

## Stennis hosts Capitol Day events



(Top photo) Former astronaut Richard Hieb addresses members of the Mississippi Senate during NASA Day at the State Capitol activities in Jackson on March 13. Hieb is flanked by members of the Mississippi Gulf Coast delegation and Stennis Space Center leaders: (l to r) Sen. Philip Moran of Kiln, Sen. Angela Burks Hill of Picayune, Stennis Center Operations Director Mark Glorioso, Stennis Deputy Center Director Jerry Cook (behind Hieb), Stennis Center Director Rick Gilbrech, Sen. Michael Watson of Pascagoula and Sen. Tony Smith of Picayune. During the day, Stennis officials displayed exhibits highlighting the center's role in the past, present and future of America's space program, and its positive effect on surrounding communities and on Mississippi's economy and quality of life.

(Right photo) Mississippi Gov. Phil Bryant speaks to Stennis Space Center employees during a dinner gathering in Jackson on March 12.



*“In the Office of the Chief Technologist, the days are anything but ‘business as usual,’ as the office charter calls for us to be an agent for change.”*

From the desk of  
**Ramona Travis**

Chief Technologist, Stennis Office of the Chief Technologist



**A**s spring 2014 ushers in, we realize it has been about a year since the Stennis Office of the Chief Technologist was established. Serving as the center interface to the relatively new Headquarters Office of the Chief Technologist and the Space Technology Mission Directorate has been a challenge, but one met with enthusiasm by the Stennis staff! Below are some of the developments of the last year.

Gigi Savona is busy as intellectual property (IP) manager. Her efforts include new technology reports, patents, licenses and software usage agreements. Patent law changes, the most significant in several decades, and the White House Initiative to accelerate federal tech transfer have required a rapid learning curve. Even so, Stennis has received more patents in the last year and a half than in the prior 10 years and is deeply involved in numerous agency studies and activities to find innovative ways to deal with IP and enhance its transfer.

Tom Stanley serves as the Small Business Innovative Research (SBIR) manager. With concerns regarding helium as a non-renewable resource and Stennis as a major user of helium, work with small businesses on ways to reclaim helium for reuse recorded good success last year. Another SBIR project through Stennis is developing a real-time collaboration tool that allows weather forecasters and emergency managers to share geospatial information for disaster response. The project already has about \$1 million in external contracts to demonstrate utility for state and local governments. Stennis also has initiated a new SBIR subtopic for innovative technologies that could support revolutionary in-space propulsion systems that may take us to Mars.

Lauren Underwood is new to NASA and performs as the technology transfer partnerships manager. One partnership she has worked is with a company using a

photocatalytic compound for keeping surfaces clean on Earth or in space (the technology was one of NASA Administrator Charlie Bolden’s top three favorites in last year’s NASA Spinoffs publication). The company recently was invited to discuss using the technology to help keep the Superdome roof clean and white. Underwood also spearheads submissions to the NASA Tech Briefs magazine, along with other technical publications; and serves as liaison officer for awards through the Inventions and Contributions Board.

The Stennis office recently hosted and co-sponsored the 2014 Nuclear and Emerging Technologies for Space (NETS) Conference, the premier annual international conference for space nuclear propulsion and power research. The American Nuclear Society co-sponsors shared, “This version of NETS was one of the best, if not the best, such conference in 25 years.”

The relatively new Center Innovation Fund (CIF) has enabled more than 20 different innovative projects and has involved employees from every Stennis directorate, about a half dozen universities and a number of small businesses. CIF work has opened the door for Stennis to collaborate with NASA’s Marshall Space Flight Center in an entirely new advanced propulsion field.

In the Office of the Chief Technologist, the days are anything but “business as usual,” as the office charter calls for us to be an agent for change. The office is engaged in new initiatives, new studies and cutting-edge technology development. Please visit to learn more about partnering with the office to push the envelope for Stennis technology development and transfer!

