



Marshall Star, November 21, 2012 Edition

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# MARSHALL STAR

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**Only Three More Weeks to Donate to CFC!**

The Marshall Space Flight Center's 2012 Combined Federal Campaign runs through Dec. 15. So far, Marshall's workforce has contributed \$401,256 toward the center's \$700,000 goal. To donate, or to browse a comprehensive list of qualified charitable organizations, visit [here](#). Contractor team members also may make a one-time donation through their CFC organization leads or assigned monitors. For a complete list of organization leads, visit the [CFC ExplorNet page](#).



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## CFC 2012: Marshall Engineers Affected by Suicide Work to Bring It 'Out of Darkness'

By Megan Davidson



Suicide claims more than 32,000 lives annually in the United States. For Marshall Space Flight Center engineers Jeneene Suttle and Mindy Niedermeyer, this isn't just another statistic. It's an all-too-real part of their lives.

In 1986, Suttle's father committed suicide. In 2010, Niedermeyer's 24-year-old son took his own life. Neither woman saw any clear warning sign, and both sought help on how to cope with their loved ones' deaths.

"They say it gets easier as time goes on, but it really doesn't," said Niedermeyer. "There's a lot of personal guilt and blame there, especially when it's your child."

"My father passed away almost 26 years ago, and I'm still dealing with the pain of his death," said Suttle. "When there's no clear reason why, you constantly try to piece it all together, and question if there was something you could have done to prevent it."

Both found help through private counseling and by becoming involved with the Combined Federal Campaign-funded organization, the American Foundation for Suicide Prevention.

The nonprofit organization was founded in 1987 by research scientists and family members who had lost loved ones to suicide. It works to understand and prevent suicide through research, education and advocacy, and to reach out to people with mental disorders and those impacted by suicide. According to the organization, 90 percent of people who commit suicide have a diagnosable psychiatric disorder at the time of their deaths. In most cases, the underlying causes of suicide are curable, but often go unrecognized or untreated. "There's such a stigma surrounding people who seek treatment for mental issues, and that shouldn't be the case," said Niedermeyer. "It's OK to get help."

Suttle and Niedermeyer use their experiences to help others going through similar situations and work to raise awareness of mental disorders and suicide prevention. On Oct. 7, the women -- with friends and family members -- participated in the American Foundation for Suicide Prevention's "Out of the Darkness" walk at Brahan Springs Park in Huntsville. Held in more than 250 communities across the country, the event features 3-to-5-mile walks, with the proceeds going to research and education programs to prevent suicide and save lives, increase national awareness about depression and suicide and provide support for survivors of suicide loss.

"I didn't tell my children what happened to their grandfather until we participated in the walk for the first time this year," said Suttle. "There's a lot of shame behind suicide, but the event was a healing place for me. I had the opportunity to talk to so many people going through the same thing. It also helped me remember all the good memories of my dad's life, rather than how his life ended. He was such a fun-loving person and had a big heart. He was always willing to help someone else."

"Suicide is a serious public health issue," said Niedermeyer. "There's a suicide attempt every minute in this country. It's the fourth-leading cause of death in men ages 18 to 65, and those statistics are even higher for adolescents."

"Even if just one life is saved through suicide awareness and prevention programs, it's worth it," she added. "Because it really isn't just saving one life -- it's also saving all of the family members' lives who are left behind."

"I miss my son every single day," said Neidermeyer. "The thing I remember most about my precious boy was how every person who ever encountered him always said the same thing -- 'What a great kid.'"

Warning signs of suicide, risk factors, educational resources and other information can be found on the American Foundation for Suicide Prevention's [website](#). Marshall team members may donate to the American Foundation for Suicide Prevention, CFC number 10545, or other charitable organizations on the [CFC ExplorNet page](#).

