

# Smaller asteroids, bigger problems

By Jim Danneskiold and Stephanie Holinka

Once in a lifetime, a physicist may get a chance to test his theories and simulations in a real-life event that changes the course of his scientific life. But rarely does that opportunity literally fall from the sky.

That's the impact of the Feb. 15 asteroid that burst over the Russian city of Chelyabinsk on Sandia physicist Mark Boslough (1442), subject of a TV documentary that aired this month and co-author of a recent cover story in *Nature* about the asteroid fireball that injured about 1,500 people and damaged more than 7,000 buildings, collapsing roofs and breaking thousands of windows.

Mark's journey to Russia shortly after the impact is chronicled in the NOVA episode "Asteroid: Doomsday or Payday," which was initially broadcast on PBS on Nov. 20 and is available for viewing online.

The show focuses on the destructive potential of asteroids, chronicling how Mark and his colleagues learn that small asteroids can do far more damage than previously thought. The *Nature* paper also suggests that there may be more small asteroids than formerly thought.

The day the asteroid hit, Mark learned of the event via Facebook from posts of Russian news stories and YouTube videos showing an object that exploded in the Russian sky.

"I saw it on Facebook long before the sound wave had even arrived in this part of the world," Mark says, estimating the transglobal sound wave took more than seven hours to reach New Mexico. "I really didn't expect to experience this in my lifetime."

As one of the first scientists to visit Chelyabinsk after the asteroid struck, Mark set out to discover where the object came from. Because it came down near a populated area, he and his colleagues were able to collect videos from people who caught the asteroid on film and video, especially the ubiquitous Russian dashboard cameras, a staple in establishing blame in traffic mishaps.

"This event was certainly one of the best-documented asteroid events ever,"

(Continued on page 5)

THE ASTEROID THAT FELL TO EARTH near Chelyabinsk, Russia, gave scientists new insights into the risks of smaller asteroid impacts. (Simulation by Mark Boslough; rendering by Brad Carvey)



**\$6 million lab!**  
 In tough year, Sandians step up to shatter ECP giving record.  
 Div. 5000 tops \$1 million.  
 Employee Caring Program  
 Story on page 4

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## Sandia wins two Popular Science Best of What's New awards

By Sue Major Holmes

Sandia's fiber optic network won *Popular Science's* Grand Award for Engineering when the magazine released its Best of What's New 2013 winners. The magazine also awarded Sandia's non-detonable fertilizer a Best of What's New citation, in the security category.

Each year, the editors of *Popular Science* name 100 innovations in the material world that they say are reshaping the future right before our eyes. According to the magazine, "Best of What's New winners make our world and our lives safer, more efficient, and straight-up better than we thought possible."

### 1 gigabit per second

In the case of Sandia's fiber optic network, the system is the breakthrough, with the most obvious attribute being the scale. The Labs integrated an Internet service provider (carrier class) core with a passive optical distribution network. Sandia built the world's largest enterprise passive fiber optic local area network, with high-speed connections for 265 buildings and 13,000 end-users, each with a hookup capable of 1 gigabit per second. It replaced its conventional 4-inch copper cable with a half-inch fiber-optic one capable of transferring voice and computer data along a single line. The network also can deploy next-generation XG-1 or XG-2 passive optical networks. As *Popular Science* said: "Think of it as a miniature version of the Internet as it should be."

"This award and accompanying recognition highlight

how innovation can create mission value, two tenets of our IT strategy," says Sandia Chief Information Officer Mike Vahle, VP of Information Technology Services Div. 9000. "Additionally, it marks the culmination of

many years of dedicated focus on bringing the promise of fiber optics to Sandia's infrastructure. These types of innovations only become reality through the creativity and dedication of an outstanding team of people."

Sandia needs superb computing capability for the nuclear weapons and national security research it does for NNSA. The Labs began looking at fiber optics early in the technology's development because of its promise of greater communication speed at longer distances. So far, Sandia has converted more than 90 percent of its bulky copper cable because fiber offers far more capacity, is more secure and reliable, and is

less expensive to maintain and operate than a traditional copper network.

In recognizing the non-detonable fertilizer, *Popular Science* said that in 2012 ammonium nitrate fertilizer was used in about 65 percent of the 16,300 improvised explosive devices found in Afghanistan. Sandia engineer Kevin Fleming, who retired earlier this year, developed a fertilizer that uses iron sulfite in the mixture to suppress detonation. He was assisted in the early stage research by Vicki Chavez (6633).

Sandia chose to keep the formula open-source so it could more quickly be adopted in developing countries.



## Partners in progress

Launching a statewide R&D council



SANDIA PRESIDENT AND LABS DIRECTOR Paul Hommert sat with Sen. Tom Udall at the inaugural summit of the New Mexico Collaborative Research & Development Council. Udall and Sen. Martin Heinrich invited the heads of the state's universities, research laboratories, and military installations to work together to advance science and technology. See the story on page 4. (Photo by John Arnold)

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## That's that

A month ago, I would have bet money that this year's Employee Caring Program campaign would have trouble matching last year's record giving level of \$5.5 million, let alone reaching this year's stretch goal of \$5.75 million. With all the uncertainties around the potential shutdown and the impact that would have on personal finances, it seemed certain to me that traditionally generous Sandians would hold a little something back this year.

But that's not our way. Here we are - with the campaign over and with contribution pledges still to be tallied - flirting with \$6 million. When all the contributions from retirees get folded in, it looks like a slam dunk that we'll cross that latest landmark number. That's just astonishing.

And how about this? Div. 5000 this year became the first single organization in Labs history to go over the \$1 million mark all on its own. For perspective, only a handful of organizations in the community - University of New Mexico/UNM Hospitals, Presbyterian Healthcare Services, and Intel - donate as much collectively as Div. 5000 did by itself. Div. 5000 VP Jeff Isaacson and his team have set a high bar for next year. History shows that we're up to the challenge. We have been faithful, exceptional servants - to the nation and to our community. They expect much of us, and we deliver. Read more about this year's ECP campaign in the story on page 4.

\* \* \*

On the subject of giving, the community's needs don't end neatly when we wrap up our ECP campaign. So I hope, generous as you've been already, you can find a few dollars to kick into a really worthy program, Shoes for Kids. There are people, neighbors, who live in a different world than we do, and in that world, a world we don't often see, a pair of shoes, a simple, decent pair of shoes, can make a huge difference to a kid this winter. Donations can be made to the Shoes for Kids Fund at the Sandia Laboratory Federal Credit Union. Account #223180,90-01 - Lastname = shoes.

