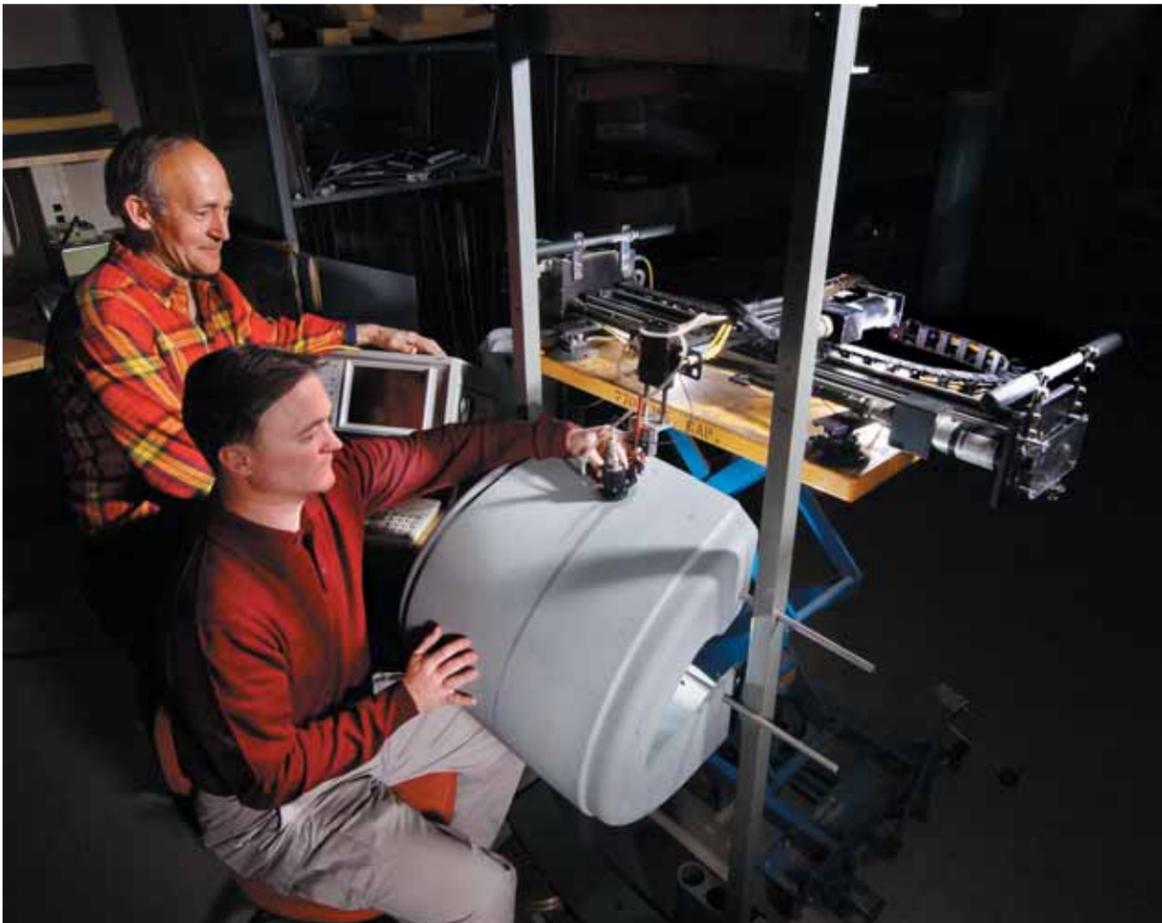


Labs' tools to help NASA get shuttles space-bound again

Aging-aircraft team develops system to find microscopic and subsurface defects in orbiter wings

By John German



SHUTTLE WING INSPECTION — Phil Walkington (left) and Dennis Roach use an ultrasonic scanner to find defects in a portion of a wing leading edge salvaged from the shuttle *Discovery*. (Photo by Randy Montoya)

The multicolored printouts Dennis Roach (6252) rips off an extra-wide printer in his lab could be some sort of abstract art. Soft blues and greens cover most of the page, but in several areas there are spots of red surrounded by rings of orange and yellow.

To the people at NASA responsible for resurrecting the space shuttle program from last January's *Columbia* tragedy, the images are a sight for sore eyes — laboratory science applied to one of the space agency's most pressing problems: how to certify that key orbiter components are spaceworthy before allowing the remainin shuttles to fly again.

Last month, NASA funded Sandia to develop nondestructive inspection hardware, techniques, and standards that will lead to a scientifically rigorous shuttle certification process. The process would be applied prior to the shuttle program's return-to-flight mission and before each successive mission after that.

"This could be a defect, perhaps a degradation of the wing composite resulting from an impact or abrasion of the coating," says Dennis, pointing to one of the red spots.

Phil Walkington (6252) locates the corresponding spot on a shuttle wing section sitting on a nearby table, a part salvaged from the shuttle *Discovery*.

"It tells us that we need to look more closely for other evidence of a defect, either on the surface or inside the composite material," Phil says.

(Continued on page 4)

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C. Paul Robinson Awards
New award recognizes excellence in regional procurement practices. See page 9.

Test Capabilities Revitalization project to modernize Sandia weapon test complex

By Will Keener

They call it "TCR" for Test Capabilities Revitalization. Second only in construction scope to the giant Microsystems and Engineering Sciences Applications (MESA) project, it is a \$110-million push toward Sandia's future as a world-class engineering laboratory. TCR will eventually reach from the Lurance Canyon Test Area to Area 3 to Area 1 and will bring the Labs' large-scale testing and associated science capabilities into the 21st century, its planners say.

The project, which broke ground last month and will continue through 2009, sets the stage for continuing Sandia leadership in stockpile stewardship, new weapon design, and cutting-edge science for the Labs' modeling and simulation strategy.

"Engineering science is a balance between modeling and simulation work and having tests to confirm your predictions and develop an understanding of the processes," said Tom Hunter, Senior VP for Defense Programs (9000) at the groundbreaking ceremony in mid-February. "This enables us to move forward and demonstrate what engineering will be like in the future."

(Continued on page 5)

More TCR inside . . .

- Test capabilities: Looking toward future 5
- TCR: Unique facilities, unique challenges 6
- Clean air high on TCR priority list 6
- TCR Phase 2 to begin next year 7



ARCHITECTURAL VIEW of new Thermal Test Complex — one of two projects in Phase 1 of the Test Capabilities Revitalization. Looking toward the southeast, it shows the extensive ductwork leading to the electrostatic precipitation system and stack at the western (right) edge of the complex. Air quality concerns have been a major part of the design process. See sidebar on page 6 for details.

<p>Bob Eagan to retire as Div. 6000 VP; Les Shephard will replace him</p>	<p>2</p>		<p>8</p>	<p>Behavioral science can help in goal of making workplace safer</p>
<p>T.Y. Chu, Tony Chen among Asian American Engineers of the Year</p>	<p>3</p>		<p>12</p>	<p>Trail of Painted Ponies ends with gift too precious for words</p>

What's what

A Sandian who is the battalion executive officer of a National Guard unit that was called up shortly after he reported to work last fall keeps his colleagues up on his activities in Iraq with e-mail and photos.

One of his most recent communiqués showed just what a small world it is, after all: His unit provided security and escort service for a group of Sandians in Iraq as technical advisors.

Wish we could tell you who they are, but for security and privacy reasons, we don't identify Sandians serving temporarily away from home and lab.

* * *

If you turned directly to page 2 to read What's what (OK, OK. . . but some people do!), be sure to turn back to the front page when you finish here, and start reading Will Keener's fine feature about Sandia's Test Capabilities Revitalization (TCR) project. It's fascinating.

TCR is a \$110 million, five-year project nearly rivaling the Microsystems and Engineering Sciences Applications (MESA) project in construction scope. Senior VP Tom Hunter (9000) says it will allow Sandia to "demonstrate what engineering will be like in the future."

Along with several sidebars and images, the story offers a detailed look at extraordinary facilities that will help define Sandia's future.

* * *

Labs Director Paul Robinson sat down recently with the Publisher/Editor of the New Mexico publication *Prime Time* - "The monthly for New Mexicans 50 Plus." When a copy of that issue showed up, several of us were looking it over and one of our irreverent number ticked off the first few headlines: "Medicare Card Fraud Alert," "Meeting the Challenges of Incontinence: 'Loss of Bladder Control,'" "Compare Nursing Homes First," and "Replace Those Grouchy Knees."

"Does anyone, especially people who are actually over 50 [as he is]," he blurted, "really believe this is 'prime time?'"

* * *

Spelling is not easy. Especially spelling in English. And most especially, spelling in English in an area with a long tradition of Spanish.

Transacting a little business by phone recently, a Sandian said, "That's Sandia National Laboratories."

"Is that S-a-n-d-i-a-l-l-a?" a perky woman spelled back, politely.

