Capturing the wind’s energy potential

By Stephanie Hobby

A drive across the nation’s landscapes is revealing more wind farms cropping up on the horizons. As of last year, 37 states are home to at least one wind farm, and the more than 40 gigawatts of installed capacity accounted for about 3 percent of the electricity generation in the US. A 2008 DOE report, however, points to much greater potential and suggests that by 2030, 20 percent of the nation’s energy needs could be supplied by wind turbines. While the idea of harnessing the wind’s energy is ancient, the global scale of the industry only began to be realized in the last five years. With this realization, the growing need for highly reliable wind turbines becomes paramount, but little data exists to point out opportunities and areas for improvement.

Wheels down

By Stephanie Hobby

One Sandian witnessed history from Mission Control at Johnson Space Center as Columbia made its final flight, marking the end of NASA’s 30-year space shuttle program. For the past 22 missions — every one since NASA’s 1981 return to space — a team of Sandians has worked tirelessly to protect the astronauts by inspecting the orbiter’s thermal protection system for damage.

NASA turned to Sandia for assistance in 2003 after Columbia’s debris-damaged heat shield failed, which caused the tragic accident that took the lives of all seven on board. In response, a Sandia team developed the laser dynamic range imager, or LDRI, which generates 3-D images from two-dimensional video. The LDRI Orbiter Inspection System (LOIS) is attached to the orbiter’s boom, and scans the heat shield twice — once 30 hours after liftoff and then again the day before re-entry — to ensure that no part of the orbiter’s heat shield was damaged during launch or orbit. With its ability to detect minute anomalies, the shuttle might have remained Earthbound.

“Sandia and NASA, and a true team effort,” says Rob Habbit, (5711) manager of Sandia’s Remote Sensing and Communications System group. “These people that we work with here are in effect co-workers. We’ve had a very tight relationship, so it’s tough to see that relationship come to a close for this project, but again, we are very proud of what we’ve been able to do and the support we’ve provided for NASA.”

The effort needed to execute the scan is extensive. In the early days, Sandia took a 24-person team to oversee all aspects of LOIS, some of that work was eventually turned over to NASA and its contractors, so for the last 17 missions, usually only nine or 10 Sandians went to Houston for the hands-on work.

“We led the inspection activity and operations in the payloads operations center for the data collections. We validated that the data was correct and that the sensor was operating properly, and then we reviewed the work of the NASA team to make sure that the data had been processed correctly,” Bob says. “That was our principal role, but in the event that there was some defect found, we provided technical expertise and support to the mission management team.”

(Continued on page 4)
That's that

Exactly 42 days to the year when Neil Armstrong and Buzz Aldrin lifted off the moon, leaving Tranquility Base a silent monument to mankind's first visit to its nearest celestial neighbor, the space shuttle Atlantis touched down (in total darkness) at its special runway at the Kennedy Space Center in Florida. And now, for the first time in two generations, the United States doesn't have the capability to put an astronaut into space.

The space program will still fly into space and will still crew the International Space Station – it's just that they'll have to hitch a ride with the Russians to get there. That's fine; space travel is a hugely expensive proposition and international cooperation has worked well (at least by all accounts) at the ISS. Isn't it ironic, though, that the Russians, who lost the space race in the 1960s, are now our only ticket into orbit? When the Soviet Union, painfully aware that it was losing its cold war, sought their technology was never as dazzling as our stuff, but guess what? They're still flying and we're not.

Having said all that, the US is still an awesome spacefaring nation. Even as our astronauts were wrapping up business on Atlantis, our space wizards at the Jet Propulsion Laboratory were getting photos of the giant asteroid Vesta from the Dawn spacecraft, which became the first probe ever to orbit into orbit around an object in the main asteroid belt between Mars and Jupiter. A year from now, Dawn is scheduled to depart Vesta and enter into orbit around another giant asteroid. Ceres, President Obama has said that he wants the US to land astronauts on an asteroid by 2015. That's a great idea, a logical step on the way to Mars. We'll see. The Russian manned program has survived everything history has thrown at it, including the dissolution of the very nation that launched the space age in the first place. Let's hope that we, like the Russians (at least in this regard) have the right stuff, the stuff to carry on. If national prestige means anything in this day and age, I think we've taken a hit, and the sooner we can get back in the saddle (so to speak), the better.

