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)
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 communications showed just what a small world it is. A fellow Sandian 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 $10 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.

* * *

Lab 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-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 sp3kHz” is, much less know it; and suspect that I wouldn’t want to admit I play “Call of Cthulhu” (what is that, anyway?) 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 Kercher (844-7842, MS 0165, hckerch@sandia.gov)

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Les Shepard named VP 6000, succeeding Bob Eagan

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

Les Shepard joined the Laboratory in 1991 and is currently the director of the Information Systems and Science Division. He has been a member of the Laboratory’s leadership team for the past 13 years, serving as the director of the Business & Information Technology Division (B&IT) since 2012.

Eagan retired as director of the Information Systems and Science Division in 2017. He joined Sandia in 1985 and has served as director of B&IT since 2012.

Shepard’s appointment follows the announcement of his retirement earlier this month and the announcement of Ford’s retirement from the Laboratory.

Shepard’s role will include overseeing the Laboratory’s cybersecurity efforts, as well as its efforts to protect critical infrastructure and information systems.

Shepard has a Ph.D. in computer science from the University of Illinois at Urbana-Champaign and has over 30 years of experience in information technology and cybersecurity.

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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 Mauritson, and son Spencer 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. Matsuoka (81) — Jan. 12
Joseph F. Dalporto (75) — Jan. 22
George W. Abbot (80) — Feb. 2
K. G. Foster (82) — Feb. 2
Francis L. Sheas (88) — Feb. 3
Alfred E. Miller (89) — Feb. 6
John H. Bannum (77) — Feb. 7
Billy D. Neil (76) — Feb. 7

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Les Shepard

Sandia Laboratories

http://www.sandia.gov/LabNews

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Sandia 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.

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Asian American Engineers of the Year T.Y. Chu, left, and Tony Chen, right, with Sandia Labs Director C. Paul Robinson attended the Santa Clara, Calif., event to introduce both Sandia winners. He pointed to T.Y.‘s international recognition 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 nanoscience 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 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.”

By Nancy Garcia

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 verified 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:

- Limited disclosure to Sandia as necessary and appropriate to make sure there is compliance with the home use program requirements.
- Limited disclosure to other companies hired by Microsoft to provide services such as customer support.
- Limited disclosure to other companies 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://omsone.microsoft.com/tc/cr_information/HUPPriv.htm.

— Charles Pethelys (11200), Attorney
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 in the components 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.

A specialized panel that contains ultrasonic, eddy current, thermography, and radiography techniques — that together would lead to flight certification.

The most promising edge would be measured and the leading edges, microcracks in the exterior coating, oxidation in the carbon-carbon layer, subsurface gaps between layers, and adhesive dis-

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 Sauder, 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 were 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 confidence level. We have a 98 percent confidence level 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 3551, said that in summary the results look good for Sandia in all major dimensions. "Although the results were positive, it does not mean we should say we are good."

"It means that we are not in the right place and should continue to improve and look for ways to make Sandia an 'Employee 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 "Sandra" 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 a craggy volcanic crater. Sandra is probably basaltic rock, say scientists. The vertical lines on the side of the rock facing the camera are due to "techniques" and typically run horizontally. So Sandra 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 at dry surface.

(Photos and caption text: NASA/JPL/Cornell)
TCR project

(Continued from page 1)

“Sanda’s modeling and simulation strategy demands that we have experimental data across a spectrum from the subscale to full-scale systems,” said Tom Bickel, Director of Engineering Sciences (9300). “The TCR investment — moving from test based understanding of our systems to greater reliance on validated numerical models — represents a paradigm shift,” said Tom. “The combination of computer simulation and full-scale testing is what makes engineering exciting.” (See story on right.)

Two-phase project

Phase 1 of TCR involves revitalization of the Aerial Cable Facility in Sol Se Mote 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 Lab’s 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 to 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 2 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. 9324. 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. An auxiliary 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,” said Steve Heffelfinger, Manager of Mechanical Environments Dept. 9314. “We are working to achieve a higher design philosophy. If you drop something and it doesn’t break, that’s something. But understanding why it responded using a lot of advanced 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 handling, and assembly areas will be installed in the new, 5,000-square-foot building. Construction 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,” said 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’s $36.45 million budget includes building, cable improvements, and infrastructure to support these different demands.

An essential consideration in planning the Thermal Test Complex was protection of the environment, including Tom Hunter. “TCR will allow us to test in environments we haven’t been able to test in the past,” he said. Life extension programs, including W 76 Mod 1, W 80 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,” said 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 and computer models, like Red Storm, will allow Sandia to move the stockpile stewardship systems to full-scale.”

