228-4200.

GUITAR AMPS, Crate cr212, $150; GX1200h head, w/Kustom 412 cab, $300; Hybrid custom guitar, $150. Gonzales, 238-0662.

TREADMILL, Image 10.6Q, 4 yrs. new, very heavy-duty, folds up, $400. Sargent, 323-9530.

AQUARIUM, 55-gal., w/stand, pumps, filters, gravel, decorations, everything but the fish, $500 OBO. Wray, 440-9286.

TREADMILL, w/adjustable speed & incline, very good condition, must have transportation to take home. Torres, 352-9342.

INFANT CAR SEAT & STROLLER, Eddie Bauer, w/2 car-seat bases, hunter green/navy/tan, $50. de la Fe, 610-2700.

TRACTOR, '48 Ford 8-N, w/Wagoner front loader, hyd. lift & dump, good rubber, everything works, $5,000 OBO. Shoemaker, 869-2775.

AIR HOCKEY TABLE, brand new, Wilson, 44" x 84", electronic scoring, $350 new, asking $200. Wahlberg, 271-1337, ask for Mark.

TIMESHARE, fully furnished condo, Point Brown, WA, Aug. 3-8, 2003, $500. Hubbard, 291-8463.

FREE DIRT, 200 sq. ft., dug up, in small bags, you haul, Lomas/Juan Tabo area. Rogulich, 298-5261.

FREEZER, scratch & dent special, Frigidaire, 16 cu. ft., upright, runs great, $75. Tilley, 292-3581.

CARPET SHAMPOOER, Hoover Deluxe, $125; 7-ft. bookcase, $60; HealthRider, $60; curio cabinet, $75; stereo system, $175. Lunsford, 299-5187.

"HOOKED ON PHONICS," original reading program, $75 OBO; Bentwood rocker, $550 OBO; corner cabinet; fertilizer spreader, make offer. Mooney, 294-5161.

TILE CUTTER, 7-in.-diameter blade, used twice, $50; few ceramic tiles, new; waffle iron, $20. Anderson, 897-2772.

WEBTV KEYBOARD, remote, all cables, $75 OBO. Lopez, 453-6207.

CARPETING, 90 sq. yds., gray, currently in use, installing new carpet, good condition, come see before removed, make offer. Vandi, 293-1249.

TRANSPORTATION

'95 SATURN SCI, coupe, sunroof, AM/FM/CD, alarm, newer tires, 74K miles. McDuffie, 363-3337 or 888-5458.

'98 TOYOTA TACOMA, Xtra-cab, 4x4, V6, 5-spd., black, CD, all power, towing pkg., nice, 64K miles, $13,999. Snedigar, 332-9238.

How to submit classified ads

DEADLINE: Friday noon before week of publication unless changed by holiday. Submit by one of these methods:

- **E-MAIL: Michelle Fleming (classads@sandia. gov)**
- **FAX: 844-0645**
- **MAIL: MS 0165 (Dept. 12640)**
- **DELIVER: Bldg. 811 Lobby**
- **INTERNAL WEB: On Internal Web homepage, click on News Center, then on Lab News frame, and then on the very top of Lab News homepage "Submit a Classified Ad." If you have questions, call Michelle at 844-4902. Because of space constraints, ads will be printed on a first-come basis.**

Ad rules

1. Limit 18 words, including last name and home phone (We will edit longer ads).
2. Include organization and full name with the ad submission.
3. Submit the ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. **One ad per issue.**
6. We will not run the same ad more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active and retired Sandians and DOE employees.
10. Housing listed for sale is available without regard to race, creed, color, or national origin.
11. Work Wanted ads limited to student-aged children of employees.
12. **We reserve the right not to publish an ad.**

'84 FORD BRONCO, $1,900. Romero, 259-0305.

'98 PONTIAC MONTANA, extended mini-van, V6, 3.4L, power everything, new Michelins, 46K miles, excellent condition, $10,900. Rizor, 296-5588.

'89 FORD F250, 4x4, ext. cab, long bed, XLT Lariat, all options, garage kept, 80K original miles, $7,200. Gutierrez, 239-7059.

'93 OLDSMOBILE CUTLAS, 4-dr., AT, AC, PD, PL, 149K miles, good running condition, $2,500. Baca, 299-4085.

'97 MAZDA MILLENNIA, loaded, sun roof, new tires, clean, 5,900 miles. Nieto, 831-6372 or 540-8265, ask for Pete.

'99 OLDSMOBILE ALERO GX, 4-cyl., fully loaded, leather, gold exterior, rear spoiler, warranty, beautiful, 46K miles, $9,200 OBO. Goodson, 286-1267.