* * *

Ever wonder if you're a geek? Or if a friend is?

Vetters, Resident GeekMaster (self-proclaimed), has prepared a 507-question quiz that might settle the question for you. Or not.

A quick scan convinced me that I'm probably not geek material, so I didn't bother to start checking boxes. I don't wear Spock ears or vampire teeth or suspenders; I have never fixed anything; don't even know what "1337 sp33k" *is*, much less know it; and suspect that I wouldn't want to admit that I play "Call of Cthulhu" (what is *that*, anyway?) even if I did.

So there you are; I'm disqualified. But if you're interested, check it out at www.innergeek.us/geek.html.

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

Les Shephard named VP 6000, succeeding Bob Eagan

Les Shephard is the new Vice President of Energy, Information, and Infrastructure Surety Division 6000, replacing Bob Eagan, who is retiring after 33 years at Sandia.

Labs President and Director C. Paul Robinson and Executive VP Joan Woodard jointly announced Bob's retirement earlier this month



LES SHEPHARD

and the appointment of Les Shephard to succeed Bob effective March 15.

Bob, who will be officially retiring in July, has led Division 6000 since 1999 and served as head of the Energy and Infrastructure Assurance (E&IA) Strategic Management Unit (SMU). Previously he was VP for Science Technology and Components and was responsible for R&D in materials, microelectronics, and manufacturing technology.

"Bob has been a key part of the leadership of the Labs in material science, microelectronics, overall science and technology, and recently in energy and infrastructure assurance," Joan and Paul said in their March 3 announcement.



BOB EAGAN

"I know that all of you join me in saying that we will miss Bob and have thoroughly enjoyed working with him for all these years."

Bob retires with numerous honors. He is the past president of the Federation of Materials Societies and the American Ceramic Society, and he serves on engineering advisory boards for the University of Illinois and the University of Arizona. He is a Distinguished Life Member of the American Ceramic Society.

"Working at Sandia, from day one 33 years ago, has been more exciting and challenging than I could have ever imagined," Bob says. "The satisfaction of working on programs that are important to the country has been compounded by the joy of working with incredibly talented and caring people."

Les has been at Sandia for 23 years. He most recently served as director of Stockpile Resource Center 2900. Joan and Paul say that Les "brings a wealth of experience and knowledge" to the vice president position.

His Sandia experience includes nearly 18 years in the nuclear waste disposal area, working on both Yucca Mountain and WIPP. He has also served as director of both the Nuclear Waste Management Programs and Geosciences Center, Executive Staff Director. He also has experience in private industry.

He has a BS in geology from the State University of New York and a master's degree and PhD in geological/geophysical oceanography from Texas A&M.

As head of the \$210 million Energy and Infrastructure Assurance SMU, his new responsibilities include fossil, renewable, and nuclear energy; geosciences; nuclear power safety and repositories; information technology programs in information surety; and programs responsible for safety and security of commercial aviation and infrastructure protection.

"Bob has done an outstanding job developing a set of cross-cutting integrated strategies for the E&IA SMU that will have significant impact over the next few years and leave quite a legacy," Les says. "It is great to return to 6000 where I have always found the work to be exciting, diverse, and important; work that relies heavily on bringing together the very best engineering and science the Laboratory has to offer to solve problems of increasing global significance and national consequence. I have very fond memories of the people in 6000 who are creative, dedicated, and 'fun-loving.' I really look forward to renewing old relationships and creating new ones within the division."

— Chris Burroughs

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Employee death

Steven Burchett of 9126 died March 5 after a brief illness.

He was 59 years old.

Steven was a distinguished member of the technical staff and had been at Sandia for 36 years.

He is survived by his wife Sue, daughter Sherri Weinmaster, and son Spencer Burchett.



STEVEN BURCHETT

Sympathy

To Tracy Peña (9527) on the death of her father, Edward Joseph Flynn, Jr., in Gulfport, Miss., Jan. 28.

Retiree deaths

Ralph H. Richards (age 81) Jan. 5
 Donald Q. Matejka (81) Jan. 12
 Joseph F. Dalporto (75) Jan. 22
 Gene W. Abbot (85) Feb. 2
 K. G. Foster (82) Feb. 2
 Francis L. Shea (88) Feb. 3
 Albert F. Miller (90) Feb. 6
 John H. Barnum (77) Feb. 7
 Billy D. Neil (76) Feb. 7



Sandians T.Y. Chu and Tony Chen named Asian American Engineers of the Year

By Nancy Garcia

"*Xie xie*" (thank you), T.Y. Chu (9100) concluded as he accepted an Asian American Engineer of the Year award at an event hosted by the Chinese Institute of Engineers/USA (CIE/USA) at the end of National Engineers Week.

He and Tony Chen (8763) were among 14 awardees this year and shared the unusual distinction of representing the same institution. Both Sandians were acknowledged, said Tony's director, Jill Hruby (8700), due to the strength of their applications.

Labs President C. Paul Robinson attended the Santa Clara, Calif., event to introduce both Sandia winners. He pointed to T.Y.'s international recog-



ASIAN AMERICAN Engineers of the Year T.Y. Chu, left, and Tony Chen, right, with Sandia Labs Director C. Paul Robinson. The two Sandians were among 14 engineers honored this year. During the awards banquet in Santa Clara, Calif., Paul described the Sandia engineers as "two folks trying to create a new world."

"[I am] honored and humbled to be in the company of giants in our profession."

T.Y. Chu

Sandia "provides a stable environment to grow and mature."

Tony Chen

nition for nuclear reactor safety research during his 27-year career, and said both winners are "two folks trying to create a new world."

Tony, a fellow of the American Society of Mechanical Engineers (ASME), has worked 25 years at Sandia, the last seven at the California site, where he manages Science-Based Materials Modeling Dept. 8763. An expert in fracture mechanics, he had taught at his alma mater, Lehigh University, and transitioned to Sandia to do something practical, he said. Here he built a national reputation for his department, hiring 14 students in the last five years, joining a new nano- and biosciences section, and applying his expertise to problems as broad as rock fracture in the Yucca Mountain high-level nuclear waste repository, oil shale blasting, and aerospace materials.

A senior scientist at Sandia and also an ASME fellow, T.Y. currently serves as adviser for the director of the Office of Stockpile Assessments and Certification at the National Nuclear Security Administration in Washington D.C., where his wife Margaret, Sandia's former director of Nuclear

Sandia California News

Waste Management, directs DOE's Office of Civilian Radioactive Waste Management. His doctoral research on turbulent thermal convection has become a classic reference. His work has spanned electronics packaging and manufacturing, nuclear reactor safety, geothermal, and, most recently, science-based nuclear weapon stewardship. He has made key contributions in the validation of computational tools and their integration with testing and experiments for weapon assessment and qualification.

T.Y. called himself "honored and humbled to be in the company of giants in our profession."

Both he and Tony thanked their management for fostering their success. Sandia, Tony said, "provides a stable environment to grow and mature."

The award is based largely on achievement and impact, but also on service. Both researchers have been active in local affiliates of CIE/USA (Tony was founding president of the New Mexico chapter, and T.Y. is a past president) and Sandia outreach groups. Tony still takes a professorial interest in his staff, having lunch with them almost daily and helping newer members acclimate to the culture as well as guiding technical work.

Feedback

Doesn't at-home license agreement put Microsoft in 'rather unique position'?

Q: Sandia e-mail addresses for various employees are posted on a public web site, but their home addresses, etc., are not. Given the Microsoft at-home software agreement recently announced, this puts Microsoft in a rather unique position of having veri-

fied employment at the Labs and having employees' home addresses, phone numbers, home e-mail addresses, credit card numbers, and the fact that they use MS Office at home. Maybe for one or two individuals, this would be no big deal. However, this is bound to be a pretty popular program, so Microsoft's list is probably a long one and it is not directly under Sandia's control. Unless some special arrangements have been made with Microsoft, it strikes me that this might be an issue if their list were to fall in the wrong hands. This agreement is already announced and ongoing, so it is probably too late to do much about it; nor is terminating it likely to be very popular.

A: The Microsoft Home Use Program Privacy Statement provides protection to the information. Microsoft may disclose information for the limited purposes described in the Statement, which include:

a) Limited disclosure to Sandia as necessary

and appropriate to make sure there is compliance with the home use program requirements.

b) Limited disclosure to other companies hired by Microsoft to provide services such as customer support.

c) If required by law.

Personal information may not otherwise be shared outside of Microsoft and its subsidiaries and affiliates without permission. The security measures that are used to protect the information are also described in the statement.

The terms and conditions of the home use program are located at http://oms.one.microsoft.com/tc/cr_information/huptc.htm

The Privacy Statement, which is also hot-linked from the terms and conditions, is at: http://oms.one.microsoft.com/tc/cr_information/HUPPriv.htm.