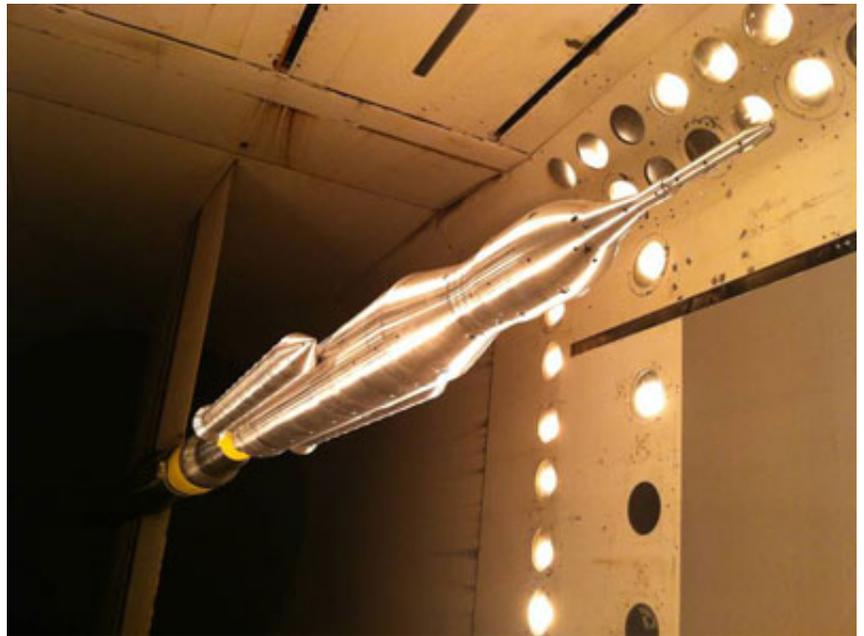
*Davidson, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.*

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**New Space Launch System Model Takes Flight at Langley Wind Tunnel**

A 10-foot-long model of NASA's Space Launch System rocket is installed in the Transonic Dynamics Tunnel at Langley Research Center for extensive wind tunnel testing. During testing, engineers evaluated the vehicle's performance in the simulated aerodynamic environment of the wind tunnel. Air rushed by the model at speeds up to Mach 1.2 to measure flight stability, vehicle aerodynamics and how the rocket responds to vibrations and resonance during simulated flight. Once the data is analyzed, NASA's rocket scientists can refine the design of the SLS vehicle using this 3-percent scale model before the full-size rocket is built for flight tests. The Space Launch System program is managed at the Marshall Space Flight Center. (NASA/LaRC)



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## Keeping the Wheels Turning: Registration Open for 20th Annual NASA Great Moonbuggy Race

By Rick Smith



Registration opened Nov. 5 for the 20th annual [NASA Great Moonbuggy Race](#), which challenges high school, college and university students around the world to build and race fast, lightweight "moonbuggies" of their own design.

**Image left: The team from the University of Alabama in Huntsville race to first place in the college division of the 19th annual NASA Great Moonbuggy Race in April 2012. (MSFC/Emmett Given)**

The students' work will culminate in two days of competitive racing April 26-27, 2013, at the U.S. Space & Rocket Center in Huntsville. NASA created the event two decades ago to complement classroom learning, provide young thinkers and builders with real-world engineering experience and inspire them to consider careers in science, technology, engineering and mathematics -- the STEM fields.

"It's our goal to keep the wheels turning," said Tammy Rowan, manager of the Academic Affairs Office at the Marshall Space Flight Center, which organizes the race each year. "The ingenuity and enthusiasm we see among racers begins in the classroom. That first spark of interest -- whether it's in basic chemistry or astronomy or the history of spaceflight -- starts the wheels turning.

"The Great Moonbuggy Race helps sustain that momentum, turning interest into passion, and dreams into a lifelong pursuit

of new answers and new horizons," she added.

International registration for the 2013 race closes Jan. 7. Registration for U.S. teams closes Feb. 4. Participating high schools, colleges and universities each may register up to two teams and two vehicles.

When Marshall created the race as a regional college challenge during the 1993-1994 school year, only eight teams participated. The high school division was added in 1996, and registration has swelled ever since.

Racers compete to post the fastest vehicle assembly and race times in their divisions, while incurring the fewest penalties. Prizes are awarded to the three teams in each division that finish with the lowest final times. NASA and industry sponsors present additional awards for engineering ingenuity, team spirit, best debut by a rookie team and more.

