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Stennis moves ahead with RS-25 test preparations

Work continues on the high-pressure industrial water system in the A Test Complex at Stennis Space Center. Once upgraded, the system will deliver the hundreds of thousands of gallons of water that must flow during rocket engine tests on the A-1 and A-2 (seen in background) Test stands.

Stennis launches 2015 Combined Federal Campaign

See pages 10-11

"To be able to do what we plan to do over the next generation will require a new generation of leaders to rise up and take the reins."

From the desk of

Randy Galloway

Deputy Director, Stennis Space Center

Just a few weeks ago, Dr. Gilbrech asked me to step up to the front office as the deputy center director. I was happy to be able to accept the challenge of leading one of the Best Places to Work in the federal government. I will do my best to carry on the legacy of great leaders that have held this position, including my immediate predecessor, Jerry Cook.

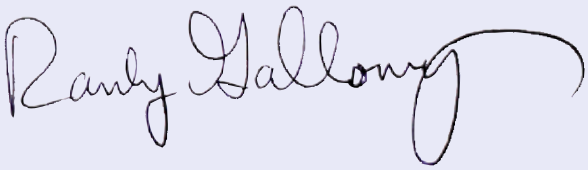
Simultaneously, Marshall Space Flight Center and Johnson Space Center have named new deputies, with Todd May and Mark Geyer (respectively) moving up. Those moves mean that the Space Launch System and Orion Programs will shortly have new leadership. The flagship human spaceflight program, the International Space Station, already has a new program manager in Kirk Shireman.

While the faces of NASA are changing at the leadership level, the challenges of executing a tremendous portfolio of work with a limited budget have not changed. Here at Stennis Space Center, we are directly in the critical path of Space Launch System development with the RS-25 engine and core stage testing projects. We just finished an extremely successful test series on RS-25. Just down the road at Michoud Assembly Facility, the core stage is being built and the Orion crew module for the next flight is being welded.

Since I have moved into the deputy position, I have come to have a heightened awareness of the issues that we face as an agency and how our agency senior leadership is dealing with them. Our leaders are focused not only on today, but they are thinking 20 years ahead to a future that has humans exploring Mars.

To be able to do what we plan to do over the next generation will require a new generation of leaders to rise up and take the reins. As the recent leadership moves show, NASA is sitting on the cusp of a major demographic shift as the folks hired after Challenger in the 1980s reach their retirement ages. Those of you who are early- or mid-career are about to get opportunities to step up and lead our agency as we leave low-Earth orbit reaching toward Mars. As the center Diversity and Inclusion Board chair, I'm going to focus personally on talking about career development and what it takes to get ready to lead the future. I plan on having some town halls to talk to all of you about career and leadership development. I am also going to be doing a lot of listening to your concerns and aspirations. The challenge of the future will demand that we fully utilize our greatest asset, our people.

I welcome the opportunity to talk to any of you about your career and issues you might have. My door is always open.



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FULFILLING NASA'S EXPLORATION MISSION

Stennis continues preparations for Space Launch System testing

Work is continuing on the B-2 Test Stand at Stennis Space Center in preparation for testing the core stage of NASA's new Space Launch System vehicle. With major structural steel work completed, work crews now are installing fabricated piping needed for core stage testing. NASA is developing the SLS to carry humans deeper into space than ever before, to such destinations as an asteroid and Mars. The RS-25 engines that will power the SLS core stage are being tested at Stennis on the A-1 Test Stand. In addition, the core stage for the first SLS mission will be tested on the B-2 Test Stand. The testing will involve installing the core stage on the stand and simultaneously firing its four RS-25 engines. NASA has been renovating the B-2 Test Stand for more than two years in preparation for the SLS test series. Months of studies and evaluations preceded the start of physical work on the stand. Testing is scheduled for 2017, with the initial SLS flight set for 2018.

Work on the high-pressure industrial water system that serves the A Test Complex at Stennis Space Center began in September, following completion of a series of developmental tests on the RS-25 rocket engine that will power the core stage of NASA's new Space Launch System vehicle. Upgrade of the decades-old system is scheduled to be completed by year's end, with testing of RS-25 flight engines to begin on the A-1 stand early in 2016.

FULFILLING NASA'S EXPLORATION MISSION

Work crews at Stennis Space Center recently completed the move of a liquid hydrogen flare stack from the A-1 Test Stand to the B-2 Test Stand, another step in preparing to test the core stage of NASA's new Space Launch System (SLS). The stack originally was located at the B-2 stand but was moved to support an earlier rocket engine test project at the A-1 facility. Back in its original location, it will be used for liquid hydrogen burn off during testing of the SLS core stage prior to the first uncrewed SLS flight in 2018. Stennis has been modifying the B-2 stand for more than two years to accommodate the core stage test project, which will involve installing the flight stage on the stand and simultaneously firing its four RS-25 rocket engines, just as will occur during the actual flight.

