



SHAKING GOING ON — Technologists Curt Tenorio, left, and Jessie Fowler install instrumentation on a B61-12 test unit for a vibration and shaker-shock test. Note: This test was conducted before social distancing and face mask guidelines were established.

Photo by Randy Montoya

Weapon program meets safety, design requirements

Review shows B61-12 Life Extension Program work can move forward confidently

By Michael J. Baker

Sandia has successfully completed another milestone in the B61-12 gravity bomb refurbishment program, demonstrating the Labs is meeting important nuclear safety and use-control requirements.

“The Combined Engineering Judgment is an important step toward ensuring the B61-12 Life Extension Program is on track, and Sandia is meeting design and development requirements for the weapon to take its place as part of the U.S. nuclear deterrent,” said Delegated Chief Engineer for Nuclear Weapons Ernie Wilson.

The Combined Engineering Judgment review was conducted by Ernie and Mission Assurance Associate Labs Director Mark Sellers and presented to Labs Director James S. Peery in April.

Sandia is the design and engineering lab for non-nuclear components of the nation’s nuclear stockpile, including the B61-12. In addition, Sandia serves as the technical integrator for the complete weapon, assuring that the system meets requirements as one unit and not just as individual parts.

Continuous data evaluation

The successful review was based on qualification evidence presented from an independent internal assessment by the weapons assessment team that has been evaluating data from day one of the B61-12 Life Extension Program.

A life extension program allows scientists and engineers to address the aging of nuclear weapons components by requalifying usable parts, remanufacturing old parts using the original specifications or redesigning parts with modern technology when the original technology is no longer available.

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Testing solutions for mask shortage

Hospitals, manufacturers partner with Sandia amid high demand for medical-grade masks

By Troy Rummler

Sandia is teaming with local hospitals and medical device manufacturers to increase the availability of respirator masks for health care workers.

“We’re helping local medical device manufacturers test materials they are using to make medical-grade masks, and we’re helping local hospitals by evaluating methods they’ve developed to clean N95 masks for reuse,” said Sandia Fellow Gil Herrera. “We’re providing them information they need to make decisions regarding the reuse of sterilized N95 masks and the use of alternatives to N95 masks to protect health care workers and patients.”

N95 respirator masks are certified to block 95% of extremely small particles without restricting breathing. Sandia is conducting tests for manufacturers to show how new mask designs measure up to these industry standards. Sandia also is studying disinfection methods that could enable hospitals to reuse masks, lessening the need for new ones.

Assistance has been provided at no cost to partners through a combination of internal funds and funding from the DOE Office of Science.

Testing unconventional materials

When respirators ran low in hospitals, Albuquerque companies Marpac, Sierra Peaks and Sew-EZ approached Sandia for help testing materials outside the typical supply chain that could be used to manufacture more. Examples include materials used for heating and air conditioning systems and vacuum bags.



BREATHING ROOM — Respirator masks are among the most effective forms of protection health care workers have against contracting COVID-19. Sandia is helping local organizations increase the supply.

Photo by Randy Montoya

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 LABNEWS Notes

How much can one person do? Something.

By **Mark Sellers**,
Associate Labs Director

Personal growth is not the point of a leadership position, but it has been, for me, a benefit of my time at Sandia. In particular, I've gained a better understanding of what it means to be an ally for inclusion and diversity. As an ally, it's not my place to speak about someone else's experience. Instead, I have responsibility for fostering a Labs' culture where people are comfortable sharing their experiences and bringing their whole selves to work.

I've thought a lot about this responsibility over the past few weeks, watching protests shift from peaceful to violent and, thankfully, in most cases, back again. (The initial report available at publication surrounding the shooting at the La Jornada sculpture in Albuquerque is stomach turning.) I don't condone violence. I also have compassion for the feelings behind the current outcry.

That people of color continue to be disproportionately harmed and killed in our country seems undeniable. The tragedy of George Floyd is among a ceaseless procession of heart-rending examples.

As a member of the white male population, my Sandia experience has impressed upon me an accountability for change. I've awakened to the fact that people I see every day experience a very different world. We might work in the same building, pick up pizza from Blaze, watch the same newsfeed. Yet if you interviewed us independently, the accounts could be drastically divergent. I am not foolish enough to believe I can truly grasp how recent events might affect



ADVOCATING FOR CHANGE — Sandia Associate Labs Director Mark Sellers and his wife, Ann, attended the June 2019 Pride Parade in Albuquerque.

Photo courtesy of Mark Sellers

any individual Sandian. That doesn't excuse me from trying.

The fiery scenes unfolding on our screens can underline our smallness. Events in our country may feel beyond our control. It's reasonable to ask, "How much can one person do?" The answer can't be, "Nothing."

Striving for change

Giving me confidence in our ability to change are relatively recent actions we have taken at Sandia with guidance from our Inclusion and Diversity organization. Within the past two years, we began mandating diverse candidate interview slates whenever the pool of qualified candidates allows and requiring that interview panels for manager positions include both a woman and a member of the minority population.

Sandia is on a journey toward greater demographic diversity in its workforce and leadership, and we are not there yet. These modifications were made because research indicates diverse candidate pools and interview panels correspond with more

diverse hiring. I am not equating our tiny piece of the world to the macro environment or claiming a magical solution, but change takes the grace to admit we could do better, followed by planning and action to actually do better. This is what we are striving for.

Kindness and acceptance

Speaking to our opportunity as individual Sandians, when fear, anger and much more complex emotions are part of our internal experience, how do we hold true to our value of bringing our whole selves to work? And how do we make it comfortable for others to live this value?

