Labs water resource simulator rapidly calculates tomorrow’s supply given today’s choices

Water management tool may help quell regional tensions, avert water crises in the thirsty world of the future

By John German

By 2015, according to experts, half the world’s population — 3 billion people — will lack access to fresh water. (See “Why water is a national security issue,” on page 4.)

A team of Sandians is developing software models they think might help not only regions and nations with seemingly hopeless water shortages, but also water-wary areas such as the Southwestern US where sound resource management might still avert a crisis.

The simulations, called Dynamic Water Budget Models, allow decision makers to see how water policy options selected today will affect a society’s water resources decades into the future.

The developers include Dick Thomas (6115), Steve Conzel (6115), Vince Tidwell (6115), Erik Webb (6115), and Cara McCarthy (University of Arizona).

Exploring policy options

The models are built on the commercial Powersim software tool, which Sandia has used to study everything from summer blackouts in California to global nuclear material inventories. The intuitive user interface allows easy changes to inputs and immediate extrapolation and visualization of results.

(Continued on page 4)

Exceptional service? How about 50 years’ worth!

Z-Beamlet celebration highlights scientific effort, political will

By Neal Singer

On a cold and windy day in a large tent put up for the occasion, Sen. Pete Domenici, R-N.M., and Rep. Heather Wilson, R-N.M., joined NNSA, Sandia, and private dignitaries behind the electronic gate in Area 4 to celebrate with several hundred Sandians and their families the successful operation of Z-Beamlet, the third largest laser in the world. Its beam recently peered into the heart of Sandia’s Z-Beamlet accelerator to record that machine’s smooth reduction in size of a prototype fusion pellet.

Sandia President Paul Robinson, who hosted the event, opened by looking over his shoulder at Domenici and Wilson and asserting coolly that the $12 million used to dismantle, haul, store, and reconfigure the laser, discarded two years ago by Lawrence Livermore National Laboratory, was “one of the best investments you ever made.”

Domenici, looking around at the billowing canvas walls, contrasted “the shiny buildings in which the breakthroughs were made” with the somewhat chilly space in which he spoke. “Remember that it’s not the kind of environment in which we share our success, but what

(Continued on page 4)
This & That

Well, here I am again all these years later, staring at a blank space — it’s a screen now; it was a sheet of paper in a typewriter then — dreaming up clever things to jot down in an entertaining newspaper column. I got a real kick out of writing a weekly column for a newspaper I edited some 30 years ago, but now I’ll point out right now is that I don’t know a thing about “possum surprise,” which has always been Larry’s favorite contribution to the more-than-occasional potluck meals we gin up in the PR group. I’ve been accused of a lot of things because of my Bluegrass connection, but “possum surprise” ain’t one of ‘em — No sirree!

Before we leave ol’ Larry, he admitted sheepishly last week that he’d have a struggle working up enough genuine enthusiasm to come back to work after the holiday break. “But that’s good,” I told him. “My problem was working up enough fake enthusiasm to come back!”

* * *

Horace Potech (5933) is leaving Sandia Jan. 14 after a 50-year career — among the longest in Sandia’s history. You’ll find Chris Burroughs’ story about him, on Page 7, a fun read. Why retire? “I don’t like to start things I can’t finish,” he told Chris. And I don’t think I can finish another 50 years at Sandia — much as I’d like to.

* * *

And on that subject of finishing things, I have a tip. A friend told me the way to achieve inner peace is to finish things I had started.

“Well, bucko, I’m ahead of you,” I thought. “Just yesterday I finished a bag of chips and a jar of salsa, the last of a blackberry jam cake my mother sent for the holidays, and a box of chocolate truffles. And I feel inner peace already — even without the Alka-Seltzer.”

Feel free to pass this along to your own friends who need inner peace.

* * *

As the old chestnut goes, “no news is good news,” and Sandia got good news in the Albuquerque Journal’s annual Cowchips Awards, which was published at year’s end. Journal writer Fritz Thompson keeps up with foibles, lapses, embarrassments, gaffes, and just about everything else people or organizations can be guilty of, then splashes them across a couple of pages in the paper as a year-end story. I read this year’s version from start to finish, and Sandia didn’t get a single mention. — Howard Kercheval (844-7842, MS 0165, hckerch@sandia.gov)

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Marion Scott named Director of Microsystems Science, Technology, and Components Center 1700

VP 1000 Al Romig announced the selection of Marion Scott as Director of Microsystems Science, Technology, and Components Center 1700, effective Dec. 14. Also, Marion has named Dave Myers “Principal Deputy” of Center 1700, with a vital role in center operations and in maintaining lines of communication with DOE Defense Programs.

Marion earned a PhD in electrical engineering from Southern Methodist University and was hired by Sandia as a Member of Technical Staff in 1986 in the Optoelectronic Components and Devices Department. Until his new appointment, he was Deputy Director for Sensors and National Security in the Microsystems Science, Technology, and Components Center. Marion’s professional contributions to Sandia include assignments as a Manager in the Sensor Programs Department and advanced Geophysical Technology Department.

Prior to coming to work for Sandia, he was a Senior Engineering Specialist at LTV Aerospace and Defense Co.

Sympathy

To Carolyn Lange (12100) and Steve Barnard (2661) on the death of her mother and his mother-in-law, Elizabeth Gross, in Albuquerque, Nov. 19.

DOE/NNSA appraisal ranks Labs performance ‘Outstanding’

Sandia’s performance has again been rated “Outstanding” in the DOE/National Nuclear Security Administration’s annual appraisal.

Each year a formal appraisal is required under terms of the contract with Sandia Corporation. This is the sixth year of evaluation since Sandia under Multi-Program Laboratory Assessment Management Structure.

“Outstanding,” NNSA’s performance in FY01 was outstanding, indicating that NNSA significantly exceeded the standard of performance,” said W. John Arthur III, Deputy Manager for Program Execution at the DOE Albuquerque Operations Office. “In his form for transmission of the report to Sandia President C. Paul Robinson, received Dec. 19.

