The Department of Homeland Security’s Science and Technology Directorate (DHS/S&T), working with researchers at Sandia, is developing a new software architecture that will help emergency incident planners and responders from around the country more effectively use and integrate advanced simulation models.

The software package, known as the Standard Unified Modeling, Mapping & Integration Toolkit (SUMMIT), will help a range of exercise professionals from the federal, regional, and local levels tap into existing models to ensure consistency, accuracy, and robustness when exercising for emergency exercises at national, regional, and local levels.

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That's that

By Rick Stulen, Div. 8000 VP

In last year's "all-California" edition of Lab News, I discussed my intent to engage more with the Golden State's congressional delegation, the importance of community and civic outreach, and a host of other long- and short-term goals designed to help support the Laboratory's mission in nuclear weapons and broader national security. While the challenges of leading Div. 8000 continue to be substantial, I'm happy to report on some early successes that have Sandia's California site on the right path.

One of the most exciting developments coming out of the Livermore Valley Open Campus (LVOC), which you'll read about in this edition, is the LVOC Fellows program. This will offer a streamlined approach to engage with the international science community, and will also provide a pipeline for the next generation of federal lab workforce into all our key mission areas (both classified and open).

Regarding government outreach, we've taken demonstrable steps to more effectively leverage Sandia's California presence by building lasting relationships with the California congressional delegation.

In December, we built upon the success of Sandia's 60th anniversary events in New Mexico and Washington, D.C., by hosting some 50 regional VIPs, including eight congressional staffs, the governor's staff, several state legislative employees, county officials, local mayors, city council members, and others here in California. This was both a reminder of the support this community has for our mission, as well as an opportunity to educate our elected officials about our history and current national security responsibilities.

Many offices have requested follow-up briefings. Most importantly, we have become a trusted, unbiased resource for our legislative delegations.

We've hosted or met with many California congress staffs, including people in the offices of Speaker Nancy Pelosi, Sen. Diane Feinstein and Barbara Boxer, congressmen John Garamendi, Jerry McNerney, and more. We've met with many California state officials, ranging from state legislators to the California Energy Commission. For each of these offices, we've been honored to become a sourcing source of analysis and information to assist with state and federal policymaking decisions.

Our relationship with the Livermore community gets every day stronger. The initiative known as Livermore Valley Outreach Services (LVOS) brings San Diegans to the Livermore site by the State of California, for instance, is a direct result of a partnership between Sandia/California and the city of Livermore, a number of other local collaborators. Likewise, momentum continues to build with the LVOC, the success of which, like IGWHR, will ultimately depend on partnerships we forge with industry players, academia, and other collaborators in the Livermore area. With strong existing ties to organizations such as Las Positas Community College, General Motors Co., and our neighboring national laboratories, we've got an excellent head start.

Education continues to be the focal point of our local community activism, particularly with K-12 schools. This past year, we conducted Family Science Night events at some 26 elementary schools, up from just four in 2004, and we've now reached roughly 35,000 students over the years and continue to help foster an interest in science with local elementary school-aged children.

This special edition of Lab News offers insight into the important work taking place at Sandia/California to support our Strategic Management Units and national security missions. It includes stories on a pathogen detection research team, a piezoelectric generator, the integrated modeling, mapping, and simulation (IMMS) project, our continued work with STTROMOR, and several human interest stories that depict the people and flavor of Sandia/California. Enjoy!

— Rick Stulen, Div. 8000 VP and California Laboratory Director

CRF's David Osborn concludes four-month JILA assignment

David Osborn (8353), a physical chemist in Sandia/California's Combustion Research Facility (CRF), is completing a four-month appointment as a Visiting Fellow at JILA, a joint institute of the University of Colorado, Boulder, and the National Institute of Standards and Technology (NIST). David began the fellowship in April and returns to Sandia in early September.

PAUSING FOR A MOMENT from their work at the JILA laboratory in Boulder, Colo., are, from left, David Osborn (8353), Scott Wines, Kristen Vogelhub, and Carl Lineberger. David is wrapping up a four-month appointment as a visiting fellow at JILA, continuing his highly regarded research institute in the physical sciences.

JILA was founded in 1962 as a joint institute of CU-Boulder and NIST-Boulder. JILA is located at the base of the Rocky Mountains, near the CU-Boulder campus in the Duane Physics complex. The facility brings together scientists in chemical physics, quantum physics, and other fields of physics. JILA has a particularly strong focus on laser development, and astrophysics.

David's CRF colleague, Craig Taatjes (8353), previously served as a JILA Fellow in late 2004.