I believe part of the answer is to continue supporting each other. Sandians have met the challenges of our COVID-altered times with kindness. The current circumstances seem to require extension of the same kindness to each one of our colleagues.

Twelve weeks ago, I know I sometimes offered "How are you doing?" as a perfunctory greeting. These days, it has new, more genuine meaning. We'll keep checking on each other with an impromptu Skype. We'll keep demonstrating we care for one another with a two-line email of empathy and appreciation. And when we get a response, we'll listen with care and acceptance.

Among my small, doable steps is to attend monthly **Diversity Cinemas** and send calendar invitations to my colleagues for these events. It's a simple and visible sign that you support others in our Labs' community.

Whatever you are feeling, I guarantee you're not alone. We'll persevere through these times like we succeed through all things at Sandia — together. 

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 LABNEWS Notes

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Working well to stay well

Labs' ergonomics team encourages online self-assessments to help employees adjust to remote work

By **Valerie Alba**

With a record number of Sandia's workforce now working from home during the COVID-19 pandemic, the Labs' ergonomic team has helped make the transition to a home office safe for employees.

Lance Perry, ergonomics program lead, said the team "is actively involved with helping the Sandia workforce in many ways through the application of the science of ergonomics. Our staff of four ergonomics professionals are fully engaged on a daily basis with educating, training and assisting the workforce through the proven principles of ergonomics and the effects these principles have on the health, safety and performance of the workforce."

In late March, the New Mexico ergonomics team began a series of weekly Skype meetings to give employees tips and resources for remote work. They also are available for one-on-one virtual meetings to discuss the ergonomics of working from home. After the stay-at-home order was issued in New Mexico, the team acted quickly, immediately enabling the one-on-one meetings.

All employees who telecommute as part of their normal work schedule are encouraged to complete an ergonomic self-assessment online, said Environment, Safety and Health Director Johnathon Huff.

The ergonomic specialists also made a video available to the workforce, as well as presentations for individual departments on request.

Common injuries

Lance said common injuries sustained by employees at their workstation, whether at home or in an office or industrial setting, include cuts, bruises, scrapes and burns as well as slips, trips and falls. For office and remote workers, musculoskeletal illnesses become prominent. Understanding causal risks for these injuries, and helping employees modify their behaviors and redesign their work and workspace is important to reducing the risk of developing these maladies, he said.

In addition to helping employees avoid injuries, the team also strives to improve employees' work performance through the science of ergonomics.

"Optimum performance is the goal of most organizations," Lance said. "Removing the obstacles that contribute to suboptimum performance always makes good business sense. Our ergonomists are here to help our business lines achieve their

business goals. Designing the workplace, tools and work practices to eliminate waste, inefficiencies and stressors, and to maximize performance, output and outcomes are the keys to success. Remember, 'What beats your people beats your performance.'"

Optimizing work, prevention

California's ergonomics specialists also have been helping telecommuters and the on-site workforce set up and maintain optimal workspaces. They offer "Ergo Tips and Resources" and "Healthy Habits – Healthy Spine" sessions over Skype, said Janet Nevarez, the site's ergonomics subject matter expert.

Almost 500 employees have participated in the online sessions so far. The California team also continues to offer in-person evaluations. The most common issues the team has seen include employees experiencing strain from frequently reaching for a mouse or keyboard, or not using an external mouse or keyboard with their laptop.

Jeff Duncan, the site's physical therapist, also performs "symptomatic" evaluations for employees who are experiencing ergonomic-related physical issues, when referred by Health Services personnel.

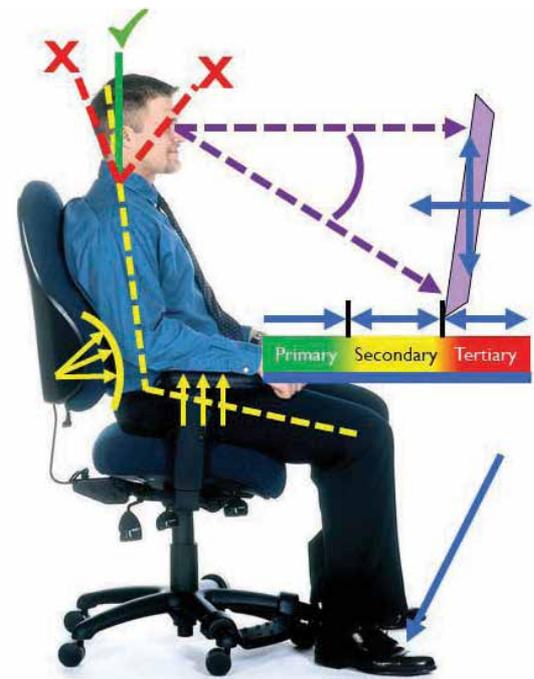
"Being proactive by completing the online self-assessment and/or a virtual evaluation is your first line of defense. Prevention is the key. Your Ergonomics Program provides ergonomic support and services to help optimize employee safety and comfort, with the ultimate goal of reducing the likelihood and severity of ergonomic-related discomfort and/or injuries," Janet said.

Mitigating the changing dynamic

When teleworking ramped up in response to the pandemic, leadership observed an uptick in ergonomic injuries. Johnathon and California Site Operations Director Pam McKeever discussed mitigations and agreed one of the most important steps was to encourage self-assessments for those working from home to ensure their safety.

When new workers start at Sandia or when a worker moves to a different office, Johnathon said, they automatically are contacted and encouraged to complete an online evaluation, which results in very few ergonomic injuries Labs-wide. Now, with so many working remotely, that dynamic has changed.