“All performance groups (Laboratory Management, Programmatic, and Operations and Administration Support) were rated Outstanding,” the letter continued.

‘Outstanding’ in 13 of 17 areas

Sandia’s programmatic performance was rated outstanding in 13 of the 17 areas under categories of Directed Stockpile Work (2 of 5), Campaigns (4 of 4), Nuclear Non-Proliferation (2 of 3), and Science & Technology Other (5 of 5). The transmitral letter particularly noted Sandia’s support for annual Stockpile Certification, development of W76 and W88 refurbishment options for the W88 warhead, start of the 12.3 teraOps Accelerated Strategic Computing Initiative white system, Z-machine experiments, and implementation of lean principles in process manufacturing.

In Operations and Administration Support, the letter took particular note of the Safeguards and Security (S&S) program’s “commendable performance” in implementing an integrated S&S management approach throughout the Labs. Also, says the letter, “S&N management continues to do an outstanding job of focusing management’s attention, setting priorities, and aligning resources to accomplish missions assigned by DOE/NNSA,” says the letter.

Lines of communication to HQ lauded

It continued: “Further, S&N management is commended for the lines of communication to DOE/NNSA, including establishing processes for interaction with HQ and AL management. Laboratory Management’s overall rating was Outstanding.”

Sandia Laboratories management is congratulated for maintaining a high level of performance for the second year in which the NNSA faced many significant challenges. S&N’s response to the national emergency that occurred on Sept. 11 was “outstanding,” involving terrorist attacks with the United States is commendable.”

Referring the Business Management Oversight Review (BMOR) of Sandia’s administrative functions, the executive summary of the annual report stated, “S&N continues to dedicate appropriate management attention to the business systems required to support a vital national laboratory.”

Some areas for improvement

While Sandia’s overall performance was rated outstanding, the appraisal did identify “some areas where SNL performance did not meet expectations and needs improvement.” These include the project management processes for the Microsystems and Engineering Sciences Applications (MESA) project, “although signs of improvement were noted late in the fiscal year,” the letter says. The letter also said Sandia should improve processes for making decisions involving its make-or-buy plan.

While four of the five administrative functional areas in the BMOR evaluation were rated “outstanding,” in the BMOR report says that significant opportunities for improvement in property database and accountability, Sandia’s collection of Other Federal Agency delinquent accounts receivable, responsiveness to Defense Program budget requests, and the lack of progress in complying with the contract’s make-or-buy plan.

Jerry Harls (12141), owner of the Sandia appraisal, was pleased with the overall assessment. “Thanks to each of you for your efforts in this accomplishment,” he wrote in a Jan. 2 memo. “Your hard work and cooperation are always appreciated!”
Students honored for success in Go Figure Math Challenge

GO FIGURE—Several students (shown in photo above left) recognized for high scores in the Go Figure Math Challenge were honored in December at a banquet hosted by Recruiting & University Partnerships Dept. 8524. A total of 244 students in grades 3-12 participated in the Third Annual Go Figure Math Challenge on Oct. 27, 2001. The math challenge was held at three Bay Area locations with the help of the Pacific Mathematics, Engineering, Science Achievement (MESA) program in Stockton, Tracy African-American Association in Tracy, and Las Positas College in Livermore. Participating students represented 36 schools and 82 teachers.

HONORABLE MENTION—Third-grader Evan O’Darney (shown in photo at top right) likes math so much, he participated in the third annual Go Figure Math Challenge on Oct. 27, 2001, and received an honorable mention. The challenge, co-sponsored by Sandia and DOE, is designed for students in grades 3-12. He was among 244 students from 36 schools in Alameda, Contra Costa, and San Joaquin counties who spent a Saturday in October taking the challenge in an SAT-like test of carefully thought-out math problems. The 62 high-scoring winners were honored at four different banquets in December, along with their parents and teachers.

Sandian Karl Gross honored as a DOE Young Investigator

Karl Gross (8723) has received the rare distinction of a Young Investigator award from the DOE Office of Energy Efficiency and Renewable Energy’s Office of Power Technologies. The award, presented Dec. 13 at the DOE Forrestal Building in Washington, recognizes exceptional talents of researchers who are working to advance DOE programs. Building upon the doctoral thesis work he completed at the University of Fribourg in Switzerland in 1998, Karl has made many breakthroughs that have helped establish Sandia as a leading laboratory in hydrogen storage research.

Karl's research centers on developing new lightweight hydride materials for hydrogen fuel-cell-powered vehicles. Karl is one of five researchers receiving the honor this year, the first year of the EERE/OPT awards.

Holiday Spirit Drive rocks . . . and rolls

FROM MEALS TO WHEELS — Employees at the California site gathered 850 pounds of food and 22 bicycles, as well as about $500 in cash, during the annual Holiday Spirit charity drive. A special effort was made to gather bicycles, including used bicycles that were refurbished in an arrangement with a local bicycle store. Seventeen went to requestors and five more were donated to area shelters. Above are Michaela Salas (8724), left, and Julie Cablayan (8723), on bike, with Renee Haynes (8527) in background.
Why water is a national security issue

Rampant overuse of fresh water resources — along with land industrialization, drought, and pollution — have made long-term agricultural sustainability a daunting prospect in many countries. Some experts argue that water shortages will become a limiting factor in the country’s ability to feed itself in the next two decades as China’s major agricultural areas run increasingly low on water.

Keynote speaker Mike Campbell, former director of LLNL as a Senior VP for Nuclear Weapons and Development (LDRD) program, said that the scarcity of fresh water resources poses a national security issue. Water is a national security issue, says Steve Conrad.

Dave Crandall, director for research, development, and simulation at DOE’s National Nuclear Security Administration, said simply of recent developments that “Some say terrorism is the atom bomb of our time. We must do something now to prevent it.”

In a recent speech, Steve Conrad said, “If the price of grain goes up because of the war in Iraq, we must develop and improve technology that helps us produce food.”

“Drought brings hopelessness to many places. It is in our self-interest to help these governments make their own futures,” said Steve.