\* \* \*

Hmmmm. I see where the AP poll as I write this ranks the New Mexico Lobos men's basketball team at No. 19 in the country. In that same poll there's another team, located over on the West Coast, that comes in at No. 22. Okay, okay, I'll admit to being petty, but somehow, that's gratifying to me. I admit, too, that our former, rather abruptly departed coach: 1) had a lot to do with putting together this year's Lobos team; and, 2) didn't have that much of a hand in the team he now runs. I get that. But I just have a feeling that our new coach, Craig Neal, is going to prove this year that he belongs right where he is: at the helm of a nationally ranked team that is going to surprise a lot of people. I think we're going to find we don't miss that other coach, great as he was, as much as we thought we might.

Regarding that ranking, one might argue that the AP poll is just the opinion of a bunch of sports writers and - speaking from first-hand knowledge - we all know that writers are, as a group, long on words and self-esteem and shamelessly infatuated with their own opinions. What do the sportswriters know, right?

But *USA Today* has its own poll, where it asks big-time coaches to rank the top teams. And guess what? In that poll, too, the Lobos come out at No. 20, a couple of slots above that little West Coast program. These coaches know talent when they see it, and in the Lobos, they like what they see. Maybe the team this year is the real thing.

\* \* \*

Saw a news item the other day where a team of researchers in the Netherlands has developed a medium that they say can store digital information for up to a billion years. In an abstract way, that's really impressive, but as a practical matter, what are we going to store for that long? What would we need to store, what would we want to store for that long? If there was one thing, just one thing, we could preserve and pass along to whatever intelligence may be around in a billion years, what would it be? Presumably, there would be nothing in the way of scientific knowledge we could share that would be breaking news a billion years from now. As such, I don't think it'd mean much to share something of what we know. Rather, I think we might want to hand down something of who we were. To that end, the question is: Who were we? How about this: We stood in awe before the universe and we tried to understand it, motivated by wonder. And by love.

See you next time.

- Bill Murphy (505-845-0845, MS0148, wtmurph@sandia.gov)

## Black Leadership's HMTech program earns 2013 Inspiring Young Minds Award



INSPIRING YOUNG MINDS — Theresa Carson, left, and Tameka Huff with the trophy received by Sandia's Black Leadership Committee from the national Phi Beta Sigma fraternity honoring the BLC HMTech program. Theresa (10244), left, and Tameka (6925) coordinate the program and more than 30 volunteers dedicate their time to its success. (Photo by Randy Montoya)

HMTech, the longstanding education outreach program sponsored by Sandia's Black Leadership Committee (BLC), has been honored by the Phi Beta Sigma fraternity with its Inspiring Young Minds Award, which recognizes organizations and individuals who inspire and help kids achieve higher skills, education, and pursue rewarding careers.

HMTech, now in its 27th year, is a summer STEM (science, technology, engineering and math) program for middle and high school students. The program gets students involved in fun, hands-on science and engineering activities and provides an opportunity to explore a variety of STEM careers. Theresa Carson (10244) and Tameka Huff (6925) coordinate the program and more than 30 volunteers dedicate their time.

Phi Beta Sigma fraternity, founded by three African American students at Howard University in 1914, is dedicated to serving humanity, promoting quality education, and developing leaders. Its involvement in supporting education programs at the national level dates back to 1945.

The Inspiring Young Minds award was presented on behalf of the Phi Beta Sigma Gulf Coast regional board on Oct. 4 at the Albuquerque chapter's Blue and White Gala. HMTech is the first recipient of what is intended to become an annual award.

"As co-chair of the Black Leadership Council," Theresa says, "I am extremely honored to have received such an important recognition for our HMTech Summer Science Program from one of our community partners." Theresa credits the long-term success and impact of HMTech to the dedication and commitment of Sandians and community volunteers over the course of nearly three decades.



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## The race is on!

### Students participate in annual Hydrogen Fuels Challenge

On Saturday, Nov. 16, Sandia National Laboratories/Community Involvement Dept. 3652 organized and sponsored the 8th annual New Mexico Hydrogen Fuels Challenge in conjunction with PNM, Albuquerque Public Schools, and Los Alamos National Laboratory. More than 300 middle school students from 21 schools around the state participated in the event at Highland High School in Albuquerque.

Each team of students was provided a hydrogen fuel cell and electric motor and asked to design a car. The event helped students understand the science of hydrogen fuel and the engineering of building a fast car. In addition to racing their hydrogen-powered cars, the students participated in a design review and an oral presentation. This year's presentation topic was: "The increasing price of gasoline has increased the desire to use alternative fuels such as hydrogen. Describe the current research at Sandia National Laboratories and Los Alamos National Laboratory on hydrogen fuels and explain how this research might make the use of these fuels possible." Ten Sandia Serves volunteers assisted with the event.

The overall winners were: 1st place, Vista Middle School Team 1 (Las Cruces, NM); 2nd place, PR Leyva Middle School Team 1 (Carlsbad, NM); and 3rd place, Vista Middle School Team 2 (Las Cruces, NM).

(Photo by Rachel Baros)

# Sandia kicks off Livermore's first Habitat for Humanity renovation project

Story by Patti Koning  
Photos by Catherine Dawson

One typically associates Habitat for Humanity with the building of houses, but on Saturday, Nov. 9, it was all about tearing down a house. A team of Sandia volunteers led by Larry Carrillo (8247) kicked off a new Habitat for Humanity project to partially demolish and rebuild a dilapidated 60-year-old house on Andrews Street in Livermore. Once completed, Habitat hopes to place a veteran in the rebuilt house.

The project is Habitat for Humanity's first home renovation project in Livermore, but it won't be the last. "I couldn't be happier about this project," says Livermore Mayor John Marchand. "We are planning five more home renovation projects with Habitat that will all follow this blueprint. I was heartened by the local residents who came to help and I was particularly grateful for the number of volunteers who came from Sandia. This is going to have a very positive impact on the Livermore community."

Marchand and Congressman Eric Swalwell, D-Calif., joined Larry, former Sandian Mary Behrendt, Tina Chou (8229), Steve Eisenbies (8237), Julie Fruetel (8114), Patty Hough (8954), Michele Kahn (8949), Chris Moen (8256), Donna O'Connell (8118), Blayne Phillips (8223), and Kina Winoto (8965) on Saturday morning to begin the demolition of parts of the house.