Expanding formidable talents

"David's appointment as a visiting fellow at JILA provides him the opportunity to expand his already formidable experimental talents by working at one of the leading institutes in the world in laser spectroscopy and chemical physics," says Andy McLennan (8350), senior manager of chemical sciences at the CRF. "I expect that he will return from JILA with new skills and ideas that will enable our combustion chemistry program to maintain its position at the cutting edge of the field."

At the CRF, David studies the kinetics and mechanisms of chemical reactions in the gas phase through a variety of highly multiplexed techniques he has developed. During his JILA fellowship, David has been working with JILA Fellow W. Carl Lineberger to investigate the vibrational and electronic structure of the elusive propargylene biradical HCCCH.

CBF scientists showed that propargylene is the dominant isomer of C3H2 in many hydrocarbon flames, and may be a precursor to soot formation. In addition to combustion, there is great interest in isomers of C3H2 in interstellar chemistry, where the cyano isomer of this species, known as cyclopentanone, is the most abundant cyclic hydrocarbon known. Propargylene can rearrange to form cyclopropenylidene.

David also has been exploring frequency comb spectroscopy with JILA Fellow Jun Ye. A frequency comb is a series of closely spaced laser frequencies, complementary to the techniques with JILA Fellow Jun Ye. A frequency comb is a series of closely spaced laser frequencies, complementary to the techniques with JILA Fellow Jun Ye. A frequency comb is a series of closely spaced laser frequencies, complementary to the techniques with JILA Fellow Jun Ye. A frequency comb is a series of closely spaced laser frequencies, complementary to the techniques with JILA Fellow Jun Ye. A frequency comb is a series of closely spaced laser frequencies, complementary to the techniques with JILA Fellow Jun Ye. A frequency comb is a series of closely spaced laser frequencies, complementary to the techniques with JILA Fellow Jun Ye.

Frank Koletar (age 92) . . . . . . . . . . . . . . . . . . . . . . Aug. 1
Bruno D. Navalevi (86) . . . . . . . . . . . . . . . . . . . . . . June 9
Gerald Stuart Roushbach (56) . . . . . . . . . . . . . . . . July 10
Nicholas S. Perea (85) . . . . . . . . . . . . . . . . . . . . . . July 19
Gene Handcock (92) . . . . . . . . . . . . . . . . . . . . . . July 21
Robert C. Colgan (80) . . . . . . . . . . . . . . . . . . . . . . Aug. 1
New Labs Director Paul Hommert tells business community about priorities: Nuclear weapons work, managing diverse Labs

By Heather Clark

Sandia’s nuclear weapons work and effective management of a laboratory that is growing increasingly diverse and answers to a variety of customers are priorities over the next five years to a decade, Sandia President and Labs Director Paul Hommert told the Albuquerque area’s business community.

Paul told hundreds of Greater Albuquerque Chamber of Commerce members and guests at an Aug. 10 luncheon that Sandia also expects a net gain of about 300 employees this year. The Labs hopes to hire 700 new employees, and expects about 400 people to end their employment each year through retirement or other transitions.

Paul called nuclear weapons work the “core of our mission responsibility.” He said a national focus on reducing nuclear weapons while maintaining the safety, security, and effectiveness of the deterrent has put Sandia “square in the sights of the national enterprise because we will be the predominant mission activity in terms of some of this life extension work on the stockpile.”

New tools in computing and basic science must be used to more rapidly and more effectively support the stockpile in the future, he said.

“Those innovations and that ability to turn product out even quicker is a great challenge. This is also a tremendous attractor to new talent at the Laboratories because there is a lot of innovation opportunity that is here,” he said.

Paul described Sandia as having moved from its historical infrastructure supporting only nuclear weapons work to becoming a multimission laboratory that works on a diversity of research areas, including energy, defense, antiterrorism, nonproliferation, and cybersecurity.

Paul said now that 60 percent of Sandia’s work falls outside its historical nuclear weapons mission, the Labs needs to focus on managing how it invests in new buildings, new capabilities and science. Sandia also will focus on its operational management, including safety, security and environmental responsibilities, he said.

“Five years from now, I’d like anyone to come to our laboratory and say — in terms of a national laboratory that operates in the national security space like we have to — they’re seeing a laboratory that’s a paradigm of efficiency, of effectiveness, of interactions with its community and with the national organizations at the highest levels possible,” he said. “I think we do an exceptional job of that today, but the bar just keeps getting raised higher.”

In response to a question from the audience, Paul said Sandia could be doing more nuclear power work in the future. Since the 1970s, the Labs’ work in this area has included risk assessment, small reactors that would reduce capital costs, and research on nuclear waste repositories.