Did you see where a new study published in Science describes something called the “Google effect”? A research team led by Carnegie Mellon University psychologist Kevin Sparrow has found that Google and other online search capabilities are changing the way we choose to remember things. As one writer put it in discussing the finding, “We are becoming a species of computer users.” That is, if we know we'll be able to find something easily via Google or Yahoo or Bing, we don't store the information away in our own memories. We just look it up. Other findings from the researchers show that a large percentage of students believe that if they have internet access then they don't have to memorize. Furthermore, if they have internet access, they feel they are losing their ability to think — and the evangelists — This proves that computers, freeing up our brains from having to remember trivial detail, are empowering us to grasp more abstract concepts. I do. I couldn't have written this column today without access to some of the facts I've cited, but in the back of my mind, I think James Cameron may have been onto something with SkyNet, which posits a future in which we are done in by our own technology. It's more than just a change in name, though. "Our new structure," Kim says, "provides a more focused and aligned mission." The RPSC has always been chaired by a line director or deputy director who already have extremely full schedules. The RPSC is a standing board that meets twice a year and provides leadership and oversight for the line and provides a link between the line and organizational units. The RPSC is a strategic management committee that meets quarterly and provides a link between the line and RP organizations. Sandia's RPSC is a recognized by DOE as a best practice for RP programs. The RPSC has always been chaired by a line director or deputy director who conducts radiological operations. Chairing a standing safety committee is often an ancillary duty requiring significant contribution from directors who already have extremely full schedules. Their leadership is critical to the success of the committees and continuous improvements in Sandia’s ES&H programs. Other directors who have led the RPSC are Kathleen McCarthy, currently the VP for Safety, Health, and Environment, different director of Sandia's HPSC, and former director of the Environmental Protection Agency. It’s more than just a change in name, though. "Our new structure," Kim says, "provides a more focused vision and strategy to a broader set of organizations and functions that provide services to the mission delivery organizations." The RPSC has always been chaired by a line director or deputy director who already have extremely full schedules. Their leadership is critical to the success of the committees and continuous improvements in Sandia’s ES&H programs. Other directors who have led the RPSC are Kathleen McCarthy, currently the VP for Safety, Health, and Environment, different director of Sandia's HPSC, and former director of the Environmental Protection Agency.
Sandia's dental care program is one plan with two types of networks. This article, prepared by Sandia's Benefits team, is intended to help answer questions about the provider networks available under the Sandia dental care program. Understanding how the two Delta Dental provider networks work together under the plan will help you make the most of the dental care cost savings available to you.

Delta Dental PPO and Delta Dental Premier Networks

Sandia's dental care program offers two in-network Delta Dental provider network options:

- Delta Dental Premier®
- Delta Dental PPO

Delta Dental Premier is the country's most extensive panel of dentists, with more than 220,900 locations across the country. Delta Dental PPO is a second, somewhat smaller (more than 141,000 locations nationally) network through which some of these participating dentists agree to deeper discounts — meaning more savings for you.

Each of these two networks has the same benefits levels under the dental care program, as shown in the following table:

<table>
<thead>
<tr>
<th>Services</th>
<th>Delta Dental PPO Network</th>
<th>Delta Dental Premier Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandia Pays</td>
<td>You pay</td>
<td>Sandia Pays</td>
</tr>
<tr>
<td>Diagnostic and Preventive Services</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Basic and Restorative Services</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>Major Services</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

For more detail on the types of services that fall into the benefit categories shown above, consult the Sandia Dental Care Program (DCP) Program Summary.

However, providers in the Delta Dental PPO network have agreed to more deeply discounted maximum approved fees than those providers in the Delta Dental Premier network.

Because the dental care program offers both network choices, anytime services are received from a dentist who participates in both Delta Dental PPO and Delta Dental Premier, the total cost of the services received will reflect the lower Delta Dental PPO maximum approved fees.

Benefit levels (percentages shown in the previous table) are the same for nonparticipating providers, but your out-of-pocket costs will typically be higher since these dentists are not subject to agreements that would require them to honor Delta Dental maximum approved fees for covered services.

To potentially save you the most money, consider selecting a Delta Dental PPO provider, whenever possible, to reduce your out-of-pocket costs. Select a Delta Dental Premier provider when a more expansive panel of dentists is needed or desired.

Some dentists participate in both Delta Dental PPO and Delta Dental Premier networks.

To help reduce your out-of-pocket costs, consider selecting a dentist who participates in both networks.

Some dentists — particularly some specialists — may be unlikely to participate in a network that requires them to reduce their fees beyond a certain point. Other dentists — ones who participate in both Delta Dental PPO and Delta Dental Premier — have structured their practices so they can see patients with Delta Dental PPO and those with Delta Dental Premier. As mentioned before, anytime services are received from a dentist who participates in both networks, the dentist will provide treatment subject to the lower Delta Dental PPO maximum approved fees.

The table below shows how using a dentist in the Delta Dental PPO network can help reduce your out-of-pocket costs.

<table>
<thead>
<tr>
<th>Example assumes a single crown procedure (CPT code 27490)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta Dental PPO provider</td>
</tr>
<tr>
<td>Dentist submitted charge</td>
</tr>
<tr>
<td>Delta Dental Maximum Approved Fee (network-specific)</td>
</tr>
<tr>
<td>You Pay 90% (Discount for major services)</td>
</tr>
<tr>
<td>You get 90% off</td>
</tr>
</tbody>
</table>

The difference in the maximum approved fees applicable under both provider networks can result in substantial savings on a single procedure — reducing your out-of-pocket costs by more than $100 in the example shown above.

If you have any questions about Delta Dental program benefits, contact HBE Customer Service at 505-844-8800 (4235) or Delta Dental at 800-264-2818.
improvement. "Wind energy is leading our nation’s and the world’s renewable energy surge. As we become more dependent on these energy sources, we must make sure we are installing the most effective, viable, and reliable systems possible to transform the energy future of the world," says Jose Zapata, (6120) senior manager for Renewable Energy Technology Development.

To address this need for data, Sandia is converting the development stage to create a Continuous Reliability Enhancement database for Wind (CREW). This database will be the foundation for analyses to identify primary failures and associated improvement opportunities, enable reduced operating and maintenance costs, and provide industry benchmarks. The DOE-sponsored project focuses on the nation’s utility-scale turbines of one megawatt and higher.