*Ramona Pelletier Travis*

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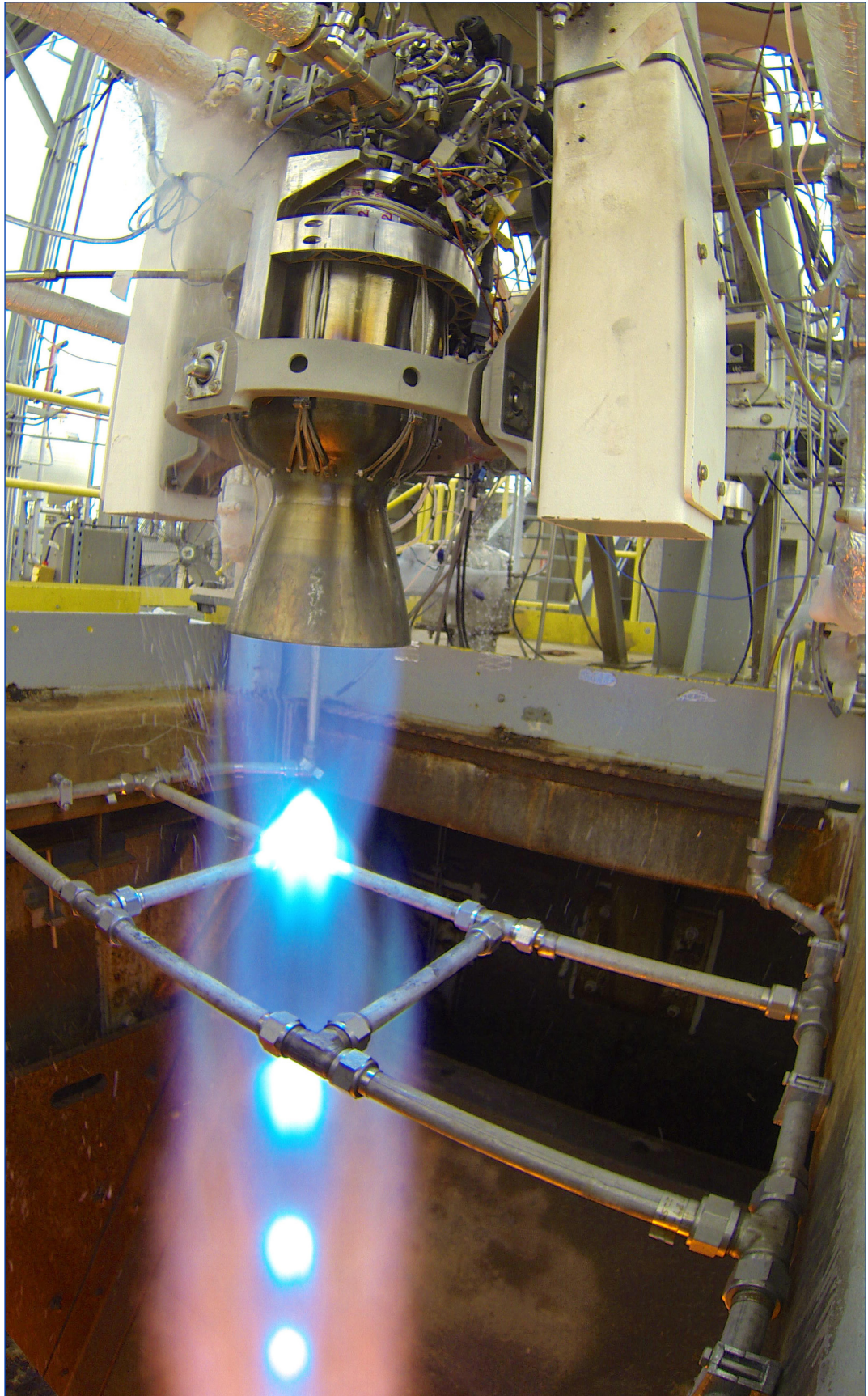
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## FULFILLING NASA'S EXPLORATION MISSION