"I appreciate the opportunity to join Habitat for Humanity, Sandia employees, and the Livermore community to help a worthy veteran and his or her family find a home in the East Bay," says Swalwell. "Our veterans served us and now it's our turn to serve them."



CONGRESSMAN ERIC SWALWELL, D-Calif., shown here addressing the volunteers at the lunch break, along with Livermore Mayor John Marchand, joined the work crew for the first half of the day.



THE INSIDE CREW had the messy task of removing all of the interior wall board, doors, fixtures, insulation, and trim. "Everyone seemed ready to get their hands dirty while still maintaining a safe work environment," comments Tina Chou, shown here attacking some dry wall.



THE OUTDOOR CREW CHEERS after safely collapsing the outdoor patio roof. The actual collapse took just a few minutes, preceded by hours of prep work to unmoor the roof and ensure that it fell straight down.

## Rebuilding to revitalize

Habitat for Humanity targets homes in blighted neighborhoods, typically foreclosures, as part of a holistic approach to neighborhood revitalization. "It's less expensive and faster to rebuild an existing home, plus there is an abundance of these properties," says Daryl Lee, corporate development officer for Habitat for Humanity East Bay/Silicon Valley.

Larry, a longtime Habitat volunteer, provided the impetus for the project. After leading a Sandia team in Habitat Build-a-Thon events in 2009 and 2010, he began talking to Lee about creating another Habitat project in Livermore. "I wanted a project in Livermore where Sandians could volunteer and help the local community," he says. "I consider myself very fortunate and volunteering with Habitat is a way to give back."

The idea gained steam in the spring of 2013 when Lee, Sandia Community Relations Officer Stephanie Beasley (8521), and Larry brought together Sandia, the city of Livermore and Habitat for Humanity East Bay/Silicon Valley. With the help of the city, Habitat identifies and purchases properties, rebuilds the homes, and eventually sells them to families with limited incomes. Lee says up to two more houses could be rebuilt in Livermore in the next year.

## Tear down these walls

The day started with a safety briefing and then the volunteers split into indoor and outdoor teams. The indoor team was tasked with removing all of the interior wall board, doors, fixtures, insulation, and trim. The outdoor team cleared debris, overgrown vegetation, and trash from the backyard and removed an outdoor patio cover. The big payoff — sending the patio cover crashing to the ground — was preceded by lots of prep work detaching the awning from bolts and fasteners securing it to the ground and edge of the roof. The team also had to ensure that the awning would not take out the neighbor's fence as it fell.



A SANDIA TEAM KICKED OFF Habitat for Humanity's first renovation project in Livermore. The project, which is expected to be completed in the spring, is the first of several planned home renovations in the city.

## Sandia California News

"We on the outside crew won the most spectacular award when we toppled the back patio cover," says Julie. "Knowing that we were improving a house for a veteran and helping to improve the neighborhood was immensely satisfying. And it was great to see Eric Swalwell and John Marchand there in the morning getting just as dirty as the rest of us."

At noon, Krissy Galbraith (8500) and Mary Gonzales (8250) reinvigorated the team by delivering lunch, complete with authentic homemade New Mexico style posole, to the worksite. Special thanks goes to Kristy Sibert (8522), who coordinated the volunteers and logistics for the workday.

Work on the Andrews Street house will continue into spring, with different businesses and community groups sponsoring workdays. Sandia will have a second workday on Saturday, Jan. 11. Contact Kristy Sibert (klsiber@sandia.gov, 294-2075) or Larry Carrillo (lrcarri@sandia.gov, 294-2309) if you are interested in joining the team.



AS PART OF THE OUTSIDE CREW, Julie Fruetel works to free one of the posts holding up the back patio cover.

# Partners in progress

## Sandia joins forces with universities, labs, and military in statewide R&D council

By Nancy Salem

Sandia President and Laboratories Director Paul Hommert told the inaugural summit of the New Mexico Collaborative Research & Development Council that its members have the resources to advance the state's contributions to science and technology.

"We have mechanisms in place," Paul said. "We can use our respective strengths."

Sandia is one of nine institutions invited by US Sens. Tom Udall and Martin Heinrich, both D-N.M., to join the council. Other members are Los Alamos National Laboratory (LANL), the University of New Mexico (UNM), New Mexico State University (NMSU), New Mexico Institute of Mining and Technology, Air Force Research Laboratory, Kirtland Air Force Base, Holloman Air Force Base and the 96th Test Group, and White Sands Missile Range.

Among those attending the meeting, in addition to Udall, Heinrich, and Paul, were UNM President Bob Frank, NMSU President Garrey Carruthers, New Mexico Tech President Daniel Lopez, LANL Director Charlie McMillan, and Holloman AFB Commander Col. Andrew Croft.

### Partnerships increasingly critical

The council encourages collaboration on research, development, test, and evaluation emphasizing critical areas related to national science and technology priorities. Udall and Heinrich said establishing and building on strategic partnerships across the state is increasingly critical as institutions face shrinking budgets and competitive funding.

"The council can help ensure that New Mexico not only retains, but enhances, its competitive position and potential for scientific contribution, economic growth, and workforce development," Udall said.

Heinrich added, "Now more than ever we need to collaborate with the challenging fiscal constraints that exist."



LEADERS OF NINE NEW MEXICO universities and research and military institutions came together to discuss how they can work together on R&D related to national science and technology priorities. (Photo by John Arnold)

### Focus on STEM

The council will meet quarterly to set goals and direct collaborative work statewide. Each member appointed two representatives to the group. Paul named VP and Chief Technology Officer Julia Phillips and Carol Adkins, director of Materials Science and Engineering Center 1800.

Julia said Sandia recently teamed with UNM to hire an individual who will work in advanced energy materials part-time at both institutions. "With this kind of collaboration we can attract people we might not be able to get by ourselves," she said.

Paul said Sandia has R&D memoranda of understanding with UNM, NMSU, and New Mexico Tech. "We need more," he said. "By engaging in an active dialog through the council we can take existing collaborations to a higher level."

Udall said the state must double the number of students who graduate in science, technology, engineering, and math (STEM) fields. "Everyone here has a need for those graduates," he said.

Paul said the state's research universities are Sandia's main source of hiring. "We have a shared set of equities in our success," he said.

### Commitment to economic development

UNM's Frank said council members will commit to making the New Mexico technology corridor along the Rio Grande Valley from NMSU to LANL a national leader in R&D. "We're making a remarkable commitment to collaborate to raise New Mexico up," he said.