“In our role of trying to reduce technological impediments (to nuclear power) and let others work out the policy and economic framework, we see a number of ways for somewhat of a renaissance of our work in this area,” he said. “It’s active and we think it should be more active going forward.”

Sandia NewMexicoNews

Labs leaders, NNSA officials, elected leaders launch new Ion Beam Laboratory

Sen. Jeff Bingaman, fourth from left, Rep. Martin Heinrich, fourth from right, and Albuquerque Mayor Richard Berry joined Labs and NNSA officials last week to mark the opening of Sandia’s newest research facility, the state-of-the-art Ion Beam laboratory (IBL). Pictured from the left are Berry; Sandia President and Labs Director Paul Hommert; Div. 1000 VP and Chief Technology Officer Steve Rottler; Bingaman, Executive VP and Deputy Labs Director for National Security Programs Jerry McDowell; IBL lab director Barney Doyle; Div. 4000 VP Mike Hazen; Heinrich, NNSA HQ Assistant Deputy Administrator for Infrastructure and Construction Michael Thompson; NNSA Sandia Site Office acting Deputy Manager Mike McFadden; and Executive VP and Deputy Labs Director for Mission Support Al Romig.

The IBL’s structure will contain six accelerator systems capable of generating ions of every element in nature from one electron volt (eV) to 400 million electron volts (MeV), and at intensities ranging from just single ions to trillions of ions per second. One eV is enough to ionize a single atom or energize a single photon. 400 MeV will accelerate the heaviest ions to 7 percent the speed of light.

Among the uses for the building’s high-energy beams is rapidly analyzing materials. A low-energy ion implantation beam then modifies the materials. (An ion is an atom with too few or too many electrons.) This artificial condition helps improve predictions about the corrosion of materials used in electronic components that permeate military and civilian life.

Other research areas at the IBL are uniquely owned by Sandia in the DOE complex. They include microscopic diagnostics of radiation sensitivity of integrated circuits, simulating the effects of the enormous fluxes of neutrons associated with nuclear detonations, to provide data that will help protect US electronics against such an occurrence. The beams also aid calibrations and certifications for the nuclear stockpile.

The 27,000-square-foot building, constructed and expected to be equipped at a cost of $39.6 million, is on track to be significantly under budget and completed approximately six months ahead of schedule.
delayed, the lethality of the virus goes up exponentially. “If a novel attack occurs and our detection systems fail, we have limited time in which to identify and characterize the organism to be able to offer effective treatment,” says Todd. History shows that identifying and characterizing a naturally occurring unknown organism is very difficult. The 1970s outbreak of Legionnaires’ disease took six weeks to characterize; Severe Acute Respiratory Syndrome (SARS) took months to characterize; nearly 30 years later, it still took nearly 30 years to determine the type of virus that was spreading in the SARS outbreaks. “If a novel attack occurs and our detection systems fail, we have limited time in which to identify and characterize the organism,” says Todd.

Sequencing the human genome took 10 years and hundreds of millions of dollars. But ultra-high-throughput sequencing, that same work can be accomplished for about $10,000 in a week or less. But ultra-high-throughput sequencing only addresses part of the problem. As Todd explains, in an outbreak scenario, there would be a large number of samples from people manifesting symptoms of the disease and the worried well. “The more samples you can sequence, the better chance you have at identifying and then characterizing the organism. But for a clinical sample, a lot of information that is not of interest,” he says. For example, 99 percent of the DNA in a blood sample is the human genome. DNA in a nasal swab is 99 percent human-derived and much of the rest is garden-variety bacteria. “You need to quickly eliminate the ‘human flora’ before sending a sample to ultra-high-throughput sequencing,” says Todd. “We aren’t exactly looking for a needle in a haystack—we’re looking for multiple needles and each one is different.”

The RapTOR normalization method is now being adapted for algae research. For example, 99 percent of the DNA in a blood sample is the human genome. DNA in a nasal swab is 99 percent human-derived and much of the rest is garden-variety bacteria. “You need to quickly eliminate the ‘human flora’ before sending a sample to ultra-high-throughput sequencing,” says Todd. “We aren’t exactly looking for a needle in a haystack—we’re looking for multiple needles and each one is different.”

RapTOR for algae: Understanding pond collapse

Last month, Todd Lane (8623), Jet Tilmann (8622), and Ben Wu (8125) received $800,000 in funding over two years from the DOE Biomass Program for their proposal “Pond Crash Forensics.” Using pathogen detection and characterization technologies developed under the RapTOR Grand Challenge, they will compare the environmental conditions and metagenomes of algal samples taken from normal ponds to those taken from ponds that have undergone collapse. Algae are widely viewed as a potential source of renewable fuel, but the technology to mass-produce fuel-grade algae is still in the early stages. A major roadblock, says Todd, is the inability to produce large amounts of algae.