FULFILLING NASA'S EXPLORATION MISSION

History in the making: The key to engine testing? Preparation

Editor's Note: The following is the sixth in a series of articles highlighting the A-1 Test Stand at Stennis Space Center. Previous articles focused 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 recently completed developmental tests of RS-25 engines and are preparing to conduct tests on RS-25 flight engines that will power the core stage of the new Space Launch System, being built to carry humans deeper into space than ever before.

NASA Deputy Administrator Dava Newman (right) visits the A Test Control Center at Stennis Space Center to congratulate operators and engineers following a successful RS-25 engine test on the A-1 Test Stand earlier this year. Countless details must be monitored and addressed prior to, during and after a rocket engine test. Team personnel use detailed checklists to ensure all stand and engine systems are ready to go. This includes such areas as video feeds, data acquisition, propellant flow, water supply, instrumentation and safety, to name a few. Nothing can be left to chance, A-1 Test Stand Director Jeff Henderson explained. Communication and coordination is critical to ensure a test is successful and provides the needed performance data. A typical test day team involves as many as 50-60 people, with backups standing by if needed.

In preparing to conduct a rocket engine test at NASA's Stennis Space Center, A-1 Test Stand Director Jeff Henderson always worries about the same thing – and yet something different – every time.

"You're worried about: 'What am I missing?'" Henderson explained. "What could arise? What could change? You don't know the unknown."

There is a lot that could be missed or change. Testing the large engines that power America's space exploration missions is, after all, rocket science – and all the complexity that entails. There are countless areas where a miscalculation or component failure could derail a test or, worse, lead to a failure that damages an engine or a test stand.

"You think about that," Henderson acknowledged, "because you know if you mess this up, they're going to name it after you, and not in a good way."

Fortunately, Henderson is not alone in test preparation and operations. He works with a team of operators and engineers at Stennis that consistently performs successful tests. There also are detailed processes to follow. For instance, the engine test countdown checklist alone includes a dozen sections covering such areas as engine purge sequences, system chilldown steps, final facility preparations and the engine start process. Altogether, the 34-page document includes more than 550 separate checklist items.

The countdown document is just one of many. It ends with post-test securing of the stand, while a separate multipage document provides a checklist for post-test securing of the engine.

Between those two, test operators use a test request document prepared by offsite engineers that can stretch as long as 70 pages. The document is unique to each test and outlines the objectives of the test and the data sought. Data is the product of testing and is delivered by Stennis operators to engine developers and mission planners to enable their work.

The test request document is a work in progress sometimes right up to the day of the test, leaving the stand team to work quickly to make sure the facility fits the test parameters so the requested data can be collected and delivered. "We have to work fast at times," Henderson said. "Facility personnel may only have a couple of days to determine if test objectives can be met and how that will be accomplished."

That is the second asset Henderson has in conducting rocket engine tests – the facility and test team.

"These are the folks who make tests happen," Henderson emphasized. "They take care of the hundreds of details that have to be in place and have to be just right in order to have a successful test."

A typical test day team will include as many as 50-60 individuals, monitoring such areas as facility performance, video feeds, data recording, propellant flow, water flow, instrumentation and safety. There also will be backup team members available, if needed. All will be gathered in the nearby Test Control Center to prepare and monitor the test.

Think of the television images of operators and engineers inside NASA Mission Control Center during an actual space launch. The scenario is much the same at Stennis on test day; after all, engines are being fired just as they will be during a launch. Much of the countdown process is the same.

In addition to control center personnel, others are working at the high-pressure gas facility and high-pressure industrial water plant to ensure operations are conducted as needed there. Skilled crafts shop personnel stand ready to address any test day needs that arise as well.

Each person has an individual assignment. Each individual assignment is critical to team – and test – success.