"We're prepared to lead in technology advances."

Council members talked about the importance of creating private sector jobs. Paul said Sandia is committed to technology transfer, industry partnerships, and economic development.

Heinrich said the council "must focus on STEM and technology transfer to grow the private sector."

"New Mexico has a proud history of scientific discovery, innovation, and technology that has long served as an engine for economic growth," he said. "The council, whose members include some of the nation's leading scientific minds from some of the nation's most prestigious research institutions, will facilitate research collaborations and strategic partnerships that will allow this culture of innovation and discovery to thrive in New Mexico even during times of fiscal uncertainty."



By Nancy Salem

## Flight to the finish

### The start was scary, but ECP took off in time to break records

and this year's ECP campaign chair. "But once there was some resolution, the ECP representatives, management, and members of the workforce turned up the volume and delivered with phenomenal results. It proved the depth of Sandians' commitment to recognizing those less fortunate and giving back to the community."

The numbers tell a story of generosity in uncertain times. Total Labs participation was 75 percent, up 1.4 percent from last year, and 75 percent of divisions increased participation. New employee participation rose 4.6 percent to 63.2 percent, and 121 organizations reached 100 percent participation.

And in a major milestone, Division 5000 became the first to pledge more than \$1 million. "In central New Mexico, only the University of New Mexico/UNM Hospitals, Presbyterian Healthcare Services, and Intel give more than \$1 million. At Sandia, one division gave that much," says Pam Catanach (3652), the Community Involvement specialist who coordinates ECP activities.

The campaign was launched Oct. 7, six days after the federal government shut down most operations after Congress failed to appropriate funds for fiscal year 2014. During the shutdown, which ended Oct. 16 with passage of an interim appropriations bill, Sandia prepared for the possibility of temporarily closing.

Most events supporting the ECP were canceled. The pledge deadline was extended from Oct. 25 to Nov. 8 to give employees time to address their individual situations and determine if they could support the cause.

Kelly says the shutdown had an impact. "People waited," he says. "They held off until the uncertainty passed and then delivered with far greater impact than I could have imagined."

Pam credited Sandia's 76 ECP representatives with getting the campaign back on track. "When we were given the green light to have activities, they came up with some great ideas," Pam says. "Once people were more relaxed about their own situation, they wanted to give."

Last year Sandia became the first New Mexico company to top the \$5 million mark in a single UWCNM campaign when employees and retirees gave \$5,508,717, a 17.1 percent boost over 2011. Since the ECP was launched in 1957, Sandia has been the single largest supporter of the UWCNM's annual campaign, donating more than \$76 million.

"I want to say two things about this campaign: Our employees are incredibly generous and the ECP reps are diligent in what they do," Pam says. "We consistently come through. It's a great place."

Kelly described the 2013 campaign as "extraordinary in the ordinary."

"We had extraordinary support in an ordinary activity," he says. "It was something of a miracle. Sandians truly raised the level of the torch, continuing the rich history in support of someone in need. Thank you, Sandia."

Sandia employees and retirees came through for the United Way of Central New Mexico (UWCNM) despite a federal budget crisis and the possibility of a Labs shutdown.

The Employee Caring Program (ECP) raised \$5.9 million as of Nov. 10, with more retiree donations to be counted. The figure topped the \$5.75 million goal



A CARING TEAM — Kelly Westlake (10586), this year's Employee Caring Program chair, and long-time ECP coordinator Pam Catanach (3652) had some stressful days early in the campaign as Sandia faced a possible shutdown. But the crisis was resolved and Sandians went on to pledge a record amount to the United Way of Central New Mexico. (Photo by Randy Montoya)

for the campaign. "We had a lot of concerns, especially during the first couple of weeks," says Kelly Westlake, manager of Business Operations Support Dept. 10586

# Asteroid: Doomsday or Payday

**Nova episode on PBS about Chelyabinsk asteroid impact features Mark Boslough**

(Continued from page 1)

says Mark.

Mark's goal was to perform stellar calculations of the asteroid's trajectory by visiting — at night when the stars shone — the exact spots where the footage was recorded.

"If the stars show up on the digital camera, we can get those angles and then calibrate that image that was taken from the dash cam, and know exactly the angles to

(You can see an animated simulation of the airburst produced by Mark [<http://tinyurl.com/k24y4zj>], as well as scientific animations and images by Sandia contractor and visual effect expert Brad Carvey and visual effect expert Andrea Carvey.)

Sandia's Laboratory Directed Research & Development program funded the simulations.

Using data collected from his visit shortly after the asteroid struck, along with data from an international team, Mark developed several additional simulations that he and other researchers have used to model the explosion and estimate the force of the blast.

The paper's authors performed a global survey of airbursts of a kiloton or more and found that the number of building-sized objects may be 10 times greater than estimates based on other methods.

The authors, led by Peter Brown of the University of Western Ontario, estimated the Chelyabinsk event was equivalent to an explosion of about 500 kilotons of TNT. At its peak, the airburst appeared to be 30 times brighter than the sun.

"Because the frequency of a strike of an asteroid of this size has exceeded expectations, with three such strikes in just over a century (Chelyabinsk, Tunguska, and a large airburst in the South Atlantic in 1963 detected by infrasound), the number of similar-sized asteroids capable of causing damage may be greater than suspected," Mark says.

Dick Spalding (5730) of Sandia's Nonproliferation Technologies Research and Development Department also co-authored the paper.

The *Nature* authors showed that previous models for estimating airburst damage do not match the observations.

An earlier paper by Mark highlights the conclusion that most airbursts are more damaging than previously thought.

"We really have to rethink the risk from airbursts. Chelyabinsk was unusual due to the a low inclination at which it entered the atmosphere, but 90 percent of objects enter the atmosphere at a steeper angle and cause more damage on the surface," Mark says. That paper, which he wrote two years ago, was recently published online in *Acta Astronautica*.

The Chelyabinsk fireball is something those who saw it will never forget, and neither will Mark.

"What's amazing to me, though, when you think about it, this is part of an asteroid that had been floating through space, orbiting the sun for billions of years," he said for the documentary in a late February interview. "And two weeks ago, it exploded in the atmosphere, dropped to the ground, and here I am holding it in my hand! That's amazing."



*"If something like the Tunguska event of 1908 happened now, it could kill hundreds of thousands or even a million people, if it happened right over a big city. An asteroid has more damage potential on the ground than a nuclear bomb of the same energy."*

— Mark Boslough, seen here on NOVA episode *Asteroid: Doomsday or Payday*

the trajectory of the fireball," he said in the documentary. "We'll have a very precise trajectory as it streaked through the atmosphere, so we can backtrack that to get the orbit, the pre-impact orbit."