Data in 36 key operating parameters

"This project is the first effort to compile a comprehensive dataset that reflects the performance of the US wind fleet. With better understanding of current performance of the major turbine systems, wind operators can direct their efforts toward improvements in those areas that will drive increased reliability and efficiency," says team lead Bridget McKenny (6211).

By tapping into turbines’ existing supervisory control and data acquisition (SCADA) industrial control systems, Sandia researchers are collecting information on 36 key operating parameters such as wind speed, blade angles, component temperatures, and torque. Every two seconds, a wind turbine’s SCADA system captures a picture of how the turbine and its components are performing relative to a defined operating envelope and its environment. Currently, four wind plant owner/operators are participating in the development phase of the CREW project by providing this SCADA data to Sandia’s CREW database via automated data collection software developed by Strategic Power Systems (SPS). SPS is a key partner with many years of experience in collecting high-volume data from steam and gas turbine systems in a proprietary software tool. SPS has converted this tool to collect data from wind turbines.

"Our assignment from DOE is to characterize the national fleet. We’re not looking at one technology, one location, or one company," says Alister Ogilvie, CREW program manager. "To look at the entire US fleet and create baseline statistics for the industry to be able to say, ‘This is what you and your competitors should be trying to achieve.’"

To reach a statistically representative baseline, CREW will aggregate data received from all participating wind plants. The current data set represents approximately 2 percent of the nation’s wind turbines, but as the project grows, CREW researchers expect to include approximately 20 percent of turbines to establish representative benchmarks.

The volume of data to sift through is mind-bending. The print collections of the Library of Congress are roughly 10 terabytes, CREW’s data set, with dozens of variables taken at two-second intervals from a fifth of the nation’s wind turbines, is expected to dwarf that. Over the past six months, four pilot plants with a combined 345 turbines, or about 2 percent of the nation’s wind energy capacity, have generated two terabytes of raw data. This data has been provided to the CREW database by the SPS collection tool. To process this enormous dataset into a usable database that can readily support a wide variety of queries, CREW turned to Sandia’s Enterprise Database Administration team (9538).

Identifying likely failure points

"The goal is not to have the biggest database — the goal is to transform it into a useful dataset for the analyst," says Michael Mink (9538). "We’re taking the raw data on weather, wind speed, angles of the blades, and so on, at two-second intervals, taking time chunks of that, summarizing it and putting it into another database that people can query easily and quickly."

"Determining which components are most likely to fail is an important part of benchmarking. Major turbine systems include a set of three blades, rotor, shaft, generator and gearbox, any of which have the potential to fail. Turbines that are down for maintenance or repair are expensive — in addition to lost productivity, the cost of hiring a crane for repairs can be upwards of $250,000, and because there are only a few cranes in the nation available to handle turbine heights and component weights, an operator might wait for months before the turbine is up and running again."

The CREW team will use the dataset to identify the major systems and components responsible for the majority of downtime, which will then inform specific research and technology improvements. "If we can identify the systems or components that are the most major, we can provide the industry and DOE with information on which ones need further research and where funding should go," says Alister. Components that were once considered the most valuable will become more reliable, allowing the industry to move on to addressing the next challenge.

"We’re excited about the results so far, and look forward to the next few years, as we make an important contribution to transitioning to wind energy by improving the reliability through a component-level focus," Bridget says. "It’s an important project for the industry and the nation as a whole, because we could not move forward succefully without the outstanding partnership of Corporate Computing and SPS, and the support and leadership of DOE. Together we can provide the tools to help shape the future of the nation’s wind energy generation."

Dealing with 10,000 truckloads of data

The Continuous Reliability Enhancement for Wind (CREW) program is going into its pilot phase, and has already generated 68 billion rows of data. Over its lifetime, the project is expected to produce more than 10 terabytes of data, roughly the equivalent of 10,000 pickup truck fulls with books. Such a fantastic amount of information would be nearly impossible to wade through, but the CREW team turned to Sandia’s Enterprise Database Administration team (9538) to turn it into something usable. The team has taken the 68 billion rows of data and transformed it into a structured database format so CREW can better use the information they’ve collected.

"Earlier this year, we formed a five-person Process Innovation Team working with supporting customers working with a terabyte of data or more," says Cynthia Huber (9538), manager of Enterprise Database Administration (EDA). "We have built new and innovative processes, designed to handle big data loads and transformations, so we can provide the customers the enterprise level database base support standards. CREW’s requirements for consuming big data loads with our growing database has been to 20th century technology. After that, we have taken our mission in managing large volumes of data, so we are enthusiastically supporting that effort.

The techniques used by EDA are expected to translate to multiple other industries, such as solar, that have the potential to generate large quantities of data, but also need that data to be user-friendly. With the mission of providing valuable database administration services to Sandia’s applications development community to ensure the integrity, availability, recoverability, accessibility, integration, and security of Sandia’s corporate data, the EDA is continually working to meet Sandia’s database needs. Working with terabyte-scale projects is an evolving field, but the EDA is well-equipped to handle such challenges.

