Sandia plays role in DHS program to bolster commuter train security

Sandia helps evaluate several technologies that aim to prevent rail bombings

By John German

Several Sandians worked alongside transit officials at a security checkpoint in a New Jersey commuter train station recently as part of a program to improve rail security.

The Department of Homeland Security (DHS) program, funded by Congress shortly after the 2004 commuter train bombings in Madrid, Spain, is intended to identify security approaches that may help prevent attacks on US rail transit systems.

The two-week field demonstration in July, which tested five new detection systems provided by vendors, took place at the Port Authority of New York and New Jersey Exchange Place Station in Jersey City. The trials involved checking rail passengers for explosive objects hidden underneath clothing as they passed through a checkpoint.

Its focus was on large threats such as explosive vests and package bombs, says project leader Jim Phelan of Contraband Detection Dept. 6418. Two other Sandians, Eric Varley (6418) and Andrew Vaughn (8134), served as technology experts during the trials and worked alongside Transportation Security Administration screeners.

“Security systems for passenger rail are challenged by open station design, ease and speed of entry, and low-cost features... .”

Five systems tested

The five demonstrated systems employ various standoff imaging techniques — including millimeter wave, infrared thermography, and terahertz imaging technologies — to detect large threat objects as commuters pass walkthrough checkpoints. A few of the systems included automatic threat recognition.

The field demonstration in Jersey City followed a round of laboratory testing.

(Continued on page 4)

Tom Hunter addresses all-hands meeting . . .

Labs’ new strategic plan aims to move Sandia to a higher plateau

By Bill Murphy

Labs Director Tom Hunter, addressing a standing-room-only all-hands meeting at the Steve Schiff Auditorium last week, laid out the context in which the Labs’ new strategic plan has been developed and why the plan is so vital to Sandia’s continued success. The new plan is being rolled out across the Labs over the next couple of weeks.

Regardless of the specific course the future takes, Tom said, there will be challenges for the nation that Sandia can help address.

The presentation, video-linked to California, Tonopah, Carlsbad, Pantex, and Washington, opened with a video that highlighted Tom’s comments at the 2006 Spring Leadership Forum. In the video, Tom rolled off a series of the surprising twists and turns the world has taken over the past decade. He concluded, “The future is never what you expect it to be, but you know it will be different.”

Nation will expect more

Regardless of the specific course the future takes, Tom said, there will be challenges for the nation that Sandia can help address.

As the nation faces the challenges of the 21st century, Tom said, the American people are going to expect more of all of their institutions, including the national laboratories. The nation, Tom said, is demanding that the national laboratories “rise above where they are today, because business as usual will not be competitive in the future.”

That expectation, Tom said, definitely applies to Sandia. “We operate pretty well, but not well enough for the future.”

The strategic plan, the result of more than a year’s effort by the Labora-
What's what

Something relatively new has crept into our lab lexicon — ECP. It's a dual-purpose initialism/ acronym for member of the employee giving program, member of the work community, or member of the work community, member of the work community, member of the work community. Slang for it's no problem, but the pronunciation is unclear. Is it ECP (like "go") or now (like "cow")?

Of course, becoming ECP or ECP (whichever it is, and the plural form in either case) isn't the first change. We now attend all-minds or all-hearts meetings, pursue customers, align strategic goals, hold informal seminars for stakeholders, etc., etc., etc.

(Sigh!) It's used to be much simpler. When we were just plain old Sandians and occasionally invited to all-hand meetings to learn about our latest missions in the interest of national security, and pursuit of funding was left to the congressional constituents of projects we were tasked with.

Yeah, it used to be a lot simpler — but then, the world was a much simpler place, too, when there was only Cold War adversary, three TV networks, Chevys, Fords, and Plymouths, and a radio station that played music that everyone — everyone! — listened to. (Sigh!)

It's worse than we feared.

Still not quite believing Albuquerque's two Krispy Kreme stores closed. In the last week, we learned that all eight of the donut franchise stores in Arizona shut their doors at the same time. Which moved Larry Rogers (10263) to wonder, "As sources shrink, can a Krispy Kreme black market be far behind?"

Could happen. Remember the 1972 movie Smokey and the Bandit? The movie was full of stunts and laughs, but the premise was true — a semi-load of semi-cult Coors beer headed east from the Rocky Mountains, because it was unavailable for sale legally much east of the mountains. Go to a Big Race course just about any large racing gathering anywhere at that time and you'd find at least one van in a parking lot peddling bootleg Coors beer out the back door at prices that made you wonder if it was made with "pure Rocky Mountain spring water" or water imported from another planet (not Pluto, of course).

So don't be surprised if one of these Fridays a block or so outside the base, you slow for the line of gate-check traffic and some guy walks up to your car, looks around nervously, and says, "Psst. . . Hey, buddy, wanna buy some donuts?"

In one of those shake-your-head-in-disbelief stories, The Associated Press reported recently that in Santa Cruz, Calif., only Rogers (10263) to wonder, "As sources shrink, can a Krispy Kreme black market be far behind?"

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Thunderbirds to hear about sleep disorder issues

Sandia Thunderbirds (and all interested persons) will hear about sleep disorder issues this month from Lisa Teves, a health educator in Sandia's Preventive Health Services group in Health Services Dept. 3331. Lisa has worked with people with sleep disorders for the past five years. The free-of-charge meetings are Monday, Sept. 11, 11:30 a.m. at the Mountain View Club on Kirtland Air Force Base. Lisa addresses a range of sleep issues: difficulty falling asleep or staying asleep, or feeling tired even during the day. After the presentation there will be an election of Thunderbird officers for 2007, followed by an ice cream social. The program, as always, is preceded by an optional lunch.