The course, built each spring on the outdoor grounds of the Space & Rocket Center, comprises a winding half-mile of gravel embankments, sand pits and obstacles that mimic the harsh surface of the moon. The race's creators drew inspiration from conditions faced by the Apollo-era [Lunar Roving Vehicles](#). Three rovers built at Marshall in the late 1960s were used on the moon during the [Apollo 15](#), [Apollo 16](#) and [Apollo 17](#) missions in 1971 and 1972.

Today, the students' moonbuggies address many of the same design challenges NASA and industry engineers overcame to deliver those historic rovers. The vehicles dramatically expanded astronauts' reach across the lunar surface and enabled them to conduct much more scientific research during their brief stays on the moon.

In the most recent [Great Moonbuggy Race](#), held in April 2012, more than 70 teams tackled the course. Petra Mercado High School in Humacao, Puerto Rico was first place in the high school division. The University of Alabama in Huntsville won first place in the college division. Petra Mercado, in only its second year in the competition, earned a completion time of 3 minutes and 20 seconds. The winning University of Alabama in Huntsville team finished in 4 minutes and 3 seconds.

To date, more than 5,000 students from around the world have participated in the races. Past winning teams have hailed from Alabama, Arizona, California, Illinois, Indiana, Kansas, Kentucky, Louisiana, Missouri, New Hampshire, New Jersey, New York, North Dakota, Ohio, Puerto Rico, Rhode Island, Tennessee, Utah and Wyoming -- and from Canada and Germany. International racers have come from as far away as India, Italy, Romania, Russia and the United Arab Emirates.

Racers from Erie High School in Erie, Kan., have held the record for the best course-completion time since 2008. Their best overall time of 3 minutes and 17 seconds earned the first-place trophy in the high school division that year.

More than 350,000 people watched live and [archived coverage of the spring 2012 race](#) on NASA TV and on UStream. Marshall maintains a rich archive of race images and information about past events [here](#).

*Smith, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.*

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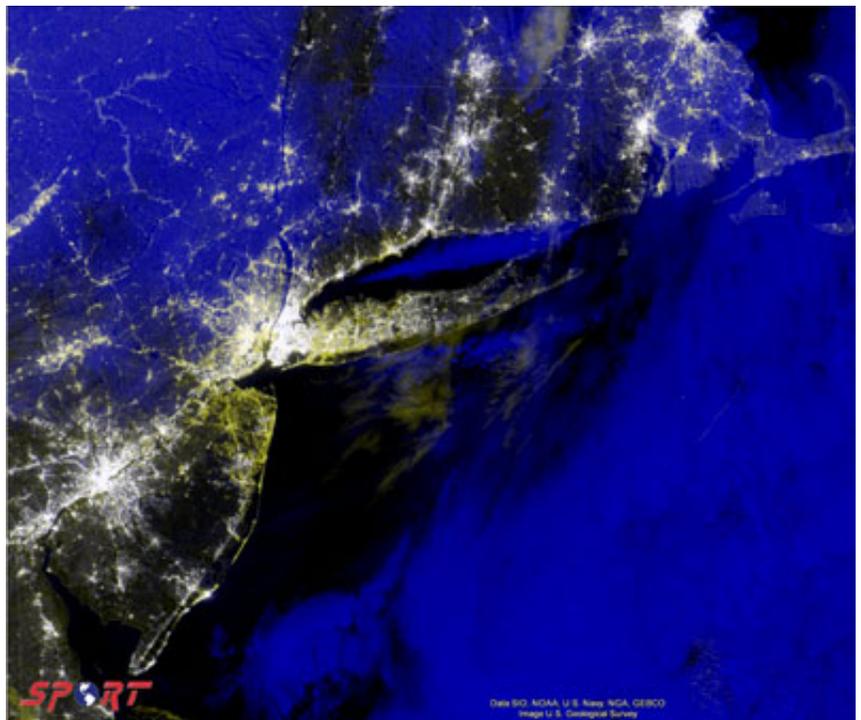
## **New NASA SPoRT Blackout Images Capture Scope of Sandy Power Outages**

*By Janet Anderson and Andrew Molthan*

NASA's Short-term Prediction Research and Transition, or SPoRT, Center has been applying enhanced, multispectral image analysis techniques to NASA satellite data to support the monitoring of Superstorm Sandy's impacts, and assisting in ongoing disaster assessment and relief efforts.