— Charles Pechewlys (11200), Attorney



Take Note

Retiring and not seen in Lab News pictures: Bill Talley (4131), 39 years.

Congratulations

To Joe and Roxanne (14186) Trujillo-Shiplett, a daughter, Jaelyn Alexis, Jan. 22.

NASA

(Continued from page 1)

Echoes of vibrations

The 2-D images are created using data from an ultrasonic scanner. The scanner uses beams of high-frequency sound waves to detect surface and subsurface flaws as the sound waves travel through the material and are reflected at interfaces and flaws in the orbiter's wings. The wings are made of quarter-inch-thick reinforced carbon-carbon material with a thin silicon-carbide coating.

The wings' leading edges are important flight safety features because they must survive the incredibly harsh environment of atmospheric reentry, during which leading-edge temperatures can reach 3,000 degrees F.

NASA scientists now believe, with Sandia's help (*Lab News*, Sept. 5, 2003), that a piece of foam insulation from the shuttle's external fuel tank fell off during launch and damaged the underside of *Columbia's* right wing, which caused the wing's internal structure to overheat, melt, and disintegrate during reentry.

Certifying for reentry

The Sandia team's work began last May when NASA's Shuttle Safety Advisory Board asked DOE and NASA labs to investigate and propose ways to improve nondestructive inspection (NDI) methods for certifying the flightworthiness of orbiter wing leading edges.

NASA's goal was to obtain a turnkey inspection system that could be used in a Kennedy Space Center hangar to certify the safety of shuttle wings prior to NASA's first return-to-flight mission, now scheduled for spring 2005. The NDI device had to be deployed without removing the leading-edge panels from the wing. It also needed to be quickly deployable following each successive orbiter mission.

Previously, orbiter wings were inspected between missions by technicians looking at the

wings carefully and perhaps running their fingers over their surfaces to feel for anomalies, says Dennis. Following the *Columbia* accident, NASA wanted a more rigorous inspection and certification process, one backed by hard scientific documentation.

Combination of techniques

The agency envisioned a combination of nondestructive inspection methods — including ultrasonics, eddy current, thermography, and radiography techniques — that together would lead to flight certification.

Impact damage, microcracks in the exterior coating, oxidation in the carbon-carbon layer, subsurface gaps between layers, and adhesive dis-bonds all need to be discovered and corrected prior to launch, Dennis says.

In addition, the advancing age of the two-decade-old orbiters gives rise to a need for more advanced monitoring techniques, he says.

"Orbiters are similar to aging commercial airliners in that way," he says. "This is an area where we think we can help NASA."

Sandia's Airworthiness Assurance Center (AANC), funded by the FAA, develops and evaluates NDI techniques as part of its work to improve methods for certifying aging commercial airliners for continued service.

The center, managed by Airworthiness Assurance Dept. 6252, was established in 1991 as an extension of Sandia's nondestructive testing (NDT) capabilities. Advanced Diagnostics and Testing Dept. 9122 continues to provide NDT support to Sandia projects and various external customers.

Looking for the same thing

In seven short months the Sandia team selected and assembled hardware and designed and tested a tripod mount for the ultrasonic scanner that could reach all surfaces of a shuttle wing.

NASA selected Sandia in December to lead the development of the ultrasonic inspection system and funded the project in February. NASA Langley is leading development of the eddy current and thermography systems, and NASA Marshall is leading the development of the radiography

system, with Sandia as a team member.

Kyle Thompson (9122) heads Sandia's work to support NASA Marshall's development of radiographic (X-ray) techniques to find flaws.

"My role has been to investigate the current radiographic technologies and determine what's the best technique to use, and also determine if it's feasible to do an on-wing inspection and what kind of trade-offs you have to make," he says.

Dennis describes the different technical approaches as complementary. Ultrasonics, for instance, has the advantage of deeper penetration into materials, whereas other techniques might find surface cracks with more fidelity.

"For the most part, we're all looking for the same thing," he says. "One method might find something and the others would be used to support those findings."

Return to flight

The Sandia team initially evaluated and refined their inspection methods and hardware using carbon-composite samples with known defects created by the Sandia team. Later, as part of the selection process, a NASA engineer hand-carried orbiter wing samples to all the labs involved in the project and asked that each lab try to find defects known only to NASA scientists.

"Our ultrasonic scanning method performed very well," says Phil.

The Sandia team now is developing the revised inspection and certification protocols and standards that can be readily integrated into NASA's Shuttle Orbiter Processing Facility at Kennedy Space Center for routine inspections after each orbiter flight.

"We are hopeful that by this fall NASA will be using Sandia's tools and approaches to safely and reliably certify an orbiter for NASA's first return-to-flight mission and for each successive orbiter reentry exposure after that," says Dennis.

Team members include Phil, Dennis, Kyle, Kirk Rackow (6252), Dick Perry (6252 Manager), Michael Hassard (9122), Steve Younghouse (9122), Mark Garrett (9122 Manager), and Jose Hernandez (NASA).

Employee survey shows Sandians mostly positive about jobs, Labs

Overall, Sandians are engaged in their work and have a renewed emphasis on the Labs mission.

Those are the findings of the 2003 Employee Preference Survey that nearly 3,000 Sandians completed last year. All other Lockheed Martin entities took the same survey. Key metrics and findings from the 2003 survey are benchmarked to five other similar companies around the country.

The survey results are similar to the employee preferences survey taken in 2001 that asked the same questions. Thirty-five percent of the employees responded to the 2003 survey, down from 45 percent in 2001.

"The results from the June 2003 survey are more positive than those from May 2001," says Ed Saucier, Manager of HR Information Systems Dept. 3551. "We are seeing a very strong intention by Labs employees to remain at Sandia for the next year and a moderately strong commitment to stay for the long term. Employees felt strongly engaged with their work."

He adds that Sandians also perceive "a stronger opportunity for themselves in the external job market in 2003 than they did in 2001." (This is contrary to the benchmark group.) The combination of high engagement and high perceived market opportunity coupled with the strong intention to remain at Sandia is good news because it indicates that Sandians enjoy their work and stay because they want to.

Sandia employees felt that their immediate manager improved over the last two years in every one of the 10 dimensions of management. The 10 dimensions are: personality, empowerment, work-life balance, fairness, knowledge and expertise, recognition, organization, feedback, development, and leadership.

"We can be fairly confident in the survey results," Ed says. "The employee retention, engagement, and manager quality indices all show positive shifts in the mean level from 2001 to 2003 that are statistically significant at almost any confidence level. We have a 98 percent confidence that there was an increase in employees' perceived opportunity to find jobs in the external job market. These comparisons assume that the returned surveys are a random sample from the population at large."

The Labs Leadership Team was briefed on the survey results on Feb. 2. Don Blanton, VP of Human Resources and Protection Services, Division 3000, says that in summary the results look good for Sandia in all major indices.

"Although the results were positive, it does not mean we should say we made it," Don says. "It means that we are on the right course and should continue to improve and look for ways to make Sandia an 'Employer of Choice.'"

— Chris Burroughs

Mars rock named for Sandia Mountains



SANDIA ON MARS — Mars Exploration Rover Spirit's panoramic camera captured this image on the 53rd Martian day, or sol, of its mission. The large, shadowed rock in the foreground is nicknamed "Sandia" for a mountain range in New Mexico. It is about a foot high and 4.5 feet long. Scientists think the rock is one of many pieces of ejecta, stuff kicked out long ago by a meteor impact that created the nearby Bonneville crater, to which Spirit is headed. Sandia is probably basaltic rock, say scientists. The vertical lines on the side of the rock facing the camera are known by geologists as "flow banding" and typically run horizontally. So Sandia is thought to be on its side. Many smaller rocks can be seen in the background of the image. Some rocks are completely exposed, while others are only peeking out of the surface.

(Photo and caption text: NASA/JPL/Cornell)

TCR project

(Continued from page 1)

"Sandia's modeling and simulation strategy demands test and experimental data across a spectrum from the subscale to full-scale systems," said Tom Bickel, Director of Engineering Sciences (9100). "The TCR investment — moving from test-based understanding of our systems to greater reliance on validated numerical models — represents a paradigm shift," says Tom. "The combination of computer simulation and full-scale testing is what makes engineering exciting." (See story at right.)

Two-phase project

Phase 1 of TCR involves revitalization of the Aerial Cable Facility in Sol Se Mete Canyon and construction of a new Thermal Test Complex in Area 3. Work is under way at both sites with total construction costs estimated at \$36.45 million. TCR Phase 2 will move into design next year, with an estimated \$55.6 million in construction costs through the project's end.

Facilities to be addressed in Phase 2 include the Labs' 29-foot and 35-foot centrifuges, the 10,000-foot sled track, mechanical shock facility, vibration and acoustics testing facility, and a central service support facility, all in Area 3. In addition a proposed 67,000-square-foot Experimental Sciences Complex would be constructed in Area 1. (For more information, see "TCR Phase 2 . . ." on page 7.)