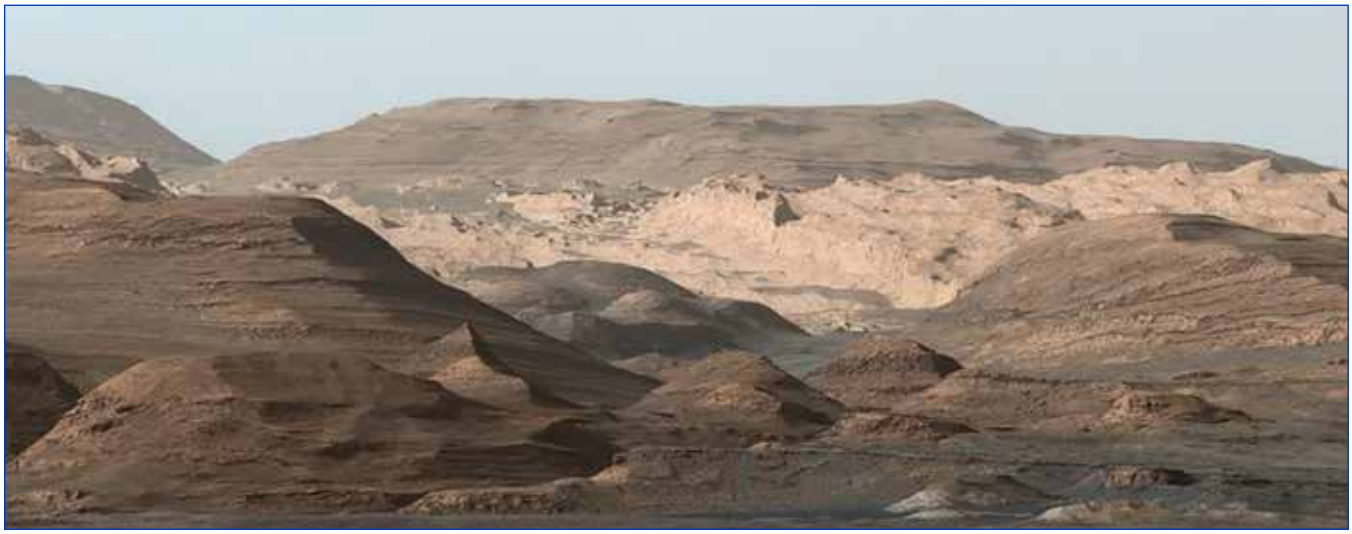
The engine deck talker is a prime example. Leading up to a test, this person is the primary contact between the test conductor in the Test Control Center and the test stand. The deck talker is stationed throughout test preparations on Level 5 of the stand and remains in constant contact with the test conductor as preparations proceed. Their communication is critical in making sure all pre-test processes have been completed, and the facility is ready for hot fire.

That is just one example of the intricate coordination that has to occur before, during and after a test as conditions change and necessary adjustments are made.

Team composition, then, is crucial. It falls to the stand director, working with area leads, to assemble the team. "When it comes to testing, it is not as simple as getting a process down and then just sticking to it," Henderson said. "It's always changing because test objectives change. You have to consider that in putting a team together. You have to put the right people in the right places. That's key, because when you get to test day, they have to perform."

FULFILLING NASA'S EXPLORATION MISSION

Three years and counting, Curiosity still at work



This composite image looking toward the higher regions of Mount Sharp was taken on September 9, 2015, by NASA's Curiosity rover. In the foreground – about two miles from the rover – is a long ridge teeming with hematite, an iron oxide. Just beyond is an undulating plain rich in clay minerals. And just beyond that are a multitude of rounded buttes, all high in sulfate minerals. The changing mineralogy in these layers of Mount Sharp suggests a changing environment in early Mars, though all involve exposure to water billions of years ago. The Curiosity team hopes to be able to explore these diverse areas in the months and years ahead. Further back in the image are striking, light-toned cliffs in rock that may have formed in drier times and now is heavily eroded by winds. The colors are adjusted so that rocks look about as they would if they were on Earth, to help geologists interpret the rocks. This "white balancing" to adjust for the lighting on Mars overly compensates for the absence of blue on Mars, making the sky appear light blue and sometimes giving dark, black rocks a blue cast. For more, visit http://www.nasa.gov/msl and http://mars.jpl.nasa.gov/msl.

NASA in the News

NASA releases Mars plan

On Oct. 8, NASA released a detailed outline of its Journey to Mars plan in its report, "NASA's Journey to Mars: Pioneering Next Steps in Space Exploration." "NASA is closer to sending American astronauts to Mars than at any point in our history," NASA Administrator Charles Bolden said. "Today, we are publishing additional details about our journey to Mars plan and how we are aligning all of our work in support of this goal." The plan can be read online at: http://go.nasa.gov/1VHDXxg. The journey to Mars crosses three thresholds – Earth reliant exploration aboard the International Space Station, proving ground work in a deep-space environment and Earth independent activities that build on what is learned on the space station and in deep space to enable human missions to the Mars vicinity, possibly to low-Mars orbit or one of the Martian moons, and eventually the Martian surface. The journey to Mars is an historic endeavor made possible by a sustained effort of science and exploration missions beyond low-Earth orbit with successively more capable technologies and partnerships. To learn more about NASA's journey to Mars, including the agency's latest exploration of the Red Planet, visit: http://www.nasa.gov/topics/journeytomars/index.html.

