National Aeronautics and Space Administration

LAGNIAPPE

John C. Stennis Space Center

Volume 10 Issue 5 www.nasa.gov/centers/stennis May 2015

Milestone work under way on B-2 stand

NASA began work May 13 on a major milestone in its preparation for testing the core stage of its new Space Launch System (SLS), beginning lifts of large structural steel sections onto the B-2 Test Stand at Stennis Space Center. The SLS is being developed to return humans to deep-space missions, to an asteroid and eventually to Mars. The B-2 stand is being modified to test the SLS core stage prior to its first uncrewed mission flight. A major step in the modifica-tion involves repositioning and extension of the test stand's Main Propulsion Test Article (MPTA) framework, which supports the rocket stage for testing. The framework was repositioned on the stand late last summer. Now, work has begun to add the large structural steel sections that will extend its height. The existing MPTA framework, built in the late 1970s to support testing of the space shuttle MPTA, stands 61 feet high and contains about 1.2 million pounds of fabricated steel. Another 1 million pounds of structural steel is being added to accommodate the larger SLS stage. Three levels of structural steel sections will be lifted into place during the upcoming weeks; this photo shows a base section on its way into place. Once all sections are lifted and anchored in place, the MPTA framework will extend 100 feet higher, providing a decidedly new look to the Stennis skyline. SLS testing will involve installing and anchoring the core stage onto the B-2 stand and simultaneously firing its four RS-25 engines, just as will occur during its mission flight.

"We continue to demonstrate that great things, including outstanding innovations, come out of south Mississippi. Keep pushing those boundaries!"

From the desk of

Ramona Travis

Chief Technologist, Stennis Office of the Chief Technologist

A number of technology program advancements and achievements have transpired over the past year. At the agency level, the NASA Technology Portfolio System –TechPort (http://techport.nasa.gov) has generated more than 43,000 technology searches and 9,000 reports used in a variety of programmatic and project decisions. In March, "TechPort (Beta)" was released to the public to enable external information sharing about NASA technology activities and encourage greater collaborations with industry and academia. The 2016 update of NASA Technology Roadmaps is in process (Stennis has three members on the team), and available for public comment (http://go.usa.gov/3k69J) prior to final review. Employees are urged to review and use both resources and offer comments.

At the center level, Stennis' technology contributions and talents are being recognized and have expanded over the last year. Last fall, from more than 50 ideas across the agency and out of 28 submitted proposals, Stennis' Early Career Initiative (ECI) project, HiDyRS-X, a transformative high-speed, high-dynamic range 3-D video system, was one of four selected in a new program encouraging agile technology development by early career employees. It was Stennis' first competitively won award from the Space Technology Mission Directorate. While it is being developed for engine testing, the technology could have wide-ranging capability for space exploration probes and similar systems. Get ready – a new ECI solicitation is being planned.

Earlier this year, Stennis was applauded by NASA Headquarters for its strong and diverse portfolio of Center Innovation Fund (CIF) projects, despite modest resources. The Stennis program has exceeded expectations, and Headquarters endorses its strategy of developing advanced test technologies for future space propulsion systems. Stennis is an operations center, but we are tapping research-and-development (R&D) talents that will allow some technologies to have broader applications to space technology. The 2016 CIF call will come out soon – start preparing ideas now.

The NASA Small Business Innovation Research (SBIR) and Small Technology Transfer (STTR) programs are a great way to engage Stennis employees in R&D efforts with innovative external research organizations on advancements needed to keep testing capabilities on the cutting edge. In April, 17 new SBIR and STTR awards were selected that Stennis personnel will oversee. The projects focus on innovative research in areas including helium reclamation, energy harvesting for remote or extreme conditions, materials development for hot hydrogen environments, applied science decision tools and health monitoring for ground systems. We would not have these projects without employees excited to serve as reviewers and contracting officer representatives, and we have the highest rate of SBIR/STTR technology infusion in the agency!

NASA Administrator Charles Bolden's recent message calls for all NASA employees to find ways to engage in innovation activities. For some, that will be in advancing new technologies. For others, it may be in providing ideas for training and streamlining processes. According to The Partnership for Public Service survey, NASA is the federal government leader in innovation, and Stennis is the innovation leader in NASA. Thanks to employees, we continue to demonstrate that great things, including outstanding innovations, come out of south Mississippi. Keep pushing those boundaries!