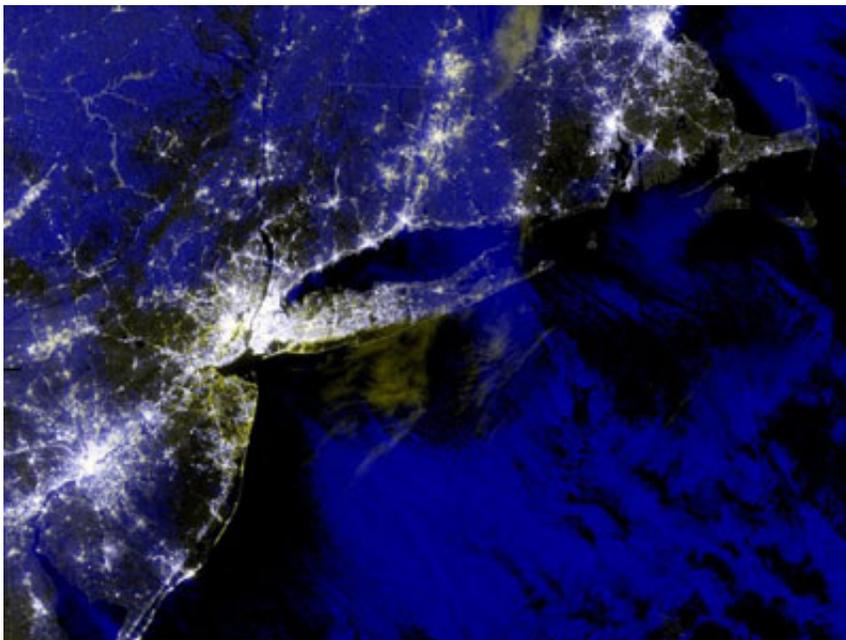
**Image right: Visible Infrared Imager Radiometer Suite Blackout RGB Composite on Nov. 1 for Hurricane Sandy. (NASA/SPoRT)**

The SPoRT Center uses Earth Observing System measurements and other satellite data to generate products useful in the analysis of weather events. SPoRT provides these products and data sets to partners including disaster response agencies.



In a recent application, data from the Visible Infrared Imager Radiometer Suite -- known as VIIRS -- a low-light sensor, called the day-night-band, on the Suomi National Polar-orbiting Partnership satellite has been used to create an experimental "VIIRS Blackout RGB Composite" product. The product was created to help the Federal Emergency Management Agency, the U.S. Army's Joint Force Land Component Command Coordination Element and the U.S. Army Corp of Engineers to use space-based assets to help monitor regions without power as part of their disaster response activities.

"This imagery has allowed emergency response teams to expedite their response to hurricane-ravaged areas," said Dr. Gary Jedlovec, SPoRT project lead at the Marshall Space Flight Center. "Seeing the impact of the blackout from space-based assets gives relief organizations a new and very effective view of the scope of impacted regions."



The VIIRS day-night-band has the ability to detect light emitted from cities and small towns in the absence of clouds. In the Google Earth display at left, the day-night-band imagery captured Aug. 31, before the storm, indicates nominal nighttime lighting for the region. It was combined with similar imagery taken Nov. 1. By assigning the "before" image to the red and green colors and the "after" image to blue using an image compositing tool, the resulting combined image depicts bright white lights where town and city lights appear in all images -- before and after the storm -- and yellow areas in the after image where town and city lights are missing.

**Image left: Visible Infrared Imager Radiometer Suite Blackout RGB Composite on Nov. 3 for Hurricane Sandy. (NASA/SPoRT)**

This compositing effect occurs because lights present in both the before and after image are coded white by the tool,

whereas it assigns a yellow color to regions where lights appeared only in the before image. This experimental product highlights in yellow many of the coastal areas where power outages are likely or confirmed. Application of the technique to data captured Nov. 3 produces the second image below.