At the beginning of June, employees at the Labs' California site who do any work from home were required to complete an online ergonomic self-assessment to evaluate their workstation and injury risk. Employees in Sandia's Environment, Safety &



SETTING UP TO WORK WELL — Ergonomics program lead Lance Perry says the two most important aspects of an optimal workstation are sitting supported, with good posture, and keeping commonly used items within reach (primary zone) in the workstation to avoid strain.

Image courtesy of Lance Perry

Health organization also have been asked to complete an assessment, and leaders in other areas are encouraging employees to complete an assessment as well.

"Many simple adjustments can be made to a person's home workspace, such as sitting on a pillow or rolling up a towel as a wrist rest. Using the RSIGuard software for reminders also can help. For ES&H and California Site Operations, these strategies are making a difference," Pam said.

Numerous resources for creating an ergonomic workstation and lowering injury risk, including the self-assessment tool, are available to the workforce at the Sandia Ergonomics web-site, ergozone.sandia.gov. 

Tips for an ergonomic home workstation

- Use an external keyboard and mouse and stand-alone monitor with your laptop.
- Take frequent breaks; get up from your desk and stretch about 10 minutes for every hour or five minutes every half hour.
- Use a headset for phone calls and videoconferences.
- Consider scheduling shorter meetings (50-55 minutes instead of an hour) to allow participants a stretch break afterward.
- Install the RSIGuard software for break reminders and stretching exercises.
- Sit in a supported, optimum seated posture and organize your desk to reduce reach (see image above).

Testing mask solutions

CONTINUED FROM PAGE 1

Sandia principal investigator Michael Omana leads a team that modified aerosol and filtration systems used for nuclear nonproliferation work to conduct tests and comparison studies for the projects. One of the systems included an automated filter tester commonly found in industry and intended for material certification.

Through these tests, the researchers identified the most promising filter media, comparable to N95 filtration, to use for respirator production.

"Sandia isn't a certification lab, but we are able to use the systems to provide quantitative results," Michael said. "We've been able to utilize two independent systems to validate a robust data set."

Evaluating reuse technologies

Sandia is collaborating with the University of New Mexico Hospital to assess how to safely decontaminate and reuse respirators.

The team is assessing a hydrogen-peroxide vapor method currently being used by the hospital, as well as less-specialized techniques that could be used at smaller hospitals. Sandia's technical breadth and experimental capabilities, including aerosol testing labs, are enabling this project supporting hospitals' efforts to address shortages in critical personal protective equipment.

The study examines the impact of repeated decontamination cycles on N95 masks' respirator filtration, fit and mechanical integrity. Sandia and UNM Hospital are seeking to understand degradation mechanisms and explore differences due to the make and model of the respirators and decontamination methods.

Advancing sterilization techniques

Supercritical carbon dioxide — a solvent that has properties of both a liquid and a gas — is becoming increasingly popular as an eco-friendly alternative in the dry-cleaning industry. It might also safely

and reliably sterilize N95 respirators and other critical medical supplies for reuse on the front lines of the COVID-19 pandemic.

A Sandia team in Livermore, California, is investigating. If found to be appropriate and effective, the sterilization process could be rapidly deployed at hospitals nationwide because it is already used in commercial dry cleaning.

Many conventional sterilization methods cannot be used because they degrade mask performance, but supercritical carbon dioxide is gentler than other chemical disinfectants and works at relatively low temperatures.

"Hospitals have different resources and different needs," Gil said, "so Sandia is working with medical practitioners on a wide range of approaches to help keep health care professionals protected. Together, we can find enduring solutions." 



WATER, WATER EVERYWHERE — Water rushes through the tubes and computer racks, providing a warm-water cooling system and keeping the high-performance computers from overheating.

Data center earns LEED v4 Gold certification

Story by **Sheina MacCormic**
Photos by **Bret Latter**

Sandia's 725E data center addition for high-performance computing at the Labs' Albuquerque campus has earned the LEED v4 Gold BD+C: Data Center Certification.

Leadership in Energy and Environmental Design, or LEED, was developed by the U.S. Green Builders Council in 1993 to measure and define green buildings, provide a roadmap for developing sustainable buildings and establish a baseline for reducing environmental impact.

LEED certification is a lengthy process with stringent guidelines. In pursuit of the certification, a building is evaluated on a point system, earning points for various green building strategies to achieve one of four LEED rating levels: Certified, Silver, Gold or Platinum. Prior to earning the certification, a building must operate and function for a period of time to make

sure all applicable green design and build goals are met. The building also must demonstrate continued operational sustainability to retain the certification.

The 725E data center was completed in October 2018, and LEED certification took 14 months to achieve. This is the first certification earned under Sandia's **LEED v4 Campus effort**.