Z-Beamlet

Z-Beamlet project leader John Porter (far left) holds forth to (in order) Sen. Pete Domenici, R-N.M., Sandia President C. Paul Robinson, and Rep. Heather Wilson, R-N.M., along with assorted Sandia High School science students. A computer analyzes pellet compressions obtained by Z fringes. The object on the table is one of Z’s targets. The photo was taken in the renovated building housing Z-Beamlet in Area 4, New Mexico. (Photo by Bill Doty)

The simulations were part of a Harvard University study that helped alter the way some experts now think about China’s future. “China’s goal is to be a self-sufficient nation with regard to grain production,” says Steve. “Our conclusion was that China is not going to be self-sufficient unless something changes drastically.”

The team then used the Middle Rio Grande Basin, the basin that supplies water to the Albuquerque area, as a test-bed for developing the model further. “It’s a way of helping our community understand the issues while also creating a tool that could help the nation and the world,” said Dick.

Working with the US Geological Survey and the state engineer’s office, they built a model that shows, not surprisingly, that current water use practices in New Mexico are unsustainable.

The team continues to work with city planners in Albuquerque and Rio Rancho to apply the tool to Albuquerque-area policy-making efforts, in cooperation with the UNM Law School’s Utton International Transboundary Resource Center.

Workable vs. unworkable options

A similar model of New Mexico’s Estancia Basin, in cooperation with the Estancia Basin Water Planning Committee, is helping show farmers and developers the possible results of various development schemes and agricultural practices for the area.

“Different users have different ideas about what optimal use of the water resource is,” says Dick. “We helped get them talking sooner about realistic approaches rather than dwelling on unworkable, unsustainable options.”

The team expects to deliver to officials a web-based version of the Estancia Basin model in four to six months as part of a project sponsored internally by Corporate Outreach, Dept. 12650.

They also are exploring, in cooperation with Sandia’s Cooperative Monitoring Center, the possibility of modeling water issues for basins shared by the countries that border the Nile River, and for the US and Mexico in the El Paso/Cuidad Juarez area.

The team has demonstrated the model to local school children as well. “It’s a great educational tool,” says Steve. “Anybody can play their own ‘what if’ game. It allows different people with different stakes in the outcome to rapidly test the long-term effects of many policy options. It’s very democratizing.”

Water

(Continued from page 1)

Making policy changes is as simple as fiddling with a few knobs, says Dick.

But underneath it all is a complex model not only of water uses but of the subtle interrelationships among ground and surface water sources, exchange rates, ground water pumping, irrigation, climate, evapotranspiration, and demographics. Future models will include other factors, such as environmental impacts, water quality, economic productivity, and an area’s social and cultural foundations.

There are modeling tools that provide greater fidelity in modeling individual components of the water system,” says Erik. “We’ve abstracted and combined those kinds of models to ask what the water resource picture might be 20 years down the road. This is the only model we’ve found that allows for big-picture, long-term modeling.”

Thinking globally, acting locally

Development of the tool, first envisioned by Dennis Engi (16000) in 1986, has been funded primarily through the Laboratory Directed Research and Development (LDRD) program. Dick and Steve built the first model in the mid 1990s to examine water supply and demand trends for China’s 10 major water basins, concluding that water will become a limiting factor in the country’s ability to feed itself during the next two decades as China’s major agricultural areas run increasingly low on water.

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Use control code
(Continued from page 1)

over the decades.

The new hardware and software has been redesigned from scratch in a systems approach intended to provide a common architecture, mod- ular products, and reusable processes to facilitate future upgrades. Now that it is operational with USEUCOM (US European Command) and USAFE (US Air Forces in Europe), the CMS becomes the common foundation for all future upgrades of PAL system hardware and software.

A huge team effort

“To design and develop a system with an overall architecture to replace everything in the field was quite a challenge,” says Doug Clark, CMS project lead engineer in Use Control Systems Dept. 2121. “We wanted to develop a system that was modular in nature, so that it could be maintained and upgraded in pieces as needed in the future. It was a huge team effort.”

Fourteen custom products (nine software and five hardware products) were delivered, accepted by DOE/NNSA, and put into operation in Europe in November. All were designed at Sandia, and in addition all the software was implemented and produced at Sandia. The custom hardware was manufactured at NNSA’s Kansas City Plant.

The software contains about 160,000 lines of uncommented computer source code (260,000 including comments). About 570 documents and drawings were prepared in support of the require- ments, development, production, and qualifica- tion of all CMS products.

The project started at Sandia in 1995 at a low level of effort, but became focused on its current development strategy in 1997. The use-control community realized that code management and PAL system equipment for recoding and manag- ing nuclear weapons developed over 30 to 40 years for securing security, to maintain and depended upon a frustrating variety of different vintages of equipment.

“This culminates eight years of work in both code management and the 161 program that had to come together at the end of November,” says Doug Mangum, Manager of Dept. 2121. “It all came together and worked as expected,” he says.

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World’s smallest microchain drive fabricated at Sandia

Microscopic bicycle-chain look-alike could power multiple MEMS devices or microcamera shutters

By Neal Singer

Except that each link and pivot could rest comfortably atop a human hair, a microchain that closely resembles a bicycle chain has been fabricated at Sandia.

(The distance between chain link centers is 50 microns. The diameter of a human hair is approximately 70 microns.)

Because a single microchain can rotate many drive shafts, the device could make it unnecessary to place many tiny microelectromechanical systems (MEMS) motors in close proximity. Usually, a separate driver powers each MEMS device.

“All those drives take up a lot of real estate on a chip,” says Sandia technician Ed Vernon (264), who has received a patent for the silicon microchain.

The microchain also makes it possible to drive a MEMS device from a motor situated at a distance, again saving considerable space on the MEMS-bearing chip.

The microchain, says Ed, could be used to power microcamera shutters, as larger chains currently do in the macroworld. It could also be used in mechanical timing and decodign.