NASA launches Mars challenge

Living off the land is different when the land is 140 million miles away, so NASA is looking for innovative ideas to use in situ (in place) Martian resources to help establish a human presence on the Red Planet. The In Situ Resource Utilization Challenge offers the public a chance to submit designs for structures on Mars that would use existing material. The agency plans to award $10,000 to the first-place winner, with $2,500 each for two second-place submissions. "NASA's newest challenge is yet another stellar example of the agency's commitment to harnessing the ingenuity of citizens as we seek to expand the frontiers of knowledge, capability and opportunity in space," NASA Chief Scientist Ellen Stofan said. "Exploring Mars and other worlds is a herculean endeavor. Like other agencies across the federal government, NASA recognizes that our success will be enhanced greatly by involving people with all kinds of knowledge, skill sets and ideas in our work." One advantage of using resources from the planet instead of bringing everything from Earth is the potential to save the agency more than $100,000 per 2.2 pounds of cargo each launch. For more about the challenge, and details on how to apply, visit: http://go.nasa.gov/1L4MSP6.

Access all NASA news releases online at: http://go.usa.gov/3f3KW.

Stennis sets $182,000 goal for 2015 Combined Federal Campaign

Stennis Space Center employees launched their annual Combined Federal Campaign effort Oct. 14 with a kickoff ceremony that featured remarks from Stennis Associate Director Ken Human (page 1 photo), Stennis CFC Sitewide Chair Samone Faulkner and Greater Mississippi CFC Chair Joe Tuite (bottom left photos). Following the kickoff event, Stennis employees were able to gather information about area service organizations supported by CFC gifts, including the United Way, the Animal Adoption Society, Mississippi Public Broadcasting Foundation, the Salvation Army and American Cancer Society. Stennis announced a goal of $182,000 for this year's campaign. CFC is the largest annual workplace charity effort in the nation.

October 1965 – 'T-Bird' arrives for testing

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.

Years of hard work came to fruition when the first complete test model of NASA's giant Saturn V second stage, the S-II-T (known as the "T-Bird"), made its long-awaited arrival to the Mississippi Test Facility (MTF) on Oct. 17, 1965.

Departing Oct. 1 for a 17-day, 4,000-mile journey from Seal Beach, Calif., where the all-systems test vehicle was developed and built for NASA by North American Aviation's Space and Information Systems Division, the S-II-T passed through the Panama Canal at 3 p.m. Oct. 11 aboard a converted U.S. Navy ship, "Point Barrow." Five days later, it docked at NASA's Michoud Assembly Facility in New Orleans. Then, it was placed aboard the barge "Little Lake" for the 45-mile voyage to MTF via the Intracoastal Waterway and the East Pearl River.

The Saturn S-II-T "T-Bird" rocket stage if lifted onto the A-2 Test Stand at the then-Mississippi Test Facility in October 1965 in preparation for test firing.

The 81.5-foot-long and 33-foot-diameter stage entered MTF's navigation lock at 12:45 p.m. Oct. 17 and moved to the stage transfer dock for removal of protective covering and inspection. The next day, it was barged and installed onto the new 200-foot-high S-II (A-2) Test Stand for subsequent testing.

Arrival of the "T-Bird" came 29 months after construction began at MTF (then Mississippi Test Operations) on May 17, 1963, and as the facility was nearing operational status. The initial mission of the rocket proving ground was to test the first and second stages of the Saturn V. The S-II-T's primary mission was developmental testing of integrated S-II flight systems and hardware under static firing conditions. Other missions of the S-II-T included verifying ground support equipment capabilities, aiding in the transition from testing heavy battleship-type test models to flight-weight structures and serving as the vehicle used to activate the test site.

Called the most powerful liquid hydrogen stage under production at that time, the Saturn S-II played a vital role in boosting America's astronauts to the moon during the Apollo lunar landing missions. The S-II's part in the lunar missions began after the Saturn V's first stage boosted the three-man Apollo spacecraft to an altitude of about 30 miles. The propulsion system for the S-II stage was a cluster of five J-2 engines, developed by NAA's Rocketdyne Division, which generated an aggregated thrust of 1 million pounds or more than 21 million horsepower. The S-II's engines roared to life to provide the thrust to push the spacecraft to a 100-mile orbital altitude.

S-II firings were slated to begin in 1966 on the A-2 Test Stand, and the actual flight stages would be launched from NASA's Kennedy Space Flight Center as part of Saturn V vehicles.