'00 FORD EXPEDITION XLT, 5.4L engine, lots of extras, must see, 49K miles, must sacrifice for pickup, $25,000. Zimmerman, 286-0365.

'79 TRIUMPH SPITFIRE, restoration started, no rust, many new parts, inherited Jaguar, must sell, $1,200 OBO. Hofer, 281-8695.

'02 SATURN SL2, 22K on warranty, 31K miles, like new, $8,500 OBO. Pasco, 890-1434.

'94 JEEP CHEROKEE, 4x4, 2-dr., 5-spd., AM/FM/CD, 132K miles, $4,000 OBO. Garasi, 856-3662.

'99 FORD TAURUS SE, ABS brakes, AT, AC, PS, PW, PL, AM/FM/cassette, red, air bags, excellent condition, 66.5K miles, $6,500. Smit, 296-3327.

'95 CHEVY TAHOE LS, 2-dr., 4x4, tow pkg., Kenwood sound system, LCD screens in headrests, $10,000 OBO. Martinez, 352-6129.

'98 MITSUBISHI ECLIPSE, 5-spd., PL, PW, tint, CD, silver, new tires, excellent condition, $7,000 OBO. Salas, 864-5951.

'99 FORD RANGER, 4WD, V6, 5-spd., ext. cab, AC, mag wheels, 59K miles, great condition, $9,500. Roseth, 856-6964.

'95 FORD MUSTANG, convertible, V6, 5-spd., AC, green, 59K miles, great condition, $7,000. Bacon, 344-8315.

'89 FORD ESCORT, CD, new tires, needs work on motor, $750. Chaves, 341-9595.

'92 LEXUS SC400, gold w/tan leather, 83K miles, runs great, needs nothing. Muxworthy, 280-7828, ask for Tyler.

'00 NISSAN MAXIMA GXE, all power, loaded, AT, sand color, 17K miles, $16,500. Keener, 291-1587, 8 a.m.-8 p.m.

'02 HONDA S2000, convertible, 240-hp, 6-spd., yellow w/black top, 5,200 miles, $31,500. Curtis, 281-8364, http://home.att.net/~jack-nm.

'92 GMC 1/2-TON, 5-spd., long bed, white, 4.3L V6, AC, receiver hitch, new tires, 84K miles, solid work truck, $4,400. Barnes, 281-0500.

'36 BUICK, 4-dr., street rod, chopped, partially complete, $12,000 OBO or trade, call for details. Barr, 281-1858.

'95 HONDA PRELUDE, runs great, $975. Doser, 323-2786.

'72 OLDSMOBILE VISTA CRUISER, station wagon, AC, PS, PB, excellent mechanical condition, 56K miles, $3,995. Surran, 256-7344.

'97 FORD EXPEDITION, Eddie Bauer edition, CD, rear AC, rear PW, auto leveler, maroon, beige leather, 49K miles, excellent condition, $17,000. Coe, 266-6579, ask for Nina.

'01 FORD F150, Supercrew, 4-dr., XLT, CD, tow pkg., bed liner, 50K miles, great condition, $20,500. Babb, 898-4379.

RECREATIONAL

WOMEN'S ROAD BIKE, medium, blue, Raleigh R600; fluid bike trainer, both like new, $600 for both, OBO. McDonald, 268-5005.

'97 WINNEBAGO CLASS A, 25-ft., rear bed, fully loaded, 41K miles, exceptional condition, $28,900 OBO. Payne, 275-0240.

'90 HARLEY-DAVIDSON, soft-tail custom, custom paint, saddle bags, 13K original miles, new battery & tires, $12,500. Turnbull, 842-5130.

'94 JAYCO POP-UP CAMPER, model 1006, Dometic refrigerator, stove, furnace, sink, awning, good condition, $3,100. Striker, 281-7945.

'84 HARLEY-DAVIDSON FXR, Wide-Glide front end, S&S carb., Iron bags, dark purple, great bike, needs new owner, $9,300. Rondelli, 890-5972.

'02 HONDA 919, naked sport bike, excellent midrange power & torque, 4,900 miles, $6,700. Delgado, 797-5209.

BICYCLES: matching his & hers Bianchi Cross, 21-spd., $125 ea. Keck, 237-0392.

DUNE BUGGY, Sandrail, recently restored, $2,500. Vigil, 856-3558.

'96 HONDA VFR750, Micron exhaust, tall windscreen, other extras, very nice sport/touring bike, great condition, $4,100. Smith, 828-3903.

'98 HONDA XR80R, nice condition, $995. Jones, 843-9645.

GIRL'S BIKES: Fisher-Price, 16-in., w/hand brakes, $40; Raleigh, 20-in., w/hand brakes, $50. Renk, 242-1277.