Ramona Pelletier Travis

Lagniappe is published monthly by the Office of Communications at NASA's John C. Stennis Space Center.

Access monthly copies at: www.nasa.gov/centers/stennis/news/publications/index.html

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FULFILLING NASA'S EXPLORATION MISSION

History in the making: A-1 Test Stand prepares for new test series

Editor's Note: The following kicks off a series of upcoming articles highlighting the A-1 Test Stand at Stennis Space Center. Subsequent articles will focus on aspects of the stand and how they enable rocket engine testing that supports America's human space program. The series is presented as NASA engineers prepare to test RS-25 engines on the A-1 stand. The engines will power the core stage of the new Space Launch System , which is being built to carry humans deeper into space than ever before.

Construction of the A-1 Test Stand at NASA's Stennis Space Center in the 1960s was no small task; a footing extending 58 feet below ground was needed to anchor the stand enough to enable testing of large rocket engines and stages.

That same footing has served as a foundation for America's human space program through the past five decades.

"This stand is special," A-1 Test Stand Director Jeff Henderson said. "Rocket stages that carried humans to the moon were tested here. Space shuttle main engines that powered a variety of scientific and research missions were tested here. Next-generation engines have been tested here, and now, the engines that will power missions deeper into space than ever before will be tested here. It's not hard to get excited when you think about all of the history related to this stand."

Henderson is not exaggerating. NASA engineers conducted seven tests of Saturn rocket stages on the A-1 stand in the second half of the 1960s. The stand was then refitted to enable 1,007 tests of space shuttle main engines from 1975 to 2006. For two years during that period, engineers also conducted 35 tests of the developmental X-33 linear aerospike rocket engine.

After 2006, the stand again was modified for 27 powerpack and gimbal (rotational) tests of the next-generation J-2X rocket engine. After yet another round of modifications, NASA early this year conducted its first full-duration test of the RS-25 rocket engine that will power the core stage of the new Space Launch System (SLS) vehicle. NASA is developing SLS to enable deep-space missions to an asteroid and Mars.

It all adds up to a pretty impressive resume for the A-1 stand, one of two single-position, vertical firing tests stands built at Stennis in the 1960s for the Apollo Program. The purpose of the stand is simple – a full-size rocket engine (or stage) is installed nozzle-down and anchored in place on the stand. The engine then is fired in the same way it must be on an actual mission and for the same amount of time (referred to as a full-duration test). For space shuttle main engines, this meant a test firing of eight-and-one-half minutes.

The process is sometimes called "static" testing because the engine remains in place. However, it still produces the same amount of thrust that powers a space vehicle off a launch pad. Instead of powering flight, the thrust (as much as 500,000 pounds, depending on the engine) is absorbed and redirected by the stand, enabling engineers to gather valuable data about the full-power performance of the engine. The engine even can be gimbaled (rotated) on the stand in just the way it must move during an actual flight to ensure proper trajectory.

"It sounds pretty basic, but it's as complicated as you expect rocket science to be," Henderson said. "You have very precise specifications to meet, and you're dealing with high-pressure, highly-flammable cryogenic propellants. There simply is no margin for error."

That fact is reinforced by the book-thick checklist that must be completed prior to each test. The checklist includes a countdown-to-test procedure akin to that followed by NASA during the actual launch of a spacecraft. It takes little imagination to understand the intricate preciseness needed.

It takes little reflection as well to appreciate the performance of the A-1 stand. No engine tested on the stand (or any of the large Stennis stands) has ever been the cause of a mission failure. That record encompasses the manned Apollo flights and 135 space shuttle missions. It is no small wonder that the A-1 stand (and its sister stands A-2 and B-1/B-2) have been designated national historic landmarks.

(Top right photo) In the past six decades, the A-1 Test Stand at Stennis Space Center has tested rocket engines and stages for the Apollo and space shuttle programs, as well as next-generation engines. It has been designated a national historic landmark.

(Right photo) NASA engineers conduct an initial test of a RS-25 engine on the A-1 Test Stand at Stennis Space Center on Jan. 9, 2015. RS-25 engines are being tested for use on NASA's new Space Launch System, which is being developed to return humans to deep-space missions. Since the 1960s, the A-1 stand has played a key role in all of the country's human space exploration programs. With its testing of RS-25 engines, it is supporting NASA plans to travel deeper into space than ever, including to an asteroid and Mars.

And yet, the historic contributions to the space program continue.