Phase 1 plans call for a complete renovation of the aerial cable site to increase capabilities for pull-down tests (using rocket motors), gravity drop tests, and simulated flight along a cable, says Mike Valley, project manager for Sandia's test organization and staff member in Mechanical Environments Dept. 9134. Four new cable systems will be installed, with new anchors, pulleys, sheaves, control winches, and a rocket sled catch box.

Down the hill from the cable site, a new 5,000-square-foot building will house a control room with capability to observe six camera stations at the site, plus storage and assembly areas. The building (Bldg. 9838) will be linked by dual laser communication systems with the test organization's newly revamped Validation and Qualification Sciences Experimental Complex (Bldg. 6584) in Area 3.

"Inherent in what we are doing is the creation of an infrastructure to support our new instrumentation and data demands," says Steve Heffelfinger, Manager of Mechanical Environments Dept. 9134. "We are working to achieve a higher design philosophy. If you drop something and it doesn't break, that's one thing. But understanding why it responded using a lot of advanced diagnostic tools and having the infrastructure to support them is another."

Construction of this \$8 million project has been awarded to Summit Construction Inc., an Albuquerque-based general contractor. The new control building, cable improvements, and infrastructure upgrades will be done by the end of the year.

"Safety, security, and data acquisition and control will all be improved in the new design," says Mike. "The improved quality of the data enhances confidence in the tests. It makes for a win-win situation for the test organization and its customers."

Thermal Test Complex

The other major thrust in Phase 1 will be a new Thermal Test Complex, designed to help support Sandia's ongoing fire science research. The project will replace Area 3's Radiant Heat Facility (Bldg. 636, which will be demolished) and some functions at the remote Lurance Canyon Burn Site.

An essential consideration in planning the Thermal Test Complex was protection of the environment, while assuring that Sandia could continue to support its nuclear weapons mission. (See "Clean Air" on next page.)

"The primary mission driver is to be able to understand fire environments for weapons qualification," says Lou Gritzo, Manager of Fire Science and Technology Dept. 9132. "We write some of the most sophisticated computer models in the world and we need to validate those models with high-quality data. We can get the scientific investigation data to provide the knowledge we need, which is called discovery data, and get data to validate computational

(Continued on page 7)

Test capabilities: Looking toward future

To make the Test Capabilities Revitalization (TCR) project work, planners looked to the future, not the past. "It wouldn't be enough merely to restore our test capabilities to the way they were in the 1980s," says Jaime Moya, Manager of Validation and Qualification Sciences Group 9130. "Our philosophy is to focus on our new missions."

Sandia's Cold War test equipment is now 50 years old in some cases. In shifting emphasis away from large-scale testing in the early 1990s, decision-makers knew that some of the test equipment would necessarily fall into disuse. (The last full-scale weapons development activities at Sandia were completed in 1989.)

"There was a change in the culture and funding structure for Sandia's experimental capabilities," says Jaime. "We went through a decade of decline . . . it was a difficult 10 years." The period saw little investment in infrastructure or staff until Sandia's Nuclear Weapons Strategic Management Unit realized capabilities had slipped below an acceptable threshold.

A white paper in 2000 outlined problems for the leadership, leading to a decision to proceed with TCR.

Jaime cites support from a variety of sources for making TCR a reality, including Tom Hunter, Senior VP for Defense Programs

(9000), Tom Bickel, Director of Engineering Sciences (9100), and Kathleen McCaughey, now Director for the Neutron Generator Production Center 14400. "Kathleen and Paul Hommert (formerly 9100) had a lot of foresight back in the time when we merged test and computational activities into one center. Kathleen, Paul, and Tom have always been advocates for us. They had a vision of what we could do and set us on a vector for success. Sometimes that took a lot of leadership courage."

Time of transformation

New demands on Sandia's test facilities — from the microscopic scale to the scale of a complete weapon system — require planners to create spaces and tools needed for future generations of testing and development activities. This means designing new kinds of laboratories for bench-scale work and new, building-sized experimental equipment for understanding problems at full-scale.

"Revitalization is exactly the right word," says Jaime. "We are looking forward to meeting the needs of this very dynamic mission environment."

The revitalization project is coming at a time when "a major transformation in the stockpile is in progress," notes Tom Hunter. "TCR will allow us to test in environments we haven't been able to test in the past," he says. Life extension programs, including W76 Mod 1, W80 Mod 3, and B61 Alt 357, will require development and qualification testing at the new facilities.

"TCR is an important investment in meeting the mission of the stockpile stewardship program," says Dr. Kevin Greenaugh, Director of the National Nuclear Security Administration's Office of Stockpile Assessments and Certification. "Modern testing and experiments enabled by TCR, integrated with advance computing supported by computers like Red Storm now under development at Sandia, will inject vigor into the engineering sciences capabilities of Sandia and give new life to the stockpile."

(Seattle-based supercomputer manufacturer Cray is teaming with Sandia on Red Storm, which is expected to be up and running this year at a beginning peak speed of 40 trillion calculations per second.)

Invisible infrastructure

To achieve that integration between testing and computer simulation, the largely invisible testing infrastructure must be significantly upgraded, says Steve Heffelfinger, Manager of Mechanical Environments Dept. 9134.

"The character of the work has changed substantially over the past 10 years as we moved from a trial-and-error approach toward a simulation-based design," says Steve, who helped to write the pivotal 2000 white paper. "The character of the experiments is different, the character of the instrumentation is different, and the quantity and quality of the data is different. We need a new infrastructure to support these different demands."

One example is photometric data. "Historically, photometrics has been the key data element. Now to couple those images to advanced modeling, we need more quantitative data," explains Mike Valley, co-project manager (9134). "With faster computers and digital cameras we are taking advantage of precision data that was unimaginable a few years ago."

Fiber optic transmission lines, in parallel with traditional copper lines, will provide much higher data densities than in the past.

Another example is power requirements. "If you want to use advanced diagnostic tools you must have reliable clean power," says Jaime. In the case of the aerial cable site, power is being routed to sites where generators were used in the past. "This will make the quality of the data much more robust," says Jaime.

TCR planners have also looked to the future with: upgrades in security features to support classified information; resolution of safety and environmental compliance issues; and consolidation of capabilities that were spread across the site in the past.

— Will Keener



DR. KEVIN GREENAUGH, Director of the National Nuclear Security Administration's Office of Stockpile Assessments and Certification, and Sandia Senior VP Tom Hunter (9000) discuss the merits of the new Thermal Test Complex during groundbreaking ceremonies. (Photo by Bill Doty)



CHECKING BLUEPRINTS — Scott Rowland (10824) assesses progress at Sandia's Aerial Cable Site. The site is one of two key projects in the Labs' Test Capabilities Revitalization effort. Cable site upgrade plans call for replacement of anchors, pulleys, sheaves, control winches, and a new rocket sled catch box. (Photo by Randy Montoya)

Test Capabilities Revitalization: Unique facilities, unique challenges

There is a common thought among the team members working on TCR. "This is exciting work," they say. "There's a lot of pride of ownership in our facilities and our capabilities and we are eager to engage in support of all our missions," says Jaime Moya, Manager of Sandia's Validation and Qualification Group 9130.

"It's exciting to be developing new capabilities for new science," says Mike Valley, TCR project manager for the test organization (9134). But it's also tough work for the entire team, he and his counterpart Paul Schlavin concede. Paul is the facilities project manager for TCR and a staff member in the Labs' Corporate Projects Dept. 10824.

Paul estimates that up to 150 people have been involved in the planning and execution of TCR to date.

"This is clearly not a typical office or light lab project," says Paul. Although every project has its unique aspects, TCR is essentially about "creating process equipment on a building scale. We're talking about 20-megawatt fires in a seven-story oven," Paul says, referring to the new FLAME Test Cell. Other parts of the project push the limits in mechanical, radiant heat, environmental protection, and blast technology.

The two project managers teamed with Bob Paulsen, Manager of New Mexico Stockpile Issues and Planning Dept. 2134, to determine what kinds of testing are needed and what facilities can provide them. "I bring the high-level requirements from the weapons community and I also help set priorities on what needs to be completed when," says Bob.

"Historically, we've had to depend on burn facilities in the Canyon Area for full-scale thermal testing," says Bob. "We were concerned that in the future, environmental restrictions might not allow that. We started by looking at the modification of an existing igloo in the Canyon Area, but Paul and Mike suggested we move some capabilities together indoors into Area 3. When we looked at the budget, it seemed possible.