"We have a highly skilled group of database administrators with many years of multidimensional database management experience servicing both enterprise and mission level applications," Cynthia says. "Additionally, our ability to scale up to handle these data volumes is made possible by the excellent support we receive from our enterprise IT partner Infrastructure Computing Services (9324), which provides the enterprise system that allows us to scale up our database server that ultimately host this capability. They provide us the hardware footprint that enables the database administrator to perform data integration and transformation necessary to deliver valuable and secure data to our customers. We are constantly evolving data integration, data transformations and securing data for customer use.

For more information about the Enterprise Database Administration’s capabilities, visit http://info.sandia.gov/enterprise-dba."

Stephanie Huber

WOUNDED WARRIORS Chetson Balion (second from left), his brother John Balion (center), and Jeddah Deloria (right), are joined by Executive VP Jerry McDowell (left), Labs Director Paul Hommet (third from left), Div. 5000 VP Jeff Isaacson (third from right), and Center 5600 Director James Peery (second from right) in front of a special commemorative wall on display in the Steve Schiff Auditorium. The wall, dedicated to those who serve, have served, or support those who serve in the nation’s military, will provide Sandians a chance to write notes of appreciation and support for members of the armed forces and their families. The wall will be divided into several pieces and will be rotated to various locations around the Labs both in New Mexico and California. At an upcoming event, the permanent home for the wall will be announced. Before the unveiling of the wall, EDA participates in the ceremony that shared their experiences in combat in Afghanistan and Iraq. In his introduction of the speakers, Paul praised the "extraordinary professionalism, dedication, and courage of the men and women who serve in our armed forces. A generation of Sandia employees are many divisions within our society, Paul said, the example of our military personnel "serves as a beacon of unification for us Americans, for our country." (Photo by Derrick Hunt)
A real-world experience
death of public information, complicated marine environments, and even the corrosive effects of saltwater are some of the challenges facing companies that seek to produce energy from river currents, tides, and waves, so Sandia is helping companies on the fron-
tier of the coming marine hydrokinetics (MHK) industry navigate these and other concerns.

Through DOE support for Sandia’s MHK research, the Labs plans to release its first report this fall analyzing the computer-simulated performance of a tidal turbine, a river turbine, and a wave-point absorber, which bobs on the surface to capture energy from waves, says engineer Rich Jepson (6122). Eventually, Sandia will analyze up to 10 devices.

MHK is the study of harnessing the kinetic energy that results from the motion of water. “The current MHK industry looks a lot like wind did 30 years ago,” says Daniel Laird, manager of Water Power Technologies Dept. 6122. “We want to take what we’ve learned to compress the MHK development from the 30 years it took wind energy down to 10 years.”

Sandia’s analysis aims to accelerate the MHK industry in the US by showing companies and DOE where investments can be made to bring down the costs of using America’s waterways and the oceans to produce energy — whether from an engineering, environmental permitting, or administrative standpoint. Companies will be able to use this information to make their own decisions about which design or system components are worth their investment, Rich says.

Real-world experience

“As a nation, we don’t have a handle on what the performance is and the actual cost of the energy that is generated,” Rich says. “Sandia also is getting real-world experience through its partnership with New York City-based Verdant Power, which is at the forefront of the MHK industry. Verdant has operated the world’s first grid-connected array of multiple tidal turbines in the East River and will operate the first tidal power plant in the country, says Dean Corren, the company’s director of marine current technology.

After Sandia began working with Verdant in 2008, DOE awarded an Advanced Water Power Project grant that expanded the partnership to include the National Renewable Energy Laboratory in Golden, Colo. Verdant’s turbines are mounted on towers on the river bottom, turning with the changing currents to always point downstream so they catch the currents and produce energy as they rotate.

“The goal of the project was for Sandia to design a stronger, more efficient blade made of composite materials, similar to what’s used in wind,” says Sandia engineer Josh Paquette (6121).

Sandia surveyed and studied prospective blade foil shapes, performed essential, computational fluid-dynamics analyses of the rotor, and then of the turbine as a whole, Corren says. The result is a blade that is stronger and thicker, more resistant to corrosion and cavitation, and one that can be mass-manufactured, Josh and Corren say. Cavitation is the creation of tiny water vapor bubbles at low pressure that can collapse and damage the surface of the blade.

TIDAL SURGE — Engineer Rich Jepson (6122), left, and hydrologist Jesse Roberts (6122), right, with their senior manager, Jose Zayas (6120), center, in front of Sandia’s Water Impact Facility, which Rich hopes can one day be used by the marine hydrokinetics (MHK) industry for controlled tests of tidal turbines and wave devices.

Sandia researchers use wind power expertise to help create industry in US for tidal, wave energy production

Sandia hydrologist Jesse Roberts (6122) says an array optimization tool developed by Sandia specifically for MHK devices analyzes both the effects of the environment on the devices and, conversely, the devices’ effects on the environment. “You can use this tool to place turbines in whatever fashion you think is appropriate throughout your water column to see how they interact with each other,” he says. “It will tell you how much energy you converted with that layout and how the water flow changes throughout the system, near and far fields.”

While the water flow is faster near the surface, potentially creating more energy, turbines sometimes can’t be placed too close or they would interfere with shipping, recreation, or wildlife, such as birds that dive deeply for their food, Jesse says.