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A better analogy is a jumble of 100 different disassembled pocket watches, with one of the original pocket watches representing a pathogen. “You have to sort through the watch parts to identify and discard everything you recognize. You have to simplify the mixture so there are more parts of significance to the pathogen,” he explains. “It’s not enough to just identify those parts that are unique—you also have to reassemble the pathogen watch.”

Molecular biologists employ a number of methods to prepare samples for ultra-high-throughput sequencing. For example, Todd explains that these methods require days of work by a highly trained scientist on the bench. “Our overall goal is a 24-hour turnaround. An end user would inject a sample of blood into the system, which then runs the sample through a number of molecular biology manipulations and sends it off to a DNA sequence,” says Todd. “The sequencer provides enriched information that the user sorts through to identify and characterize the sample.”

The team already has succeeded in adapting one method to a microfluidic platform: normalization, which removes high-abundance genetic material from a sample, leaving a small, representative amount of all the genetic material found in a sample. Currently, researchers use high-abundance genetic material to remove the double-stranded DNA, and with some additional manipulation, the resulting DNA all appears in low abundance. Hydroxylapatite chromatography follows the same process, substituting a phosphate buffer for the crab enzyme to remove the double-stranded DNA without destroying any of it. The entire process can be automated. The RapTOR normalization method is now being tested against human clinical samples for “towers of unknown origin” and not only against the known deadly pathogen. “These are outbreaks that get ignored because they are serologically testing negative,” says Todd. “We created a capillary-based system to perform hydroxylapatite chromatography. It’s faster, cheaper, and simpler method that doesn’t destroy the material in the process.”

In the traditional, benchtop normalization process, double-stranded DNA is heated to separate the two strands. As the DNA cools, the pathogen that the pathogen watch is interested in could be lost in the low-abundance DNA that will find their partner stands more quickly than those expressed in low abundance. A researcher stops the cooling sequence, adds the enzyme to the mixture so there are more parts of significance to the pathogen. “These are outbreaks that get ignored because they are serologically testing negative,” says Todd. “We created a capillary-based system to perform hydroxylapatite chromatography. It’s faster, cheaper, and simpler method that doesn’t destroy the material in the process.”

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RapTOR is designed to be a public health tool applicable for day-to-day work. “If you develop a tool like this, you need to regularly apply it to real-world scenarios.”

The tool will have other applications in other fields as well, such as environmental detection. Todd explains that RapTOR could be used to take regular atmospheric samples and analyze their genetic makeup to develop a baseline. This application has garnered interest from the Defense Threat Reduction Agency, DoD, and DHS.

RapTOR will never eliminate the problem of unknown unknowns, but it will make the unknown faster and simpler, says Todd.

RapTOR (Continued from page 1)
Terry. “It’s a passively pumped vacuum system, using a car. “If you took microscopic pictures before you drove under these conditions, it would look so bad you might not want to drive again,” he explains. “But the parts have big tolerances — it’s going to look so bad you might not want to drive.”

However, current modeling tools are effective on their own terms. Blast effects, numbers of immediate casualties, information on damaged buildings and infrastructures, radiation exposure to citizens, and other key pieces of information. While current models are effective, they do not integrate the information in piecemeal fashion, there is no way to bring the models together side-by-side with others. “We’ve just scratched the surface, and look forward to seeing the full impact that SUMMIT will have,” says Lynn.

Deployment at FEMA exercise provides real-world learning for SUMMIT developers

FEMA’s National Level Exercise 2010 (NLE-10), which took place earlier this spring, had a new twist this year: the presence of DHS/S&T’s Integrated Mapping, Mapping & Integration Toolkit, or SUMMIT. “This was SUMMIT’s first foray into a real-world envi- ronment, and the team learned a lot. We have a lot to feed back into the ongoing architecture development process,” says Lynn (Yang 8114), a systems analyst who works on the BOM project team.

To run this year’s national exercise, FEMA’s National Exercise Division designed a scenario focused on the federal government’s ability to respond to a potential terrorist threat that could move its operations to contingency locations outside of Washington, D.C. “The threat involved the detonation of an improvised nuclear device. More than 60 federal agencies participated in the exercise.”