"The Thermal Test Complex will allow us to test a full-scale weapon, minus the nuclear materials, indoors with a very controlled fire. With tests to validate the modeling, engineers will be able to computationally adjust conditions of the fire and orientations of the weapon and begin to under-



READY TO DIG — Visitors from DOE/HQ Washington, NNSA's Sandia Site Office, representatives from the construction contractors, and Sandia executives officially broke ground for Phase 1 in February. (Photo by Bill Doty)

stand how the weapon will respond in great detail," Bob explains. "That knowledge becomes critical in the event that a weapon might be involved in a transportation accident, for example."

"Everyone on the project has been faced with designing new solutions to meet issues. Every element has been carefully engineered to meet the system need," Paul says. In the case of the one-of-a-kind Thermal Test Complex facilities, staff members Alex Brown, Jill Suo-Anttila, Tom Blanchat, Walt Gill, and Jim Nakos (all 9132) worked hard doing analyses to support the design for FLAME, XTF, and the Electro-static Precipitator. Sheldon Tieszen (also 9132) assembled a team of thermal specialists to provide design input as well.

Another unique aspect of the TCR project has been the close working relationship among weapons customers, the test organization, and the construction team. "We have worked closely with the construction plans for the cable site and we actually have tests planned there before the project is complete," says Bob. At the aerial cable site, construction contract language calls for work to stop during specified blocks of time later this year so that weapon-related drop tests can be conducted at the site.

In addition to their liaison with Bob and the technical line, Mike and Paul are linked in an organizational chart with boxes reaching to DOE for oversight and funding; support teams in architecture and a variety of engineering disciplines; and support staff in security, safety, environment, finance, purchasing, land use, and other areas.

"We have a team approach with some good players involved," says Mike. "The key to success for our aggressive schedule has been strong support from senior management, strong buy-in from the organizations involved, and timely responses from the people."

"The strong support by Dr. Kevin Greenaugh at DOE headquarters and the shared vision between DOE and Sandia have been very helpful. To make a huge investment like this, you need a strong, integrated team to move forward," says Jaime. — Will Keener

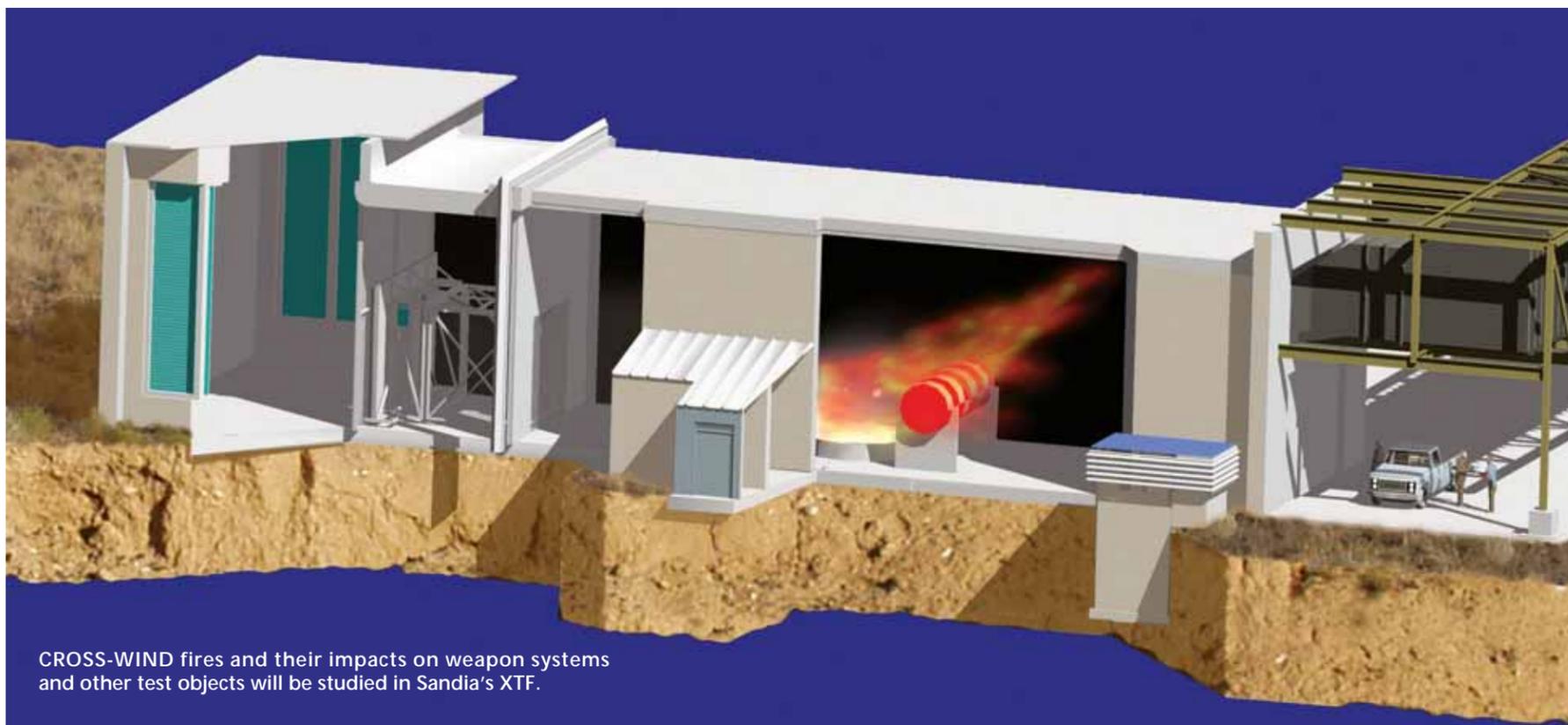
Clean air high on TCR priority list

An important aspect of the Thermal Test Complex — obvious to all who see the drawing of the proposed facility — is the state-of-the-art electrostatic precipitation system.

This high-efficiency air filtration system — connected to the test complex with an elaborate ducting system — uses electrically charged plates to trap particles from the fire emissions. The particles are diverted to a special collection tank, explains Mike Valley, co-project manager (9134). "Sandia is taking this extra step to make sure any materials coming out of the fire are filtered prior to the air being discharged."

Sandia's plans to keep the environment clean and minimize the impact of testing garnered praise from Patty Wagner, Sandia Site Office Manager for the NNSA. "Installation of this system shows that Sandia is conscious of working in this community and protective of the environment," she says.

Sandia examined a number of possibilities and selected the one with the lowest life-cycle cost and highest efficiency, says Mike. The system will cost about \$3 million. Because the system uses no liquids, it significantly minimizes and simplifies waste handling for the Labs' Hazardous Waste Management employees.



CROSS-WIND fires and their impacts on weapon systems and other test objects will be studied in Sandia's XTF.

TCR project

(Continued from page 5)

models. Then at the end of the day, we want to be able to test real systems in real environments."

Sandia will be able to test full-scale weapon systems, without the special nuclear materials, to determine that the non-nuclear safety systems will keep the weapon safe. "You always want to do that reality check. You don't want to believe the model alone. You want to assure yourself that there are



SEVEN-STORY FLAME Test Cell is a key part of the new Thermal Test Complex, under construction in Area 3. The cell includes water-cooled walls and an airflow control system to achieve consistent test conditions.

no hidden subtleties that you may have missed," says Lou.

The new complex, says Lou, will offer advanced capabilities in three distinct areas — fires under calm conditions, fires under cross-wind conditions, and radiant heating to determine how an object reacts to the heat of fire. The complex will have three primary parts: the FLAME Test Cell, the Thermal Test Facility, and the Cross-Flow Test Fire Facility, or XTF.

FLAME Test Cell

The FLAME Test Cell is a 50-foot-high, 60-foot-diameter cylinder offering the ability to conduct liquid- or gas-fuel fire and radiant heat testing. FLAME offers the potential to use liquid fuels, like JP-8 and methanol, burned in a pan beneath a test object. Beneath the movable pan will be gas burners for use

with hydrogen, methane, or other gases. Radiant heat testing will be possible with use of a 5.2-megawatt quartz lamp array.

In all cases, water-cooled walls and airflow equipment will help control the boundary conditions for the fire environment. Scientists will use laser diagnostic equipment to study the fire physics. An adjustable 150,000-cubic-foot-per-minute airflow system will allow experimenters to accurately control the combination of radiant heat and convective heat much better than in the past. Fires will reach 20 megawatts of energy, with temperatures up to 1,100 degrees C.

"It's hard to get repeatable fire data suitable for high-quality science, so we can understand the physics of fire and compare our measurements with predictions from models," says Lou. The FLAME facility is an important step up from the smaller facility currently available in Lurance Canyon. "We're interested in big fires that are fully turbulent where the physics mirror high-consequence events. To study big fires you need an enclosure large enough so that the walls don't strongly affect the fire."

FLAME and XTF will be controlled from the Thermal Test Facility, which will house a control room, office space, shop and assembly areas for test setups, a smaller radiant heat test cell, and an abnormal-thermal-science lab for tabletop-scale fire physics studies. It will also be home for environmental chambers, large enough to support weapon systems

tests with humidity and heat controls, a diagnostics development lab, and laser measurement rooms for the FLAME Test Cell.