The program also discusses how asteroids can contain rare and valuable elements, leading researchers to seriously evaluate the benefit of harvesting them.

But Mark also wants the research community to pay more attention to the potential risk that asteroids present.

"If something like the Tunguska event of 1908 happened now, it could kill hundreds of thousands or even a million people, if it happened right over a big city," he said in the documentary. "An asteroid has more damage potential on the ground than a nuclear bomb of the same energy."

Mark was part of a team of 33 researchers who completed the study featured in *Nature*. "A 500-kiloton airburst over Chelyabinsk and an enhanced hazard from small impactors" examines the characteristics of the fireball. Mark and his colleagues also used the simulations to help design the journal's cover.

## Sandia organizations honored for strides in their quality journeys

Quality New Mexico, the New Mexico Performance Excellence Awards administrator, has announced 13 quality award recipients for 2013, including two Sandia organizations.

Nuclear Facilities and Applied Technologies (Tech Area 5/Org. 1380) earned a Roadrunner award, demonstrating substantial progress in building sound and systematic processes to strengthen overall operations and attain improved outcomes. Progress was evaluated through an assessment and site visit.

Sandia's Payroll Services Dept. 10502 earned a Piñon award, recognizing its commitment to quality and for demonstrating through their assessment and an independent site visit that they are using systematic processes and data to strengthen overall operations and attain improved outcomes.

The New Mexico Performance Excellence Awards are modeled after the Malcolm Baldrige National Quality Award. They provide applicants with feedback on strengths and opportunities for improvement, based on the time-tested Baldrige Criteria for Performance Excellence. Applicants are rated in seven areas of best practices including leadership; strategic planning; customer focus; measurement, analysis, and knowledge management; workforce focus; process management; and results.

### Tech Area 5's quality journey

In 2008, after a series of programmatic findings over several years of external audits identified chronic performance gaps, Tech Area 5's line managers spent dedicated time carefully thinking through the organization's challenges in the areas of services, customer interfaces, stakeholders' perceptions, and work process inefficiencies. What was called for, they determined, was a re-engineering effort to develop integrated solutions responsive to the organization as a system. With support from management at the director and VP level, significant changes were introduced.

By 2011, quality engineer Sherrie Trezza (1382) felt Tech Area 5 was ready to advance on the next phase of its quality journey by formally embracing the Malcolm Baldrige criteria for performance excellence. The criteria offer standards for organizations committed to continuous improvement. Management agreed, and subsequently, Tech Area 5 submitted a 2012 application in the New Mexico Performance Excellence Awards program. That application garnered a Piñon award and an in-depth feedback report from Quality New Mexico. The feedback provided a roadmap for continued improvements. The state of this progression was subsequently documented in a 2013 application that led to the Roadrunner award, which recognized strides made over the past year. Key to lasting improvement has been the fact that Tech Area 5 staff has enthusiastically signed on for the journey.

### Payroll Services earns Piñon award

Payroll Services decided to participate in the New Mexico Performance Excellence program to help it realize the vision set by the Accounting Center: To lead



QUALITY NEW MEXICO, administrator of the New Mexico Performance Excellence Awards, which are modeled on the Malcolm Baldrige National Quality Awards, has announced 13 recognition recipients for 2013, including two Sandia organizations, Nuclear Facilities and Applied Technologies (Tech Area 5/Org. 1380) and Payroll Services Dept. 10502. Tech Area 5 garnered a Roadrunner award and Payroll Services took home the Piñon award.

the DOE complex as the model financial organization.

Payroll, along with other accounting departments reporting to the Controller's group, were asked to incorporate into operations specific measures aimed at improving the quality and efficiency of Sandia's accounting processes.

Sandia's complex operations present challenges to the Payroll Department, which deals with a multitude of compensation payments, multiple benefit plan deductions, and unique tax reporting requirements. Additionally, the department provides wage data for costing labor charges, which is essential in accurately tracking the financial results of projects charged by employees.

Payroll's application for recognition of its quality strides focused on work done over the past year to improve operations, including modifications to the time reporting system.

In earning the Piñon level award, the department was recognized for payment accuracy in processing such a large volume of paychecks for each payroll period and for partnering with the Human Resources organization to ensure accuracy in information used to calculate the biweekly payroll. Additionally, the department was cited for the quality of its year-end reporting as measured through accuracy of W-2 forms provided to employees.

Tech Area 5 and Payroll Services will be recognized at a reception on Dec. 2 at the Governor's Residence in Santa Fe, and then at the 2014 Quality New Mexico Learning Summit and Performance Excellence Awards Ceremony, April 16-17.

# Engineer honored for contributions to precision strike systems

## Advanced Hypersonic Weapon work caps honoree's career

By Heather Clark

The chief engineer of Conventional Prompt Global Strike programs at Sandia has been honored with a national award for his outstanding personal and technical contributions to precision strike systems.

Gary Polansky, distinguished member of technical staff in Flight Systems Dept. 5424, recently won the 2013 Precision Strike Association Richard H. Johnson Technical Achievement Award for his technical leadership of several hypersonic flight systems and hypersonically delivered warhead systems. The award was presented Oct. 23 at the annual Precision Strike Technology Symposium at the Johns Hopkins University Applied Physics Laboratory in Laurel, Md.

"Gary's engineering skills have led to an era of technological innovation for Sandia's conventional global strike programs that have culminated in the success of the Advanced Hypersonic Weapon," says Eric Schindwolf, deputy director for Strike Systems & Aerospace Technologies Dept. 5420. "This award recognizes Gary's amazing 30-year engineering career at Sandia and his exceptional contributions to develop cutting-edge technology to protect our national security."

The award is given to a public or private sector person for their contributions to precision strike systems. It is named for Richard H. Johnson, an aircraft and missile designer who worked for the former Dallas-based Temco Aircraft, Texas Instruments, Raytheon, and other defense companies during his career. Johnson received the first Johnson Trophy posthumously for leading the design or redesign of more precision strike airframes than any contemporary designer.

### Advanced Hypersonic Weapon benefits from honoree's work

Gary's career-long achievements resulted in the first



GARY POLANSKY

successful test flight of the Advanced Hypersonic Weapon (AHW) from one of Sandia's test facilities in 2011. The glide body flew across the Pacific Ocean to a precision impact in the target area.