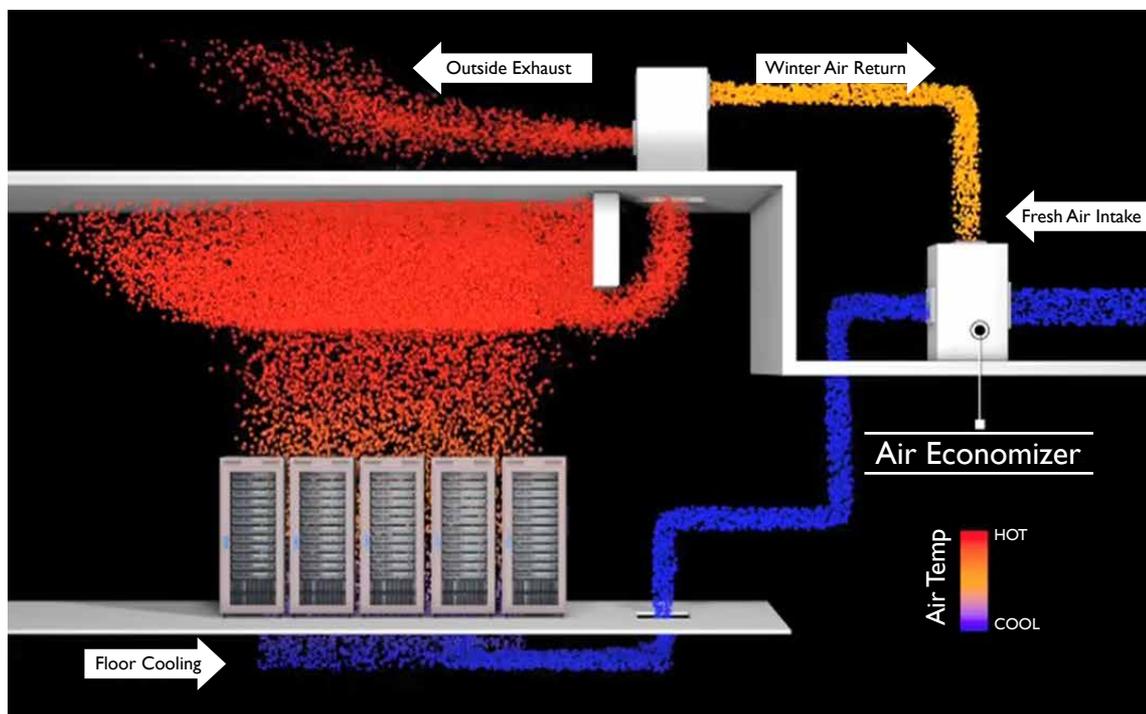
Sandia has four corporate data centers. The 725E data center is home to the Labs' Astra and Vanguard high-performance computing systems. David J. Martinez, engineering program/project lead, and other team members in data center services and facilities management and engineering worked together to design, build and operate the facility as a LEED-certified building.

The certification "is a great milestone for the Labs," David said. "This is something that I had a vision for 20-plus years ago, and we have been working on it for some time."

David's passion for and experience with green LEED building increased with the work he did

on the campus of DOE's National Renewable Energy Laboratory in Golden, Colorado, where he helped design a LEED Platinum-certified HPC data center. He spent several years collaborating with NREL to help with the design and assist in overseeing the construction of their data center.

"NREL is still the world's most energy efficient center," he said. "However, our certification now puts Sandia in the top 20. Eventually we would like to place our mark as one of the top five energy efficient data centers in the world."



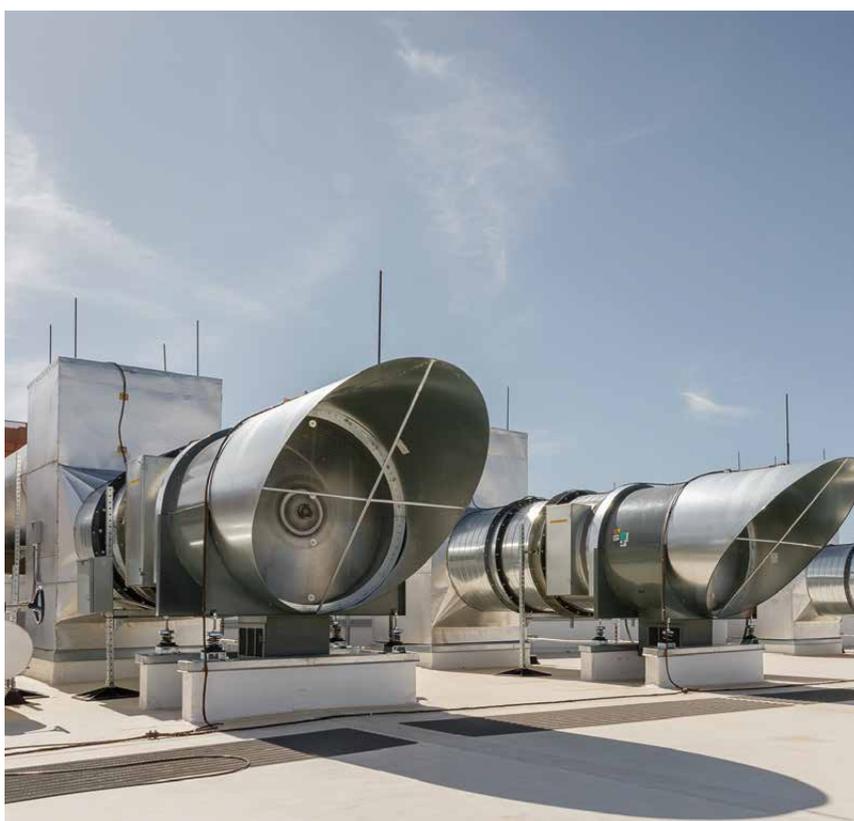
HOLDING STEADY — The Airside Economizer uses outside air to help cool the high-performance computers and maintain an ambient temperature inside the data center.