Fires under wind conditions

The Cross Flow Test Fire Facility (XTF) rounds out the complex. It includes a low-speed wind tunnel for fire testing articles that may include hazardous materials, including explosives. XTF will be a 25-by-25-foot tunnel, 80 feet long, designed to survive unplanned explosions. It will be constructed with 30-inch reinforced concrete walls, combined with a six-inch covering of refractory concrete, a material used in rocket pad construction. XTF will also offer radiant test capabilities, to allow for maximum flexibility in testing.

"We know cross-wind fires are significantly different with much higher heat transfer and higher temperatures. XTF gives us capabilities to study these effects," says Lou.

In addition to fire research tied directly to weapons, the field has increased in importance in recent years because of the threat of terrorism, Lou notes. "We've been very busy doing work related to fire vulnerabilities from terrorist threats. These facilities will allow us to do the research we need to improve homeland security."

Hensel Phelps Construction Co., a national general contractor with Albuquerque offices, won the thermal complex contract for this \$28 million project, with an expected completion date of spring 2005.

TCR Phase 2 to begin next year with Area 1 complex

Design efforts will begin next year on Phase 2 of Sandia's Test Capabilities Revitalization (TCR) project, which will overlap the Phase 1 work now under way. Phase 2 will involve improvements to the Labs' thermal, vibration, acoustic, shock, centrifuge, structural mechanics, and rocket sled test facilities.

Perhaps the most visible part of Phase 2 will be the construction of the Experimental Sciences Complex (ESC) in Area 1. Current plans call for a 67,000-square-foot structure that will bring together workspaces, some 15 labs including characterization and specialty labs, radiographic diagnostic tools equipment, wind tunnels, and supporting shops. The ESC will consolidate research, development, and testing to develop tools to move from test-based certification to validated modeling and simulation certification, planners say.

The functions of these labs include model and simulation development, characterizing material properties and performance, measuring structural or system response to a test environment, development of diagnostics, and other research and science-based engineering activities. New diagnostics will be needed to study the test environments that weapons are subjected to and for quantifying weapon system performance.

Some of the ESC labs will play an important role in weapons component certification. The ESC staff will include new employees, visiting researchers, students, and Labs researchers to be relocated from Bldgs. 860, 865, and 880.

Among the plans for Phase 2:

- Upgrades of the rocket sled track target handling area,
- Enhanced thermal-vibration capabilities for system-level tests,
- Doubling of shock and vibration system spectrum for sub-system level testing,
- A new "vibrafuge" capability at Sandia's indoor centrifuge, and
- A variety of upgrades to improve data gathering, transmission, and analysis and to provide advanced photometric analyses and radiographic diagnostic tools.

An upgraded central services facility for Area 3 is also in the second phase of the proposal. This facility would involve renovations of Bldgs. 6710, 6711, and 6712 for long-term storage, a central machine shop, and a light-assembly area. Currently these functions are provided independently at each test facility. A number of older temporary buildings and storage/transportation containers will be removed as a part of this plan.

John Finger wins DOE's 'Ring of Fire' award for lifetime contributions to geothermal industry

By Will Keener

John Finger, who retired from Sandia in November after a 41-year career, has received the Department of Energy's Ring of Fire Award for his outstanding contributions to the geothermal industry. John's first department manager in geothermal, Sam Varnado (now director of the Labs Information Systems Center 5500), presented the award to John in February in a brief ceremony with his colleagues present.

The award, given in recognition of career achievement, is the first for any Sandian,

says Allan Jelacic, senior scientist in DOE's Office of Geothermal Technologies.

John came to Sandia from Mississippi State University in 1962, working in the Environmental Testing group. He earned a master's

degree in mechanical engineering and transferred to Sandia's Geothermal Research program in 1979, with some persuasion from a Mississippi State classmate, Sam Varnado. John stayed with the geothermal group throughout the rest of his career.

"John has done an outstanding job in representing Sandia to the national geothermal community," Sam said on news of the award. "He has made significant contributions to reducing the cost of drilling geothermal wells, thus contributing substantially to US energy security needs.

"... his long-term experience, wisdom, and engineering insight will be greatly missed."



RING OF FIRE AWARD — Sam Varnado (left) presents John Finger with the Ring of Fire Award from DOE for his lifetime of contributions to the geothermal energy industry.

John will be sorely missed in this community."

Ed Hoover, Manager of the Geothermal Research Dept. 6211, said John contributed in one way or another to most of the geothermal energy projects performed by the department during his career there. "John brought an end-to-end systems perspective along with a unique combination of technical and leadership skills to every single geothermal project he was involved in over the past 25 years, and his long-term expe-

rience, wisdom, and engineering insight will be greatly missed."

During his career, John researched new drilling technologies and tested new hardware ideas in field operations settings. Major development projects, such as insulated drill pipe, Diagnostics-While-Drilling, and "slim-hole" drilling took him to Nevada, Oregon, California, and New Mexico for Sandia.

"We do good work analytically and in the lab, but the way we gain credibility with industry is by demonstrating these advances with field drilling projects, and much of Sandia's geothermal reputation rests on these demonstrations," says John, who often notes he spent more days at Sandia wearing a hard hat than a tie. In 1993, John began to explore the idea of using slim-hole drilling, using a smaller-diameter drill string and less expensive rig to characterize geothermal resources. "Industry didn't believe you could characterize a reservoir with a slim hole," says John. Industry is now using the techniques he helped develop.

John's long-term projects included exploratory drilling at Long Valley Caldera in California and hardware proof-of-concept tests at Catoosa Test Facility in Oklahoma. He wrote or co-authored 17 SAND reports (one of which is used as a textbook); presented 22 technical conference papers (including three "Best Paper" awards); authored 10 articles in periodicals and journals and two book chapters; and participated in many program reviews at DOE.

John's response on winning the award: "I've worked with some exceptional people inside of Sandia and in the geothermal industry. If I can claim any credit, they all ought to share it."

Labs officials hear from behavior-based expert to explore ways to improve safety

With 236 on-the-job accidents causing injuries serious enough to require more than first aid last year, Sandia is taking a renewed look at safety awareness.

To learn more about what can be done to make Sandia a safer place, Labs officials invited a behavior-based safety expert to talk to ES&H managers and staff, Labs Leadership Team, union officials, and ES&H coordinators about this method to improve safety.

Scott Geller, professor at Virginia Tech's Department of Psychology and senior partner of Safety Performance Solutions, spent March 1 at Sandia discussing how behavior-based safety can make a difference.

"Behavior-based safety is a process that comes from the behavioral sciences," he says. "One can apply behavioral analysis to safety."

The problem with safety, he says, is that "you only see it when a person gets hurt." What needs to be done is to develop a process to make it less likely for a workplace to have injuries.

"That process starts with behavior and a focus on what people do and why," Geller says. "You look for explanations for certain behaviors."

"An interesting dynamic is that in order to reduce injuries, we need to have an environment where more of them get reported so that at-risk conditions can be fixed."

For example, a workplace may experience injuries due to people not wearing their personal protective equipment, for example safety glasses. Why not? It may be that the glasses are not conveniently available so an individual might be apt to work at-risk rather than take the time to find them. Identifying that as a behavioral precursor makes it easy to fix.

Next, Geller says, you understand the ABC model of human behavior — (A) Activators direct (B) behavioral (C) consequences. In other words, people are motivated by the consequences of their behaviors. They ask, "What's in it for me."

Next is to focus on positive consequences

and motivate people to achieve success by highlighting positive consequences. "You want people to be success seekers, not failure avoiders," Geller says.

Finally, the scientific method is used to decide what interventions to use.

Behavior-based safety uses observation techniques where employees periodically observe each other and then give informal one-on-one coaching feedback regarding safety-related behaviors. Observational data are collected and analyzed to identify areas needing special attention. The observations are then discussed in work teams to develop intervention strategies. As employees become more comfortable with the informal observation process, they begin to observe and give behavior-based feedback more frequently as safety coaching becomes a natural part of the work culture.

At a large laboratory like Sandia, Geller says one way to start to implement behavioral based safety is to select pilot groups that might be interested. All group members learn the principles of behavior-based safety, and then a worker-based steering committee is formed to start the implementation. Steering committee members become coaches and observe how people work. They then analyze the observed behaviors and come up with ways to perform work more safely. Eventually everyone becomes observers.

Paul Yourick (3140), who is heading up the ES&H Enhancement Project, which is designed to improve safety at Sandia, says that behavior-based safety is only one approach Sandia is looking at as it moves ahead to improve safety.