The successes of Gary's team have led to further development of the AHW concept for the US Army Space & Missile Defense Command and of hypersonic boost-glide technologies for potential future DoD applications.

Gary holds a doctorate from the University of Texas-Austin and has worked for more than 30 years at Sandia in national security, nuclear energy, and environmental programs. Gary has authored or co-authored more than 50 technical publications in computational physics, nuclear technology, and hypersonic systems.

He has made key contributions to many program areas, including aerospace systems, space nuclear power and propulsion, nuclear energy, and nuclear materials management. Gary is a member of the American Society of Mechanical Engineers and an Associate Fellow of the American Institute of Aeronautics and Astronautics.

In addition to the AHW, Gary has provided Sandia with technical and management leadership of hypersonic flight systems and hypersonic-delivered warhead systems for other government agencies.

### Sled track testing of advanced warhead concept

In 2006, Gary led the development and rocket sled testing of Kinetic Energy Projectile (KEP) warheads. Three successful tests demonstrated the viability of the concept in a prototype configuration and established the technical basis for future KEP warheads.



PRECISION RECOGNITION — Gary Polansky (5424), center, has been awarded the 2013 Precision Strike Association Richard H. Johnson Technical Achievement Award for his technical leadership of several hypersonic flight systems and hypersonically delivered warhead systems. Gary is joined here by Susan Kennedy, deputy executive for the Precision Engagement Mission Area at Johns Hopkins University's Applied Physics Laboratory and David Keese, director of Sandia's Integrated Military Systems Center 5400.

(Photo by Ed Whitman, Johns Hopkins University Applied Physics Laboratory)

Gary also led the technical team that conducted sled track tests of an advanced fuze for high-speed penetrators. He was instrumental in developing new rocket-sled, payload-separation technology that enabled the longest ever free-flight of a separated vehicle to target impact. The test delivered conditions that were groundbreaking in their precision for the initial test of the high-speed penetrator in its delivery vehicle.

In 1990, Gary helped develop high-performance nuclear thermal propulsion for the Strategic Defense Initiative Organization. This team performed several successful reactor experiments showing the feasibility of an advanced nuclear fuel.

Throughout his career, Gary has sustained his involvement in aerospace nuclear safety by advising the Interagency Nuclear Safety Review Panel, which reports to the White House on space missions that carry radioactive materials. His work directly supported presidential-level decisions to launch the Pluto New Horizons and Mars Science Laboratory space missions.

## Taking tons o' turkeys to work

Story by Stephanie Holinka  
Photos by Randy Montoya

Sandia employees donated a record-high 395 turkeys, more than 6,200 lbs. worth, during this year's Take a Turkey to Work campaign. The record level of turkey donations comes at a time when food banks in New Mexico and across the country feel the strain since federal Supplemental Nutrition Assistance Program (SNAP) benefits were

cut in early November.

Volunteers from throughout the Labs, including many OPEIU members, organized the collection points, advertised the event, and collected turkeys.

Daniel Sanchez and John Moya (both 10262-1) of the Transportation/Receiving Team picked up the turkeys from various drop-off locations and delivered them to the main Roadrunner Food Bank facility.

"This is the ninth year I've done the turkey delivery," says Dan. "We delivered many more turkeys than last

year. It seems like when times are hard, we give more."

Sonya Warwick, communications officer with Roadrunner Food Bank, says Roadrunner relies on Sandia's turkey drive, since proteins are in short supply during the holidays.

Warwick says the turkeys will find their way to families by Tuesday, in time for them to be thawed and cooked for holiday tables.

Sandia's Community Involvement Dept. 3652 has organized the turkey day annually since 2002.



LINDA DUBBERT (left) rode her bike to Hardin Field to donate her turkey.



TOMMIE KUYKENDALL (left) and Sandra Portlock (right) corralled the frozen turkeys for pick-up by Sandia's Logistics folks, who transported them to the main Roadrunner Food Bank facility.

**Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads**

**Note: The Classified Ad deadline for the January 10, 2014 paper will be 5 p.m. on Monday, Dec. 23. This change in the deadline applies only to the Jan. 14 paper.**

**MISCELLANEOUS**

ANTIQUE LIVING ROOM CHAIRS, 2, small, wood, needlepoint cushions, \$200/pair. Greathouse, 821-0980.  
 BALLOONING BAD PINS, seen at Balloon Fiesta, blue or yellow, \$10 ea. Keiss, 299-6610.  
 BEDROOM FURNITURE: king bed, night stands, lamps, dresser, mirror, pristine condition, photos available, \$1,200 firm. Lapetina, 505-856-1147.  
 LIVING ROOM SET: Ashley, couch, loveseat, large chair, all power recline, steel color, \$2,000. Valdez, 934-3331.  
 CRIB, converts to toddler bed, then daybed, w/mattress, \$75 OBO. Jaramillo, 363-8807.  
 COMPOUND BOW, 011 PSE Vendetta, RH, black, #60, \$385; Browning bow, RH, #60-75, \$75; Navaho longbow, #55, \$275. Schroeder, 917-4516.  
 REFRIGERATOR, Frigidaire, stainless steel, '06 model, 20.6-cu. ft., 29-1/2"W x 33"D x 68-1/4"H, top freezer, w/ice, water in door, works 100%, \$420. Eller, 417-4390.  
 XBOX 360 CONSOLE, new in box, still shrink-wrapped, \$80. Tran, 797-2041.  
 PORTABLE SPACE HEATERS, 2, Eden-Pure, infrared, barely used, \$75 ea. Miller, 298-3815.  
 WINTER TIRES, Bridgestone Blizzak MZ-03 Z45/40R18, complete set, <5K miles, from BMW 530xi, best offer. Aguilar, 508-6070, ask for Richard.  
 GAS DRYER, Kenmore, white, model 417 93042300, \$100; railroad ties, 8, \$20. Draelos, 505-296-3078.  
 EXERCISE BALL, BOSU, fun way to strengthen core muscles, build up stamina & flexibility, \$60 OBO. Montoya, 342-0043.  
 AB GLIDER, ProForm platinum series, w/DVD, \$75; Schwinn Broadway bicycle, \$100. Cotinola, 385-7770.