The Sandia Thunderbirds is Sandia's retiree club. Rod Boenig at 845-6977 for information of Thunderbird officers for 2007, followed by an ice cream social. The program, as always, is preceded by an optional lunch.

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This demonstration network elevates cell phone cameras to surveillance tools

By Nancy Garcia

Take common cell phone cameras combined with parallel-processing algorithms and pattern-recognition capability, add radio frequency links, and get an economical and robust wireless sensor network available to contractors, critical infrastructures, emergency scenes, or other potential danger spots.

That’s the idea behind DISCERN, the Distributed Camera Recognition Network, a Laboratory Directed Research and Development (LDRD) effort coming to an end this month with an anticipated demonstration of a small set of nodes.

“We’re sort of taking the ‘cheap, simple, plentiful approach,’” says Dept. 8961 Manager MIchiko Suzuki.

Although the project uses simple components in a novel slant on wireless sensor networks, it incorporates high-performance concepts by treating the system as a distributed computer, building on years of research to push the limits on computer visualization and distributed systems. The flexible, low-power system is scalable and can be extended to other sensor systems. Embedding each node with artificial intelligence to recognize features, collaborate, and relay relevant information has several advantages, says principal investigator Teresa Ko (8961).

“You only send images that tell you something,” she says. Not funnelling pictures continuously to a central base station conserves power and relieves human operators of monotonous surveillance in which performance can falter.

Each node has an eraser-sized Agilent Cyclops camera atop a compact Crossbow Stargate processor embedded with pattern-recognition programming. The individual nodes recognize visual changes, extract features, and alert neighboring nodes, which collaborate to figure out the exact position and direction of movement. Decisions are made from machine learning derived from statistical probabilities.

Because of limited communication bandwidth, parallelism, and machine learning at each node, the algorithm works by treating the system as a distributed computer, incorporating high-performance components in a novel slant on wireless sensor networks.

The work leverages previous wireless sensing network research at Sandia with the image sensor manufacturer, Agilent, and the Faculty Monitoring LDRD. The development is intended to culminate in a small network demonstration in September. The work leverages previous wireless sensing network projects, such as TALON (Target Acquisition, Location, Observation, and Neutralization), SDAC (Sense, Decide, Act, Communicate), HERD (Hybrid Emission Radiation Detection), MASS (Modular Architecture Sensor System), and the Facility Monitoring LDRD.

Team members include Teresa, Embedded Research Institute cofounders Nina Berry and Rob Armstrong, and Michael Chen (all 8961), and Jeff Carlson (15211). Additional collaborators include Ron Kyker (8245), Jesse Davis (formerly of 8961), Phillip Kegelmeyer (8141), Doug Stark (8226), Chris Kershaw (8252), and Grace Soh (8235).

Intern Maritina Lee worked on the graphical user interface in 2005. Also Leo Smuzel and Keith McGuire are interns working on the demo system. Craig Ulmer (8963) is working on networking issues, and Joe Kenny (8961) is working on power management.

Can I use an exercise ball instead of an office chair? . . . and more

Q: Sometimes I’m sitting in my office and having a hard time staying awake. I was thinking about bringing in one of those exercise balls to sit on not only because of its “active sitting” capabilities but also because it might help me stay more alert. The only problem I saw with that was the possibility that ES&H might call it unsafe. Would I be allowed to use a ball as a part-time replacement for my desk chair?

A: I would not recommend using an exercise ball as a substitute for an office chair. At Sandia we have had incidents of employees sitting on a ball and having them rupture and falling off the balls. There is no assurance that a ball will help you stay awake. It is much easier to fall off than out of a chair if you happen to doze off. I would suggest a stand/sit workstation. Standing periodically and working would certainly be more beneficial to your general health and safety.

— Larry Suzuki (3331-2)

Q: Sandia’s gardeners and landscapers do a fantastic job of keeping Sandia looking nice. We have upgraded or damaged areas look like a bomb hit it, and it just looks awful. Are the contractors responsible for putting back the landscaping they destroy or remove? If so, and they don’t do it, can Sandia withhold payment to them to make the repairs? There is another digging job going on by my building and I shudder to think of what I will have to look at when they are finished. A previous job that was done damaged the chain link fence, and the gates have been lying on the ground for many months.

A: Contractors are responsible for restoring landscaped areas based on what requirements are contained in project contract specifications. In most all cases it is their responsibility to restore areas to original conditions since this requirement is placed in the project scope. There could be circumstances where we would not want the area restored immediately if subsequent work in the area would affect the same landscaping.

Payment to contractors is made on a schedule of values, meaning as work is completed in stages the contractor is paid for what has been completed. Therefore, until the contractor finishes the scope of work in the contract they are not paid in full.

If you identify anything that you believe needs repair, please contact the LDRD office at 844-4573 and someone from Facilities will investigate.

— Lynnwood Dukes (10860)

Q: Why is it that the ES&H Organization expects everybody to spend time completing an ergonomic self-assessment and taking ergonomics seriously (which my organization does) but the ES&H Organization itself makes many of their employees get their desk chairs from Reapplication? Reapplication is where most of us send old chairs that are no longer in good working condition. Shouldn’t the ES&H Organization be setting the standard for the company in ES&H matters and taking care of its own employees?

A: I wish I could contact you directly to explain our aggressive ergo program within the center. All employees are aware that they are entitled to have a comfortable and ergonomically designed work area. Those who have questions, issues, or health concerns are set up for an ergo evaluation, the same as the rest of the Lab. If employees have special needs, such as a special chair, they are encouraged to see if the appropriate furniture is available in Reapplication. If a solution cannot be found in Reapplication, we purchase the necessary furniture or equipment.

Employee safety and health is our number one concern. Using cost saving resources is a smart way to do business.