# NASA tests Project Morpheus engine

NASA engineers conducted a series of tests of Project Morpheus' HD4B-LT engine at the E-3 Test Stand at Stennis Space Center Feb. 20-21. The HD4B-LT engine was built to be a backup engine to the one already flying on the Morpheus vehicle. The nine-test series over the two days of testing on the liquid oxygen/liquid methane engine concluded with a 128-second, full-duration firing. Morpheus is a prototype vertical takeoff and landing vehicle featuring innovative technologies that may be incorporated into future exploration missions. The HD4B-LT engine is designed to power the prototype planetary lander. Morpheus tests automated landing and hazard avoidance technology and an engine that runs on liquid oxygen and methane, or "green" propellants. These new capabilities could be used in future efforts to deliver cargo to planetary surfaces. Project Morpheus involves NASA engineers at a number of centers. Johnson Space Center in Texas is developing and operating the lander. Stennis is testing the engines to power Morpheus. Kennedy Space Center in Florida hosts free-flight tests of the lander at a specially landscaped runway area, and Marshall Space Flight Center in Alabama manufactured the engine's nozzle using an innovative 3-D printing process known as selective laser melting. The liquid oxygen/liquid methane-propelled test vehicle is sized to simulate carrying 1,100 pounds of cargo on a prototypical lunar mission. For additional information about Project Morpheus, visit: <http://tiny.cc/2smicx>.



## FULFILLING NASA'S EXPLORATION MISSION

# Curiosity rover makes tracks on Mars surface



NASA's Curiosity Mars rover used the Navigation Camera (Navcam) on its mast for this look back after finishing a drive of 328 feet (100 meters) on the 548th Martian day, or sol, of the rover's work on Mars (Feb. 19, 2014). The rows of rocks just to the right of the fresh wheel tracks in this view are an outcrop called "Junda." The rows form striations on the ground, a characteristic seen in some images of this area taken from orbit. A panorama made from Navcam images taken during a pause to observe Junda partway through the Sol 548 drive is available at: <http://tiny.cc/ydebcx>. For scale, the distance between Curiosity's parallel wheel tracks is about 9 feet (2.7 meters). This view is looking toward the east-northeast. NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology, Pasadena, manages the Mars Science Laboratory Project for NASA's Science Mission Directorate, Washington. The laboratory designed and built the Curiosity rover and the rover's Navcam.