Hail & Farewell

NASA bids farewell to the following:

Mark Carley	AST, Technical Resources Management	Center Operations Directorate

And welcomes the following:

Kristopher Mobbs	AST, Electrical Experimental Equipment	Engineering and Test Directorate

Office of Diversity and Equal Opportunity

Diversity and inclusion – a clarion call to action

The following information was written by Katrina Emery, manager of the Stennis Office of Education

It is hard to believe that America's space program is 57 years young with the many accomplishments and advancements that have been made since its inception, with a formal diversity plan included among those. Diversity comprises the unique characteristics, perspectives and life experiences that define us as individuals, while inclusion is the means by which we optimize the benefits to the mission inherent in our diversity. This ultimately results in each employee feeling valued and respected, despite a changing definition of diversity and inclusion in the workplace amongst the generations. A diversity study by Deloitte and the Billie Jean King Leadership Initiative states that "Millennials" have a totally different definition of "diversity and inclusion in the workplace" than "Baby Boomers" and "Generation Xer's." If you want to build a truly inclusive culture – one that leverages every individual's passion, commitment, and innovation, and elevates employee engagement, empowerment and authenticity – you should be willing to break down the narrow walls that surround diversity and inclusion, and limit their reach.

Reflecting on the past years, the landmark decisions, new laws, policies and initiatives that helped to break down barriers have stretched and strengthened the NASA workplace as we know it today.

> *More than fifty years ago, on July 2, 1964, one of the biggest legal barriers to equal opportunity in America was toppled when President Lyndon Johnson signed into law the most sweeping civil rights legislation since the Reconstruction era. The Civil Rights Act of 1964 outlawed discrimination in such areas as voting, public restaurants, employment, and education on the basis of such characteristics as race, color, religion, national origin, and sex. It was a pivotal moment in our nation's struggle to form "a more perfect union" and transformed the face of America.*

The Civil Rights Act of 1964 helped to change the cultural landscape of NASA (1958) early in its existence. Leaders within NASA and in Congress were champions for change. In the 1970s at NASA, Harriett Jenkins worked as the assistant administrator for equal opportunity programs at NASA, responsible for programs that assisted minorities and women, including recruiting some of the agency's first African American astronauts. Beyond the astronaut program, she was a champion for more opportunities for minorities in NASA's procurement contracts and research efforts during her almost 20 years of service.

In reading a recent article, "*How African Americans at NASA helped remake the segregated South*" by Beryl Lieff Benderly, it refers to the dual goal of the space program and civil rights movement in the 1960s – developing a plan to attract more African Americans to NASA and developing and enforcing policies relative to integration and the leaders that emerged to champion the cause. I was struck by the parallel of the similarities of that time period and now.

Today, although we have made advancements, there is still a call for action. There is a need for employee engagement to become advocates for change to remove barriers. There is a need for empowerment through awareness and being inclusive. There is a need for understanding and appreciating the added value that diversity brings. As a new fiscal year is upon us, and goals are being set, think about how diversity and inclusion may help you to reach those goals individually and organizationally. Think about the historical tenets that have propelled the agency forward and how the models employed more than 50 years ago, may be employed to address 21st-century barriers.

"Promising Practices for Equal Opportunity, Diversity, and Inclusion," published by the Office of Diversity and Equal Opportunity in July 2015 and available online at: http://odeo.hq.nasa.gov/index.html, provides a myriad of examples on how to get more engaged as employees and become champions for change in our current sphere of influence.

Stennis marks Hispanic Heritage Month

Carl Arredondo, chief meteorologist at WWL-TV Channel 4 in New Orleans, speaks to Stennis Space Center employees during a National Hispanic Heritage Month program Oct. 7. The annual emphasis celebrates contributions of American citizens whose ancestors came from Spain, Mexico, the Caribbean, Central America, and South America. The Oct. 7 program was sponsored by the Stennis Diversity Council and the Naval Oceanographic Office.

Stennis conducts Tupelo outreach

NASA teams from Stennis Space Center participated in an education outreach effort in Tupelo on Oct. 5-6, providing demonstrations and hands-on activities for some 3,500 visiting eighth-grade students from 33 North Mississippi schools. The Imagine the Possibilities event was sponsored by CREATE Foundation and the Toyota Wellspring education fund and featured various companies, business owners, educators and financial professionals. Students from four Mississippi counties participated in the event, which was organized around career pathways, such as energy, engineering and manufacturing. Students were provided information about possible careers and the potential salaries, necessary levels of education and required work ethic associated with each. Stennis participants included NASA employees Jared Grover of Diamondhead and Jason Hopper of Long Beach, who provided a cryogenics demonstration for students.