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 said. “Modern testing and experiments enabled by TCR, integrated with advanced computing and computer models, like Red Storm, will allow Sandia to move the stockpile stewardship systems to full-scale.”

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,” said Jaime. “We are looking forward to meeting the needs of this very dynamic mission environment.”

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Visible infrastructure

To achieve that integration between testing and computer simulation, the largely invisible testing infrastructure must be significantly upgraded, said Steve Heffelfinger, Manager of Mechanical Environments Dept. 9314.

“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,” said 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, in project manager (9314). “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 wires, will provide much higher bandwidth and flexibility than in the past.

Another example is power requirements. “If you want to use advanced diagnostic tools you must have reliable clean power,” said 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,” said Jaime.

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

Test capabilities: Looking toward future

To make the Test Capabilities Revitalization (TCR) project work, planners looked to the future, not the past. “We won’t be doing tests to be able to repair our test capabilities to the way they were in the 1980s,” says Jaime. “Our philosophy is to focus on our new missions.”

Sandia’s Cold War test equipment is more than 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 defense 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 Test Program gave new life to the stockpile.

“Modern testing and experiments enabled by TCR, integrated with advanced computing and computer models, like Red Storm, will allow Sandia to move the stockpile stewardship systems to full-scale.”

Time of transformation

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(Continued on page 7)
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.

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. 2314, 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. 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 understand 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 Test Cell.

An important aspect of the Thermal Test Complex is obvious to all who see the drawing of the proposed facility — it 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."

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 Greenough 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

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TIR 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 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 1,300 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-sciences 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 reconstructed 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 recently 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, 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:
• 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. 671G, 671J, 671L, and 671Z 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 42-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 him an engraved stein at a 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.

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 experience, wisdom, and engineering insight will be greatly missed.”

During his career, John researched new drilling technologies and tested new hardware ideas in field operations of many geothermal development projects, such as insulated drill pipe, Diagnostic-While-Drilling, “slim” downhole tools, and others. He 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 Cat皇上 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 closely with some of our brightest minds at 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.

Dr. Bruce Geller is a 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.”

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 convenient enough 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.”

Finally, the scientific method is used to decide what interventions to use. Behavior-based safety uses observation techniques where employees are encouraged to observe each other and then give informal one-on-one coaching feedback regarding safety-related behaviors. Observations are collected and analyzed to identify areas needing special attention. The observations are then discussed in work teams to develop new 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 behavior-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, was impressed to see how the approach can work. “We realize that whatever approach we take it will take several years to see 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.”
First-ever C. Paul Robinson Awards honor top accomplishments in regional procurement efforts

Think globally. Buy locally.

For many years, Sandia has made local purchases a priority; since 1993, Lockheed Martin’s GOCC 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.

Paul says, “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 honor!”

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 order 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 event, will be posted online at the Bldg. 800 Lobby, north wall. For details about award criteria or submitting nominations for next year’s award, contact project lead Julia De La Cruz at 844-9869 (julea@lanl.gov).

Sandia News Briefs

John Stephens named chairman of ASTM International Committee on Electronics

Sandia’s John J. Stephens (1883) 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 joint-related research, and he has led 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 Board’s Committee. A news release from the university said she is “thirsted and honored” to be leading the board.

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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.

Tony Leon Kovarik, Sandia’s lead for small business development, management, or other administrative (for 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-making sessions between buyers and suppliers, adding that initial feedback from exhibitors and attendees was overwhelmingly positive.

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 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 program that reaches out to small regional suppliers to provide new/continuing opportunities, while complying with Sandia policies and procedures. Recipient: Construction Partnerships for Emergency Response Situations — Christine Cooper, also from the Construction and A/E team.

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 Advocate: 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 Schwater, Dallas Stafford, and Christine Whitley.

Bill Murphy
Mileposts

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

David Clements

Recent Retirees

Management promotions

New Mexico

Chris Miller joined Sandia in April 1994 as a member of the Media Relations and Communication Department, where he initially worked as a media relations specialist. 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 funded projects. One of Vern’s assignments included a temporary assignment to DENG 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 a co-inventor patent for a High Temperature Adhesive Silicone Foam and was recently given a Classified Inventor Award for the DAROS 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, computer, information & mathematics Center since joining Sandia 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 electrical engineering and a PhD in applied mathematics, both from Georgia Institute of Technology.
Mitzie Bower’s painted pony ‘Wilderness Roundup’ makes a magnificent entrance onto fabled trail

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.

“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.”

Steps 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 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 weapons designer 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