Tide power is ‘weather-proof’

Sandia provides information about how underwater turbines and wave devices change the physical environment to aquatic ecologists at partner labs, who study the effects on marine life. Jesse says that while each aquatic environment is different, the more questions that can be answered upfront, the better companies can predict environmental permitting costs or research requirements.

Early estimates show that a significant amount of the current US national electricity demand may eventually be met through tidal and wave energy generation, and, moreover, these power sources will be located near popula-
tion centers on the East and West coasts where demand for energy is high.

Tidal power in estuaries and straits is predictable and steady, as opposed to wind and solar power, Corren says. “We look up at the moon and can know what’s going on, and we don’t have worry about the weather,” he says.

Rich also is looking at another potential resource for the MHK industry at Sandia, a 50-foot-deep pool with a nearby large electrical power source that could be converted into a large-scale facility to generate waves under controlled conditions needed for accurate large-scale testing of devices.

With some additional investment, “our lake is big enough that companies could put in a prototype and do full-system tests all the way to generating electricity,” Rich says.

There are signs that Sandia’s efforts to help the MHK industry are paying off. Rich says a growing number of companies are becoming interested in Sandia’s work on the array optimization tool and materials and coating research for the turbine blades.

“Being in this industry at the early stage, being able to define the future of an entire industry is interesting. It’s like being a researcher in wind energy 20 to 30 years ago,” Jesse says. “Hopefully, we’ll be able to follow this for quite some time and help influence the direction it goes.”

Catch a wave

HARNESSING THE ENERGY of a wave can do many things: propel a surfer toward shore or serve as a source of virtually limitless energy for 21st century America.
Sandia’s special appointments represent employees from all areas of the Labs’ operations: Senior Scientist/Engineers, Distinguished Members of Technical Staff, Distinguished Members of Laboratory Staff, Distinguished Technologists, and Distinguished Administrative Staff Associates. Seventy-nine Sandians have been honored with special appointments this year.

According to Corporate Policy System documentation, “Placement in the Distinguished Level signifies a promotion to the highest level of the Technical Staff, Laboratory Staff, Technologist, or Administrative Staff Associate ladder. This level is different from the other levels in that it is subject to a 10 percent population limitation to preserve the distinction of the level.”

Employees selected for the new levels have been recognized with a special plaque and a nonbase salary award, in addition to this special mention in the Lab News.

As has been its tradition for many years, the Lab News presents photographs of Sandians who have received special appointments this year. Not pictured here are: Michael Bencoe (9513) DMTS; Reid Bennet (5918) DMTS; Patricia Dickens (4031) DMLS; Anand Ganti (9336) DMTS; Steve Gossage (9336) Sr. Scientist; Sharla Haley (11000) DMLA; Donald King (1384) DMTS; Bonnie Ladd (9532) DMTNG; Paul Schrader (8533) DMTNG; and Francine Vigil (4024) DMTS.

Mark Allen  
DMTS  8532

Brad Altman  
DMTS  412

Lawrence (Larry) Anzilano  
DMTS  9538

David L. Barr  
DMTS  2952

Daniel L. Butler  
DMTS  1111

Robert (Mike) Cahoon  
DMTS  9310

Sharon Chino  
DMTS  10549

John Clauss  
DMTS  413

Christine Cooper  
DMTS  10693

Christine Coverdale  
DMTS  5945

Mary H. Crawford  
SRSE  1123

Todd Crew  
DMTS  5358

John Darby  
DMTS  241

Frank M. Delnick  
DMTS  2546

Michael P. Desjarlais  
SRSE  1640

Patrick Ditty  
DMTS  8131

Ruberita (Rubbie) Evans  
DMTS  9342

Todd Fine  
DMTS  5437

Bruce D. Fehl  
DMTS  2548

John Franklin  
DMTS  240

Mike Frisch  
DMTS  8513

Richard Gay  
DMTS  8949

Brad J. Godfrey  
DMTS  2115

Jaime Gomez  
DMTS  5732

Orlando Greigo  
DMTS  4826

Christine Gutierrez  
DASA  10685

Kenneth W. Govin  
DMTS  1524

Donald J. Hanson  
DMTS  1387

Marcia Jacobs  
DMTS  8949

Lawrence Jones  
DMTS  5416

S. Todd Jones  
DMTS  5631

Samuel (Sam) Jones  
DMTS  9342

Scott E. Klenke  
DMTS  2113

George Lasche  
DMTS  6633

Wei-Yang Lu  
DMTS  8246

Lee H. Marshall  
DMTS  2666

Jeffrey B. Martin  
DMTS  5713

David Martinez  
DMTS  9324

Douglas Medlin  
DMTS  8656

Darlene Moore  
DMTS  4024

Bryant Morgan  
DMTS  8236

79 Sandians move into Distinguished, Senior ranks
Sandia’s role extended beyond the launch and re-entry; team members worked intensely before, during, and after each mission to ensure everything went smoothly.

“After every touchdown, once the orbiter returned to Kennedy, we did a full checkout and calibration on LOIS, and then we would integrate it back to the orbiter at the Orbiter Processing Facility,” Bob says. “Before the next launch, our team would again test the system on the launch pad before the payload bay doors were closed.” Those efforts sometimes came at great personal sacrifice to Sandia’s team, as many had to work through holidays and family occasions like birthdays and anniversaries. “We’re all very happy to do it because of the importance of our work to the mission.”