SUMMIT’s role during the exercise’s planning stages, says Lynn, was to provide a small part of the overall “ground truth” data to the simulated scenario created for the event, including information on casualties, weather, resource requirements, and demographics in various regions (most of the data was produced by other DOE and DHS modeling and analysis centers).

During the execution phase of the exercise, SUMMIT integrated a “medical surge” model from the Department of Health & Human Services with other modeling tools, such as those used to model plane dispersions, population, and infrastructure. “Medical surge” generally refers to the ability to provide adequate medical evaluation and care during events that exceed the limits of the normal medical infrastructure of an affected community. When combined and effectively integrated by SUMMIT, models like these can be quickly and easily brought to bear for analysis purposes, such as real-time exercise scenario adjustments.

SUMMIT essentially acts as the “glue” that allows the emergency management community to bring models together and talk to each other, says Lynn. “SUMMIT offers the ability to bring credible, yet disparate, models together and easily integrate them with other modeling and simulation efforts.” Though SUMMIT had a limited role in the NLE-10 exercise, she says, the IOMS team saw glimpses of how this software tool will allow SUMMIT to process the information.

The broader goal, says Jalal, is to make the SUMMIT capability a pervasive part of preparedness, response for emergency managers, responders, and exercise teams in federal, state, and local governments.

SUMMIT (Continued from page 1)

How the device’s aging will affect performance and how much tritium needs to be added to compensate. “This is an engineer- ing design project, so we need to answer the burning questions as soon as possible,” he says.

Anticipating burning questions that could arise during production, project lead Chris Apteblit (1815-2) brought the Kansas City Plant and Savannah River Site into the project early. Tritium has never been used in this application, so Savannah River gave input on design changes to facilitate the loading process.

The subtleties of manufacturing

“We were able to understand some subtleties of the manufacturing and loading process and bring that knowledge back into the design,” says Terry. “It was definitely a worthwhile process to have these discussions early.”

After replicating Savannah River’s loading manifold setup, Andy determined that a significant modification to the loading manifold was necessary to ensure that the bottle temperature was uniform during tritium loading. “We’ve just scratched the surface, and look forward to seeing the full impact that SUMMIT will have,” says Lynn.

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How the device’s aging will affect performance and how much tritium needs to be added to compensate. “This is an engineer- ing design project, so we need to answer the burning questions as soon as possible,” he says.

Anticipating burning questions that could arise during production, project lead Chris Apteblit (1815-2) brought the Kansas City Plant and Savannah River Site into the project early. Tritium has never been used in this application, so Savannah River gave input on design changes to facilitate the loading process.

The subtleties of manufacturing

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Workforce Appreciation Day is all about building bridges

Story by Patti Koning
Photos by Dino Vournas

On Saturday, Aug. 7, about 250 members of the workforce and their families gathered at the Robert Livermore Community Center for the third annual Workforce Appreciation Day presented by the Division Diversity Council (DDC). The event’s purpose is to promote diversity, unity, and team building across the Sandia/California site, as well as give thanks to members of the workforce and foster Sandia’s mission of unity and community.

“I’ve been fortunate to attend all three Sandia Workforce Appreciation Days, and each one has been very special. It’s been wonderful to connect with people from work in a relaxed, social setting. It has also been great to meet friends and families. The DDC has done a terrific job in sponsoring such a fun event,” says Pat Smith (8500), director of site operations.

Ed Allen (8243) organized the first Workforce Appreciation Day in 2008 after attending an NNSA conference on diversity. “It’s a chance to rub shoulders with people you might never talk to at work. When you share personal experiences outside of work, playing bingo or baseball for example, you build bridges and that builds inclusiveness,” he says.

Members of the workforce brought their significant others, children, parents, friends, and pets to the picnic. Everyone enjoyed a delicious barbecue lunch, volleyball, baseball, balloon animals, board games, karaoke, raffle prizes, and, of course, bingo. Special guest Marie Brown (3512) from the Diversity and Inclusion Program Office at Sandia/New Mexico served as the moderator for the bingo games and raffle.
Livermore Valley Open Campus

By Mike Janes

The Livermore Valley Open Campus (LVOC), an initiative embraced by NNSA and the DOE Office of Science since 2009, continues to make progress. Sandia and Lawrence Livermore National Laboratory (LLNL) are working collaboratively to create an open national security research and development campus that facilitates ready access to NNSA expertise and facilities.

As currently envisioned, the Open Campus initiative will consist of an approximately 110-acre parcel along the eastern edge of the LLNL and Sandia sites bordering Greenville Road. The LVOC will be modeled after R&D campuses found at major industrial research campuses and other DOE laboratories with graded security, and a set of business and operating rules devised to enhance and accelerate international scientific collaboration and partnerships with US industry and academia.