In just a matter of days, NASA engineers once again will run through the pre-test checklist for a full-duration test of a RS-25 rocket engine like those that will power the next flight of the SLS core stage. The RS-25 is the former space shuttle main engine; when that program ended, remaining engines were modified and reclassified.

The primary modification comes in the addition of a new engine controller. Consider it the "brain" of the engine, and in the case of the RS-25, it is a highly developed brain. The RS-25 is unique among many engines in that it automatically runs through its cycles and programs. That is accomplished by loading the performance specifications, such as what percentage of thrust is needed and when, into the controller.

The controller then monitors the engine status and communicates the programmed performance needs. For example, if the engine is required to cycle up to 99 percent performance, the controller monitors the fuel mixture ratio and regulates the thrust accordingly.

It is essential that the controller communicates clearly with the engine; since the SLS will be bigger than the previous Saturn rockets and will be used for unprecedented missions, its engines will have to perform in new ways.

The vehicle will not fly until NASA proves it can do so successfully. To that end, the RS-25 engine and controller will be put through a series of performance tests in this first round of firings. The importance of the tests is not lost on Henderson.

"We're continuing the work of the pioneers who carried us to the moon and back," he said. "We're going to places we've never been. When you think about that kind of history and future, it's not hard to get motivated about this work. This is frontline work. There's really nothing else like it."

FULFILLING NASA'S EXPLORATION MISSION

NASA tests multiuse thruster at Stennis

NASA engineers conducted three days of testing on a methane-fueled 2K thruster on the E-3 Test Stand at Stennis Space Center on May 6-9, gathering data for continued development of the multiuse engine. The tests marked the second such series for the thruster; engineers also visited Stennis in December for several days of tests. About two dozen tests were conducted in the latest round as engineers gathered heat flux data needed for continued thruster design. Tests ranged from ignition firings to full-duration firings of 30 seconds. The tests involved various components, including an injector developed at Johnson Space Center, as well as one manufactured by Sierra Engineering as part of a NASA Small Business Innovation Research project. A chamber heat exchanger made by Addaero also was tested during the series. The 2K thruster is being developed for a variety of possible uses, including to power small planetary landers. Development of the thruster incorporates lessons learned in the recently completed Morpheus Project, a NASA effort to develop a prototype lander that could carry small payloads to space destinations. Stennis also tested thrusters used in that project on the E-3 Test Stand. This summer, the recently tested 2K thruster will be used on a NASA project to test a cryogenic helium storage process, which could be employed on future space missions. NASA engineer Andy Guymon served as the test conductor for the 2K thruster series on the E-3 stand. The test team from Johnson Space Center included engineers Rob Morehead, J.C. Melcher and Matt Atwell, as well as engineering co-op student Aaron Comis.

Curiosity rover views serene sunset on Mars

The sun dips to a Martian horizon in a blue-tinged sky in images sent home to Earth recently by NASA's Curiosity Mars rover. For a single-frame scenic view, see: http://photojournal.jpl.nasa.gov/catalog/PIA19400. Curiosity used its Mast Camera (Mastcam) to record the sunset during an evening of skywatching on April 15. The imaging was done between dust storms, but some dust remained suspended high in the atmosphere. The sunset observations help researchers assess the vertical distribution of dust in the atmosphere. "The colors come from the fact that the very fine dust is the right size so that blue light penetrates the atmosphere slightly more efficiently," said Mark Lemmon of Texas A&M University, College Station, the Curiosity science team member who planned the observations. "When the blue light scatters off the dust, it stays closer to the direction of the sun than light of other colors does. The rest of the sky is yellow to orange, as yellow and red light scatter all over the sky instead of being absorbed or staying close to the sun." Just as colors are made more dramatic in sunsets on Earth, Martian sunsets make the blue near the sun's part of the sky much more prominent, while normal daylight makes the rusty color of the dust more prominent. Since its August 2012 landing inside Mars' Gale Crater, Curiosity has been studying the planet's ancient and modern environments. For more, visit: http://www.nasa.gov/msl or http://mars.jpl.nasa.gov/msl. Follow the Curiosity mission at: http://www.facebook.com/marscuriosity and http://www.twitter.com/marscuriosity.