— Phil Newman (10300)
All-hands

(Continued from page 1)

ory Leadership Team, with support from staff across the Laboratory, assumes the Labs must follow to meet the new, higher level of expectations.

The underlying premise of the plan — and the key to its success — is that Sandians at all levels need to internalize the Labs' strategic intent (see "Sandia's strategic intent" this page). Tom summarized that intent by noting that in answer to a new strategic management group, Laboratory Transformation, headed by Executive VP John Stichman. (VP Lenny Martinez has been tapped to lead the new Enterprise Transformation Division 9000.) And it was the theme of transformation — the need for the Labs to adapt to a new geopolitical national security environment — that colored everything Tom said. The Labs future, ultimately, hinges on its ability to transform.

"The plateau of what we must go is much higher than the plateau where we are.

There are several immediate and near-term implications of the new plan. It sees the nuclear weapons program and the combined ITS programs as each representing about 50 percent of the Labs' operating budget within a few years.

Vivid Description: We are widely recognized as a national leader in preventing technological surprise, in anticipating threats, in providing innovative, science-based systems-engineering solutions to our nation's most challenging national security problems. Sandia's strategic intent is to become the laboratory that the US turns to first in innovative, science-based systems-engineering solutions to our nation's most challenging national security problems, and in managing the Laboratories in a way that inspires customer confidence. The excitement and importance of our work, our exemplary work environment, our partnerships with academia, industry, and other partners, and our record of historic contributions help us to become the laboratory that the US turns to first for innovative, science-based systems-engineering solutions to our nation's most challenging national security problems.

Mission: Committed to "science with the mission in mind," Sandia creates innovative, science-based, systems-engineering solutions that:

- Sustain, modernize, and protect our national infrastructures, and
- Protect our national infrastructures, and
- Sustain, modernize, and protect our critical resources.

Radar security

evaluations at Sandia of the five systems. For the lab tests Sandians built mock bombs, including explosive vests and belts, to understand system performance against a range of threats. They also tested the systems for false alarm rates, passing through the mock checkpoints with concealed cell phones, PDAs, and other commonly carried objects.

It's been a whirlwind," says Jim of the activity leading up to the field tests.

The first trials in New Jersey were the third in a series of field exercises that are part of the overall DHS program. The first, in June at a MARTA station in Atlanta, Ga., evaluated dogs specially trained to sniff out explosive vapors coming off passengers' fingers, including those carrying explosives. The dogs were trained via an Auburn University "vapor wake canine" process. Andy Vaughn led the canine field tests and evaluation, with participation from Oak Ridge National Lab and the Atlanta Police Department bomb squad.

The second field exercise, in June at a Maryland Transit Administration station in Baltimore, tested two developmental fare-card vending systems that detect trace explosives residue on passengers' fingers. Four Sandians — Dave Hannum (6418), Mary Mitchell (6418), Akinbayowa Falase (6115), and Jim — planned and performed the field test and served as technical advisors.

Next step: assessment

Sandians will now begin assessing the systems and approaches based on the data gathered during the lab evaluations and field tests. As part of the DHS program, Oak Ridge National Lab also is using enterprise modeling to assess the greater impact of new security systems on rail transit in terms of delays, costs, manpower, and other factors.

This has been a great project in demonstrating where technology can meet some of these needs, and how much further it needs to go," says Jim.

Traditionally, nuclear weapons has accounted for the majority — even a substantial majority — of the operating budget. Within just a year or two, the actual majority of income may be for non-nuclear program work.

There's particular challenge to that new trend: Historically, DOE has invested hugely in key Labs capabilities and infrastructure. As ITS programs assume a larger role in the Labs mission space, Tom asked rhetorically, will those customers be willing to make strategic investments in the Labs' capabilities to the extent that DOE has? There are some positive indicators in that regard, but the challenge — and the concern — is still there.

As the Labs move into the future, the FTE load will change — through a combination of attrition and a slightly slowed down hiring program — from a current level of about 8,500 employees to an FY10 estimated level of about 8,200 employees.

Tom spoke in some detail about benefits costs and the challenges they pose for the Labs. He also addressed the compensation package just approved by DOE for the coming year.

Regarding that package, Tom noted that DOE has accepted the Labs' principle of matching salaries to market. As a result of the new package, to be outlined in detail in mid-September, provides an overall compensation improvement of more than five percent.

That's the average Labs-wide; raises vary according to current market valuations for different job classes. Individual raises also are tied to annual performance reviews.

To see Tom's entire presentation in streaming video, including his answers to a number of questions at the end of the session, go to:

http://as4inl.sm.sandia.gov/mediastilviewer/ FrontEnd/FromTheDirector/FakeJay/


Sandia's strategic intent

Sandia's strategic intent is a combination of its core purpose statement, its vision statement, and supporting statements presented here.

Core Purpose: Exceptional service in the national interest.

Vision: Sandia National Laboratories is the provider of innovative, science-based, systems-engineering solutions to our nation's most challenging national security problems.

Highest Goal: Sandia's highest goal is to become the laboratory that the US turns to first for innovative, science-based systems-engineering solutions to our nation's most challenging national security problems, and in managing the Laboratories in a way that inspires customer confidence. The excitement and importance of our work, our exemplary work environment, our partnerships with academia, industry, and other partners, and our record of historic contributions help us to attract exceptional staff. Our employees are recognized by their professional peers for their outstanding contributions.

Mission: Committed to "science with the mission in mind," Sandia creates innovative, science-based, systems-engineering solutions that:

- Sustain, modernize, and protect our nuclear arsenal,
- Prevent the spread of weapons of mass destruction,
- Provide new capabilities for national defense,
- Defend against terrorism,
- Protect our national infrastructures, and ensure stable sources of energy and other critical resources.
CINT opening

(Continued from page 1)

When Teller obliged, only to find his keys missing, he later said, "I'm so pleased we can fund this building to have here," she said. "Dr. Hunter," she said, turning from the podium to face Tom, "this is another example of a line-item project well-managed by Sandia.