A desire to continue NASA partnership

The shuttle program launched 359 astronauts into space since its inception in 1981, was responsible for transporting and maintaining the Hubble Telescope (which captured its millionth observation on July 4), and was the workhorse that assembled the International Space Station. As the nation waits to find out what the next manned mission in space entails, Sandia’s team is already participating in panels and committees to explore NASA’s future needs.

“There is certainly a desire to continue that partnership; we feel like we’ve provided great value to NASA and the shuttle program. Without our sensor and our ability to provide the confidence needed for a truly high-quality inspection, the whole complexion of the shuttle program would have been very different,” Bob says.

NASA gave Sandia a tremendous honor after exceptional work during STS-131 in April 2010. NASA managers invited Sandia’s team to be part of the STS-131 plaque-hanging ceremony, a long-standing tradition to acknowledge outstanding efforts during the mission. The ceremony took place in the Mission Evaluation Room’s conference room, which is across the hall from the historic Apollo Mission Control Center.

Sandia’s multidisciplinary effort for the LOIS program spanned the Labs and has included people from divisions 2000, 5000, and 9000. Without such a collaborative effort, Bob says, the LOIS effort would not have been possible.

Sandia’s final inspection of Atlantis was July 19, and while everything checked out and all went smoothly, there was a hint of sadness among the team that day.

Bob wrote in an email to his colleagues: “This milestone is met with conflicting emotions — a great deal of pride and accomplishment for an excellent contribution to the nation and sadness to see Sandia’s NASA shuttle program partnership come to closure.”

**End of shuttle program evokes ‘conflicting emotions’ in Sandia team**

(Continued from page 1)
Individual honorees

Not pictured among individual winners: Cynthia J. Ahine, John P. Hinton, Ryan Layton, Katrin M. Mahrous, Andi J. Martinez, Charles J. Mulkier, Lisa M. Shannon

Team honorees

Height-of-Burst Requirements for the B61 Life Extension Program

For exceptional execution of the design and installation of the B61 Life Extension Program that will ensure that program’s technical risk while meeting nuclear safety, technical, and non-technical requirements.

Team members: Steve Hatch, John L. Darby, Jeff Pankron, Doug Wino, Matt Ketcham, Rich Mantleman

Unique Signal Development for the B61 Life Extension Program

For developing a more robust unique signal to close the B61 LEF’s strong links, which will strengthen the nuclear safety of the refurbished weapon.

Team members: John L. Darby, Jeffrey D. Bresser, Kenneth C. Chen

1513 Contamination Control Team

The team provided exceptional service to Nuxia by cleaning and certifying flight hardware during the 11-month shutdown of the Precision Cleaning Facility.

Team members: Melissa Yaklin, David A. Barringer, Denise Tidbro, Shane Adew, Kev Winkler, Debra L. Fritts, Greg Kuropaj

Application of QASPR to Threat Encounters

The team utilized the QASPR qualification approach to encompass threat radiation scenarios for the first time.

Team members: Tom Lauth, Joseph Castro, Chuck Hembree, Patricia Griffith, Philip Cooper, James E. Cash, Wu-Chung Cheng, R. Russel DePratte, Edward Parma Jr., Eric Rankin

A Comprehensive Anomalous Thermal QMU Simulation Study

The team used integrated team of analytic, radiation experts, and code developers completed a comprehensive (QMU) assessment of thermal safety for the B61 LEF.

Team members: Samuel Suhle, Dean Dobrash, Amanda Dodd, David Nelder, Nichola J. Dancy, Roy Morgan, Dean Davis, Brian Kareus, Dean Dobrash, Gregory Wagner

Chip-Scale Atomic Clock Laser Development Team

This multi-disciplinary team created custom virtual cavity surface-emitting lasers enabling the realization of the first commercial chip-scale atomic clock with symmetric and Chipaker Laboratory.

Team members: Kent Golt, Victoria Sanchez, Darren Lerkland, Gordon Keister, Greg Pons, Tony Harlow, Thomas M. Bion

Gamma Irradiation Facility (GIF) Source Disposition Team

The teams completed the shipment of more than 50,000 curies of non-irradiated radioactive Co60 source for its final disposition in Canada.

Team members: Mary Horvath, Karen Pickard, David Salamond, Michelle Galasen, Steve Bonnico, Christopher Babb, Todd Dunfee, Donald Hansen, Jason Myers, Craig Marker, Kevin Costley, Bryan Green, Ed Finley, John Garcia, R. Zare, Michael McCauley, Michael Triebold, Anthony Baca

III Accelerator Systems Move Team

For safely and efficiently moving all of the existing accelerator equipment and installing the new equipment into the new 1513 Laboratory.

Team members: Bruce McWatters, James Daniel, Daniel Butler, Daniel Perry, Stu A. Kevon

Magnetic Devices Product Realization Team

This team contributed to the successful recognition and delivery in 2010 of over 10,000 mark quality magnetic components to the Kansas City Plant.

Team members: Christina Benavides, Amy Levar, Lourdes Romero, Debra Chavez, Trenton Stratten, Ryan Anderson, Paul Vright, J. Ekek, Paul R. Stedle, Robert D. Sanchez, Daniel Hughes

Metamaterial Science and Technology Grand Challenge LiDRIED Team

For developing foundational team in the area of metamaterials and demonstration of new’s first-wafer-scale 3-D Microwave-BandPass Lithography (3D-MBPL) and electro-optical reconfigurable submicron-scale, under the NSF CR-LBH.