SPoRT receives real-time VIIRS data from the University of Wisconsin through a collaborative partnership under the National Oceanic and Atmospheric Administration's Geostationary Operational Environmental Satellite -- R Series and Joint Polar Satellite System programs. The processing of the VIIRS data is performed by SPoRT at Marshall.

*Anderson is a public affairs officer in the Office of Strategic Analysis & Communications, and Molthan is a research meteorologist in the Science & Technology Office.*

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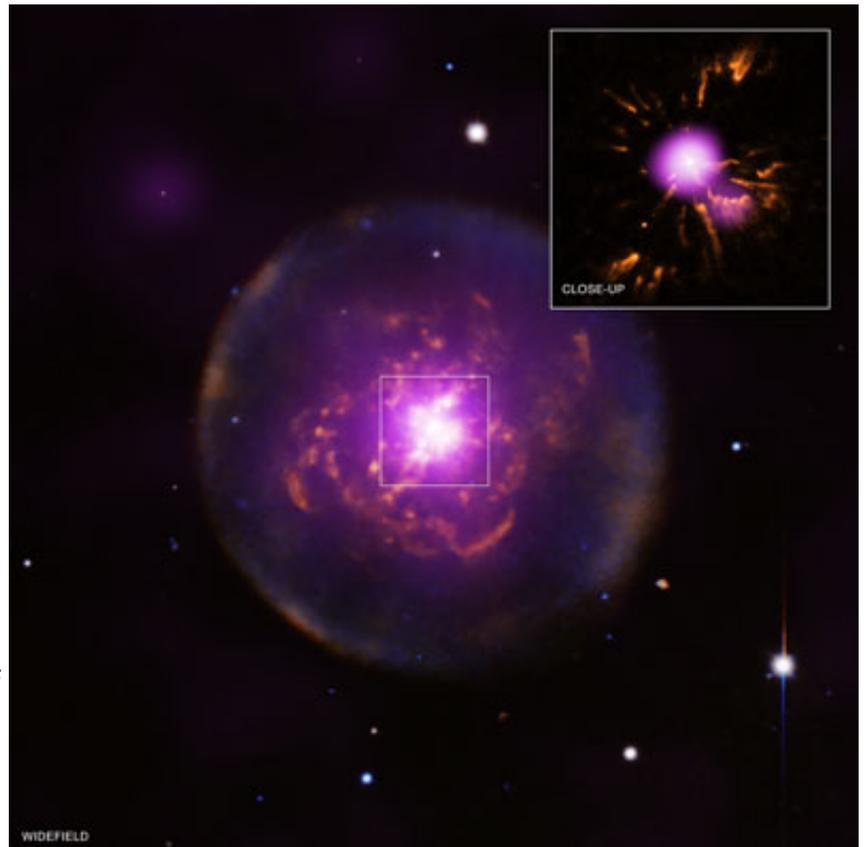
## A Reborn Planetary Nebula

*These images of the planetary nebula Abell 30, also known as A30, show one of the clearest views ever obtained of a special phase of evolution for these objects. The inset image on the right is a close-up view of A30 showing X-ray data from NASA's Chandra X-ray Observatory in purple and Hubble Space Telescope data showing optical emission from oxygen ions in orange. On the left is a larger view showing optical and X-ray data from the Kitt Peak National Observatory and the European Space Agency's X-ray Multi-Mirror Mission-Newton, respectively. In this image the optical data show emission from oxygen (orange) and hydrogen (green and blue), and X-ray emission is colored purple.*

*A planetary nebula -- so called because it looks like a planet when viewed with a small telescope -- is formed in the late stage of the evolution of a sun-like star. After having steadily produced energy for several billion years through the nuclear fusion of hydrogen into helium in its central region, or core, the star undergoes a series of energy crises related to the depletion of hydrogen and subsequent contraction of the core. These crises culminate in the star expanding a hundred-fold to become a red giant.*

*Eventually the outer envelope of the red giant is ejected and moves away from the star at a relatively sedate speed of less than 100,000 miles per hour. The star meanwhile is transformed from a cool giant into a hot, compact star that produces intense ultraviolet radiation and a fast wind of particles moving at about 6 million miles per hour. The interaction of the UV radiation and the fast wind with the ejected red giant envelope creates the planetary nebula, shown by the large spherical shell in the bigger image.*

*In rare cases, nuclear fusion reactions in the region surrounding the star's core heat the outer envelope of the star so much that it temporarily becomes a red giant again. The sequence of events -- envelope ejection followed by a fast stellar wind -- is repeated on a much faster scale than before, and a small-scale planetary nebula is created inside the original one. In a*



sense, the planetary nebula is reborn.