REAL ESTATE

2-BDR. PENTHOUSE CONDO, 2 baths, like new, 2 yrs. old, neutral colors, appliances, NW, $89,900. Gutierrez, 922-7390.

2-BDR. COUNTRY HOME, 1 bath, loft, 1,800 sq. ft., 23 acres, 10 miles south of Datil, phone, electric, solar well, barn, $126,000. Jones, 877-9073 or 243-8604, http://mywebpages.comcast.net/maj666.

IMMACULATE HOME, spectacular views, Tanoan East. Henderson, 299-6083, http://mywebpages.comcast.net/jhenderson78/home.htm.

3-BDR. HOME, 1-3/4 baths, renovated kitchen & bath, hard-wood floors, new tile/carpet, detached garage, 1,100 sq. ft., North Valley, $114,900. Cooley, 897-7404.

'72 MOBILE HOME, 1-1/2 baths, furnished, great condition, $4,000 OBO. Gonzales, 344-4933.

22 ACRES, La Madera, adjacent to San Pedro Creek Estates, great views, borders intermittent stream, $8,000/AC. Clement, 890-0515.

3-BDR. HOME, 2,119 sq. ft., beautiful hot tub room, new windows & carpet, Foothills, MLS# 202903, $179,000. Mitchell, 301-4386.

WANTED

TICKET BUYERS, Moriarty's First Cowboy's Night Out, win prizes, proceeds go to improve Moriarty area. Neill, 281-5688.

'79 SANDIA HIGH SCHOOL YEARBOOK, will pay $50 for good condition book. Archuleta, 822-0002.

SPEAKERS, Altec Lansing, 15-in. or 16-in., any age, working or not, woofers or duplex (coaxial). Kureczko, 286-4426.

USED CAR, for commuting, AT, runs well, reasonable interior, no body or mechanical repairs needed, $2,000-$3,000. Link, 821-7325.

HOUSE, purchase or rent, in Sandia Heights or Glenwood Hills. Chu, 856-8342.

LOST & FOUND

FOUND: 4-1/4-in. black metal PDA pointer, parking lot west of TTC. Moya, 844-7031.

Book drive set

The Office Professional Quality Council and the ABEC Read to Me Program are looking for new and gently used children's books to distribute to disadvantaged pre-schools in the Albuquerque area. OAA's throughout the Labs will have deposit boxes for contributions.

This is the first time the Office Professional Quality Council is partnering with the ABEC Read to Me program to provide preschool age children with books.

For more information, see the teaser on the Sandia internal Web home page.

The Read to Me program encourages families to read to their children at least ten minutes a day. This will help preschoolers when they go to school be able to learn to read and write more readily.

Books are Fun will sponsor a book fair to benefit the National Atomic Museum at the International Programs Building, 10600 Research SE, 9:30 a.m.-3:30 p.m., April 8, 9, and 10.

Says modest Sandian Tan Thai . . .

'Mine is a typical American story'

Yet the challenges he overcame on his way from Vietnam to Sandia were anything but routine

By Iris Aboytes

The "Fall of Saigon," "Sea Pirates," and "Suicide Missions" could be titles of novels. They actually are incidents in the life of Sandian Tan Thai (5902).

With the fall of Saigon to communism, the life Tan enjoyed while growing up in Vietnam changed drastically. His father, a businessman, lost everything. His younger brother, Loc, was drafted by the communists to carry ammunition — no weapons, just ammunition. Tan, a teacher in a middle school, could not see past a bleak future.

Tan says the strength and love of his mother motivated him and his older sister, Mai, to escape Vietnam. "Don't cry," she said, as they left. They were captured on their first attempt but were successful on their next attempt.

"Successful" meant they arrived on Pulau Bidong, a small island off the east coast of Malaysia, after three days and nights at sea. Their journey included being robbed on three separate occasions by Thai sea pirates. The pirates robbed them, threatened their lives, and terrorized them. "Only by God's grace did they let us go," says Tan.

The boat was a typical small, wooden Vietnamese fishing boat. It was packed, overcrowded with 40 or 50 people of all ages. All healthy bodies, including Tan, were jammed into the lower deck. "People vomited all around me. The odor was horrific," says Tan. "My sister and I had some water but no food."

Their arrival in Pulau Bidong was traumatic. But a surprise awaited them. As Tan and Mai sat on the dock, from nowhere appeared Loc. Tan's family had not heard from Loc in a very long time. He also had escaped. Loc told them he had gone to the only dock on the island daily in hopes of seeing family members. That was a joyful day for them.

TAN THAI, as a middle-school student in Vietnam.

There were 6,000 refugees in Pulau Bidong when they arrived. Refugees built their own houses. The house that Tan and Loc built was small, l0' by 8'. The walls were made of plastic sugar bags, and its roof was a blue, thicker piece of plastic. Pieces of trees harvested from the hills in the island formed studs.