Team members: Jon Rokhlin, Paul Cen, Sami Salamo, Tony Jacon (Louis), Ting T. Liu, Bruce Battle, Igor Brener, Joel Wintt, Michael B. Sinclair, Larry Warner, William A. Johnson, Loren Basile, Daniel Bender, James Carroll, Pat Diamond, Chuck Hembree, Will Allen, Robert D. Barr, and team members: David Peters, Roger Raderbery, Charles Reiner, Eric Shurer, Gregory Ten Eng, Nicky Wang, Benno Jost, John Anderson

Microenvironment Team

For building a world-class program in the science and technology of micro-environmental devices, including lithographically defined radio frequency acoustic filters and oscillators and inertial sensors.

Team members: Roy Olson, Michael Baker, Todd Bauer, Dean Branch, Peggy Chen, Scott Halverson, Benigno Kim, Manuel Mamani, Kathryn Myres, Christopher Nordquist, Ted Parson, Jamie Parson, Tracy Petersen, Christopher Rodenbeck, James Stevens, Jeff Stevens, Kenneth Woychikowski, Maryam Ziai-Mousavi, Christine Ford, Christianna Rendue

New Mexico Small Business Assistance (NMSBA) Program

In recognition of the outstanding achievement of bringing technology and expertise of Sandia National Laboratories to small businesses throughout New Mexico.

Team members: Jackie Kerby Moore, Gennaro Montoya, Sharon Evans

Quantum Information Science & Technology (QIST) Grand Challenge Team

The QIST team accomplished a broad, grand challenge scale, significant, worldwide effort, which is uniquely positioned Sandia on quantum science and technology for the nation.


Sandia’s Cielo Acceptance Team

For the dedicated and sustained effort required to bring up the Cielo computer platform and complete acceptance testing within schedule.

Team members: Kevin Pedrotti, Lisa Ice, Douglass Doefelt, Ruth Kuetz, Suzanne Kelly, John Nino, Paul Lys, James Lacro, Robert A. Baldwin, Constantine “Steve” Polycarpou, Courtney Vaughan, Alan Scott, John O’Malley, Pamela Ares, John Wilson, Sudip Dey, Karrin Hallock, Keith Hemenway, Joseph Martinez, Susan McIntire, John Nangle, Mahak Raina, David Roberts, Sandra Shiner

Winning X-Caliber Proposal for the DARPA/U.S.IPIC Program

In recognition of the creation of a winning Sandia’s DARPA proposal to continue prototype computer architecs with an advanced memory system and demonstrated system-level component development.

Team members: Richard Megyesi, James Arg, Brian Barrer, Richard Rankin, Ronald Brightwood, David Campbell, Karl Herrmann, Michael Persians, Anthony Leatherman, Kevin Peterson, Kevin Rodden, Jack Shulkin, John Tyler, Kyle Wither, Andrew Bayne, Tisha Black, Halbert Standford

Z Photonics Team

For engineering and operations excellence in re-establishing the capability to perform experiments with photonic systems on Sandia’s Z machine.

Team members: Michael Jones, Mike R. Loser, Robert Miehling, Gregory Nairn, Joe Gare, Tommy Mitchell, Eric Breuer, Roy K. Romack, Matt Kembn, William A. Stogies, Chris W. Nakel, Roger Harmon, Daniel Sandbaum, Eino Loo, Mike Sullivan, Dean Rosen, Duane Spencer, G. Randy Mult E. D. Cull, Paul J. David, John E. Nangle, Michael Drinkwater, Lisa Hope, Mark T. Kelly, Mahak Raina, Albert Davis

BSI Dismantlement Team

The BSI dismantle team successfully completed and implemented the dismantlement procedures for the B61 dismantlement, including unloading, disassembly, and commencing of BSI dismantlement operations in October 2010.

Team members: Dan Pine, Art Ls, Cathy Kiblinger, Kemal Mohrness, Tom Lim, Daniel A. Summers, Harry Adcock, Mike Eckert, Martin Fuentes,

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Always/Never Documentary


Pension and Life Administration Team

This team administers pension and life insurance benefits for Sandia's workforce. The team provides a significant reduction in administrative errors, more than 200 reenrollments were processed in December 2010. Team members: Cara Waram, Barbara Roberts, Cheryl Frye, Sandra Smallwood, Marlene Urge, Janie Marbach.

Second-to-Deferring Talent to the Labs

In recognition of outstanding "extra-mile" effort in achieving Sandia's hiring goals in support of Sandia's mission goals - Q2 2011 Staffing, Staff Augmentations, interns, and Experienced Hires.


Flight Laboratory (FAL) Team

A fly Away Laboratory was developed to allow rapid deployment of precision laboratory equipment that quantifies vulnerabilities of nuclear warheads up to four days faster than traditional methods.


Beam Laboratories Facilities Project Team

The Joe Beam Laboratories Facilities Project Team executed a 840 million lab project on time, on budget, and under warranty, with zero change orders and no lost work days.

Team members: Laura Krause,老子 Wang, Steve Liu, Eric Thomas, and Gary J. Fischer.