The large nebula seen in the larger image has an observed age of about 12,500 years and was formed by the initial interaction of the fast and slow winds. The cloverleaf pattern of knots seen in both images, corresponds to the recently ejected material. These knots were produced much more recently, as they have an observed age of about 850 years, based on observations of their expansion using Hubble.

The diffuse X-ray emission seen in the larger image and in the region around the central source in the inset is caused by interactions between wind from the star and the knots of the ejected material. The knots are heated and eroded by this interaction, producing X-ray emission. The cause of the point-like X-ray emission from the central star is unknown.

Studies of A30 and other planetary nebulas help improve our understanding of the evolution of sun-like stars as they near the end of their lifetime. The X-ray emission reveals how the material lost by the stars at different evolutionary stages interacts with each another. These observations of A30, located about 5,500 light years away, provide a picture of the harsh environment that the solar system will evolve toward in several billion years, when the sun's strong stellar wind and energetic radiation will blast those planets that survived the previous, red giant phase of stellar evolution.

The structures seen in A30 originally inspired the idea of reborn planetary nebulas, and only three other examples of this phenomenon are known. [A new study of A30](#), using the observatories mentioned above, has been reported by an international team of astronomers in the Aug. 20 issue of *The Astrophysical Journal*.

The first author of the paper reporting these results is Martín A. Guerrero of the Instituto de Astrofísica de Andalucía in Spain. The other authors are N. Ruiz and J. Toalá, both also of the Instituto de Astrofísica de Andalucía; W.-R. Hamann, H. Todt and L. Oskinova, all of the University of Potsdam, Germany; Y.-H. Chu and R. Gruendl, both of the University of Illinois, Urbana; D. Schönberner and M. Steffen, both of the Leibniz-Institut Für Astrophysik in Potsdam; and W. Blair of Johns Hopkins University in Baltimore, Md.

The Marshall Space Flight Center manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge, Mass.

Credits: Inset X-ray (NASA/CXC/IAA-CSIC/M.Guerrero et al); Inset Optical (NASA/STScI); Widefield X-ray (ESA/XMM-Newton); Widefield Optical (NSF/NOAO/KPNO)

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**More than 1,700 Students Learn More about NASA's Mission at Annual Education Event**



Marshall Space Flight Center Director Patrick Scheuermann, second from left, carries on the long Marshall tradition of tossing the opening coin at the Alabama A&M University High School Senior/NASA Day football game Nov. 3. The matchup between Alabama A&M and Southern University in Baton Rouge, La., was one of many activities for Senior/NASA Day. The event is held annually to encourage students to pursue careers in technical fields. More than 1,700 students from 19 states took part in the event, sponsored by the Marshall Center and organized by the Office of Diversity & Equal Opportunity and the Academic Affairs Office in the Office of Human Capital. (NASA/MSFC/Emmett Given)

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**NASA-WPI 2013 Robot Prize Competition Registration Open**

*NASA news release*

NASA and the Worcester Polytechnic Institute, or WPI, in Worcester, Mass., have opened registration and are seeking teams to compete in next year's robot technology demonstration competition, which offers as much as \$1.5 million in prize money.

During the 2013 NASA-WPI Sample Return Robot Challenge, teams will compete to demonstrate a robot can locate and retrieve geologic samples from a wide and varied terrain without human control. The objective of

the competition is to encourage innovations in automatic navigation and robotic manipulator technologies. Innovations stemming from this challenge may improve NASA's capability to explore a variety of destinations in space, as well as enhance the nation's robotic technology for use in industries and applications on Earth. The competition is planned for June 2013 in Worcester, attracting competitors from industry and academia nationwide.