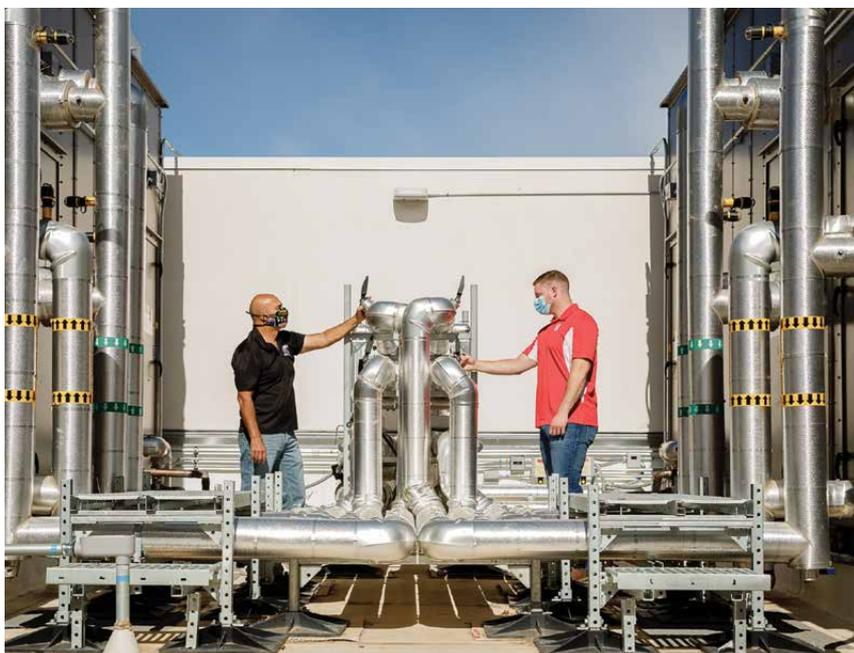
NETWORKING — The Cooling Distribution Unit pumps cool water into a network of tubes that runs through the floor of the facility and inside the computers.



BIG CHILL — Water runs through large, uninsulated pipes, part of the processing system that serves cooling directly into the computers via the Cooling Distribution Unit.



HOT AIR — When the air temperature nears 100 degrees, the Airside Economizer system's giant exhaust fans vent hot air from the facility and pull in fresh air.



PASSING INSPECTION — David J. Martinez, left, and David M. Smith inspect the piping that supports two Airside Economizer fan units. The piping provides water for the cell deck, as well as hot and cold water.

Getting to Gold

HPC systems consume substantial amounts of energy to perform the large-scale computations required by these supercomputers. A byproduct of that energy consumption is a substantial amount of heat, requiring stringent cooling regimens to keep the computers running.

Although a typical building is designed to meet heating and cooling needs for the comfort of its human occupants, HPC data centers must provide massive cooling power for their banks of servers. This usually results in high water

and energy usage. Employing energy efficiency and conservation techniques in the building of data centers is crucial for operation and reducing ongoing costs. Numerous green building strategies and new, innovative systems were implemented in the 725E data center to get it to the LEED Gold level.

“From the beginning, our goal was to design/build to get the Gold certification. Approximately 25-30% into the design, we sent out to bid for a contractor/engineer to keep us focused on the certification goal requirements

Sustainability features come together

Warm water cooling

One way Sandia's LEED v4 Gold certified 725E data center addition for high-performance computing conserves energy is by using warm water to cool HPC systems. The computers generate a sizable amount of heat, and warm water is more efficient in cooling the computers than cool water.

The complex water-cooling system includes numerous tubes and pipes flowing through the HPC computer racks. Water swirls through flexible tubes that are visible through the rows of glass tiles spanning two racks. At the end of the racks sits a unique pumping system called the Cooling Distribution Unit, which controls the water flow and rates.

Cooling with outdoor air, thermosyphon technology

Some of the computers housed within the data center do not use water cooling exclusively. To handle this, the building was designed with the Airside Economizer, an outdoor air-cooling system.

“Since New Mexico is a dry climate, we can leverage 75-80% of our outdoor air without having to cool it,” said David J. Martinez, engineering program/project lead.

The Airside Economizer brings fresh air in and cycles it to the floor. Heat generated by the computers rises, and some of it escapes outside via exhaust, while a portion remains near the top of the 25-foot ceiling, allowing the facility to maintain an indoor temperature of around 78 degrees. On the data center roof is a cell deck, similar to a high-powered swamp cooler, that is used only about 17% of the year. During other times, it cycles the cool air in.

“As long as it's not above 78 degrees, we don't need to enhance the cooling at all,” David said. “Above 96 degrees, then we use mechanical cooling. It's never that hot at night, though, so we go back to outdoor air. We can rely on outdoor air to help cool the building and components. We don't want to throttle back the computer's performance. We're able to find the balance of operating our structure and the computers as well.”

The 725E data center also is equipped with a [thermosyphon cooling system](#), which uses passive heat transfer to make the building more efficient. The system saved more than a half million gallons of water during its first six months of operation.

More design features provide energy, water savings

Many other green building elements helped the 725E data center earn its LEED Gold certification, including highly efficient windows that offer natural lighting. “You rarely see a data center with natural lighting,” David said. “We have windows facing north. During the day, you don't need lights. Sensors turn lights on when needed.”

Other factors that helped the center earn points toward the certification include a 250-kilowatt solar unit that contributes some of the energy used in the building, as well as water-conserving elements like native vegetation and low-flow toilets.



LEED DESIGN — The 725E data center on Sandia's Albuquerque campus features a minimalist exterior with water-wise landscaping and an energy-efficient design.

and where we could get points for certification,” David said.

Verdacity, the Albuquerque sustainability firm who won the bid, is no stranger to LEED design, with more than 75 LEED certification projects, including Sandia's [LEED v4 Campus masterplan](#). They helped the Sandia team find and implement many green building features for the data center.