## NASA in the News

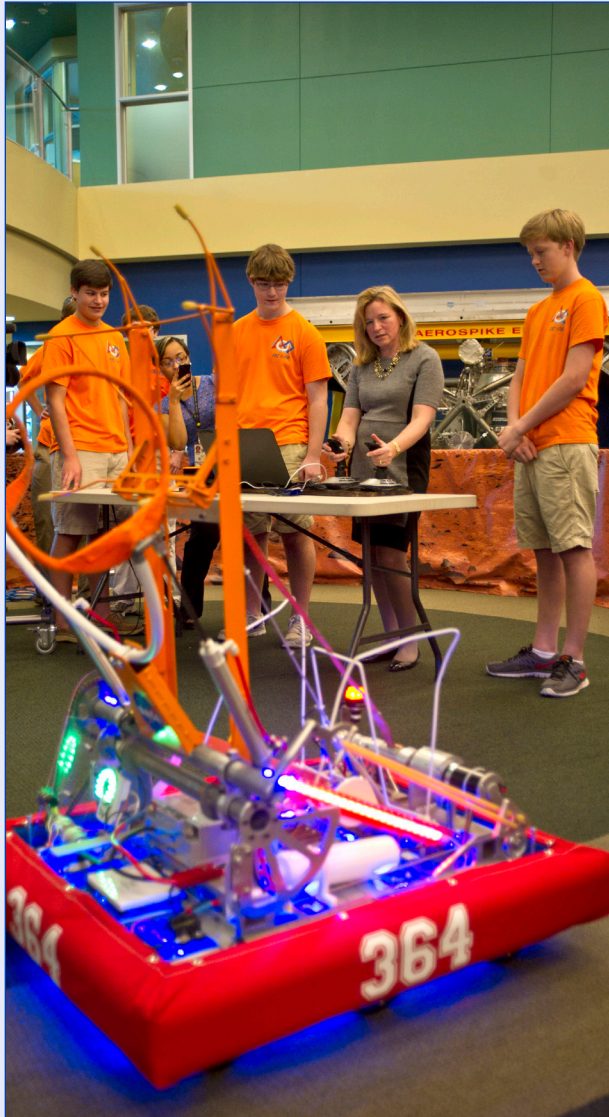
### Bolden issues budget statement

The following statement is from NASA Administrator Charles Bolden on the Obama Administration's budget request for the 2015 fiscal year: "Today, President Obama released his fiscal year 2015 budget request for the nation, and there is a lot of good news in it for NASA. The president's funding plan for America's space program reaffirms the path we are on, and will keep us moving forward – pushing farther in the solar system and leading the world in a new era of exploration. Through NASA's work at all of our centers, our nation is recognized for scientific and technological leadership and knowledge-sharing that improves lives all around the world.... The president's budget ... keeps us moving toward the missions and breakthroughs of tomorrow even as it enables the tangible successes of today.... This budget ensures that the United States will remain the world's leader in space exploration and scientific discovery for years to come." The NASA budget and supporting information are available at: [www.nasa.gov/budget](http://www.nasa.gov/budget).

### NASA selects small business projects

NASA has selected 108 research and technology proposals from U.S. small businesses that will enable NASA's future missions while benefiting America's new high technology-driven economy right here on Earth. The selected proposals now enter into negotiations for contract awards as part of Phase II of the agency's Small Business Innovation Research Program. Two selected proposals involve technology administered by the Office of the Chief Technologist at Stennis Space Center. The Phase II projects affiliated with Stennis Space Center are:

- "Polymer Derived Rare Earth Silicate Nanocomposite Protective Coatings for Nuclear Thermal Propulsion Systems," developed by Nanosonic Inc. of Pembroke, Va.
- "Building a Rice Decision Support System to Support Global Food Security and Commodity Markets," developed by Applied Geosolutions LLC of Newmarket, N.H.



## NASA scientist visits Stennis

NASA Chief Scientist Ellen Stofan visited Stennis Space Center on Feb. 18-19, meeting with area students, NASA personnel and media members during two days of activities. On Feb. 18, Stofan met with students from the Gulfport High School robotics team and participated in a robotics demonstration at INFINITY Science Center. The following day, Stofan met with Stennis leaders, personnel from the Stennis Applied Science and Technology Project Office and the Office of the Chief Technologist, and Stennis early career employees and students. She also toured Stennis facilities and joined Duane Armstrong, chief of the Stennis Applied Science & Technology Project Office, to hold a question-and-answer session with local media members. Media members also were briefed on ForWarn, which is a satellite-based monitoring and assessment tool to detect and track changes in forest vegetation across the country and locally in Mississippi and Louisiana. The tool is designed to help natural resource managers rapidly detect, identify and respond to unexpected changes in the nation's forests, such as those caused by insects, diseases, wildfires, extreme weather and other natural or human-caused events. Stofan praised Stennis for taking scientific data and creating a product that can be used effectively by community members who do not even have a science background. Stofan was appointed NASA chief scientist last August.