Terry Wallace, LANL Acting principal associate director, spoke about the appropriateness of "integrating Los Alamos and Sandia around a new type of science." He said that the Building 26 "stretch" target to reduce it to 2.2.

The highest injury rate continues to be in the areas of repetitive trauma/motion, slip/fall/pin/chafing, lifting/carrying/moving, and struck by/against. But each of those areas have seen dramatic reductions.

Efforts to reduce accident rates really took hold last year at Sandia when Labs management launched a new "Best in Class" initiative to drive a change in safety culture and performance (Lab News, April 1, 2005).

DuPont safety resources were hired to help assess Sandia's safety systems, culture, and performance. DuPont was given two tasks: assess the current state of safety and propose a path forward with recommendations for improvement.

In the fall of 2004 a new employee safety culture survey was conducted by DuPont representatives with all employees who responded, some 55 percent of the potential survey population.

In addition to the survey, DuPont representatives conducted 265 interviews last July and August with Sandia executive leadership, management, technical and laboratory staff, scientists, technologists, ES&H staff, and contractors. They also visited facilities around the Labs, reviewed safety-related documents, and analyzed injury frequencies and worker compensation claim data.

Their biggest finding was that Sandia's present safety culture is in "an early stage and is driven by compliance." "Over the past year we have moved ahead significantly," Phil says. "People are no longer seeing safety as something that is mandated. Instead they are starting to view it as an integral part of their work life. After all, no one wants to get injured."

Recordable work-related accidents continue downward trend

By Chris Burroughs

Despite a small spike in August, the number of recordable work-related accidents — those requiring treatment beyond basic first aid — is down.

Month by month the accident rate has been dropping," says Phil Newman, director of Sandia's ES&H and Emergency Management Center 10300. "For example, in January there were 30 OSHA [Occupational Safety and Health Administration] recordable accidents, but by July, there were only eight."

Phil suggests several factors contributed to the decreasing figures.

"I don't know what that story has to do with nanotechnology," said Jeff, "but it's too good a story to pass up."

After praising the openness of the new facility — "you don't have to drive through a checkpoint to reach it" — he went on to say that the $75.8 million spent on the project (including a Los Alamos Facility at LANL features roughly 11,000 square feet of laboratory space dedicated to chemical and biological synthesis and characterization, biomaterials fabrication and characterization, optical microscopy and spectroscopy, physical synthesis, thin film fabrication, scanned probe characterization, and advanced computation.

Both facilities will house lab scientists, post-doctoral researchers, technical support staff, and visiting researchers. A ceremony marking the opening of the LANL Gateway Facility was held in Los Alamos Aug. 21.

The 36,500-square-foot CINT Gateway to Los Alamos Facility at LANL features roughly 11,000 square feet of laboratory space dedicated to chemical and biological synthesis and characterization, biomaterials fabrication and characterization, optical microscopy and spectroscopy, physical synthesis, thin film fabrication, scanned probe characterization, and advanced computation.

Both facilities will house lab scientists, post-doctoral researchers, technical support staff, and visiting researchers.

A ceremony marking the opening of the LANL Gateway Facility was held in Los Alamos Aug. 21. The Sandia Gateway is already in place in Building 887.

A new agreement and laboratories milestone, called a pre-competitive users agreement (PUA) and designed specifically for outside researchers, is in place. The agreement with DOE enables relatively quick access for industrial, university, and non-profit researchers because DOE BES agreed to delegate its right to review and approve each agreement to local authorities at Sandia and LANL.

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Solar power shines once again at UNM

The time to repair the roof is when the sun is shining

By Darrick Hunt

In a world of ever-increasing energy costs, inflation concerns, and political unrest, it is becoming harder and harder to miss the headlines about diminishing energy resources, or to ignore that steadily increasing figure on your utility bills.

“The University of New Mexico is no exception to these economic challenges. However, for the university the solution to reducing those energy costs was hanging right above us,” says Mammoli standing among the panels four stories above the university campus. “The potential waiting to be realized was incredible.”

When the Mechanical Engineering Building was completed in 1980, it was designed to be a model of energy efficiency during a time of rising energy costs and diminishing reserves. A system of thick walls, small windows, and solar panels all worked to make the building the most energy efficient on campus.

However, as the costs of traditional energy sources receded in the late 90s, funding for system maintenance was cut. When ethylene glycol from the panels began to damage the roof shortly thereafter, the system was abandoned altogether.

Solar power rides again

Thanks to the work of David Menicucci (PhD.), UNM students and manager of the energy-surety program, Greg Kolb (G216) of the solar heat program and UNM project design review team, with professor Mammoli and Peter Vorobieff, a project is underway to bring solar power back to the Mechanical Engineering Building.

Mammoli discovered the Clean Energy Grant Program by the New Mexico Energy, Minerals, and Natural Resources Department, which offered funding for clean energy systems. Mammoli approached David with his idea for rebuilding the solar panels, and together they wrote and submitted a proposal to refurbish the system.

When the review board’s results were announced, Mammoli and David’s proposal was the highest-ranked proposal submitted, and the team was awarded the nearly $200,000 grant. The revision funds will allow the team to replace the system’s old, smaller panels with a new, more efficient panel.

“The new collectors we bought are much bigger than the old collectors, so the total surface area of the 40 new collectors is approximately equal to that of the 88 old collectors,” says Mammoli. “These new collectors reflect 25 years of technology improvement and are much better performers — especially in high-temperature applications such as this one.”