In the spring, Sandia and LLNL announced Flad Architects as their selection for a $500,000 architectural and engineering contract to perform design and master planning services for the project. Flad, says Brian Damkroger (8300), has developed several design options and continues to work with both labs’ LVOC management teams to identify the most effective, long-range master plan for the campus.

The motivation for the LVOC stems from future national security challenges that require increased coupling with the private sector in order to understand threats and deploy solutions in areas such as energy, cyber security, high-performance computing, and non-proliferation.

NNSA Administrator Thomas D’Agostino and DOE Under Secretary for Science Steve Koonin signed a mission needs concept for LVOC in 2009, and last summer a $3 million expenditure of laboratory overhead was approved. This allowed the labs to move forward on the conceptual development of design alternatives required to reconfigure the existing laboratories into a more open layout.

Flad is a Madison, Wis.-based architectural, engineering, planning, and interior design firm with offices in San Francisco and five other locations. The firm was unanimously selected by a team of Sandia and LLNL program and operations specialists. Flad has done other campus master planning projects at Oak Ridge National Laboratory and Brookhaven National Laboratory.

Among the issues Flad has been looking at are land density and the “zones” that might make up the open campus. “One of the fundamental issues they’re examining is the open campus land and infrastructure, and the best way to utilize it,” says Brian.

The designated space offers considerable room for future growth. Planners, however, want to avoid creating a campus that resembles a vacant lot, with no sense of place, Brian says. The open campus needs to have a degree of denseness, but a design that accommodates ample parking space, is walkable, and makes sense from a programmatic standpoint, he says.

One of the initial design concepts the LVOC management team is looking at, says Brian, is a so-called “string of pearls” that takes a page from the famed Googleplex in Mountain View, Calif. The campus might feature several “mini-centers,” each with a mission or technical theme, such as an “energy corridor,” followed (a block or two away) by a “biology neighborhood,” a “cyber center,” and so on.

Program areas that could have a presence in the LVOC include high-performance computing, transportation energy, cybersecurity, biosciences, materials science, high-energy-density science, and various homeland security activities. The open campus could also house amenities and features such as conference space, collaboration facilities, a visitors center, and food services to support tenants and lab workers.

In addition to proposed development zones on the open campus, Flad is conducting market studies that examine opportunities for industrial and academic tenants, and results from interviews with laboratory managers and staff to help define specific program requirements for the LVOC. Berkeley-based Economic & Planning Systems (EPS) is leading the market studies portion of the work.

In parallel with the master planning, construction has begun on a new vehicle lane on East Avenue that will allow visitors to Sandia’s Combustion Research Facility (CRF) to access that portion of the site from the east (Greenville Road). The CRF is considered one of the main anchors for the LVOC. The opening of the new lane, expected to take place by early-October, will come with a number of new features along the eastern end of East Avenue meant to accommodate the new access while keeping the remainder of the site secure. Newly installed features will include new directional signage and automated gates.

In addition, with the closing of the “Sandia hill” popular with Sandia and LLNL recreational walkers, a pedestrian pathway is being constructed near the CRF (parallel to East Avenue) out to Greenville Road. This feature, says Doug Vrieling (8512), is designed to provide lab members of the workforce with a safe and convenient connection to Greenville for jogging and walking.

Sandia and LLNL are preparing a report on LVOC development options that will be delivered to NNSA for review by the end of September.

This drawing represents what a future “build-out” of the LVOC could look like. A series of small villages or “mini-centers” could be created using program elements (energy, biology, cyber, etc.), stretching from the CRF complex in the southwest to LLNL’s National Ignition Facility (NIF) to the far north. Included in the drawing are several proposed parking structures (P1, P2, etc.) as well as potential buildings.
A visit to the Antarctic this winter?

Count me in, says California researcher

By Mike Janes

While most people are dreaming of Florida beaches during the chilly winter months, David Burnett (8136) apparently likes to go against the grain.

David, an electrical engineer who works in the Protection Technologies & Systems group at Sandia/California, will travel to Antarctica in October for a two-to-three-month work assignment paid for by the National Science Foundation (NSF). The trip is in support of a project led by Moss Landing Marine Labs, which is developing a robotic device known as the Submersible Capable of under Ice Navigation and Imaging, or SCINI.

SCINI is an underwater robot specifically built to complete science missions beneath the frozen surface of the ocean in Antarctica. Such ecological research is important, David says, since the seafloor and marine organisms found in this part of world are essentially untouched and remain largely unexplored.