"We realize that whatever approach we take it will take several years to near our vision of zero injuries," Paul says. "An interesting dynamic is that in order to reduce injuries, we need to have an environment where more of them get reported so that at-risk conditions can be fixed. Behavior-based safety might work for Sandia. We will be proposing some implementation options." — Chris Burroughs

Feedback

Improvements on Eubank are great, but . . .

Q: I am a daily commuter on Eubank Blvd. living in the near Southeast Heights. The improvements to South Eubank Blvd. are indeed welcomed but I am not sure what traffic engineer developed the operational traffic light sequence for the Eubank Blvd./Gibson Ave. intersection. For the life of me, I cannot see the logic in frequently holding up 50-60 cars on Eubank Blvd. during the rush periods so that 2-3 cars can enter Eubank Blvd., and then to dwell on the Gibson Ave. westbound green light for an additional 15-20 seconds while the 60 or so of us on

Eubank Blvd. idle away our gas and contribute to the Albuquerque green cloud. Let's recommend that the city apply some rational logic to the settings on the lights in this intersection to end this ludicrous situation.

A: Thank you for your concerns on the timing of the lights on Eubank Blvd. and reminding people that idling vehicles contribute significantly to Albuquerque's pollution. We have asked the city to examine the timing of the lights and see if they can improve the situation. — Ed Williams (10864)

First-ever C. Paul Robinson Awards honor top accomplishments in regional procurement efforts

Think globally. Buy locally.

For many years, Sandia has made local purchasing a priority; since 1993, Lockheed Martin's GOCO contract with DOE has made that priority even more explicit: whenever possible, buy from local businesses to boost the regional economy.

And now, the C. Paul Robinson Awards have brought the local-buy principle front and center. The awards, established by the Sandia Supplier Community Advisory Council (SCAC), are designed to give high-profile recognition to Sandia's project and program procurement managers and teams who are leaders in using regional suppliers or who demonstrate excellence in community development through procurement opportunities.

In ceremonies during the recent Sandia/City of Albuquerque Supplier Showcase (see "Showcase brings buyers, suppliers together . . ." below), Paul presented four awards to Sandia teams and individuals who have made notable progress in regional procurement practices.

Says Paul, "I told the audience at the Supplier's Showcase event that while honored to have the award named after me, I had serious doubts as to whether anyone would take such an award [with my name on it] back to their homes!"

In a serious vein, Paul continues: "When individuals in our supplier community go out of their way to help improve our own processes, they truly deserve to be recognized. Secondly, an outstanding lab depends upon outstanding purchase agents and construction managers, and we should honor the heroes among them. And finally, regardless of the dedicated efforts of our procurement organization to reach out to small and disadvantaged businesses, the ultimate purchase decision is the line customer whose needs must be satisfied. Without our technical people

Details on the C. Paul Robinson Award, including category information, the full list of nominees, and photos from the awards ceremony, will be on display in the Bldg. 800 Lobby, north wall. For details about award criteria or submitting nominations for next year's awards, contact project lead Julia De La Cruz at 844-9869 (jdelacr@sandia.gov).



SANDIA PRESIDENT C. Paul Robinson presents an award bearing his name to Christine Whitley of A/E and Construction Procurement Dept. 10253, recipient of the Sandia Team Advocate award. Beside Paul, NNSA official Bob Braden congratulates Christine Cooper, also from the Construction and A/E team.

(Photo by Bill Doty)

'buying in' to the benefits of local, small business, and disadvantaged business purchases, such efforts cannot succeed. It was a pleasure to honor all of these folks with the 'C. Paul Robinson' awards."

Here are the award categories and recipients for the first C. Paul Robinson Awards:

Regionally Procured Services/Product: This award is based on the project/program that achieved the largest increase (percentage or dollar increase) in the use of small regional service/product suppliers within a project/program fiscal year. **Recipient:** The Advanced Atmospheric Research Equipment Team — Joe Sanders, Brian Schwaner, Jef Duncan, Glen Barker, Jim Finch, Walter Caldwell, Jo Cunningham, Augie Chapa, Dave Rakestraw, and Mechanical Solutions, Inc.

Innovation in Small Regional Business

Labs' Supplier Community Advisory Council encourages local spending

Sandia's Supplier Community Advisory Council (SCAC) includes representatives from the local business community, business development organizations, and Sandians. The council's primary aim is to foster relationships between Sandia and the regional supplier community. Sandia, with a goods-and-services budget of about \$866 million in FY03, directly spent more than \$400 million on in New Mexico businesses. Of that total, some \$292 million was spent on New Mexico small businesses, plus \$44 million on small disadvantaged businesses, and \$39 million on woman-owned businesses.

Procurement: This award is based on the project/program that reaches out to small regional suppliers to provide new/continuing opportunities, while complying with Sandia policies and procedures. **Recipient:** Construction Partnerships for Electrical Mechanical, and General Construction Services — Christine Cooper, Nancy Davis, Nenita Estes, Stan Harrison, Gerry Lipka, Israel Martinez, Lynn Schluter, and Christine Whitley.

Sandia Staff Advocate: This award recognizes an individual staff member for regional procurement accomplishments that had a significant impact for small business suppliers. **Recipient:** Toby Garcia, Project Engineer, Sandia Explosive Components.

Sandia Team Advocates: This award recognizes a team of Sandia employees (line, procurement, management, or other administrative) for regional procurement accomplishments that had a significant impact for small business suppliers. **Recipient:** A/E and Construction Procurement Department — Mary Armijo, Ruby Chavez, Christine Cooper, Nancy Davis, Rhonda Dukes, Shannon McConkey, Christine Riddle, Jimmy Romero, Dianne Sanchez, Brian Schwatken, Daniel Stafford, and Christine Whitley.

— Bill Murphy

Sandia News Briefs

John Stephens named chairman of ASTM International Committee on Electronics

Sandia's John J. Stephens (1833) has been named chairman of the ASTM International's Committee F01 on Electronics. ASTM International is one of the world's largest management systems for development of voluntary standards for materials, productions, systems, and services. Committee F01 is one of more than 130 ASTM technical standards-writing committees. John has served on a number of F01 groups since joining ASTM International in 1991. He also is a fellow of ASM International and a member of the American Welding Society and the Minerals, Metals, and Materials Society. At Sandia, John's career has focused on materials and joining-related process issues for the design and manufacture of high-reliability components.

Carol Yarnall named chair of Wheeling Jesuit University Board of Directors

Executive Staff Director Carol Yarnall (12100) this week became the first woman to lead the Wheeling Jesuit University Board of Directors. She assumed the role of chairwoman on March 18. Carol majored in chemistry at Wheeling Jesuit, which is in Wheeling, W. Va., and has served on the University's Board of Directors since March 2003. A West Virginia native, Carol will oversee the Board's Executive Committee and the Sponsored Programs Committee. A news release from the university said she is "thrilled and honored" to be leading the board.

Showcase brings buyers, suppliers together for one-on-one deal-making

Sandia and the City of Albuquerque in late February partnered to host the Supplier Showcase at the Albuquerque Convention Center. The event gave Sandia's supplier community a chance to show off and talk about their wares and services for Sandia buyers, Sandia line personnel with procurement needs, and others in the local economy.

Toni Leon Kovarik, Sandia's lead on the project, notes that, because of the wide range of different suppliers who work with Sandia, the showcase was designed to focus on suppliers in three specific areas: homeland security, optics, and biotechnology. Those three areas are increasingly important to Sandia — and to Sandia buyers and line managers with procurement needs. They also represent areas of potential growth for the local economy. (Thus, the interest of the City in cosponsoring the showcase with Sandia.)

The showcase featured 65 exhibitors. This year, for the first time, it had a new format that exhibitors had been asking for: an opportunity to meet one-on-one with potential customers. Toni says she was very gratified to help arrange almost 200 one-on-one deal-



OWNERS OF DIANA'S HOMEGROWN Inc. meet with customers during the Supplier Showcase at the Albuquerque Convention Center. Diana's Homegrown has a patented process of preparing and packaging sandwiches that stay fresh for weeks and have applications in emergency response situations. Some 65 Sandia suppliers participated in the showcase, which focused this year on suppliers in optics, biotechnology and homeland security-related products and services. Special guests included NNSA HQ procurement official Bob Braden; Greg Gonzales, Small Business Program Manager, NNSA Service Center; Jerry Hanks, representing N.M. Lt. Gov. Diane Denish; EPA competition advocate Corrine Sisneros; and Chris Berkheimer, N.M. State Office of Homeland Security.

making sessions between buyers and suppliers, adding that initial feedback from exhibitors and attendees was overwhelmingly positive.