A portion of the funds will also provide for renewable energy research and the salaries of students who assist with the refurbishment project. Although many of the systems that debuted in the 1970s, such as the one on UNM’s engineering building, were carefully designed and put together, they often did not work properly. Consequently, solar power systems developed a bad reputation in the ‘70s and ‘80s, says Mammoli.

“Our system was not poorly designed; however it was a complex system and thus was prone to failures without careful and continued maintenance,” he says. “Also, the old control systems were not as reliable as the modern microprocessor-based ones, which we now have.”

In order to avoid the fate of the original system, the refurbished system will make use of multiple redundancies and fail-safes.

“We will have multiple pumps on an uninterrupted power, a valve system to protect the panels from damage, and we’ll be using pure water in the system, rather than the ethylene glycol originally used,” says Vorobieff.

System will provide cooling, too

Originally, the system only provided heating for the 70,000-square-foot building. With the help of Vorobieff, Mammoli redesigned the system to include an absorption chiller, making the new system capable of providing both air conditioning and heating.

By Mammoli’s conservative estimates, the new and improved system will prevent 100 tons of carbon dioxide emissions a year and a 20 percent reduction in overall utility costs. Of course, the only drawback of a solar energy system is that the sun isn’t overhead 24 hours a day.

“An inherent problem with the supply of energy is that it is in highest demand when it is least available,” says Vorobieff.

With some innovation, Mammoli and his team have overcome this limitation.

“By employing thermal storage tanks, that renewable energy source is now available to us at anytime,” says Mammoli. “A unique benefit of the project is that we will have an absorption chiller, which can be used for either heating or cooling.”

New Mexico is that weather conditions are fairly easy to predict, which makes it easy to manage the loads on the energy supply.

Looking to the future

The research and development goals for the renovated system will benefit both Sandia and the university, says David. “The grant we’ve received will allow us to establish a test bed where we will be able to perform research on the solar energy systems. This is particularly exciting because here at Sandia, we have no solar collectors quite like what they have at UNM.”

In fact, it is the educational possibilities that most excite David about this project.

“We’re going to be studying the configuration and components of these systems, and exploring ways to increase their performance and efficiency as well as operations strategies for the economic aspects of these systems,” says David.

“The opportunities that will be created through this project for students to perform research, publish joint papers, and gain real hands-on knowledge and experience in this area of technology are just fantastic.”

Students and faculty alike are already involved with the project. Professors Mammoli and Vorobieff are working to create a curriculum on the practical application of sustainable energy systems with focused studies in solar energy and energy management, thereby putting UNM “on the map” in the renewable energy community, says Mammoli, who already is teaching a course in sustainable energy.

Mammoli also hopes to expand the system to the adjacent Nuclear Engineering Building in the near future for a nighttime radiant cooling system, which would release heat into the night sky as a means of cooling.

The team is collaborating with local company Energy Control Inc. on the GridWise program, a DOE initiative aimed at making the electricity grid more efficient, robust, and flexible. “But Wildin, ME Professor Emeritus and original codeveloper of the system, deserves a lot of credit for the first design and for all the advice he is providing for the refurbishment,” says Mammoli.

“We also really have a lot to thank David Menicucci for with his contributions on this project,” says Vorobieff. “David’s been an inspiration for us.”
Late one night this summer, while you were sleeping, Joseph Cordova, Sandia's construction manager for the Bldg. 703 project, was scanning the skies, looking for telltale flashes of lightning, listening for the rumble of thunder.

As Joseph (10826) jokes — only too well — a big rainstorm that night could mess up everything. But Mother Nature showed her gentle side that night. The rains held off and the big pour was on.

But that night, a team of Sandians, vendors, contractors, and officials from NNSA's Sandia Site Office pulled off one of the biggest single concrete pours in recent Sandia memory. The pour was what is called in the business a monolithic pour — that is, the nearly 500 yards of concrete that make up the shield walls for Bldg. 703 was poured in one seamless joint-free process.

Project Manager Brian Behling

The July 6 concrete pour for the Bldg. 703 shield walls went as planned and was an unqualified success, says Brian Behling, project manager for the Bldg. 703 pour.

Seventeen Summit Construction employees were onsite from the beginning of the pour, at the LaFarge plant and the FAA tower alright. The guy at the other end of the phone rang — and the FAA tower answered. The FAA tower was the one decision-making was the one, keeping their enthusiasm, and keeping the concrete evenly.

Right before the trucks began to roll, the construction team — Sandians, federal officials, and vendor/contractors — held a production meeting. They went meticulously through the sequence of operations. Every step of the process was reviewed and safety issues were identified. Then the safety issues were identified again.

Just after 10 p.m. Summit Construction, the main building contractor for the project, began coordinating the concrete delivery. A fleet of more than a dozen concrete trucks shuttled between the LaFarge concrete plant (near the Big) and the Bldg. 703 site, coming through the contractor gate at a clip of about a truck every six minutes or so.

In all, the trucks made 52 separate deliveries. The whole job was done at night, says Bldg. 703 project manager Brian Behling (10826), to minimize traffic impact, but also so that the LaFarge plant could donate its whole production capability to the job.

Critical concrete work at Bldg. 703
done in unprecedented nighttime pour

While you were sleeping

Putting Bldg. 703 to bed

When the last pour was finished, Bldg. 703 was bedded down in thermal blankets designed to minimize the temperature differences that can occur as concrete cures. It’s a particular concern in monolithic pours. Because of the chemical reactions involved, concrete gets hot as it sets. (In the huge Hoover Dam project, stainless steel cooling pipes were actually incorporated into the concrete pour. Chilled water from a specially built refrigeration plant was circulated through the dam’s concrete walls to speed up and equalize the cooling process. Without that design element, cooling would have taken an estimated 100 years — if the dam had been able to survive the thermal stresses of the normal curing process.)