NASA in the News

NASA tecnology aids Nepal rescue efforts

In the wreckage of a collapsed textile factory and another building in the Nepalese village of Chautara, four men were rescued, thanks to a NASA technology that was able to find their heartbeats. A small, suitcase-sized device called FINDER helped uncover these survivors – two from each destroyed building – in one of the hardest-hit areas of the 7.8-magnitude earthquake that rattled Nepal on April 25. The technology detected the men's presence even though they were buried under about 10 feet of brick, mud, wood and other debris. FINDER, which stands for Finding Individuals for Disaster and Emergency Response, is a collaboration between NASA's Jet Propulsion Laboratory, Pasadena, California, and the Department of Homeland Security's Science and Technology Directorate in Washington. R4 Incorporated of Edgewood, Maryland, took FINDER to Nepal to assist with relief efforts in the aftermath of the earthquake. To learn more about FINDER and its use in Nepal, visit: http://go.usa.gov/3kBtd.

NASA chief counsel group visits Stennis

NASA Office of Chief Counsel representatives toured Stennis on May 5 during their 2015 annual General Counsel Conference in New Orleans. During the visit, conference participants visited the A-1 Test Stand, where they were briefed on its RS-25 rocket engine test series. RS-25 engines are being tested at Stennis for use on NASA's new Space Launch System vehicle, which is being built to carry humans deeper into space than ever before. The group also toured the Aerojet Rocketdyne engine assembly facility and heard luncheon presentations on areas of Stennis work.

Stennis observes Holocaust Days of Remembrance

Stennis Space Center Deputy Director Jerry Cook (l) stands with participants of the Holocaust Days of Remembrance prgoram held at the site April 22. The annual emphasis memorializes the 6 million Jews murdered in the Holocaust – as well as millions of non-Jewish victims – as a result of Nazi persecution. This year's program focused on "Learning from the Holocaust: the Reality of Genocide – Three Surviving Voices Speak." Participants included (l to r): Cook, Jo Ann Larson (NASA), Rena Perwien (NASA), Richard Balser (Naval Oceanographic Office), Rear Adm. Tim Gallaudet (Naval Meteorology and Oceanography Command), Steven Farber (Naval Oceanographic Office); and Venetia Gonzales (NASA Shared Services Center).

Mississippi Power representatives visit Stennis

Participants in Mississippi Power's Executive Familiarization Tour stand in front of a RS-25 rocket engine in the Aerojet Rocketdyne engine assembly facility at Stennis Space Center on April 30. During the daylong visit, the group also toured the site's propulsion test complex and various other facilities and received briefings on work currently under way at the south Mississippi center.

Stennis marks Earth Day 2015 with 'Be Green' focus

(Top photo) NASA employees Charles Hallal (l to r), Mitch Krell and David Walters visit the Crosby Arboretum booth during the 2015 Earth Day emphasis at Stennis Space Center on April 22. Each year, the center hosts an expo featuring environmentally focused information and presentations, and displays of eco-friendly merchandise for purchase.

(Right photo) Naomi Lord, daughter of Jacobs Technology employee Gary Lord, shows off her Earth Day tote bag featuring the 2015 theme – "Be Green."

Mississippi Test Operations nears completion

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.

When Jackson Balch was appointed the second manager to lead NASA's Mississippi Test Operations in May 1965, the site was in its final phase of preparation to initiate ground tests for the Saturn V moon rocket stages.

A division of Marshall Space Flight Center, the Mississippi site was selected in October 1961, and land acquisition and construction plans were under way in 1962. Four years after the site announcement, a new phase of work focused on an increase in personnel to prepare the facility for readiness.

Personnel changes encompassed an overlap of two functions – completion of basic construction and the initiation of special equipment installation, coupled with the arrival of the first element of the permanent operating staff. A reshape of several Marshall elements – planning, construction and general activation – along with the present Mississippi Test Operations and the Activation Task Force were formed into a new Mississippi Test Facility Task Force.

Marshall Director Wernher von Braun appointed Balch, then-assistant deputy (technical) director at Marshall, to industrial operations to spearhead the Mississippi site's activation. Balch served in dual capacities as site manager and head of the task force.

General Electric's William Roy (l), and NASA Plant Operations Chief Henry Williams visit the the newly opened cafeteria in Building 1100 (now the Roy S. Estess Building) at the Mississippi Test Operations site in May 1965.

A 1965 construction site photo of the A-2 Test Stand at the Mississippi Test Operations site, known today as John C. Stennis Space Center.