SMART PHONE, Galaxy, Verizon, rooted AOKP, new screen protector, arm band, charger, mint condition, \$180 OBO. Lovato-Montoya, 449-7193.  
 SOFA, leather, TEMA Melrose, glove-soft, light yellow, \$200; oversized chair & footstool set, \$150; \$300/set. Pasterczyk, 252-2264.  
 REAR-PROJECTION HDTV, Sony, 720p, 57-in., \$150. Nation, 505-259-4438.  
 IPAD KEYBOARD, ZAGG ProFolio, ultra thin, backlit keys, new, \$70 OBO. Witt, 991-1878.  
 CHINCHILLA, w/cage & accessories, great pet, college student moving, possible hold for Christmas, \$100. Cox, 505-319-1714.  
 KITCHEN TABLE & CHAIRS, 1950's, salmon-colored, nice, \$250; Lane dovetail coffee table, \$150; can send photos. Langwell, 350-1313.  
 FM PORTABLE TRANSCEIVER, Icom IC-215 Ham 2-meter, w/whip antenna, Drake 1525EM microphone, excellent condition, \$75. Laskar, 856-7806.  
 METAL DESK, 4-drawer, drawers work properly, no chair, you move, \$85. Harris, 343-0683.  
 WALK-THROUGH PET GATE, w/door, white, extra tall, \$35; Aerobed, twin, used once, \$50. Wallace, 256-1643.  
 MODULAR MOTORCYCLE HELMET, GMax GM54S, flat black, 3XL, worn once, \$170 new, asking \$100. Cocain, 281-2282.  
 LUMINARIAS, benefits non-profit, \$10 first dozen, \$5 ea. additional dozen. Black, 702-510-4065, ask for Kristen.  
 MICROWAVE BOWL POT HOLDERS, new, set includes 1 large, 1 small, \$20/set. Blea, 505-450-3593.  
 COUCH & LOVESEAT, great condition, photos available, \$300/both. Elmazi, 505-856-2197.  
 SOFA & LOVESEAT, matching, \$75; blue sectional w/pullout bed & recliners, \$100 OBO; photos available. Wimpy, 822-0223.  
 XBOX KINECT, w/3 games, like new, \$100. Trujillo, 505-321-2731.  
 PATIO UMBRELLA, 8-ft., granite base, w/wheels, \$40; Harvard Classics, 48 books, \$50; contractor's forced-air heater, Remington 150, \$50. Garcia, 280-5815.

**How to submit classified ads**  
**DEADLINE: Friday noon before week of publication unless changed by holiday. Submit by one of these methods:**  
 • EMAIL: Michelle Fleming (classads@sandia.gov)  
 • FAX: 844-0645  
 • MAIL: MS 1468 (Dept. 3651)  
 • INTERNAL WEB: On internal web homepage, click on News Center, then on Lab News link, and then on the very top of Lab News homepage "Submit a Classified Ad." If you have questions, call Michelle at 844-4902. Because of space constraints, ads will be printed on a first-come basis.

- Ad rules
1. Limit 18 words, including last name and home phone (If you include a web or e-mail address, it will count as two or three words, depending on length of the address.)
  2. Include organization and full name with the 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. We will not run the same ad 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, retired Sandians, and DOE employees.
  10. Housing listed for sale is available without regard to race, creed, color, or national origin.
  11. Work Wanted ads limited to student-aged children of employees.
  12. We reserve the right not to publish any ad that may be considered offensive or in bad taste.

**TRANSPORTATION**

'10 SUBARU WRX, silver, 2 sets of wheels, K&N cold air intake, 36K miles, \$18,000. Maranville, 239-1865.  
 '09 TOYOTA TACOMA, 4x4, quad cab, upgraded wheels, tow pkg., bright white, 61K miles, excellent condition. Pape, 505-385-7200.  
 '05 NISSAN 350 Z ROADSTER CONVERTIBLE, V6, 6-spd., yellow/black, 54.5K miles, \$15,500 OBO. Reyes, 505-299-8081, ask for Eddie.  
 '68 CAMARO, project car, last driven in '04, w/original parts, original 327cid, 4-spd, \$3,300 OBO. Dawson, 281-1235.  
 '13 FORD FUSION, hands-free voice activated, 22-34-mpg, 20K miles, \$18,000 OBO. LeVon, 505-918-6469, ask for Rose.  
 '99 TOYOTA TACOMA SR5, 4x4, V6, 5-spd., tow pkg., newer tires, line-x, alarm, 213K miles, \$7,900. VanGemert, 620-7145.  
 '05 CADILLAC DEVILLE, fully loaded, 68K miles, excellent condition, \$8,900. Sleafee, 505-281-4103.  
 '98 SATURN SL1, AC, silver, 145K miles, great for teenager, \$1,300 OBO. Carlton, 797-7703.  
 '03 PORSCHE 911 C4S COUPE, black/black, manual, new tires, shocks, struts, springs, 52K miles, immaculate, \$34,000. Simon, 505-944-5282.  
 '88 CHEVY, 4x4, single cab, LWB, great shape, new drive train & paint, \$4,500 OBO. Johnson, 264-9907.

'02 KAWASAKI PRAIRIE 650 ATV, 4WD, winch, spare wheel/tire, passenger handles, \$2,500. Hansche, 505-281-5623.

**REAL ESTATE**

2-BDR. HOME, 1 bath, large backyard, downtown, historic district, pueblo-style bungalow, remodeled, zoning/utilities for guest house, \$329,000. Weeks, 505-310-5254.  
 2 ACRES, Tome, 2 miles from UNM campus, for building, no irrigation. Chavez, 505-480-2497.  
 2-BDR. HOME, w/bonus room, 1 bath, large country kitchen, gas stove, all appliances stay, new thermal windows, many upgrades, 2318 Edna NW. Hunter, 505-450-5209, ask for Cec.  
 3-BDR. HOME, 2 baths, 2-car garage, 1,420-sq. ft., NW Albuquerque, energy efficient, call for more info. McDonald, 554-2048.

**WANTED**

FORMING NEW WOMEN'S BRITISH BOOK CLUB, call for details. Summerlin, 463-5144.  
 4WD PICKUP TRUCK, used, in good working condition, shell/cap preferred, but not necessary. Mosley, 350-0928.  
 GOOD HOME, black cat, 2 yrs. old, very affectionate, neutered, very scared of dogs. Dinger, 505-818-8933.  
 ROOMMATE, 2nd master bdr., \$425 plus utilities. Delgado, 440-8599.  
 ROOMMATE(S), in Volterra, 5 mins. from Eubank, WiFi, \$450/mo., utilities included. Guillen, 505-385-8189.  
 LEAD SINGER, classic rock-n-roll band, easy going musicians. Gates, 294-3222.  
 SOMEONE TO MAKE T-SHIRT QUILT THROW. Brewster, 238-4704, ask for Julie.  
 HANDYMAN, general ongoing maintenance, house in Placitas (near the Merc), number wrong in previous ad, if you called before, try again. Sullivan, 805-294-0056.