Two weeks later, the blankets came off, the building was awakened, and construction proceeded. Before long, those walls — the walls that were poured while you were sleeping — will protect future occupant Mike Eatough and his team, enabling them to safely perform the neutron generator testing that had previously been done in the basement of 807.
Three lightning detection systems alert outdoor workers that electrical storms are in area

By Chris Burroughs

Everyone knows that working outside when lightning strikes can be dangerous. But at Sandia it’s less dangerous than most work places.

The reason? Three lightning detection systems give workers early warning that electrical storms are in the area. Two of those protect people working with explosives, and the third protects everyone.

EOC system

About three years ago Sandia’s Emergency Operations Center (EOC) replaced an unreliable system that measured lightning potential with one that provides information on generally where and when lightning strikes occur.

Sandia’s sole meteorologist, Gina Deola (10333), worked with the EOC to determine which system to buy and where to put it. At her suggestion, Sandia purchased a system from the Arizona-based company Vaisala that consists of a sensor placed on a five-foot concrete pedestal just north of Tech Area 3 in the middle of the desert.

When lightning strikes anywhere within a 30-and 15-mile radius of Sandia, the information acquired by the sensor is transmitted via a modem to a computer in the EOC, located in the basement of Bldg. 801. Data concerning strikes are instantly displayed.

Software called WARN produces a computer screen in the EOC a pie-shaped chart centered over a map of Sandia that consists of 16 30-mile pie-wedge-shaped sectors and 16 15-mile pie-wedge-shaped sectors. They show the general area where the lightning strikes are occurring. When there are five or more strikes in a sector, the sector turns red. Less than five, it is yellow. Sometimes — like at 7:45 p.m. on Aug. 21 during a riveting lightning storm — the entire pie turns red.

John Sensi (10337), who manages the computer system, says when any quadrant turns red, an alarm alerts EOC communication coordinators. They then send a text page message to about 200 Sandians warning them that lightning is in the area. The people on the page list have all requested to be notified when lightning strikes are in the area. Most work outside as groundkeepers, at the Solar Tower, at Coyote Canyon, or are contractors at construction sites.

“This is our best effort to warn people working outside about lightning strikes,” John says.

“It gives us a heads-up where strikes will occur, it just tells us that lightning strikes are happening in the area.

Over the past several weeks, the monitoring system has been busy, John says. There has been hardly an afternoon when some sectors or all have not been red, and workers have not been paged.

People wishing to be added to the pager list should call EOC at 844-6511.

Two lightning warning systems protect for explosive workers

Sandians working with explosives have two lightning warning systems.

“Obviously it is really important to keep people working outdoors with explosives informed about possible lightning,” says Ama-rante Martinez (1535), who operates the lightning warning systems for field testing groups.

“Even conditions with high electric static conditions that may not produce lightning can be a problem and force operations to shut down. That’s why we use these two systems.”

One system is a Lightning Early Warning System (LEWS), a commercial product that, through a satellite, monitors lightning strikes throughout the country. However, Sandia has only purchased rights to monitor strikes within a 120-mile radius of the Labs and closely watches strikes in a 60-mile range. All data are archived. As an example, Ama-rante points out that within a 24-hour period Aug. 22-23, there were 323 lightning strikes in a 120-mile radius of Sandia and 39 strikes in the 60-mile range.

The second system, which consists of 14 probe sensors on candy cane-shaped five-foot poles, is homegrown, designed by Sandia engineers.

“This is a system Sandia developed on its own because of need,” Ama-rante says. “It’s gone through many renditions with the most recent version put on the web two years ago. It is available to any Sandia group that wants to subscribe.”

The 14 probes — located primarily in Area 3 where field testing is routinely done but also in other locations around Sandia including Mt. Washington, the Eubank Gate, and Sandia’s munitions storage facility — transmit data constantly. The information is put on a website. The sensors detect volts per meter (V/m). When V/m is at 1,000 or less there is no advisory. An advisory is issued at 1,000 to 2,000 V/m, yellow code, and at 2,000 V/m and above, a red code. If lightning is in the vicinity, it’s not unusual to reach 7,000 V/m. That’s definitely time to suspend outdoor work!

Organizations subscribe to the web-based lightning monitoring system. Ama-rante says explosives testing groups constantly monitor the website while preparing for and staging tests.

“They know they are in danger if the V/m goes into the red zone,” he says.

Recently subscribers have been given pages that provide test page messages whenever V/m at any probe site reaches the yellow zone warning level.

Some organizations have local probes at their locations just in case the web and radio frequency repeater go down. They provide the same type of V/m information in the consoles.

“The warnings provided by both the web and portable sensors have definitely saved lives,” Ama-rante says. “People need to know when and how to get to a safe area or vehicle. And we do follow the 30-30 rule, which is not to resume fieldwork after 30 seconds and portable sensors have definitely saved lives,” Ama-rante says. “People need to know when and how to get to a safe area or vehicle. And we do follow the 30-30 rule, which is not to resume fieldwork.

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...
What's the reporting policy for those in search of help for depression, anxiety

Q: do not understand the acceptance of DOE's policy requiring reporting personnel securityudy to whether or not being referred for depression, anxiety, or even sleep disorders. My understanding is that we (Sandia employees) are required to notify DOE within three days if we are given a medical prescription to assist with depression or anxiety. It is also my understandings that, once we report this information, DOE may investigate this matter further to determine whether or not we should be allowed to maintain a clearance (which is a requirement for the work many of us do at Sandia). If investigated, we must either answer all of our questions, no matter how personal, or risk losing our clearance. Right?