The 50-link silicon microchain is designed to transmit power somewhat like the drive belt in a 19th-century sewing factory. There, a central engine shaft powered by steam turned drive belts to power distant work stations — for example, sewing machines — before the dawn of the age of electricity.

Chain systems, unlike stroke systems, do not require back-and-forth movements but instead allow for both continuous and intermittent drive translation.

Ed fabricated a microchain rather than a microbelt because though silicon belts are rough and flexible, they are spring-like and produce too much torque on gears not aligned in a straight line. Each chain link, on the other hand, is capable of plus-or-minus 62 degrees rotation with respect to the preceding link, without creating pressure on the support structure. The wide angle means designers can be relatively unconstrained in positioning multiple devices.

The longest span unsupported by gears or bracing is 500 microns. A microchain tensioner is needed to accommodate longer spans.

The multilevel surface-micromachined silicon device was constructed with the aid of Sandia’s patented Summit IV and Summit V technology, which enables construction of complicated MEMS devices.

Overview — Pictured is a microchain. The distance between chain link centers is 50 microns.

Program seeks current, retired Sandians who suspect beryllium exposure

Current and retired Sandia employees who suspect they have been exposed to beryllium while working at the Labs may be eligible for benefits under the Energy Employees Occupational Illness Compensation Program.

Fred Archuleta, who heads up an Energy Employees Compensation Resource Center in Española, will outline who is eligible and what benefits are available during a presentation for Sandia employees and retirees on Jan. 17 from noon to 1 p.m. at the Bldg. 810 auditorium. The presentation will be simultaneously broadcast on Video Sandia as well as video teleconferenced to Sandia/California’s Bldg. 904 auditorium.

Also on hand in Albuquerque will be two claims workers who, following the presentation, will answer questions from employees on an individual basis.

In addition, during the following week case managers from the Española office will be available to assist with processing new claim applications. They will be at a temporary office set up at the Sheraton Uptown in Albuquerque. Office hours will be 9 a.m.-7 p.m., Jan. 29, 30 and 31, and 9 a.m.-noon on Feb. 1.

The Energy Employees Occupational Illness Compensation Program Act was designed to locate people who became ill as a result of exposure to airborne concentrations of the light-weight metal and its alloys while working in the nuclear weapons industry for DOE. Individuals who developed cancer from exposure may be eligible for a $150,000 lump-sum compensation and medical expenses provided through the act.

The Energy Employees Compensation Resource Center in Española is one of 10 around the country designed to assist people exposed to beryllium, silica, or radiation while working in the nuclear weapons industry for DOE, including its contractors or subcontractors.

Claims filed through the Energy Employees Compensation Center will be sent to the Department of Labor regional office in Denver for processing.

More information can be obtained by calling the center at 1-866-272-3622 or by visiting the Department of Labor’s website at www.dol.gov.
A key contributor to Labs’ whole history, Horace Poteet retires after 50 years at Sandia

Projects included radars, US/Soviet Joint Verification Experiments, Taos Hum, ‘black-hat’ studies

By Chris Burroughs

The Cold War was burgeoning, the transistor was a new fangled invention, and many current Sandians weren’t even a twinkle in their parents’ eyes when Horace Poteet (5933) joined the Labs in 1951.

With 50 years of service, among the longest in Sandia’s history, Horace officially retires Jan.14.

“I don’t like to start things I can’t finish,” Horace says. “And I don’t think I can finish another 50 years at Sandia — much as I’d like to.”

During his career at Sandia, Horace has been involved in many projects ranging from radar work to investigating the “Taos Hum,” and from doing “black-hat” studies on coded switches in nuclear weapons to participating in US/Soviet Joint Verification Experiments.

The variety and novelty of the work he performed were among the many reasons he stayed at Sandia five decades.

Horace came to Sandia shortly after obtaining his master’s degree in physics at North Texas State College. He was a young engineer who just wanted to work with electronics.

He started undergraduate school at Texas Wesleyan College in Fort Worth on a Methodist scholarship; his father was a Methodist minister. Knowing that he wanted to study physics and math, he transferred to North Texas State Teachers College in Denton, which had programs more to his liking.

During his final year at North Texas, a recruiter from Bell Labs approached him, suggesting that Horace look at Sandia Corporation as a possible employer.

“I had no notion of what Sandia did,” he says, “but when I came out for the interview I was hooked — both on Sandia and Albuquerque. Sandia hired me as a physicist and immediately put me to work doing electrical engineering. This suited me fine since while I was growing up I was interested in radio. It was the only electronics around.”

He spent part of that first year in the “leper” colony (place where people worked who didn’t have clearances), though he hardly remembers it, and roomed with some other young men also newly hired at the Labs. Mostly about those first months he recalls driving back and forth to Denton in his 1940 Chevy to court his girl, Joy, a recent graduate of Texas State College for Women in Denton. They married on March 23, 1952.

Between 1951 and 1956 he did analysis, design, and testing of MC-60 fuzing radar for the MK-4 bomb as well as advanced fuzing radar development. Then in 1956 he joined the active duty US Naval Reserve where he attended Officer’s Candidate School. He was assigned to the Armed Forces Special Weapons Project, Nuclear Weapons Training Group at Sandia Base — now Kirtland Air Force Base and home of Sandia National Labs.

There he taught maintenance and repair of the MC-1 and MC-3 fuzing radars. It was while he was in the Navy in 1956 that he and his wife purchased their home near San Mateo and Constitution in Albuquerque — the same house where they raised their four sons and, after many modifications, continue to live today. (They’ve had the same telephone number for 46 years.)

After three years in active duty, he returned to Sandia in 1959 and has remained ever since. Horace recalls that when he first came to Sandia, vacuum tubes were in their highest state of development; they were used in everything. The transistor had been invented only a few years earlier.

“I had read about them and heard about them, but I had never seen one,” he says. “I saw my first transistor at Sandia.”

Asked what his most significant and favorite project over the past 50 years has been, Horace is quick to reply: his participation in the US/Soviet Joint Verification Experiments between 1988-1992. The experiments involved underground nuclear tests conducted in August 1988 at the Nevada Test Site and in September 1988 at Semipalatinsk Shagan River Test Site in the then Soviet Union.