NASA is providing the prize money to the winning team as part of the agency's Centennial Challenges competitions, which seek unconventional solutions to problems of interest to the agency and the nation. While NASA provides the prize purse, the competitions are managed by non-profit organizations that cover the cost of operations through commercial or private sponsorships.

"We've opened registration and are eager to see returning teams, and new challengers, enter this second Sample Return Robot Challenge," said NASA Space Technology Program Director Michael Gazarik at the agency's Headquarters. "Contests like NASA's Centennial Challenges are an excellent example of government sparking the engine of American innovation and prosperity through competition while keeping our nation on the cutting edge of advanced robotics technology. Teams from academia, industry and even citizen-inventors are all invited to join the competition and help NASA solve real technology needs. With a \$1.5 million prize purse, we're looking forward to seeing some great technology that will enable our future missions and advance robotics right here in America."

The first Sample Return Robot Challenge, which took place in June, also was held at WPI. While almost a dozen teams entered the competition, none qualified to compete for the prize purse. NASA and WPI are partnering again to repeat and advance the competition, which is expected to draw more competitors and greater technological innovation from among the teams.

"The anticipation for the second running of the Sample Return Robot challenge has been building," said Sam Ortega, program manager for Centennial Challenges at the Marshall Space Flight Center. "The teams who competed are eager to try again and show their progress, and we've had a lot of interest from newcomers. We are excited to see what each team is able to accomplish."

"We're honored and excited to once again host the Sample Return Robot Challenge," said WPI President and CEO Dennis Berkey. "This year, 7,000 people turned out to watch the competition, which was the first of its kind on the East Coast. This university is a hub of expertise and innovation within the area of robotics, and it's a pleasure to engage people of all ages and backgrounds in the wonders of this competition, this festival, and this emerging field."

There have been 23 NASA Centennial Challenges competition events since 2005, and through this program NASA has awarded more than \$6 million to 15 different challenge-winning teams. Competitors have included private companies, student groups and independent inventors working outside the traditional aerospace industry. Unlike contracts or grants, prizes are awarded only after solutions are successfully demonstrated.



WPI offers bachelor's, master's and doctoral degrees in robotics engineering. In 2007, the university was the first in the nation to offer a bachelor's degree program in this area. Through its Robotics Resource Center, WPI supports robotics projects, teams, events and K-12 outreach programs.

For more information about the Sample Return Robot Challenge and WPI, visit <http://challenge.wpi.edu>.

The Centennial Challenges program is part of NASA's Space Technology Program, which is innovating, developing, testing, and flying hardware for use in NASA's future missions. NASA's Space Technology Program and the Centennial Challenges are creating new technological solutions for NASA and our nation's future. The Marshall Center manages Centennial Challenges for the Office of Chief Technologist.

For more information about NASA's Centennial Challenges and the Space Technology Program, visit <http://www.nasa.gov/challenges>.

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## International Space Station Astronauts Land Safely In Kazakhstan

NASA news release



Three members of the Expedition 33 crew undocked from the International Space Station and returned safely to Earth on Nov. 18, wrapping up a mission lasting more than four months.

*Image left: Expedition 33 Commander Sunita Williams of NASA, right, and Flight Engineers Yuri Malenchenko of the Russian Federal Space Agency and Akihiko Hoshide of Japan Aerospace Exploration Agency, left, sit in chairs outside their Soyuz capsule just minutes after they landed in a remote area outside the town of Arkalyk, Kazakhstan, on Nov. 18. Williams, Hoshide and Malenchenko returned from four months onboard the International Space Station. (NASA/Bill Ingalls)*

Expedition 33 Commander Sunita Williams of NASA, Flight Engineer Akihiko Hoshide of the Japan Aerospace Exploration Agency and Russian Soyuz Commander Yuri Malenchenko undocked their Soyuz spacecraft from the space station at 4:26 p.m. CST and landed north of Arkalyk, Kazakhstan, at 7:56 p.m. The trio arrived at the station July 17 and spent 127 days in space, 125 of which were aboard the orbiting laboratory. This was the first pre-dawn landing in darkness for a station crew since April 9, 2006, when Expedition 12 crew members returned.