Is there any guidance on these requirements? I contend that these reporting requirements and investigational practices inhibit some Sandians from seeking medical assistance that they need and should have. Why would Sandia be a party to such reporting requirements? I wish to first like address the question as to why Sandia would accept DOE's reporting policies. The DOE policies on this matter and related subject matter are addressed in DOE's National Laboratories. In signing the contract to do the work this laboratory is responsible for, we signed up to abide by DOE's personnel security policies, including those that you discuss in your question. It is clear that you understand that the requirements you refer to are part of a federal government process to make determinations regarding whether or not to authorize access to sensitive and classified information, facilities, and personnel. Access to those facilities or personnel is not a right and is clearly consistent with national interests, and risk losing our clearance. Right? I do not see any guidance on these requirements. I contend that these reporting requirements and investigational practices inhibit some Sandians from seeking medical assistance that they need and should have. Why would Sandia be a party to such a practice?

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DOE Manual 470.4-5 Attachment 2, (g)

Individuals must

(2) Provide direct notification to the DOE processing personnel security office of the following conditions affecting the status of an applicant's or employee's access authorization.

(3) When an individual under their cognizance who holds an access authorization is hospitalized for mental illness or has received other treatment for a condition that in the supervisor's opinion may cause a significant defect in the individual's judgment or reliability, verbal notification must be made to the DOE processing personnel security office of the following conditions affecting the status of an applicant's or employee's access authorization.

(4) Providing notification of a significant defect in the individual's judgment or reliability, verbal notification must be made to the DOE processing personnel security office of the following conditions affecting the status of an applicant's or employee's access authorization.

As noted above, the specific requirements for cooperation with access authorization, and for self-reporting are captured in DOE Manual 470.4-5 Attachment 2 — see excerpt, next column). There remains a requirement for government contractors to report on any employee's medical treatment, that treatment could affect the employee's judgment or otherwise affect their suitability to hold an access authorization. It appears that this requirement is the closest thing to the requirement that you refer to (reference DOE Manual 470.4-5 Attachment 2 and see excerpt below).

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Buying, selling energy being conducted in safer environment due to Sandia standards assessments

By Chris Burroughs

Companies buying and selling natural gas and electricity are conducting business in a safer environment thanks to better information standards assessments done by Sandia since 2000.

"Buying and selling natural gas used to occur in a system where everyone knew each other. All transactions were handled by phone and, people trusted each other," says David Duggan (5534), who has been involved in three assessments of information standards by the North American Energy Standards Board (NAESB), formerly the Gas Industries Standards Board (GISB), DOE's Office of Fossil Energy.

All that changed with the arrival of the Internet. In today's world, bidding and purchasing of fossil fuels are done electronically with limited or no personal contact — opening the door for fake transactions or worse.

In 2000 a Sandia team performed assessments of the GISB's Electronic Delivery Mechanism (EDM) standard for wholesale gas distribution.

"At that time the organization didn't understand much about information security and didn't realize how it could be for someone to break into the system," David says. "As a result, we found a number of critical security issues in the standard we reported them to GISB along with suggested mitigation strategies."

As is generally expected with security assessments, GISB was not in complete agreement with Sandia's assessments of all the vulnerabilities. However, the GISB made enough direct changes to the standards that when a second Labs assessment team did a follow-up in late 2005 and early 2006, they found that more than half of the original vulnerabilities had been corrected.

"More than half of the residual vulnerabilities were eliminated by the addition of improved technology," David says. "For example, new and better encryption methods were adopted — methods that didn't exist in 2000. It is GISB's credit that they, as an industry consortium, have addressed a majority of the vulnerabilities and are working on plans to address the remaining vulnerabilities." A third assessment team recently completed an analysis of proposed public key infrastructure (PKI) standards for the wholesale electric power sector, finding some vulnerabilities and offering mitigation strategies. Since these are new standards that have been reviewed and used by NAESB members, "a proactive opportunity exists for NAESB to address a number of these issues before the standard is ever implemented," David says.

"If these mitigation strategies for PKI are followed, it will enable the standard to be secure for many years to come," David says. He adds, "With the leadership and collaboration provided by DOE's Office of Fossil Energy, these assessments would never have been performed on this important component of the US critical infrastructure, and electronic transactions for the energy sector would be considerably more vulnerable."

Employee Open Enrollment moves to the web

SANDIA LAB NEWS • September 1, 2006 • Page 10

Paper-based process retained for retirees

Sandia employees can expect to surf the web during this fall's Benefits Choice 2007 Open Enrollment period, which will be held Oct. 20–Nov. 9, with coverage effective Jan. 1, 2007.

A new web-based system, part of Sandia's HR Self-Service initiative, will replace the Open Enrollment phone system for all employees. No longer will employees indicate their benefits choices by punching numbers into a phone. Instead, they will be able to select and review their benefits choices online with a few clicks of the mouse.

Health, Benefits, and Employee Services is confident that the new system will make changes to health plan costs and other benefits easier. The new system will also help employees double-check their benefits choices by providing an easily accessible benefits summary.

The new Peoplesoft-based Open Enrollment system will process more than 10,000 transitions over the three-week period. Implementation of the new system will allow Sandia to more efficiently manage the enrollment processes and systems data exchange, required during the processing of an open enrollment period.

Since retirees may not have Internet access, Sandia retirees will continue to receive Open Enrollment books and can make plan or dependent changes through a paper-based enrollment process. Retirees in Albuquerque and Livermore can also get prior information about Benefits Choices 2007 Open Enrollment.

Stay tuned to the Lab News and Daily News/TNT for key announcements about Open Enrollment.

Sandia health plans — changes and transitional challenges

In 2006, Sandia made major changes to health plans for both employees and retirees. These changes were made to improve the value of Sandia’s health plans — which cover more than 20,000 members — as well as to keep costs down and make changes to health plan costs and other benefits.