For more than 200 years, the United States has played an active role in exploration of the Antarctic, and that history has led to a continuous US presence there since the 1950s. Current federal policy, according to the United States Antarctic Program (USAP), “suggests continuation into the foreseeable future of a strong US government capability to support Antarctic scientific research.”

SCINI is funded by a three-year NSF grant that started in 2007. Development of the device takes place in Moss Landing’s Benthic Lab. Annual field deployments during Antarctica’s summer season (fall and winter in the US) are based out of McMurdo Station, an American Antarctic research center located on the southern tip of Ross Island on the shore of McMurdo Sound in Antarctica.

David’s involvement in the project was a classic case of serendipity. He learned about the work through his peer network and, as luck would have it, his most recent Sandia projects were winding down, offering a gap in his schedule. In June, he started lending his talents to the team at Moss Landing and has been focusing his efforts on the SCINI device’s power and camera systems.

The SCINI device is operated remotely, allowing its pilot to view previously impenetrable parts of the ocean seafloor via a camera mounted on the device. A SCINI pilot utilizes a video game controller to direct the device (similar to those found on an Xbox), and a computer flat screen shows not only the seafloor, but also the device’s status array and engineering diagnostics.

David points out that the work, to date, is not currently part of any sponsored Sandia project. His expenses for the Antarctic trip will be covered by Moss Landing Marine Lab’s NSF funding. But he and other Sandia managers firmly believe the SCINI device could have wide-ranging benefits to laboratory mission areas, including assessing the ramifications and recovery of the Gulf oil spill. He suggests that climate modeling and sampling, as well as general ecological studies, would all benefit from a flexible robotic device.

“David’s role has clear ties to Sandia’s interest in robotics and teleoperated systems and a broad range of sensing capabilities, including potential future projects at Sandia,” says Will Bolton (8136), acting manager of the Protection Technologies and Systems Department.

More information on the SCINI project can be found at www.iceaged.info. The site describes both the science mission SCINI is serving and the engineering behind the project.
Reinvented CCD taking shape at California site

Successful cyber program ‘ready for a transition’ at place where it all started

By Mike Janes

San diego’s well-known Center for Cyber Defenders (CCD) initiative, which has enjoyed a long track record of success in Albuquerque and California, has now entered a new phase in the longstanding relationship with General Motors (GM). The Labs and the giant automaker have initiated a “liaison” program — essentially, a swapping of researchers — meant to support and strengthen the organizations’ strategic alliance.

That alliance, says Art Pontau (8360), is focused on advancing and developing computer science and information technology. “We’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science.”

By Mike Janes

Sue Downes finds ‘dream job’ in Motor City

Sandia researcher heads to Detroit via unique exchange agreement with General Motors

Sue Downes, a digital native with a PhD in computer science, says she never thought she’d be working on the theory of vulnerabilities a day on the theory of vulnerabilities a day. “I was born out of necessity,” she says. “It was quite simple: We needed to defend from cyber threats.”

In addition to project work and ongoing access to industry sponsorship and identifying the many tasks and activities that need to be completed prior to the CCD’s does being thrown open next summer.

The key to success, says Art, has been establishing strong personal relationships between individual researchers and management teams of both organizations. “If Sandia is truly responsible for exceptional service in the national interest, then we need to be able to partner with other entities,” Sue adds. “The world continues to become global-dependent, and we can no longer solve problems by ourselves unless we want to take decades to do it. We can tackle them together, though, and solve problems much faster.”

Tang Wei, a thermodynamics researcher, is the GM liaison to Sandia. He has begun his assignment at Sandia/California’s Combustion Research Facility.

But where are the solutions going to come from? They’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science. They’re going to come from people conducting experimental science.
Mileposts

New Mexico photos by Michelle Fleming
California photos by Randy Wong

Dennis Gutierrez 40 5574
Ernest Nevada 48 4843
Clinton Atwood 35 19132
James Beasley 33 2957
Paul Gabaldon 35 413
Jim Hachman 33 8945

Michael Lucero 35 4842
William Morgan 35 5761
Theodore Simmons 33 4128
Robert Bevington 30 4245
Linda Bramsitter 30 2127
Terry Calloway 30 5937
Donald Davis 30 2663

John Goldsmith 30 8131
Diane Gomes 30 8944
William Holub 30 4844
Cal Jaeger 30 6756
Michael Rosco 30 4844
Glenda Ross 30 8243
Gary Sanders 30 2

Thomas Souther 30 1527
Frank Vigil 30 2994
Bernard Argo 25 4849
Lawrence Armija 25 4211
Robert Barlow 23 8351
J. Douglas Bentley 25 3336
Bob Brandt 25 8331