IP0C Emergency Reference Guide Committee

This team effort personifies the motto “Working safely, securely and mindfully,” demonstrating that safety is everyone’s business.

Team members: Kristin Klossner, Caren Garcia, Lita Suina, Claudia Dixon, Joanne Trujillo, Craig Parke, Jennifer Chamberlain, Ted Blythe, and Anthony G. Chavez.

Sandia Corporate Fitness Facility Team

The Fitness Facility, located in Bldg. 956, was transformed into a corporate, commercial-ide fitness operation that enables the health and well-being of Sandia’s workforce.


Site-Wide Environmental Impact Statement (SWIES) Source Document Team

The team successfully delivered a detailed document to assist in the preparation of an O&M SWIES. The outstanding performance was recognized by the O&M management.


Site-Wide Investigation/Resolution Team

The team conducted a thorough technical investigation to explain the presence of tritium detected under the Mixed Waste Landfill, avoiding the need for further expensive action.

Team members: Min Michael, Akira Aron, Tim Jackson, Pamela Santars, Mike Mitchell, Eric Thomas, and Gary J. Fischer.
The Cable Anomaly Resolution team solved a complex system-level interface issue, and along the way improved the way flight cables are tested, inspected and integrated.

Cable Anomaly Resolution Team

Team members: Mary Anne Tidwell, John McClendon, Sara Sokolowski, Doug Blankenship, Tom Hunter, Jim Redmond, Sheldon Tieszen, Thomas Martinez, Tina Papenfus, Larry Ritter, Denise Tibbets, William Wilbanks, Melissa Ann Yaklin

High Temperature Measurement Team


Out with the Old (ETI) and In with the New (aika)

PeopleSoft Time & Labor.

Benefits Technical Evaluation Team

Team members: Melissa Ann Yaklin, Karen A. Baca, Amy Blumberg, Jeana Martinez, Tina Papenfus, Larry Ritter, Denise Tibbets, William Wilbanks, Melissa Ann Yaklin

Project Loredo

Team members: Joseph Perry, Clinton Landrón, Gary Ashcraft, Lisa Thompson, Jessica Hobbs, Johanna Hartenberger, Dale Kruzic, Monica Matthews, William Atkins, Cindy Burnett, Tara Renee Camacho-Grimm, David Ho, Paul Hooper, Randolph Kay, Riley Kilgo, Andrea Lewis, Arden Anderson, Pavel Chaplya, David Godsey, Jeffery Green, Gordon Thompson.

Hydrogen Tank Cycle-Life Research Team

Team members: Ray Bambha, Paul Schrader

Hydrogen Tank and Principles of hydrogen technology and hydrogen technology under high pressure at Sandia National Laboratories is an important and innovative area of research. The team is currently engaged in several projects involving requirements.

Nexus Mission Assurance Team

Team members: Mark D. Ivey, Fred Helsel, Bernie Zak, Hope Michelsen, Bernadette Edge, Bob D'Spain

IMMS NE10 Team

Team members: Karen A. Baca, Amy Blumberg, Jamie Coram, Benjamin Currier, Jamie Coram, Benjamin Currier, Jamie Coram, Benjamin Currier, Jamie Coram, Benjamin Currier, Jamie Coram, Benjamin Currier.
KevinCarlberg

Kevin Carlberg — “Over the past two decades, computer simulations of physical phenomena have become indispensable tools in science and engineering. In particular, the development of high-fidelity computer models, efficient solution algorithms, and supercomputers, analytics now use these tools to better understand complicated engineering systems, reduce design costs, and enhance reliability. Despite these advances, a complex system such as the power grid requires a detailed computer model that can take weeks or months to simulate, even on supercomputers with thousands of processors. This renders computer simulations impractical for many time-critical applications. For example, designing nanoporous materials for gas storage affords only a few hours for each simulation; actively controlling the power grid demands faster near- real-time simulation.”

“At Sandia, I aim to contribute to breaking this barrier separating high-fidelity computer simulation from time-critical application domains. I will develop a ‘reduced-order modeling’ methodology that reduces the complexity of high-fidelity computer models while preserving their essential features. Although such approaches have been successfully applied to simple systems, their effectiveness on complex, non-linear, real-world systems such as the power grid remains an open question. I plan to devise a technique for these systems by investigating ways to decouple the model’s complexity in both space and time— as well as the number of computing processes required for the simulation— while satisfying mathematical properties related to optimality, consistency, and stability.”

Sandia’s 2012 Truman Fellows. They join the ranks of 14 other researchers who have been appointed since the first Truman Fellowship in National Security Science and Engineering was established in 2004. Because the fellowships are three-year assignments, six Truman Fellows are still doing research at Sandia. Additionally, seven other Truman Fellows subsequently joined the Labs’ technical staff upon completion of their fellowship assignments, including many of Sandia’s leading researchers at Sandia.

Matt, who earned his doctorate in physics from Caltech in 2009, has already reported to Sandia, where he is working in Radiation Hard CMOS Technology Development. Specifically, Matt manages transistor research for the Radiation Hard CMOS group under manager Jerry McNelis. His mentor will be Peter Frischkorn, Senior Technologist and Manager for the High-Performance Computing Technology Group under manager and mentor Rich Donnelly.