The intent was to provide enough choice in the health plans for employees to choose plans that best met their needs. At the same time, a conscious effort was made to control costs for both Sandia and our members — a difficult task in light of ever-increasing health care costs.

Changes in 2006

To achieve these goals, Sandia rolled out new health plans in 2006. These new health plans were designed to provide broad, national-network work coverage options while maintaining a safety net for members by implementing out-of-pocket plan maximums. We also wanted to promote a healthy population by providing certain preventive care coverage at 100 percent. Finally, we deliberately built health plan consumerism into these plans to encourage members to use their health care dollars wisely.

Sandia also selected new third-party administrators (TPA) for our health plans through a competitive bid process. As a result, CIGNA remains the TPA for medical plans with Sandia/Lovelace Health Systems in New Mexico, and United HealthCare (UHC) became the new TPA for medical plans affiliated with New Mexico's Presbyterian. UHC brought significant advantages to Sandia and our membership: (1) greater provider discounts, (2) lower administrative and other costs for both members and Sandia, (2) lower administrative and other costs for both members and Sandia, (3) new and better encryption methods were introduced, (4) access to web tools and features, (5) disease and case management programs, and (6) a commitment to create a physician provider network. In addition, the roll out of this program, which measures physician quality and efficiency, is targeted for November 2006 in New Mexico.

Smoothing out the transitions

Health, Benefits, and Employee Services (HBE) recognizes that some members have experienced transitional challenges with the new plans. UHC plan members in both New Mexico and California have encountered stressful network changes, and the CIGNA plan members' woes are undergoing a hospital change in Albuquerque.

Unfortunately, such transitional challenges are common when changing TPAs or plan designs. These issues typically arise as the new TPA addresses claims from the old TPA, develops effective TPA member communications, and streamlines new claims administration.

However, HBE is committed to working on these issues and communicating with our members. HBE is optimistic that the transition will smooth out over the remainder of 2006.

Note: This information about Benefits Choices 2007 and open enrollment was provided to the Daily News/TNT by Benefits Dept. 3332.

Benefits Choice 2007 coming to Sandia Oct. 20–Nov. 9

Fully insured and self-insured health plans: what's the difference?

There are two types of health care plans: self-insured and fully insured. Both types of plans are contracted with a third-party administrator (TPA). However, the risks and responsibilities that the TPA assumes differ depending on the type of plan.

In fully insured plans, the employer pays a TPA a fixed monthly premium for each member. The TPA then assumes the risk and responsibility for paying all membership claims. The TPA designs the health plan and provides a network of physicians. Sandia's fully-insured health plans include the Kaiser Health Maintenance Organization, Kaiser Senior Advantage, Lovelace Senior Health Plan, Presbyterian MediCare Premier Provider Organization, Kaiser Senior Advantage, Lovelace Senior, and Presbyterian MediCare Premier Provider Organization, and our membership: (1) greater provider discounts, (2) lower administrative and other costs for both members and Sandia, (3) new and better encryption methods were introduced, (4) access to web tools and features, (5) disease and case management programs, and (6) a commitment to create a physician provider network. In addition, the roll out of this program, which measures physician quality and efficiency, is targeted for November 2006 in New Mexico.

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The calls are as diverse as the analysts themselves. Before Thanksgiving one year a Sandian called asking how long to cook a turkey. Fortunately for her, it was Rich Stewart who answered her call. Without skipping a beat, he asked her the size of turkey, how it was going to be cooked (in the oven, fried, or outside), and if it was going to be stuffed. Rich just happens to be handy in the kitchen, so he made his recommendations, and the caller was grateful.

Rich has been at Sandia about seven years. He works on computers here, at home, and at his friends’ homes. His work is also his hobby. “Our jobs keep us learning,” says Rich. “We learn from our customers. Our next caller benefits from the previous call. We are in a constantly changing industry.”

Joann Okuzono-Perkins came to Sandia last October. She loves Albuquerque and Sandia. “Sandians are very grateful,” says Joanne. “I enjoy the challenge and the immediate personal satisfaction.”

Analysts are contract employees from SAIC, LMIT, and Kemtah, who are hired as much for their people skills as for their technical skills. Although the analysts work for different contracting companies their teaming and customer service focus unite them,” says project leader Steven Sanchez (4342). “I enjoy talking to the customers,” says Joann. “There is something new every day. This is the best job I have ever had. I love it.”

A call comes in to CCHD and a service request is recorded in its ticketing tracking system, the Enterprise Service Suite (ESS). If CCHD is unable to resolve a computing issue, a service request is routed to the appropriate service provider (i.e., application developers, networking, e-mail team, corporate server group, corporate database group). CCHD currently partners with 83 service providers.

Real-time statistics from the Avaya Definity Automated Call Distribution (ACD) system are projected on the wall. In addition to live calls, analysts can be working on e-mail, voicemail, contributing to the Knowledgebase (a repository for technical and general support information), or updating alerts.

Dept. 4330 earns ISO certification

Another Sandia team has earned ISO 9000 certification. Cyber Infrastructure Development and Deployment Dept. 4330 received ISO 9001:2000 certification. ISO 9001:2000 is the latest version of the ISO 9000 family of business standard certifications. It is intended to be a framework for management systems to provide assurance that products conform to established standards as well as giving customers avenues for feedback. Performance Review Institute of Warrensdale, Pa., is accredited by the ANSI-ASQ National Accreditation Board to perform ISO certifications.

After an audit of Dept. 4330’s operations, PRI awarded a certificate of registration for “Telecommunication Delivery and Infrastructure Services” within the group. The registration covers 180 employees working three shifts and is effective from July 26, 2006, through May 13, 2009. Leonard Stanns is the acting senior manager of the department.