“We designed based on what we needed and wanted for energy efficiencies,” David said. “Verdacity guided us along in the design to find and earn LEED certification points.” [f](#)

Frank Hansen earns lifetime achievement award

By **Whitney Lacy**

The Wendell D. Weart Lifetime Achievement Award was presented to retired Sandian Frank Hansen at a ceremony in Phoenix on March 10.

This award was created by Sandia and Waste Management Symposia Inc. in 2001, in honor of Wendall Weart, who retired from Sandia in 2000, to recognize the recipient's long-term commitment to solving major nuclear waste challenges, including education, research, public policy and actions contributing to the resolution of significant nuclear waste management issues.

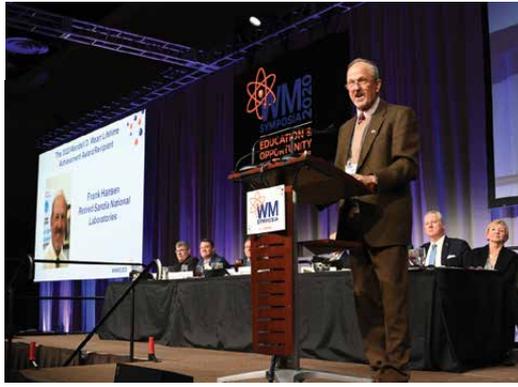
Of the many testimonials submitted in support of Hansen's nomination, one notes that he is "one of the most versatile, practical, pragmatic, trustworthy, credible and reliable earth scientists and geoengineers." Hansen, who retired in 2017, distinguished himself with a 45-year career in geomechanics applied to the geological disposal of radioactive waste, according to the nomination.

Hansen's long career at Sandia began in 1988, when he was hired as an expert in field, lab and computer modeling studies in the behavior of salt for nuclear waste disposal. He helped Sandia with the licensing of the Waste Isolation Pilot Plant near Carlsbad, New Mexico — a process requiring in-depth regulatory and independent technical reviews. He was there when the U.S. Environmental Protection Agency approved the facility in 1999 to begin accepting shipments of nuclear waste. He also helped with the licensing of the Yucca Mountain nuclear waste repository in Nevada.

Hansen's knowledge of how to isolate radioactive waste in deep, underground environments has led to numerous national and international collaborations for the betterment of nuclear waste management. He played a key role in a series of U.S.-German workshops on salt repository science, which have continued for the past 10 years.

"The international network of fellow scientists Frank constructed over the years serves to amplify Sandia's impact globally in the field of nuclear waste management," said Sandia senior manager Paul Shoemaker. "I'm delighted Frank was honored for this award. It is extremely well deserved."

Wendall Weart, who is considered the "father" of Sandia's work at WIPP, wrote this of Hansen: "No one, including myself, ever deserved the WMS Lifetime Achievement Award more than Frank Hansen." [fb](#)



LIFETIME OF SERVICE — Retired Sandian Frank Hansen was presented the 2020 Wendell D. Weart Lifetime Achievement Award at a ceremony in March for his long-term commitment to solving major nuclear waste challenges.

Photo courtesy of the WM Symposia Inc.

B61-12 Life Extension Program

CONTINUED FROM PAGE 1

"It's that enormous amount of data that gives us confidence to execute this review and continue moving forward," said Scott Lindblom, a qualification manager in the B61-12 program at the time and now a senior manager. "This successful review validates Sandia's work on the B61-12 LEP up to now, and it brings in an independent review team to say, 'Yes, really, really, you are doing the right things.'"

The weapons assessment team is a group of about 10 Sandia weapons experts brought together to do an internal review of the weapons system that is independent from the design, development and testing teams, said Todd Simmermacher, a nuclear safety assessment manager. The team's work reviewing and assessing the design and qualification data is continuous from the beginning of the program.

That qualification data comes from tests of the whole weapon system and each component to ensure everything always works when authorized by the president and never under any other circumstances.

"The team is constantly reviewing and assessing the design and data to the best of our ability as the weapon's team produces it," Todd said. "The B61-12 evidence showed that the system is meeting its safety and security requirements."

Service life extended by decades

Impact, vibration, drops, extreme temperatures and massive electrical impulses are some of the physical tests conducted to show that a component and the entire B61-12 weapon system will operate as intended. Combining hours of computational analysis and advanced computer algorithms with that field-testing, including flight tests, ensures components, systems and warhead integration are safe and secure enough to prevent unplanned detonations or unauthorized use of the weapon.

The B61 first entered service 50 years ago. Numerous modifications have been made since, to increase safety and reliability. The B61-12 consolidates and replaces most of the previous variants, extending the bomb's service life by at least 20 years and ensuring its continued safety, security and effectiveness. The NNSA plans to produce the first unit of the B61-12 in fiscal year 2022.



VIBRATION INTEGRITY — A B61-12 model receives a vibration test to analyze structural integrity. Placing the diagnostics are Daniel Rohe, left, Patrick Hunter, center, and Maxine Norton. Note: This test was conducted before social distancing and face mask guidelines were established.

Photo by Randy Montoya

Sandia's Combined Engineering Judgment review has added a high degree of confidence in the B61-12 engineering and design, Scott said.

It was the second such review and showed that the gaps identified earlier had been closed, he said. "Nothing was a surprise, and Sandia is moving forward on the B61-12 LEP with trusted data and design." [fb](#)

SANDIA CLASSIFIED ADS

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MISCELLANEOUS

GAS DRYER, LG, DLGX4371, 7.4-cu. ft., ultra large capacity, black stainless steel, like new condition, w/box, \$500. Duis, 775-830-6266.