They were designed to demonstrate that the Threshold Test Ban Treaty could be verified.

Among the more unusual projects Horace has worked on was the “Taos Hum.” He joined a team of several engineers from Sandia, Los Alamos, the Philips Labs, and the University of New Mexico to study the hum, believed to be a low frequency noise heard by some Taos residents.

“Stories on where the hum came from were rampant,” Horace says. “Some said it was a big government conspiracy and others said it was made by aliens.”

Horace and other team members spent a week at various locations in and around Taos with microphones, antennas, geophones, magnetometers, and other instruments measuring noise. And although he could hear the noise (and not everyone can) — it sounds like a big diesel engine running far off in the distance — no source was found.

In his retirement, Horace says, he has a long “honey-do” list around the house and also plans on taking time to hike, travel, do woodworking — and some technical consulting to Sandia.

“Sandia’s been a marvelous place to work,” Horace says. “It’s been a long and interesting trip. And, for the most part — fun!”

MEMORIES OF SERVICE — Horace Poteet, who is retiring after 50 years, talks of his memories of the early years of Sandia’s history during a visit last week to the National Atomic Museum. (Photo by Randy Montoya)

Horace at work circa 1970.

CONGRATULATIONS HORACE — Executive VP Joan Woodard and Senior VP Roger Hagengruber (5000) congratulate Horace Poteet, center, for 50 years of exceptional service to the country.

Young Horace with wife, Joy, and two of their four children in 1958.

Mountain comes to Mohammed

The mountain came to Mohammed just before the holiday break when the Labs Leadership Team (LLT) participated in a celebration for Horace Poteet, who is retiring after 50 years.

The group, made up of Sandia’s top executives, went to the Center for National Security and Arms Control (CNSAC) building for the celebration that featured a video about Horace’s time at Sandia and a plaque presentation.

Senior VP Roger Hagengruber (5000) said that people who reach their 40th anniversary are invited to attend an LLT meeting generally held in Bldg. 802. But for someone who achieved 50 years at Sandia, the LLT wanted to honor him by going to his work area.

Of Horace, Roger says, “Horace is an example of one who is able to contribute at a high level. He notes that Horace was in one of the first groups selected for Distinguished Member of Technical Staff (DMTS) at Sandia.

“He is an outstanding example of what a DMTS should be,” Roger says. “He is able to move from task to task, quickly become technically capable in a new area, and to reflect credit on Sandia with outstanding performance. A measure of his value is that he would be among the first people selected for any new assignment.”
Nine teams win 2001 Gold President’s Quality Awards

By Chris Burroughs

Nine teams will be named Gold Award winners Jan. 15 during the ninth annual Sandia President’s Quality Awards (PQA) program. Also to be awarded will be 12 silver awards and six turquoise awards.

Mary Nation (12142), PQA project manager, says this year’s applications for the awards were "the best that PQA has ever seen."

"Many," she adds, "were written in the days after Sept. 11. We saw enormous pride in our jobs reflected in the applications. This has been a great year for the program."

The PQA Program is designed to provide a self-evaluation of project activities. It encourages Sandia teams to identify customer needs and requirements, implement improved processes, and monitor the quality of goods and services provided to customers.

Independent PQA examiners evaluate all the teams’ applications and recommend recipients of the gold, silver, and turquoise awards.

Teams’ applications must have achieved and sustained excellent results relative to customer requirements. Silver winners had to achieve and sustain very good to excellent results, and Turquoise winners had to show very good results relative to key customers.

Here are this year’s Gold Award recipients:

Infrastructure System Engineering Study (ISES)

In late 2000 the Small Infrastructure Leader- ship Team chartered an Infrastructure System Engineering Study (ISES) to better understand and find solutions to three "visionary challenges" Sandia faces in achieving its new vision and highest goal: The challenges: ensure a world-class workforce, provide a great work envi- ronment to enable people's performance each day, and regain Sandia's self-governance by restoring trust. Working with two nationally recognized system consultants, the ISES team used system engineering and project management processes to understand the problems and to create and deliver the desired system solution and recommendations on schedule. Executive management’s subsequent decision to implement the ISES design is expected to irreversibly improve the way enabling services are delivered to the mission customers.

Team members include: Douglas Weaver (7001), Curtis Johnson (7000), Terry Bahill (non Sandedian), Wanda Rechdel (10003), Douglas Blooomquist (1630), James Bryson (6431), John Concell (10006), Rosemary Dunivan (6001), Lindsay Ferguson (3020), Larry Ellis (6500), Emily Soares (9329), Linda Houston (8520), Marlene Kelley (10004), Timothy Knewitz (7002), Denise Krupka (7002), Christopher Madigan (12111), Daniel Rondouc (13003), Edward Saucier (3051), and Susan Schear (9412).

Information Design Assurance Red Team (IDART™) Program

The Sandia Information Design Assurance Red Team (IDART™) developed assessment methodologies, processes, metrics, and tools that are replicable, defendable, effective, and efficient. These methodologies are currently used in assisting national security-focused customers in improving the security robustness of their information systems. In addition, Sandia IDART continues to develop a program designed to provide awareness on security vulnerabilities, education on security technologies, and improvement on the security design of complex information systems. Red Team Assessments are targeted assessments used to identify vulnerabilities in Information Technology (IT) systems from an adversarial perspective. Although assessments that actively engage systems are best used when security policy and procedures are institutionalized, the methodology developed can be applied throughout the life cycle of an information system. The assessments include analysis of nightmare consequences, identification of potential vulnerabilities and how they might be exploited to achieve those nightmare consequences, and recommendations for mitigation.

Core team members include: Ruth Duggan (6512), Michael Skroch (6512), Jennifer Depoy (6512), David Duggan (6516), Stephen Kaulman (6512), Mary Lopez-Carter (6517), Martin Mckillip (2305), Thomas Obenauf (6514), Raymond Parks (6512), and Reynold Tamashiro (6517). Many others throughout SNL contributed to this effort.