## Stennis hosts emerging technologies session

Participants attend the opening session of the 2014 Nuclear and Emerging Technologies for Space conference, held at INFINITY Science Center on Feb. 24-26. More than 180 participants attended the session, including some representatives from international organizations. The conference was co-sponsored by the Stennis Office of the Chief Technologist and the Aerospace Nuclear Science and Technology Division of the American Nuclear Society. Stennis Chief Technologist Ramona Travis served as general chair of the event, while Lauren Underwood of Stennis served as technical chair. The conference represented the first space nuclear research meeting associated with Stennis and featured overviews of current programs as well as presentations on possible methods of meeting the challenges of future space endeavors. NETS is the premier conference for the space nuclear community and serves as an important venue for presenting cutting-edge science and innovations that could dramatically redefine space travel and exploration. Apollo 13 astronaut Fred Haise, a native of Biloxi, addressed the group on the closing day.



# Engineer enjoys historic career at Stennis

*Note: For more than 50 years, NASA's John C. Stennis Space Center has played a pivotal role in the success of the nation's space program. This month's Lagniappe provides a glimpse into the history of the south Mississippi rocket engine test center.*

**O**n one of the history pages of Stennis Space Center is Elizabeth Messer, the first female NASA engine test conductor at the center. She is being recognized for her history-making accomplishments at Stennis, as well as Marshall Space Flight Center during March's National Women's History Month.

Messer's interest in aerospace began while studying agricultural engineering at Mississippi State University in Starkville. It was a summer job assisting with the testing of various nozzle designs for crop applications of Raspet Flight Research Center at MSU that convinced Messer to switch her major to aerospace engineering.

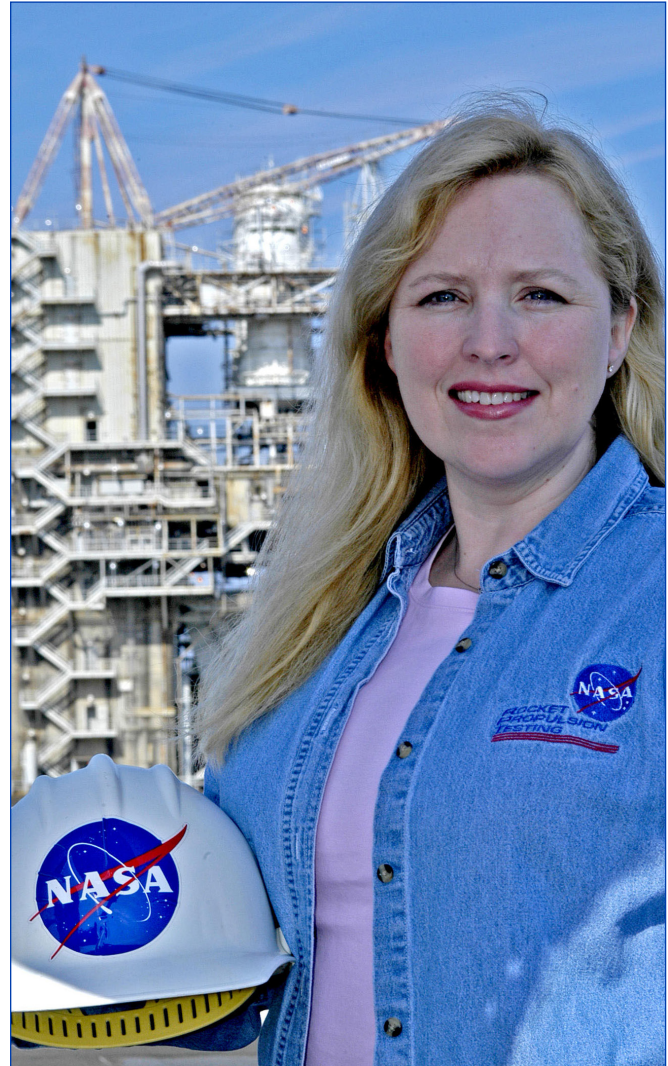
"I caught the testing bug there," Messer said in a 2004 interview. "I was part of a team that developed a prototype composite aircraft, from concept to fabrication and, then, testing. It gave me a great appreciation for research and development and the dedication required to be successful at it."