By April 30, 1965, there were 3,740 onsite employees – 1,130 activation and operation employees and 2,610 construction and installation employees. It was projected by July 1965 that most of the 5,150 employees (2,200 activation and operation and 2,950 construction and installation) would be hired to complete ground testing of large space vehicle stages – Saturn S-IC first stages and S-II second stages – on the first of two S-II test stands constructed for the Apollo Program.

Most of the Mississippi Test Operations workers continued to be employed by private companies. During the construction phase, dozens of firms worked under the supervision of NASA's construction agent, the Corps of Engineers, which had 176 employees at the site. The majority of the activation and operation personnel were employees of The Boeing Company and North America Aviation Inc., prime contractors for both Saturn V stages, and General Electric Co. for support contractor and subcontractors.

To accommodate onsite workers, the main cafeteria in Building 1100 opened its doors for business 50 years ago on May 14, 1965. In other May developments, a notable milestone was passed when traffic was routed over the new canal bridge and Road "A" for the first time. Automobiles traveling north on U.S. Highway 43 detoured over Road "A" while entering the facility.

Office of Diversity and Equal Opportunity

Celebrate Asian Pacific American Heritage Month

May is Asian Pacific American Heritage Month. Each year, Americans honor the Asian culture for their past and ongoing contributions to society. It is a rich heritage of hardworking people with a strong desire to contribute to their surroundings and society as a whole. Join in a focus on four Asian-Americans who have contributed much to American culture through their unique abilities.

There are those who would label Steven Chu a scientific genius. As a young child, Chu loved to build things, from model airplanes to metal girders. As he grew older, Chu hoarded his lunch money to pay for the parts of his homemade rockets. As a senior at Garden City High School in New York, he discovered the thrill of experimentation once again. In physics lab, the Chinese-American teen built an instrument to measure gravity. After studying physics in college and graduate school, Chu worked as a scientist at Bell Laboratories for nine years. In 1997, all of Chu's years in the lab paid off when he received the Nobel Prize in Physics for his work on cooling atoms. The cooling of atoms has made it possible to make new measurement tools, such as precise atomic clocks and sensors that can measure gravity and rotation with extraordinary precision. Chu was the director of the Lawrence Berkeley National Laboratory and professor of physics and professor of molecular and cell biology at the University of California, Berkeley. He served as U.S. secretary of energy from Jan. 21, 2009, to April 22, 2013. In that role, Chu was charged with helping to implement an ambitious agenda to invest in clean energy, reduce American dependence on foreign oil, address the global climate crisis and create millions of new jobs.

One of the world's great musicians, Yo-Yo Ma began studying the cello at the age of four. As a toddler, he and his parents moved from Paris to New York. At age nine, Ma made his musical debut at the famed Carnegie Hall in New York City. Since graduating from the Julliard School and Harvard University, Ma has played as a soloist with orchestras around the world. Along the way, he has recorded 50 albums and collected more than a dozen Grammy Awards. He is also dedicated to bringing music into the lives of young people through education programs and family concerts. Ma plays two instruments – a 1733 Montagnana cello and a 1712 Davidoff Stradivarius.

Amy Tan was born in 1952 in Oakland, California, the daughter of Chinese parents who had immigrated to the U.S three years earlier. As a teenager, her family moved to Europe, where Tan attended high school in Switzerland. Tan later returned to the U.S. to attend college. She gained international attention in 1989 with publication of her first novel, "*The Joy Luck Club*," a story about Chinese women and their Chinese-American daughters. The book has been translated into 25 languages and made into a movie. In addition to her best-selling novels, Tan's other two books, *"The Kitchen God's Wife"* (1991) and *"The Hundred Secret Senses"* (1995), have also appeared on the New York Times bestseller list. Her latest novel, *"The Bonesetter's Daughter,"* was published in 2001. Tan has also written two children's books: *"The Moon Lady"* (1992) and *"The Chinese Siamese Cat"* (1994), the latter of which was adapted to television for PBS.