IT/CS Retraining Program

The Information Technology/Computer Sci- ence (IT/CS) Retraining Program formed in March 2000 to retrain current Sandia employees in skills related to information technology—an area where critical skill shortages exist lab-wide. The first group of students started in May 2000. To date 45 Sandians have successfully completed the program. This fast-track, challenging program addresses the increasingly critical IT/CS skills, hiring limitations, competing exter- nal market demands for these skills, and Sandia’s commitment to enhance employee career develop- ment. Unique characteristics of the program include: cooperative partnerships with line orga- nizations; customized curriculum; creation of a new organization for the students in New Mex- icos small training center (the program); and a mentorship component to help ensure that students successfully move into their new organi- zations. The program focuses on 1) fundamental software development; 2) data exploitation and analysis; 3) system administra- tion; and 4) retraining in information systems and computer engineering. The final three are administered in New Mexico. Track four is administered at the Sandia/California site.

Team members include: Belinda Holley, Linda Wilson, Jodi Case (all 3021), Sharon Chapas (6543, now ret.), William Cook (6542), Patricia Cover (3020), Larry Ellis (6500), Emily Soares (9329), Sheryl Satterlee, Swen Swartz (9329), and Steven Weissman (6523).

Back Injury Reduction Program (BIRP)

The Back Injury Reduction Program (BIRP), originally conceived in 1982 in the Physical Therapy Clinic, provides on-site, job-specific information, education, and skills to Sandia employees, contractors, and management. It is designed to reduce the number of occupational and nonoccupational back injuries, decrease costs associated with back injuries (days away and restricted days), promote employee health and safety, and empower individuals to be proactive about back health and safety. In April 1999 BIRP evolved into a cross-team program to support a broader customer base, using the inte- grated expertise of Physical Therapy (PS), Salud, and Disability Management. As of December 2001 the number of back-related incidents has been cut by 45 percent, days away for back-related incidents have been reduced 100 percent, and restricted days have decreased 50 percent. In addition, costs associated with restricted days and days-away back-related injuries for organiza- tions participating in BIRP have declined from $27,000 to $5,400. BIRP participation has remained high, with an average rating greater than 8.50 for the past three years.

Team members include: Suzu (3333), Judith Boswell, Phillip Block, Eileen Burch (all 3333), Larry Clevenger (3300), Linda Duffy, Jen- nifer Hamrah, Renee Holland, Sara McCabe, Debra McGuire, Bridget McDermott, Maria Sandervell, Randy Jo (3333), Lisa Teves, and Brian Trujillo (both 3333).

Computer Support Unit Operations

Computer Support Units (CSUs) were estab- lished in the mid-1990s to provide a standard level of desktop and laptop computer service to Sandians. As the customer base increased, well- designed processes and metrics became a key to successful operation. Beginning in FY99, basic CSU service became and remains an indirectly funded “utility” available to all computer users at Sandia, including on-site contractors. The CSU organization has worked extensively with Sandia management to improve support and reduce costs through standardization of CSU services and of the computing environment at Sandia. Most CSUs are staffed through contractor-directed con- tracts, with each CSU overseen by a project man- ager who is a Sandia employee. The exceptions are where many customers are involved in activi- ties that require company-wide support or SCI clearances, so it is more appropriate to staff that CSU entirely with Sandia employees. All CSUs are within one department, the CSU Opera- tions Department.

Team members include: Donald Rogers, Charles Shirley (both 9623), Mary Adams (9624), Dennis Bonvouloir, Kevin Crumwel (both 9623), Cynthia Caton, Debbie Chavez, Jerry Davis, (Continued on next page)
Computer retraining PQA gold winner really shines

Sandra’s two-year-old Information Technol- ogy/Computer Science IT/CS Retraining Pro- gram, recipient of a 2001 Gold President’s Quality Award, is helping to solve a Labs-wide problem — filling critical jobs in computer science. “We are very proud to receive this award,” says Linda Wilson (3021), a co-project lead. “This has been a truly unique program that is a win-win situation for both the students and Sandia. The stu- dents learn a new skill and Sandia gets highly trained infor- mation technology professionals. The program was created to help meet Sandia’s critical need for information tech- nology and computer science skills. It enables existing Sandia staff to acquire new skills in these areas. A fast-track program for retraining individuals to perform work in a number of organizations throughout Sandia, it is divided into four tracks designed to equip students to perform specific job functions.” Many students are Sandia scientists and engineers who already have master’s degrees and PhDs. During the six to eight months that students are in the New Mexico program, they leave their old jobs and move into a new organization, Retraining in Information Sci- ence and Engineering (RISE) Dept. 3010. They take rigorous and challenging classes offered by the National Technological University and the University of New Mexico, as well as a Sandia- specific curriculum developed on-site. Mike Teto (6536), who is a manager in Cen- ter 6500 that hires many of the graduates, gave high praise for the program during last month’s graduation ceremony. “We are pleased with our graduates and with their contributions,” Mike said. “Overall, we have been pleased to have nine IT/CS retraining graduates over the last year. We have put them into some of our most important and challeng- ing projects. They are helping to develop the solutions we are creating. That is high praise for this pro- gram.” Other graduates were assigned to Centers 1600, 5100, 5300, 9100, and 9300. Students, too, give a big “thumbs up” for the program. Sandy Ballard (6533), who has been at Sandia for 15 years and has a PhD in psychophysics, saw the program as a way “to take a right- hand turn and do something different.” In the long run, she added, it is a way to “open up” their engineering students. Previous student Tracy Woolever (3133), who has an MBA in accounting and is a CPA, worked on the “travel side of the house” — working with airline ticket databases. She saw the program as a way to blend her accounting and computing skills. “Coming from the administrative side, the program gave me a whole new slant on Sandia,” Tracy said. “It was interesting getting to know the scientists and engineers and learn about their projects.” She graduated in December 2001. She started Jan. 2 working in Dept. 3133, building a security bidding database. Sandia/Columbia worked with the students in a different way. Students there remained in their current positions and took classes on-site in the University of California-Berkeley and Davis. Ten more students completed the training in December 2001. They return to their current positions and move into new roles and skill base to perform tasks previously beyond their capabilities. A unified, general comment heard from the students is the appreciation of being able to gain new skills at work while growing their personal careers. The camaraderie of the students working together, helping one another learn and study, was an additional benefit. Since the program began in June 2000, 45 people have completed the rigorous courses and are now working in new areas at the Labs. Seven others are currently enrolled in the program.