FULL-SIZED BED, espresso-colored compact, w/6 drawers for easy storage, no mattress, located in CA, \$250. Buckley, 623-687-7107.

CAMPER SHELL, good shape, working windows & hatch, used on '99 Ford F250 6-1/2 ft. bed, \$100 OBO. Eanes, 505-331-3264.

1979 BALLOON FIESTA POSTER, framed, artist John Martinez, 34" x 20", \$300. O'Grady, 720-587-9857.

INVERTER GENERATOR, Champion model, portable, 3,100-W, barely used, in East Mountains, \$550. Willmas, djwillmas@gmail.com.

WHEELS, 4, '20 Toyota 4Runner TRD, off road, machined aluminum/black, \$425. Hennessey, 505-506-7936.

ELLIPTICAL EXERCISE MACHINE, Sharper Image, cardiovascular workout, easy on the joints, excellent condition, \$100 OBO. Montoya, 505-342-0043.

17-IN. WHEELS, Toyota, only 1K miles on them, from '20 4Runner, like new, \$400/set. Torres, 505-508-6795.

SPARE TIRES, 2, compact, w/wheels, never used, T165/90D18 & T145/80D17, \$50 ea. Ghanbari, 505-400-4188.

PORTABLE BASKETBALL SYSTEM, old, no net, you pick up, free. Walkington, 505-831-6974.

PET CRATE, double door, black wire, for training & transport, 22"L x 13"W x 16"H, brand new, \$25. Wagner, 505-504-8783.

CONVERTIBLE CRIB, cherry, Babi Italia, toddler rail, mattress & owl crib set, email for photos, \$150. Aimone, bradaimone@gmail.com.

NORDICTRACK, w/classic ski care kit, \$150 OBO. Korbin, 505-299-9088.

TRANSPORTATION

'12 **FORD ESCAPE LIMITED, AWD, AT, V6,** white, charcoal leather, seat heaters, 39K miles, almost new tires, 2nd owner, runs great, \$10,750. Dwyer, 505-249-6935.

'12 **BMW 335i CONVERTIBLE,** hardtop, blue, tan leather, 66K miles, excellent condition, \$14,900. Shannon, 505-270-7610.

'12 **CHEVY VOLT,** white, 63K miles, 187 life-time mpg, white, great shape, well maintained, <book, \$8,500. Kerschen, 505-821-2848.

RECREATION

'06 **HONDA CBR1000RR,** ~26,330 miles, will increase slightly as I still ride it. Benally, 970-692-4736.

SAILBOAT, well equipped, lake or coastal cruising sailing, info/photos: tinyurl.com/y8escqsc. Kercheval, 505-266-5833.

REAL ESTATE

VACANT LAND, Magic Valley subdivision, Sandia Park, 3+ acres, \$59,000; 2.4+ acres, \$45,000. McCormack, 505-296-3936.

EAST MOUNTAIN LAND, 25.5 acres, Tijeras, \$139,000; 4.95 acres, Cibola National Forest, off grid, \$35,000; 2.36 acres, Edgewood, C-1, \$169,000; all prices firm. Dotson, 505-850-2939, ask for Lori.

WANTED

SWIM INSTRUCTOR, provide private swimming lessons in your pool, for 5-yr. old. Tapia, 505-250-1111.

VOLUNTEERS, Fabulous Felines needs help with rescued cats, fabulousfelines.org. Stubblefield, 505-263-3468.

AD RULES

1. Limit 18 words, including last name and home phone (web or email address counts as two or three words, depending on length).
2. Include organization and full name with ad submission.
3. Submit ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. The same ad may not run more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce and retired Sandians only.
10. Housing listed for sale is available without regard to race, creed, color or national origin.
11. Work wanted ads are limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in poor taste.

Mileposts



*New Mexico photos by Michelle Fleming
California photos by Randy Wong*



Cathy Ottinger Farnum 40



Jim Klarkowski 40



Larry Trost 40



Roger Showalter 35



John Torczynski 35



Doug Nordquist 30



John Parmeter 30



Ed Brady 25



Rich Field 25



Chuck Rhykerd 25



Mark Stevens 25



Nicolette Bauer 20



Rhonda Goodpasture 20



Kim Goodrich 20



Dominic Pohl 20



Cory Sisk 20



Val Valdez 20



Carolyn David 15



Tracie Durbin 15



Steve Feador 15



Justin Ford 15



Justin Garretson 15



Chris Harmon 15



Brenna Hautzenroeder 15



Gene Littlefield 15



Sarah Mahoney 15



Sue Pickett 15



Donna Robertson 15



Angeleen Saiz 15



Rose Shutco 15



Jon Whetzel 15

Recent Retirees



*New Mexico photos by Michelle Fleming
California photos by Randy Wong*



Barbara Allison 20



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Expanding access to cyber research tools

By **Troy Rummler**

Faculty and students at Purdue University now have access to cybersecurity research software developed at Sandia. This marks the first time Sandia has collaborated with an academic community to make its cyber software widely available.

Sandia has previously invited academic collaborators to use cyber research software at the Labs or by connecting to its systems remotely. This is the first academic partnership in which Sandia has made the software available throughout an institution for teaching or research regardless of affiliation with the Labs.

The software, called minimega, will help advance cybersecurity research to discover security threats in a variety of systems and develop new safeguards. It also will increase research opportunities at the Center for Education and Research in Information Assurance and Security, based at the West Lafayette, Indiana, university. It was installed on a server that supports the center's new Scalable Open Laboratory for Cyber Experimentation, or SOLACE, which was unveiled in February.