NASA astronaut Kevin Ford took command of the space station on Nov. 18. When the Soyuz spacecraft undocked from the space station, Expedition 34 began. Ford and his crewmates, Russian cosmonauts Oleg Novitskiy and Evgeny Tarelkin, will tend to the station as a three-man crew for one month until the arrival of three new crew members, including NASA astronaut Tom Marshburn.

Expedition 33 advanced the scope of research aboard the station by conducting a wide range of physical science, Earth observation and technology demonstration investigations. Research included testing radiation levels on the orbiting outpost,

assessing how microgravity affects the spinal cord, and investigating dynamic processes on Earth, such as melting glaciers, seasonal changes and human impacts on the ecosystem.

The crew also participated in the Integrated Resistance and Aerobic Training Study-Sprint, which evaluates the use of high-intensity, low-volume exercise training to minimize loss of muscle, bone and cardiovascular functions during long-duration missions. The expedition crew members also managed a number of visits by international and commercial spacecraft, including the first contracted commercial resupply flight by SpaceX, and conducted several challenging spacewalks to sustain the productive operation of the orbiting complex.

Williams, Hoshide and Malenchenko orbited Earth 2,032 times and traveled 54,090,628 miles. Williams, who has spent 322 days in space on two missions, now ranks sixth on the all-time U.S. endurance list, and second all-time for a female. Malenchenko has spent 642 days in space on his five flights, which ranks him seventh on the all-time endurance list. During their mission, Williams and Hoshide performed three spacewalks to replace a component that relays power from the space station's solar arrays to its systems and repair an ammonia leak on a station radiator. With 50 hours and 40 minutes, Williams holds the record for total cumulative spacewalk time by a female astronaut. Hoshide holds the record for total cumulative spacewalk time by a JAXA astronaut at 21 hours and 23 minutes.

For more information about the International Space Station and its crew, visit <http://www.nasa.gov/station>.

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### **Sixth Annual Science & Technology Jamboree and Holiday Party to be held Nov. 30**

The sixth annual Science & Technology Jamboree -- where team members can show off their science work to the Marshall Space Flight Center community -- will be held Nov. 30.

Open to the public, the event will be from 9 a.m. to noon, at the National Space Science and Technology Center on Sparkman Drive in Room 4078.

Presenters' slides are due by 5 p.m., Nov. 27. For details on how present and to submit material, contact Kiran Kilaru at [kiranmayee.kilaru-1@nasa.gov](mailto:kiranmayee.kilaru-1@nasa.gov).

A holiday party will follow the presentations. All attendees and presenters are requested to make a food or \$5 contribution to the potluck. The deadline to RSVP, and turn in money is due by noon Nov. 27. For questions and food sign up, contact Marcia Crowe at [marcia.e.crowe@nasa.gov](mailto:marcia.e.crowe@nasa.gov) or 256-961-7342, or Michelle Russell at [michelle.p.russel@nasa.gov](mailto:michelle.p.russel@nasa.gov) or 256-961-7410.

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### **Celebrating Honor and Tradition**

*In celebration of Native American Heritage Month, Jimmy Yellowhorse, a performer and member of the Cherokee tribe, plays the flute during a lunch and learn activity Nov. 13 at the Marshall Space Flight Center. The event featured traditional Native American dancing and music. (NASA/MSFC/Emmett Given)*



*Tiffany Gandy, a fancy shawl dancer, performs a colorful dance during Marshall's Native American Heritage Month event. (NASA/MSFC/Emmett Given)*

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## Obituaries

**James A. Belew**, 84, of Salem, Mo., died Nov. 6. He retired from the Marshall Center in 1985 as an aerospace engineer. He is survived by his wife, Freida West Belew.

**Gene Thomas Smith**, 81, of Harvest died Nov. 7. He retired from the Marshall Center in 1988 as a program analyst. He is survived by his wife, Ann Smith.

**Donald Reid DuPree**, 79, of Huntsville died Nov. 12. He retired from the Marshall Center in 1993 as a computer engineer.

**Howard League**, 88, of Toney died Nov. 16. He retired from the Marshall Center in 1983 as a mail clerk.

Find this article at:

<http://www.nasa.gov/centers/marshall/about/star/index.html>