PQA winners

(Continued from preceding page)

Craig Hansen, Wilda Harms, Kenneth Hatfield, James House, Samuel Jones, Mark Judy (all 9623), James Kelly (9624), Joseph Kehyka, Tom Klitsner, Rado Kovachevich, David Ortiz, Dorothy Rarick, Charles Jojola (2996), Faye Long (10252), Rosalie Ornum (14405), Charles Walker (14171), and Linda Wilson (9513), co-project lead, and Bill Cook, Manager of Retraining in Information Science and Engineering (RISE) Dept. 3010.

MC4300 neutron tube product realization

A neutron tube is a miniature ion beam acceler- ator in which deuterium ions are accelerated to a tritium-loaded target. The resulting D-T fusion reaction produces the neutrons, which are used to initiate weapon nuclear fission reactions. The MC4300 neutron tube is positioned as a broad-use, limited-lifetime replacement for the MC3854-like neutron tubes in use today. Like the MC277 neutron tube cur- rently in production at Sandia, the MC4300 is a focal ion beam neutron tube, using production capabilities already existing for the MC277. Performance requirements for the applications are very similar, yet the size requirement for the MC4300 is half the volume, creating significant challenges. The MC4300 Product Realization Team has embraced these challenges, meeting them with a simplified design, greatly easing manufac- turing and exceeding performance require- ments in a number of ways.

Team members include: Carla Busick (2564), Michelle Fleming (12640), John Brainard (2564), Scott Gillespie (14406), Ronald Goeye (14171), Charles Jollia (2996), Faye Long (10252), Rosalie Lopez-Spinello (14405), Kevin Mcbride (2996), Keith Meredith (14405), Gregory Neugebauer (2564), Gary Presly (14402), Juan Romero (14171), Matthew Senkov (14405), John Stephens (141812), Fernanda Uribe (14171), David Van Ornum (14405), Charles Walker (14171), and David Zamora (14172).

Dinero Compensation Review Tool

Dinero is an Excel-based tool designed to sup- port and facilitate the corporate Compensation and Personnel Compensation processes. It was designed and implemented in 1998 to conform to a market- focused compensation structure and align pay with an employee’s value of contribution. From a pro- gram administration perspective, Dinero provides both division and center users the ability to receive and return their compensation and performance review data for their employees. In addition, it allows managers to conduct “what if” scenarios of pay decisions, thereby understanding the impacts of those decisions. At the highest level, compensa- tion data needs to be securely distributed and returned in a standardized format. Dinero meets this need by providing data at the desktop, security and access controlled, and the ability to transmit data in a timely and efficient way. Dinero has been continually improved to meet and sur- pass customers’ desires by offering automated tools and exceedingly more flexible analysis. Team members include: Kelli Strader (3052), Roberta Jaramillo (9513), Kimberly Brown (3052), Richard Garcia (3031), and Mary Roehrig (6535).

Oracle 11i Procurement E-Learning Project Team

Moving to an enterprise E-Commerce solution such as Oracle can be successfully adapted at Sandia and the Labs’ suppliers only through suc- cessful user training. The Oracle 11i Procurement E-Learning Project Team has begun this journey by developing six web-based e-learning course mod- ules with simulations that help increase the authenticity of the learning program — thus mak- ing it more transferable and motivating. In addi- tion, the e-learning modules complement the Labs’ E-Commerce strategy by providing the right infor- mation to the right customers at the right time, even though the content is constantly changing.

Team members include: Theresa Carson (10205), Judith Hubbard (10206), Carla Forrest (3021), Shelby Green (non-Sandian), Frank Lujan III (10305), Christine Tomlin (10206), and Linda Wilson (3021).

SNL/CA Mixed Waste Management

The SNL/CA Waste Management Group in Organization 8516, Environmental Operations, dis- poses mixed hazardous and radioactive waste from the California site on behalf of DOE Kirtland Area and Albuquerque Operations offices. The most recent activity began in August 1999 during transi- tion, survey, and decontamination of Bldg. 913 and has continued. These wastes contain both a haz- ardous chemical contaminant, regulated by Califor- nia Department of Toxic Substances Control (DTSC) rules and permits, and radioactive material contaminant, regulated by DOE rules and orders. Each step of the mixed waste management process — characterization, handling, packaging, trans- portation, treatment, storage, and disposal — must meet customer and regulatory requirements for both the hazardous and radioactive contaminants in the waste. Sandia/California Waste Management employs a quality process for disposal of mixed wastes derived from nuclear quality assurance requirements for low-level radioactive waste man- agement. This quality process allowed Sandia/ California to successfully establish a mixed waste disposal program and meet DOE mission needs.