"Minimega is an open-source emulation platform that allows users to set up a simulated, virtual network to safely explore and reason about computer networks and distributed systems. This could include looking at cybersecurity, resilience, what-if scenarios and red-teaming assessments. Resources like this are relatively few and far between," said Sandia computer scientist Vince Urias. A red team identifies vulnerabilities for the purpose of fixing them.

A virtual testing ground like minimega is an important early step in research because it can quickly generate data on variations of experimental security protocols or simulate enterprises that are difficult to reproduce in the real world, especially large or specialized systems. Researchers use the simulated data to home in on approaches that show the most promise for use in the real world and to identify unintended effects on a system.

The program is part of Sandia's suite of cybertools, called **Emulytics** — a portmanteau of emulation and analytics.

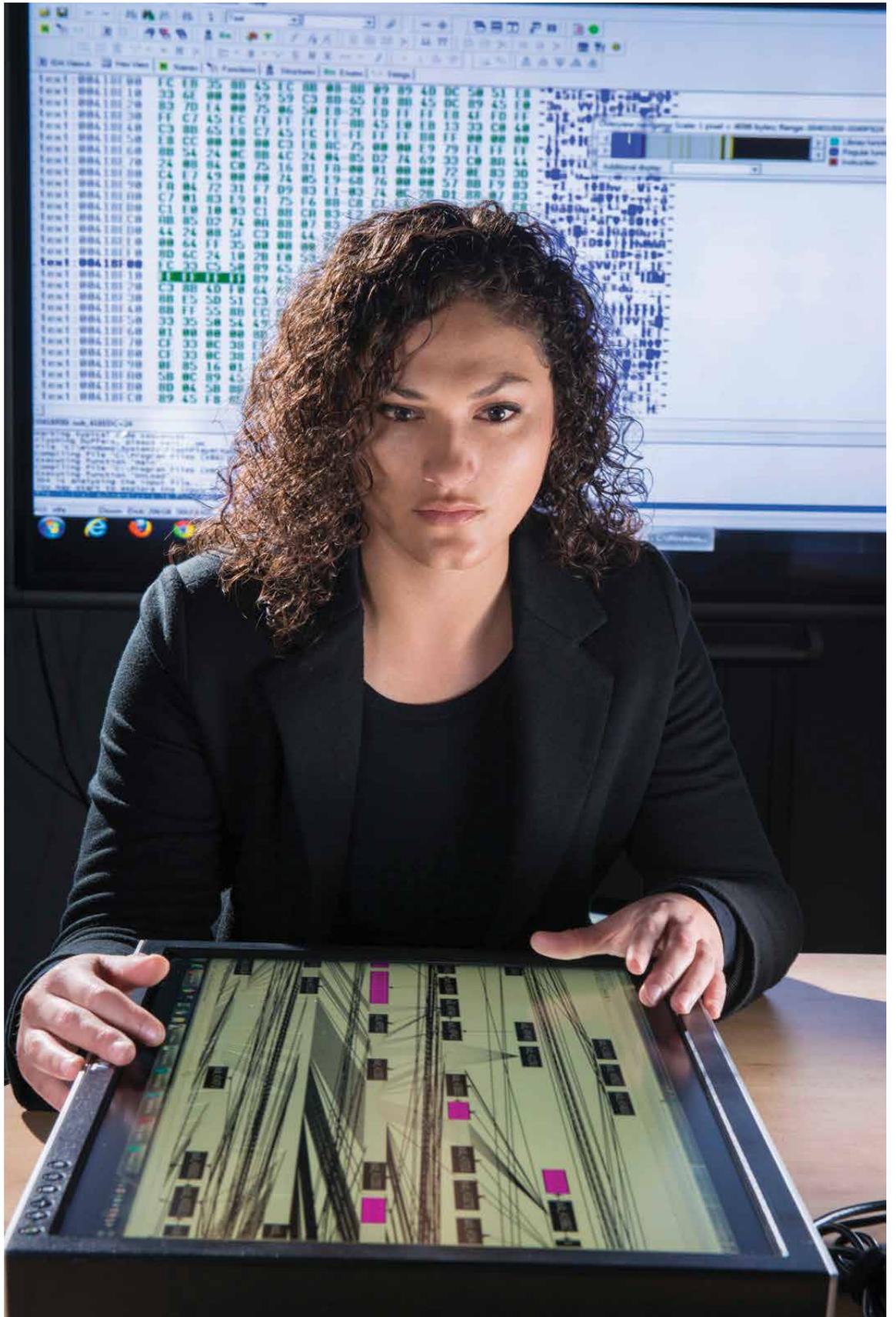
Expanding the program

"We hope more universities will follow," said Han Lin, who oversees Sandia's cyber educational outreach programs. "Cyberthreats are always changing, so it's important that researchers have easy access to tools to test new countermeasures."

"This is just a first step — we have plans in the works to release more of our Emulytics software stack to the experimental cyber-research community, working closely with our academic partners" said Zach Benz, who formerly managed Sandia's Emulytics development.

In addition to installing the software, Sandia staff developed training and "hosted outreach and support for installation and configuration, as well as led workshops with faculty to help them get up and running," Vince said.

"We want to ensure universities have tools to quantify how good a system is — actual metrics that tell you a system is safe, rather than thinking it's safe," said Kamlesh "Ken" Patel, manager of Purdue partnerships at Sandia. [f](#)



CYBERDEFENSE — Developing advanced cybersecurity defenses starts with research, so Sandia has created free cyber research tools for academic and research institutions.

Photo by Randy Montoya



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