With an early interest in math and science, she was influenced by her eighth-grade science and high school chemistry teachers, but it was her pre-calculus teacher who made her want to go into engineering. Messer transferred to MSU to study agricultural engineering after one year at a community college. She graduated from MSU with a bachelor's degree in aerospace engineering in 1988, working shortly with Raspet until 1989, when a position came open at NASA.

Messer then moved to Huntsville, Ala., taking a position at Marshall. She worked in the turbine machinery analysis and design group, the technology test bed group and, finally, for the test area. Messer was the only woman engineer in the test area. She was also the first woman to conduct tests at Marshall, but she avoided publicity, preferring not to make gender an issue in her job performance.

Messer was appointed to lead testing at Marshall's oxygen cold-flow facility in 1994. When Messer got the assignment, the facility did not exist. She and her team built it from the ground up.

In 1996, management of the test stands was transferred from Marshall to Stennis, and Boyce Mix talked Messer into moving with the program. Her first challenge at Stennis was to get one of the center's test stands up to speed. The B-2 Test Stand had been mothballed for 12 years, and by June 1998, the stand was operational again, test-firing the prototype Fastrac engine.



Elizabeth Messer stands in front of the A-1 Test Stand in a 2005 photo from Stennis Space Center.

Messer continued in engine testing until 2000, working first at B-2 stand and then at the E-1 Test Stand, helping to complete construction of that facility. She then helped prepare the stand for testing of a 250,000-pound-thrust hybrid rocket motor and became the first woman to be named test conductor at Stennis. She led her team in successfully testing the hybrid motor on the E-1 stand.

In 2000, Messer became an assistant to the chief of operations. In this capacity, she was responsible for creating processes to improve testing efficiency, training new engineers and furthering collaboration among the various NASA centers.

"With hard work and perseverance, any goal you can imagine is achievable," said Messer, who was born in Tupelo, Miss., and grew up on her grandfather's farm located between Verona and Plantersville. After 20-and-a-half years of service with NASA, Messer retired four years ago this month.

## Office of Diversity and Equal Opportunity

# For women, glass ceiling is now a plugged pipeline

**G**ender bias has not vanished; it has just gone underground. Stubborn stereotypes about what women cannot do are operating in surprising ways. New research suggests that a better image for what is happening today is what may be called the “plugged pipeline.” In the workplace, women are hitting barriers and getting tripped up all along the way, not just as they near the top.

In corporate America, the number of women promoted to board seats in Fortune 500 companies, which had steadily increased in the late 20th century, dropped over the previous three years, according to a major 2011 report by the consulting firm McKinsey & Co. The report found that the proportion of women falls quickly as one looks higher in the corporate hierarchy, and overall, “this picture has not improved for years.”

Also, women’s gains in computer science and engineering have slowed or even shifted into reverse. Women make up a dismal 11 percent of tech executives. The percentage of women in computer fields has declined from nearly 40 percent in 1991 to 25 percent today, according to the U.S. Chamber of Commerce.

Women are doing well in academia, where they now earn the majority of advanced degrees. But it is a different story in the workplace. Women are stalling out, and the higher they go, the harder it gets.

The direct, in-your-face gender discrimination of the past has faded, but bias has not vanished. It has just gone underground and is growing. Under a veneer of “progress,” what can be called the new soft war on women is gaining

momentum, based on stubborn stereotypes about what women cannot do. New research finds that stereotypes are now operating in surprising ways.

Too often, young men climb the ladder ahead of more seasoned female colleagues. For promising men, potential is enough, whereas women are judged on what they have actually done, according to research by McKinsey and the think tank Catalyst. As Vikram Malhotra, McKinsey’s chair of the Americas, put it, “Qualified women actually enter the workforce in sufficient numbers, but they begin to drop off when they are eligible for their very first management positions.”