Team members include: James Bartel, Deanna Dicker (both 8516), John Betita (8523), Earl Con- way (3134), Laurie Farren, Leighton Ford, Sarah O’Connor (all 8516), Steven Orth (8119), and Warren Tenbrook (8516).
Mileposts

Photos by Iris Aboytes

Randall King
35 5913

Robert Varga
35 14181

Douglas Weaver
35 7001

Joseph Bonahoom
30 2612

Raymond Decker
30 2541

Doug Greenway
30 1751

Richard Brazfield
25 2111

Carolyn Bucken
25 9821

James Dawson
25 10824

Michael Deveney
25 1734

Rick Esler
25 15212

Mario Garcia
25 3114

Richard Heintzleman
25 2333

Sharon Jensen
25 5800

Martin Jinzo
25 15322

Duane Patrick
25 9134

Charles Randour
25 5921

Joseph Roesch
25 5850

J. David Sealey
25 3113

Paul Smith
25 10821

Judd Hollister
15 3132

James Jones
15 15272

Jeffrey Kawola
15 9126

Dennis King
15 10827

Michal McDuffie
15 12620

Olivia Salisbury
25 3031

Samuel Key
23 9142

Fredrico Mora
15 9334

William Peters
15 10251

Richard Shagam
15 2612

Rick Eisler
25 15212

Gerrie Garcia
27 10825

Raymond Patrick
30 6516

Kathy Marder
20 5951

Barry Marder
26 1674

Olivia Salisbury
25 3031

Samuel Key
23 9142

Randy Shul
15 1763

Gerard Sleepe
15 2613

Frank Trowbridge
15 2616

Photos by Iris Aboytes

Recent Retirees
**MISCELLANEOUS**

**DESK & CREDAZEA, large natural oak, 5-ft., w/chair, $250. Jones, 100, $150. Natt, 903-718.**

**GUARDIAN DUCK, 4 1/4 cat, Weaver, 524-3782.**

**面积的，sawhorse, $10.00, 706-246-0228.**

**AREA VACUUM ATTACHMENT, 4000 CFM, 307-637-2153.**

**PEacademy, 732-5239.**

**ACCORDIAN DOORS, 2-ft. wide, free.**

**COUCH, full-size, 8 ft., tan color, $500.**

**PIANO, Koehler & Campbell, very good condition, $1250.**

**GUARD RINGS, 2-1/4 carat, Butterfield, 946-2793.**

**FREE-STANDING WOOD STOVE TONG,}
If you saw the current remake of the Hollywood movie, Ocean's Eleven, you might have found something weirdly familiar in the terminology of some scenes. “Pinch,” employed as a plot device to short out the electricity of Las Vegas, Nev., in the film, 11 con artists employ a physics device called “the pinch” to help them rob a vault containing the riches of three casinos. Set off in the middle of Las Vegas, the pinch allegedly detonates an intense “electromagnetic pulse” (EMP) that blacks out the city’s power grid for a few moments. “I enjoyed the movie and the ‘pinch’ was an amazing twist but had little to do with science,” says Jeff Quintenz (1600), director of Sandia’s Pulsed Power Sciences Center housing Sandia’s Z pinch machine — the world’s most powerful producer of X-rays. “I can confirm that Sandia’s Z machine is the inspiration for the creative ‘pinch’ seen in the film,” says Neal Singer (12640), who spent several hours more than a year ago talking to the prop people from the movie about the Z pinch, which creates lightning-like skeins of startling beauty for a few billionths of a second as it fires. “We discussed Z’s possibilities as a plot mechanism,” he says. “I explained it might be hard to move the 100-foot-diameter Z machine to the top of a station wagon and not have it stop them, obviously.” At least the characters ultimately fitted the pinch device in a van rather than a station wagon.

The pinch is “a poor EMP source,” says Jeff. “We have on occasion interfered with the sensitive electronics in cameras and computers located in the same laboratory space, but to my knowledge we have never caused a problem with any electronics or electrical system outside the accelerator building itself.”

The Z pinch gets its name from the fact that an initial burst of electricity creates a magnetic field that compresses or “pinches” a gas of charged particles along the vertical direction, denoted by scientists as the “z” direction. Like the con-artist plot itself, the movie’s pinch device is a well-executed deception. According to a news release by Ben Stein from the American Institute of Physics, which sees the movie as a chance to teach some physics, “But perhaps even the filmmakers themselves did not realize that the pinch pulls off the ultimate swindle… The movie’s pinch violates the most fundamental principle of physics, the conservation of energy, which says that energy can be converted from one form to another but not created or destroyed. Any van-sized electricity source, not just a pinch, is just too small to store the energy required to produce a blackout-generating EMP.”

— Neal Singer

Retirees (only):
To notify the Labs of changes in address, call or write Carol Wade, Benefits Dept. D 3341, at 505-844-9705, Mail Stop 1021, SNL, Albuquerque, NM 87185-1021.

Others:
To receive the Lab News or to change the address (except retirees), contact Iris Aboytes, Media Relations and Communications Dept. 122640, telephone 505-844-2282, e-mail iaboyte@sandia.gov, or Mail Stop 0165, SNL, Albuquerque, NM 87185-0165.

Nominations sought for this year's Employee Recognition Awards

Nominations for the Ninth Annual Employee Recognition Awards program are being accepted via the ERA web site from Jan. 14-31. The ERA program, launched by Lockheed Martin soon after it assumed management of the Labs, commends superior results in four general categories, one for teams and three — technical excellence, exceptional service and leadership — for individuals. Nomination forms with detailed instructions are available from the web at Sandia's Internal Web Homepage or at http://www-irn.sandia.gov/era/02era.html.

The primary requirement of the nomination process is that the nominee’s accomplishments be described in 250 words or less. An optional one-page supplement may be added for supporting evidence. Individual nominees must be current, regular, Sandia employees on roll since Oct. 1, 2000. Team members may include non-regular employees and contractors.

Anyone may nominate individuals or teams. A separate nomination form must be submitted for each individual and team nomination. The review process and final selections take place in each Division. Divisions are allocated slots for awardees based on their division on-roll population as of October 2001. A combined total of 122 individuals and teams will receive corporate Employee Recognition Awards.

ERA Individual winners and designated representatives from winning teams will be recognized at the Corporate Employee Recognition Night, Saturday, June 29, 2002. NOVA awards, too!

From Sandia’s 2002 ERA winners, Paul Robinson and Joan Woodard will select the two nominees that will represent Sandia in the Lockheed Martin NOVA awards program. This prestigious program honors 50 individuals and teams across the Lockheed Martin Corporation who have made outstanding contributions to Lockheed Martin Mission Success. NOVA awardees will attend a Lockheed Martin Corporate celebration in Washington, D.C.