Mileposts

New Mexico photos by Michelle Fleming



Mike Ford
40 4221



Darwin Newcom
30 5523



Michael Hightower
25 6202



Ellen Lemen
25 6223



Arlo Ames
20 15222



Ron Anderson
20 1738



Glenn Barker
20 5533



Barry Bronkema
20 9125



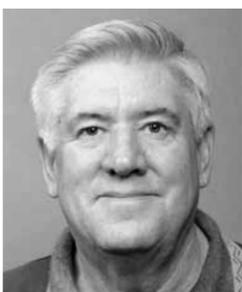
Billy Carlen
20 2613



Raymond Dukart
20 15417



Scott Gillespie
20 12326



Jerry Mercer
20 15322



Del Packwood
20 9311



David Clements
15 2111



Robert Koss
15 2112



George Libman
15 11500



Doretta Liyai
15 10268



Rich Pryor
15 9216



Annemarie Rader
15 3121

Recent Retirees



Roscoe McGee
37 10010



Larry Greher
27 11200

Management promotions

New Mexico

Chris Miller, from PMLS to Manager, Media Relations and Communications Dept. 12640.



CHRIS MILLER

Chris joined Sandia in April 1994 as a member of the Media Relations and Communications Department, where he initially worked as a media relations specialist. During his nearly 10 years at Sandia, he has worked with staffing and recruiting to develop new recruiting materials and helped create *Sandia Technology* and was its first editor. Chris also helped develop and edit Sandia's Annual Report.

He was the communications products team leader from February 1998 until December 2001. He then headed the media relations team from January 2002 until his promotion to department manager.

Chris is a former newspaper reporter and has worked for the *Roswell Daily Record*, *Wichita Falls Times and Record News*, *The Albuquerque Tribune*, and the *Albuquerque Journal*.

He has a bachelor's degree in journalism/history from the University of New Mexico. Chris also attended the University of Strasbourg (France) and the Alliance Francaise (Paris, France) for French language studies.

Vernon Willan from DMTS, Application Technologies Dept. 5936, to Manager, Weapon Intern Training Dept. 2914.

Vern has primarily worked in the weapon systems group since he joined Sandia in May 1978. He's worked on a wide variety of projects, including the B61-7, B61 6-8 Stockpile Improvement Program, Code Activated Processor, Sea Lance Test, Peacekeeper Missile Unique Signal Ordnance Arm Switch and Advanced Development.

Most recently, Vern has worked in Center 5900 developing remotely deployable sensor systems on WFO



VERNON WILLAN

funded projects. One of Vern's assignments included a temporary assignment to DOE/HQ where he served as chairman of the Use Control Effectiveness Committee and the US chairman of the US/UK Use Control Working Group in support of the development of the UK TASM weapon system.

He was awarded (co-inventor) a patent for a High Temperature Adhesive Silicone Foam and was recently given a Classified Inventor Award for the DARS project.

Vern has a BS in mechanical engineering from the University of Arizona and an MS in mechanical engineering from the University of Illinois Urbana-Champaign.

David Womble from Manager, Computational Math/Algorithms Dept. 9214, to Level II Manager, Computer Science and Mathematics Dept. 9210.

David has spent his entire Sandia career as a member of the Computation, Computers, Information & Mathematics Center since joining Sandia



DAVID WOMBLE

in January 1987. As a staff member, he worked in numerical algorithms for parallel computing and focused particularly on efficient, scalable linear solvers for large-scale modeling and simulation. In addition, he worked in numerical algorithms for seismic imaging on parallel computers.

He has won two R&D 100 awards, one in 1994 for parallel solvers, the second in 1997 as a member of the seismic imaging team. He was promoted to DMTS in 1995 and to Level I manager in 1997.

David has a BS in mathematics and computer science from Rose-Hulman Institute of Technology. He also has an MS in applied mathematics and an MS in electrical engineering and a PhD in applied mathematics, all from Georgia Institute of Technology.

Reader Service information

The *Sandia Lab News* is distributed in-house to all Sandia employees and on-site contractors and mailed on the date of publication to Sandia retirees. It is also mailed to individuals in industry, government, academia, nonprofit organizations, media, and private life who request it.

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Mitzie Bower's painted pony 'Wilderness Roundup' makes a magnificent entrance onto fabled trail



Mitzie and "Wilderness Roundup" 14 months ago.



"Wilderness Roundup," all dressed up and ready for her entrance.

In the Oct. 4, 2002, *Lab News* we reported on the challenge of Sandia graphic artist Mitzie Bower (12620) to paint a life-size polyurethane pony. She has now done it. It took Mitzie about 14 months of spare time to paint this pony.

Read as Mitzie shares her experience with us.

"A very dynamic relationship developed between this pony and me the day it entered my life. Its sheer majesty alone, in the absence of color, was breathtaking. From the very first day I began to paint, my emotions bonded to the pony like acrylic, with every brushstroke. I knew I wanted to use wildlife in a changing seasonal environment as a theme. Paint application was also vital to achieve the textural sensation of fur or shimmering reflections of ripples in water.

"I believe painting this pony challenged my faith, patience, and time: faith in my ability to paint on a large-scale three-dimensional canvas, patience to commit myself to a deep-rooted impulsive desire to push my skills to the limit, and finally, my foresight of the time it would require to transfer the essence of myself onto such a massive surface.

"As days turned to weeks, weeks to months, the quiet equine suddenly began to whisper inspiration and visualization to me. Teaming together, we rounded up inhabitants of the wild and corralled them into a dazzling menagerie of rich color and sensual tactile charm."

Trails of the Painted Ponies will be releasing

a new herd of miniature figurines, and Mitzie's pony will be included. The release date is still unknown. The Enchanted Dreams Foundation for autistic children has expressed an interest in purchasing the pony.

Says Mitzie, "This painted pony is lovingly named Wilderness Roundup. She is a product of all that I could possibly gift her. She, in turn, has also given back to me a creative experience that I couldn't begin to express in words. My husband, Tim, was central to the success of this project. His ingenuity solved many problems that placed limits on my work. Enjoy the beauty and peacefulness of Wilderness Roundup, follow your dreams and believe in yourself."

— Iris Aboytes

Cold War expert to address Sandia colloquium on April 1

Thomas Reed will offer insider's first-hand account of Cold War from beginning to end

Thomas Reed, secretary of the Air Force under President Ford, director of National Reconnaissance, and a national security consultant to President Reagan, has written a first-hand insider's account of the Cold War.

His book, *At the Abyss*, has just been published by Presidio Press/Ballantine Books. Reed will address a Sandia colloquium on April 1, 3-4 p.m., in the Steve Schiff Auditorium, to talk about his book and his personal reflections on the Cold War.

Reed has close connections to New Mexico and Livermore. In his book, he recounts a 1958 visit to Albuquerque ("the central node of the US nuclear weapons establishment," he writes) while serving with the Air Force Ballistic Missile Division.

"We discussed [at that Albuquerque meeting] the technical details of integrating warheads into reentry vehicles. . . . I had glimpsed the nuclear genie. It would never let me go." That fascination led him, after his Air Force stint, to a job at Lawrence Livermore National Laboratory, where he worked as a weaponeer directly under Edward Teller.

The news release about the publication of *At the Abyss* describes Reed as a "prominent player" throughout the Cold War, a perspective that allows him to explore "from a unique vantage point America's fight against Communism from [Stalin's death in] 1953" until the collapse of the Soviet Union in 1991.

The announcement continues, "And Reed writes, 'The Cold War was a fight to the death, fought with bayonets, napalm, and high-tech weaponry of every sort — save one. It was not fought with nuclear weapons.'"

Even there, at the abyss, Reed says, the superpowers never stepped over the edge because "the Cold Warriors on both sides, the officers entrusted with nuclear matters, always displayed the greatest integrity in times of crisis."

In an interview provided by his publisher, Reed says his book makes for compelling reading because, "Well, bluntly put, I know what I am talking about. . . and I suppose my engineer's attention to detail made me fanatic about getting the story right."

According to at least one reviewer, Reed did indeed get it right.

William Rusher, in a syndicated review of the books, writes, "There may be people who were more deeply involved in the Cold War, over its 40-year length, than Reed, but if so, they haven't written their memoirs. If they did, it is highly unlikely that they would write them half so well." Rusher continues: "Reed's book is a fascinating account of many previously unfamiliar Cold War episodes, laced with colorful descriptions of the chief personalities involved. Would you like to know what would really happen, minute by minute, if the president reached for that 'football' that always accompanies him, and ordered nuclear weapons launched? Reed tells you. Or would you prefer his hilarious account of how we allowed Soviet spies to steal the blueprints for an oil pipeline (carefully doctored to self-destruct)? Our own observers were inadvertently baffled when a year or two later they noticed a huge explosion in a part of Siberia that had not previously excited their suspicion."

Reed was personally invited to come to Sandia by Labs Director C. Paul Robinson after the two had participated in a recent public forum about nuclear weapons policy.

— Bill Murphy

Thomas Reed Colloquium

Topic: *At the Abyss: An Insider's History of the Cold War*

When: April 1, 3-4 p.m.

Where: Steve Schiff Auditorium