Professors Madeline Heilman of New York University and Michelle Haynes, now at the University of Massachusetts-Lowell, have found that if it is not crystal clear which member of a two-member, male-female team is responsible for the team’s success, supervisors or boards of directors far more often give credit to the male team member. Female members were seen as less competent, less influential and less likely to have played a leadership role in the job at hand. Both men and women fell into the trap of giving higher marks to the male team member.

Heilman also found that men who are competent are seen as forceful, worthy of promotion and likely to succeed. It is all on the upside for them. However, women who display competence are too often seen, by both men and women, as unlikable, unfeminine, aggressive, conniving and untrustworthy.

*(Rosalind C. Barnett and Caryl Rivers are the authors of “The New Soft War on Women.”)*

## Stennis observes African-American History Month

Craig Bramley, general manager of ASRC Federal at Stennis Space Center, presents a plaque of appreciation to Kenneth C. Scott Sr., chief of police for the Louisiana State University Medical Center Police Department, at the close of the 2014 African-American History Month program at Stennis on Feb. 26. Scott was keynote speaker for the program, sponsored each February by the Stennis Diversity Council in recognition of African-American History Month. The theme of this year’s observance was “Civil Rights in America.” In addition to Scott, the Stennis program featured a musical presentation by Lucette Jackson with the Navy Office of Civilian Human Resources at Stennis.



## 2014 Bayou Regional *FIRST*<sup>®</sup> Robotics competition April 3-5

Students from as many as 56 high school teams in nine states are scheduled to compete in the Bayou Regional *FIRST*<sup>®</sup> (For Inspiration and Recognition of Science and Technology) Robotics Competition on April 3-5 at the Pontchartrain Center in Kenner, La.

*FIRST*<sup>®</sup> is a unique varsity sporting competition designed to teach teamwork and inspire students to pursue education and careers in science, technology, engineering and mathematics fields. The competition is designed to be as close to “real-world engineering” as a student can get. Volunteer professional mentors lend their time and talents to guide each team.

Each year, teams from high schools across the nation are given identical parts kits and six weeks to build robots for performing assigned tasks. Teams then use the robots to compete in regional events and earn a spot in a season-ending national tournament.

This year’s “Aerial Assist” game will be played by two alliances of three teams each. Alliances will compete by trying to score as many balls in goals as possible during a two-minute-and-30-second match. Additional points can be earned by robots working together to score goals and by throwing and catching balls over a truss suspended just over five feet above the floor. A description and video simulation of the “Aerial Assist” game can be found online by searching keyword, “*FIRST* Robotics.”

Expected Bayou Regional participants include 30 teams from Louisiana and seven from Mississippi. Qualifying teams from the Bayou Regional event will join teams from across the country to compete in the *FIRST*<sup>®</sup> Robotics World Championship on April 23-25 in St. Louis.

For more details on the Bayou Regional event, visit: [www.bayouregional.org](http://www.bayouregional.org). For more on *FIRST*<sup>®</sup> Robotics, visit: [www.usfirst.org](http://www.usfirst.org).



## Stennis offers astronaut training camp

Amy Snyder tries out a photo-op astronaut suit for size during a daylong Astronaut Training Camp hosted by the Stennis Space Center Education Office at INFINITY Science Center on Feb. 8. Twenty-three students ages 7-12 participated in the camp, exploring what it takes to live and work in space, whether aboard the International Space Station, mining an asteroid or stepping onto the Martian surface. They also learned about rockets and the engineering behind traveling to and landing on destinations beyond Earth. Campers designed their own spacesuits, participated in astronaut physical fitness activities and learned about the nutritional needs of astronauts in space.



## Stennis hosts school outreach activities

Stennis Space Center personnel visited Lillie Burney Elementary School in Hattiesburg on Feb. 20 to conduct a community outreach event for students. The event featured hands-on educational activities for students to highlight such areas as rocket transportation, as well as a presentation to teach students about living and working in space. Students also had an opportunity to take photos in an astronaut suit cutout.