**RECREATION**

'12 CBR250 MOTORCYCLE, never dropped, 159 miles, w/large helmet & riding jacket, \$4,600. Casteel, 328-7404, leave a message.  
 '02 SUNSEEKER, 26-ft., Class C, 1 slide out, sleeps 6, 1 owner, 7,100 miles, excellent condition, \$24,995. Carroll, 281-6209.  
 LADIES BICYCLE, 130 Fuji Discovery, \$200. Norwood, 331-8608, ask for Fred.  
 '97 YAMAHA MOTORCYCLE, electrical short, best offer. Carson, 238-2997.

TIMESHARE, Costa Del Sol, near Marbella, Spain, 1-bdr., sleeps 4, kitchen, short walk to Mediterranean Sea, Dec. 6-13, www.alan-daclubmarbella.com, \$400 plus electric. Blanch, 505-850-9428.  
 CHRISTMAS TREE, 7-1/2-ft., dual-style needles for realistic look, beautiful tree, \$35; Casio LK-110 keyboard, w/stand, \$45. Pena, 271-5222.  
 PRINTER, new, Canon PIXMA iP6220D; Pioneer Elite DV-C36, 5-disc DVD player; basic office chair; \$50 ea. OBO. Verley, 410-9885.

**Recent Retirees**



Dennis Mowry 34 2952 Kathleen Diegert 33 2950 Dan Naru 31 753 Paul Werner 21 421 Michael Ulrickson 20 1352 Mary Roehrig 19 6521

**Mileposts**

New Mexico photos by Michelle Fleming



Matt Senkow 35 2735 Philip Eslin 30 5956 Cynthia Kajder 30 2913 Charles Little 30 6134 Scott Neely 30 10265



Fred Helsel 25 6913 Kristina Kominek 25 5562 John Vonderheide 25 2660 Ruth Harris 20 9544 Russ Jarek 15 2726 Riyaz Natha 15 6833 Alex Quintana 15 9713



A NEARLY FULL autumn moon guides Sandhill Cranes in for the night at the Bosque del Apache National Wildlife Refuge south of Socorro.

(Photo by Randy Montoya)

## Sandia's Design Improvement Team takes journey in understanding

By Sue Major Holmes

*It was called* the Design Improvement Team, but the initials for the group assigned to tweak parts of Sandia's TotalComp system could have stood for diversity and inclusion.

The main driver in how the team reached its conclusions and recommendations turned out to be its makeup of people from across Sandia, spanning positions from staff to director and professions from engineering to human resources.

*"We all still have strong opinions, but now we better understand the other perspectives."*

"The outcomes were better as a result," says Kim Sawyer, deputy laboratories director and executive VP for Mission Support. "It goes to inclusion — where every-

one is heard and their opinion is valued."

The team was formed in March to recommend how to clarify performance zones and address concerns about implementing zones in small organizations, among other things. The Lab Leadership Team has accepted DIT's recommendations.

DIT members were hand-picked as leaders in their organizations, critical thinkers, and problem-solvers who had successfully executed projects, says Susan Rhodes (0111), technical deputy to the chief of staff. In addition, everyone "had a strong desire to make a difference by improving aspects of TotalComp and had skin in the game — each of us would have to live with the outcome of our efforts," she says.

Some DIT members were very familiar with TotalComp's details when they joined; others were not.

The team spent the first meetings understanding compensation concepts and how TotalComp fits into Sandia's workforce management system, aided by Rob Nelson (3300), Health, Benefits, and Employee Services director, and his HR compensation team.

Center 5700 Director Jim Chavez says the DIT was meant to complement and advise the compensation team on improving both the design and implementation of TotalComp, with the constraints that the system's performance zones and the percentage of employees in each were not on the table.

### A delicate balance

"That drove us to think about some of the other things like zone descriptors, merit matrix, things that could have a huge impact on improving the design of TotalComp," he says.

Member Elizabeth Roll (3502) says the turning point came "when the team went, 'Ah, ha, compensation systems are a delicate balance of tradeoffs.'"

"We're still a bunch of individuals with diverse perspectives," says senior manager Wahid Hermina (1710).

But, he adds, "in the end, we're all in the same boat. We just got here in different ways. We all have the same objectives in mind. We've gone from a low-trust diverse team to a high-trust diverse team. We all still have strong opinions, but now we better understand



TEAM JOURNEY — Pam Hansen Hargan, VP of Human Resources and Communications Div. 3000, left, meets with Caren Wenner (0431), center, and Elizabeth Roll (3502) about the Design Improvement Team, assigned to tweak parts of the TotalComp system. Caren and Elizabeth were part of the diverse team from across the Labs who came together to work on the system.

the other perspectives."

Team members brought different concerns to key issues. For example, Wahid says, descriptions for performance and behaviors that determine which zone an employee is placed into led to "rich discussions."

"What does it mean to be in zone 2? Some felt all it means is you're in the lowest 10 percent of the population, but that population could be a high-performing population," he says. "It doesn't necessarily mean anything other than that."

Jim says the ambiguous nature of the overall assignment — improve the process — was initially confusing because of the constraints and team members' different levels of understanding and interpretation of their responsibility.

Once Elizabeth, an experienced facilitator and member of Sandia's Change Cadre, led members through discussions of expectations, and consultant Jerry Allen, a retired Sandia director, helped them set priorities, the team started to gel.

Susan and Jim say the team "stormed," or let everyone talk about their TotalComp experiences, before bringing in Allen to help them focus, prioritize, and plan the effort. Rob's team then helped members to a common level of understanding TotalComp.

"People felt like we had made some significant differences in improving the process," Jim says. "In the end, both sides understood each other a lot better. The compensation people understood where the line people were coming from and the line understood constraints on TotalComp."

Diverse teams tend to get off to a slow start as they grapple with different viewpoints, experiences, assumptions, and personal principles, Elizabeth says. However, those discussions help teams bond, give them a solid basis for recommendations, and lead to more creative solutions, she says.

"I appreciate that the team was given the time to work through that and that both sides took the time and took the risks to have some pretty candid conversations that were sometimes uncomfortable," she says. "I admire that the members of the team cared enough to do that."



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