Mark Grohman 25 6723
Georgianne Peck 25 6333
David Plummer 25 2600
Inelda Quam 25 5923
William Sweatt 25 1535
Cynthia Acosta 20 10621
Connie Adams 20 10637

Deanna Dicker 20 8516
Jeanne Evans 20 212
Roger Hartman 20 6416
Michael Hobbs 20 1516
Scott Keith 20 8314
John Merson 20 6730
Bill Richmond 20 8945

Gail Simon 20 9753
Brian Thomson 20 4128
Sherrie Trezza 20 1382
Julia Phillips 15 1200
Sarah Renfro 15 920
Christopher Shaddix 15 8367
Peggy Underwood 15 3520
Rebuilding Haiti

Steve Orth lends a hand in the building of a new church in Petit-Goâve

Story by Patti Koning

I n April, Steve Orth (8517) and his 20-year-old son, Austin, witnessed firsthand the devastation of the magnitude 7.0 earthquake that struck Haiti last January. For about a week, Steve and Austin worked with 18 other volunteers to build a new church in Petit-Goâve.

Located about 42 miles southwest of Haiti’s capitol Port-au-Prince, Petit-Goâve is one of the oldest cities in Haiti and has a population of about 12,000. On Jan. 20, it was the epicenter of a magnitude 5.9 aftershock.

Steve has undertaken more than 20 such trips in the last 25 years, traveling to Ecuador, Swaziland, Peru, and Mexico to help build homes for the poor through Livermore’s Discovery Church of the Nazarene. Each year he leads a group of high school students to Mexico, just past the California border.

A sense of adventure — Steve is an avid backpacker — and desire to help others in keeping with his Christian beliefs drove him to set out on his first humanitarian trip. “I don’t know if you could find a place like that today, so untouched by the rest of the world,” says Steve. “It was an amazing experience.”

In April, Steve, Austin, Dan Dague from Discovery Church, and 17 members of the Fidylay church headed to Haiti with the goal of finishing the Petit-Goâve church and helping the machine and carpentry shop at the Nazarene College prepare for future recovery projects.

“When we flew into Port-au-Prince, my first thought was that the landscape looked like Los Angeles, with blue swimming pools visible everywhere,” says Steve. “As we got closer, I realized those weren’t swimming pools, they were blue tarps being used as tents all over the city.”

As they drove from the Port-au-Prince airport to the Nazarene College, there were two constants: rubble from earthquake damage and tent cities in every imaginable place. One tent city was erected in the median of a busy four-lane highway, bordered with 50 mile-per-hour traffic on both sides. “It was freaky seeing little kids playing in front of the tents and ramshackle structures with cars just whizzing by,” says Steve.

The group stopped at the Nazarene College where they spent several days making roof trusses, frames for bunks beds, and benches for church pews. Taking advantage of the metalworking skills of several members in the group, the Nazarene College had them churn out building materials for future work groups — enough to build another six to seven churches, says Steve.

They next journeyed onto Petit-Goâve, where local workers paid by the Nazarene Church had already poured the foundation for the church and built the floor and walls. In three busy days, the American group put on a roof, installed tiles, and painted the entire building.

“The whole community got really involved because they knew what this church would mean for them,” says Steve. “One night we went to sleep around 10 p.m. to a lot of noise and activity. When we woke up early the next morning, the locals had constructed the sidewalk from the church to the street.”

He left Haiti satisfied that he’d done something, however small, to make a difference to one community. “There was a lot of sadness, because everyone you talked to had lost a family member or friend to the earthquake. And around Port-au-Prince there were all these flattened buildings where people were likely crushed,” he says. “At the same time, it was uplifting to see how well the Haitian people coped with the devastation and that they are able to move on with life.”

In 2007, Steve traveled to Peru with his son, daughter, and father to build a church in Pucallpa, Peru. Shown here, Austin, Mackenzie, Steve, and Roland take a break from work to visit Machu Picchu, the “lost city of the Incas.”

STEVE and his son Austin in front of the church they helped build in Haiti.

STEVE WITH NIKKO, one of the local Haitians who helped build the church in Petit-Goâve.

STEVE’S DAUGHTER, Mackenzie, and his father, Roland, lay bricks for a wall of the church in Pucallpa.

TENT CITIES, like the one shown here, popped up all over Haiti in the aftermath of the earthquake. Steve says many people he encountered were afraid to sleep inside even if their homes encountered no damage.

STEVE’S DAUGHTER, Mackenzie, and his father, Roland, lay bricks for a wall of the church in Pucallpa.

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REBUILDING projects.

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