Beds were constructed out of tree bark, later "upgraded" with wooden planks. "For a while, we shared our house with three others, girls, friends of my sister. At night the ladies slept on beds, while my brother and I slept on hammocks," says Tan.

They all received food rations supplied by the United Nations High Commission on Refugees. Each ration bag included a small bag of white sugar, artificial orange drink mix, salt, a bag of rice, three cans of sardines, a can of chicken, and three cans of green peas. Food was not a problem, but water was. It had to be brought to the island. However, many of the refugees used water from self-dug wells. Tan's family used water from an underground source off a hill nearby. "My brother and I would each carry two 10-liter water cans on our shoulders, racing down the hill barefooted," says Tan.

The rainy season posed a different hardship. Prolonged rain during the monsoon months created torrents of water that could crush the flimsily constructed houses. "Our stay at Pulau Bidong lasted about six months," Tan says.

TAN THAI, reunited with his mother on his first trip back to Vietnam after becoming a US citizen.

TAN THAI today, at his church in Albuquerque. (Photo by Randy Montoya)

Delegations from different sponsoring nations like the US, Canada, Australia, France, and Germany could come and interview refugees for final settlement. Some had to wait for five or six years if they didn't have relatives or friends in any sponsoring countries.

"We were fortunate. My sister's husband had escaped in 1975 and lived in Dallas, so it took us only half a year of waiting in Bidong," says Tan. However, because of Loc's health problem, Tan and Mai ended up waiting another three months in a transit camp instead of a week or two as they had hoped. As for Loc, it took him another six months to reach the States.

The transit camp offered no privacy. "We [refugees] all slept next to one another in long barracks," says Tan. "The days were long and dull with time waiting in long line for food, water, and toilets."

Once in Texas, they all lived together, but marginal English made their lives lonely and tough. Tan's first English teachers were a dictionary and a copy of the *Reader's Digest*.

Tan worked as a laborer with hopes of going back to college. Not going back was not a choice especially because of the sacrifices made by his family. About a year and a half after arriving in Dallas, he moved to Arkansas to live with his aunt and uncle who offered him a place to live while attending the University of Arkansas.

His mother's love, back in Vietnam, was what gave them strength. "I deeply love and respect my mother," says Tan. "She was a pillar of strength as she wanted the world for her family. Her deep love and quiet demeanor as she insisted we leave was an example for all of us to follow. We know that a little piece of her heart died as we left." His mother died before the paperwork for her to come to the United States was completed.

Working at a gas station one summer while going to college, Tan came across a grieving old man who had lost his wife. The man talked about seeing his wife again and offered Tan a gift, a leaflet containing the Gospel of John. Tan's interest in religion had been almost nonexistent. He took the leaflet home, put it aside but came across it one day. His dad, an atheist, believed once you died that is it. The Gospel of John offered him a different option.

It was at Bible class that he met Lan, his wife. Her brother had become his roommate and she attended the same class they did. They all went to the same church.

Tan's degrees in electrical engineering brought him to Sandia in 1987 by way of AT&T. Today at Sandia, Tan does research and development for computer security applications. He was promoted to DMTS in 2001.

"Tan is absolutely a superb person," says Ricardo Contreras (5936). "He is quite remarkable in how he solves very difficult technical problems as a member of Center 5900. For example, he was on a couple of projects I managed, and he was the energy behind the technical success of each of those projects. Tan, as he goes about his daily business at Sandia, exhibits those rare qualities of modesty and appreciation. His broad smile and twinkle in his eye broadcast loud and clear how proud he is of being a citizen of the United States of America."

His director, Patricia Gingrich (5900), says, "It is an honor to work with Tan. He is creative, technically brilliant, and leads a very dedicated team. His team respect and admire each other. It works like magic."

Today, Tan's life is full. "I don't want to be a busy person, I want to be a useful person," says Tan. He and his wife Lan, a Vietnamese interpreter at UNM, have three children, Hannah, Nathan, and Stephen. Tan also serves as a biovocational pastor at a Vietnamese church. His nights and most of the weekend are filled with church work and family activities. Recently Tan has joined many of his colleagues at work to build a radio-controlled sailplane for fun.

Loc works for Boeing. Mai works for an electronics firm. They both live in Texas.

Tan became a US citizen in 1986 in Arkansas. "Much is given," says Tan. "Much is required. It has certainly been a privilege and an honor to be a naturalized citizen." Although he is glad that his children did not have to experience his quest for freedom, "I do hope, however, that they value what they have in this country," says Tan.

"To me, mine is a typical American story," says Tan. "It is a story my mother would embrace with humility."