A native of Taiwan, Jerry Yang came to America at age 10, knowing a single English word – "shoe." After arriving in Los Angeles, Yang's family settled in San Jose, California. Although he admits to having had a short attention span in school, Yang aced his studies and was accepted to one of the nation's top colleges, Stanford University. As a graduate student at Stanford, Yang and classmate, David Filo, created the Yahoo! directory to help their pals hunt down cool web sites. Today, Yahoo! is one of the world's most frequently visited Web sites, with 237 million loyal surfers. Yahoo's kid site, Yahooligans, is popular with young webmasters as well. When he is not tracking down web links, Yang is hitting the links. He is an avid golfer and sumo wrestling fan. Yang married Akiko Yamazaki, whom he met at Stanford. She is a graduate in industrial engineering and director at the Wildlife Conservation Network. Yang is also a philanthropist; he donated $75 million to his alma mater, Stanford University, which was used in building the Jerry Yang and Akiko Yamazaki Environment and Energy Building. With a net worth of $1.2 billion, Yang is one of the richest people in the U.S. With his deep insight into the world of business, Yang has achieved a lot at a young age.

(Information published by Scholastic Inc.)

Hail & Farewell

NASA bids farewell to the following:

Cheri Bennett	Administrative Operations Specialist	Office of Education

And welcomes the following:

Kim Avery	Management and Program Analyst	Office of the Chief Financial Officer

NASA invests in innovative small business projects

NASA has selected research and technology proposals from 254 small businesses and 39 research institutions for grants through its Small Business Innovation Research (SBIR) and Small Technology Transfer (STTR) Programs. Twelve selected proposals involve technology being administered by the Office of the Chief Technologist at NASA's Stennis Space Center.

Two of the projects involve a Louisiana company and a Louisiana university.

The SBIR Phase I projects affiliated with Stennis are:

- "Extreme Temperature Radiation Tolerant Instrumentation for Nuclear Thermal Propulsion Engines," developed by Arkansas Power Electronics International Inc. in Fayatteville, Arkansas.
- "Helium Recovery System Based on High-Performance Proton Exchange Membranes," developed by Amsen Technologies, LLC in Tucson, Arizona.
- "Integrated Stack and Advanced MEAs for High-Yield, Long-Life Helium Reclamation System," developed by FuelCellsEtc in College Station, Texas.
- "MEMS Sensor Arrays for Cryogenic Propellant Applications," developed by KWJ Engineering Inc. in Newark, California.
- "Multi-Species Chemical Microsensor For Real Time Cryogenic Purge Line Monitoring," developed by Makel Engineering Inc. in Chico, California.
- "Highly Efficient Electrochemical Cryogenic Purge Gas Recovery System," developed by Sustainable Innovations, LLC in East Hartford, Connecticut.
- "ModelLab: A Cloud-Based Platform to Support Advanced Geospatial Modeling of Earth Observation Data," developed by Azavea Inc. in Philadelphia, Pennsylvania.
- "Cloud-Based Open Data Environment and Flow-based Aggregation Science Tool," developed by Geocent, LLC in Metairie, Louisiana.

The STTR Phase I projects affiliated with Stennis are:

- "High Figure-of-Merit Macro-Structured Thermoelectric Materials," developed by MicroXact Inc. in Blacksburg, Virginia, and Virginia Tech University in Blacksburg, Virginia.
- "High Temperature Multimode Harvester for Wireless Strain Applications," developed by Prime Photonics, LC in Blacksburg, Virginia, and Virginia Tech University in Blacksburg, Virginia.
- "Extreme Environment Ceramic Energy Harvesting/Sensors," developed by Solid State Ceramics Inc. in Williamsport, Pennsylvania, and Pennsylvania State University in University Park, Pennsylvania.
- "Integrated Monitoring AWAReness Environment," developed by American GNC Corp. in Simi Valley, California, and Louisiana Tech University in Ruston, Louisiana.

NASA Orion display at Stennis features flown-in-space items

Members of the NASA Office of Communications and NASA Office Human Capital at Stennis Space Center stand beside a Space Launch System (SLS)-related exhibit in the Roy S. Estess Building. The exhibit features a video, a backdrop, vertical banners and a scale model of the SLS, NASA's new space vehicle. It also includes two artifact items that flew aboard the Orion Exploration Flight Test-1 on Dec. 5, 2014 – an American flag and a copy of a Maya Angelou poem. Orion is being developed as the crew vehicle to carry astronauts on deep-space missions aboard the SLS. The flag was presented to NASA by Lockheed Martin, who is developing Orion for NASA. The poem, *"A Brave and Startling Truth,"* was presented to NASA by the family of Angelou, an American poet who died just a few months before the Dec. 5 flight. The flag and poem were joined to create a traveling exhibit for NASA centers. Stennis is the first center to host the exhibit, on site through May.