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John C. Stennis Space Center

LAGNIAPPE

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J-2X Powerpack tests begin

Constellation work under way with 'chill test'

On Dec. 18, NASA began testing core components of a rocket engine from the Apollo era on the A-1 Test Stand at NASA's Stennis Space Center.

Data from the tests will help NASA build the next generation engine that will power the nation's new Ares launch vehicles on voyages that will send humans to the moon.

COLD FLOW – Liquid oxygen runs through the piping on Stennis Space Center's A-1 Test Stand on Dec. 18 to test the ability of the J-2X engine's Powerpack 1A to withstand the temperature change and pressure. Just visible above and to the right of the test article's nozzle is a frosty pipe, indicating the supercold fuel is flowing as it should.

NASA is testing the engine's powerpack, a gas generator and turbopumps that perform the rocket engine's major pumping and combustion work. These components originally delivered propellants to the Apollo-era J-2 engine that fueled the second stage of the Saturn V rockets.

NASA is using these heritage parts to develop a new engine, known as the J-2X, to power the upper stages of both the Ares I crew launch vehicle and the Ares V

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Combined Federal Campaign approaching goal

With their gifts of $48,788.08 as of Dec. 3, NASA employees surpassed their $41,038 goal for donations to the Combined Federal Campaign at NASA's Stennis Space Center. Sitewide, CFC has received $193,151.30 (76 percent of its goal) as of Jan. 4. Pledges were still being fulfilled on that date.

The CFC is the world's largest and most successful annual workplace charity campaign, with more than 300 CFC campaigns throughout the country and internationally helping raise millions of dollars each year. Pledges made during the campaign season support eligible nonprofit organizations providing health and human service benefits throughout the world.

The Southern Mississippi CFC set a goal to raise $811,900 in pledges during the 2007 season. Last year, the campaign raised nearly $774,000, earning it the 2006 Campaign Increase Award recognition from the Office of Personnel Management.

From the desk of

Robert Cabana

Director,
Stennis Space Center

The future is now!

It's a new year and the challenge of developing and testing a new engine for the first new U.S.-built human spacecraft in over 30 years is upon us.

This is an exciting time for human space flight as we transition from the space shuttle, a workhorse that has served us well in low-Earth orbit and enabled construction of the International Space Station; to the Ares I rocket, which will carry Orion crews to the ISS, back to the moon and eventually on journeys to Mars.

Nowhere is this excitement more evident than on the test stands here at the Stennis Space Center.

The J-2X powerpack testing has already commenced on the A-1 Test Stand, and subscale diffuser testing in the E Complex is paving the way for design verification of the new A-3 Test Stand for the J-2X.

The J-2X is not just a copy of an Apollo-era engine, but an upgraded version using today's technology to deliver significantly better performance.

Gene Kranz immortalized the saying, "Failure is not an option," and his words ring even truer for us today.

The J-2X represents one of the highest risk development efforts within the Constellation Program. Without the J-2X, the program is stuck on the ground and the gap between retirement of the shuttle and an operational Orion vehicle grows even larger.

"The J-2X represents one of the highest risk development efforts within the Constellation Program. We at Stennis have a critical role to play in the delivery of this new capability."

We at Stennis have a critical role to play in the delivery of this new capability, and I can't wait to see it come to fruition.

In accepting this challenge, we also have to remember to keep safety in the forefront. As we come back from our holiday break, let's focus on doing things right. We cannot risk injury to our personnel or equipment. Our resources are limited, and we need everyone at 100 percent if we're going to succeed.

It's a new year, our future is bright, let's charge off and make it happen.

Stennis representatives brief state legislators

Representatives of NASA's Stennis Space Center met with Mississippi state legislators and community leaders Dec. 13 at Pearl River Community College's Waveland facility. They heard an update from NASA-Stennis' Legislative Affairs Officer Myron Webb (left) and NASA's Ron Magee (third from left), assistant to Stennis' director of Center Operations, about ongoing activities at SSC. John Wilson, Jacobs Technology education program development director (second from right) gave them a status of the INFINITY science center. Pictured (from left) are: Rep. J.P. Compretta, Bay St. Louis; Rep. Jessica Sibley Upshaw, Diamondhead; Sen.-elect David Baria, Bay St. Louis; Rep. Dirk Dedeaux, Perkinston; and Beth Carriere, executive director, Hancock County Tourism Development Bureau.

FULFILLING NASA'S EXPLORATION MISSION

A-3 Test Stand construction update

The concrete foundation placed Dec. 8 (foreground) for Stennis Space Center's future A-3 Test Stand has almost completely cured by early January. Meanwhile, the project hopes to have awarded a contract for the stand's structural steel tower by the end of the month, according to Bo Clarke, NASA's contracting officer technical representative for the foundation contract. By late December, construction on foundations for many of the test stand's support structures – diffuser, liquid oxygen, isopropyl alcohol and water tanks and gaseous nitrogen bottle battery – had begun with the installation of 'mud slabs' (background). The slabs provide a working surface for the reinforcing steel and foundation forms.

POWERPACK

Continued from Page 1

cargo launch vehicle. Results from the tests will help engineers modify the machinery to meet the higher performance requirements of these two next-generation rockets.

"The J-2X engine will incorporate significant upgrades to meet higher thrust and efficiency requirements for Ares," said Mike Kynard, manager of the upper stage engine in the Ares Projects Office at NASA's Marshall Space Flight Center in Huntsville, Ala.

"That's why we're taking a new look at these components – to gather performance data, test their limits, and reduce risks down the road when we're building and testing the engine."

The powerpack test article and components were installed on the test stand in late September 2007.

"The test team at Stennis has put a lot of effort into this project and looks forward to getting these first tests completed," said Gary Benton, test project manager of the Ares upper stage engine at Stennis.

The first test in the series was a chill test, which helped engineers verify the tightness of seals in the fuel lines and pumps at propellant temperatures as low as minus 425 degrees Fahrenheit. Engineers also verified accuracy of the chill procedure and determined the amount of time required to chill the pumps.

MILESTONE MOMENT – Dwarfed by the J-2X powerpack installed on the A-1 Test Stand's Level 5, Stennis Space Center workers evaluate the status of the test article and its Powerpack 1A following a chill test Dec. 18.

Later tests in the series will progress to include test fires at a variety of power levels and durations ranging from 12 seconds to 550 seconds. Testing is currently set to continue through March.

The Ares rockets support NASA's goal of providing safe, reliable, affordable transportation to support sustainable, long-term exploration. The Ares V, a heavy-lift launch vehicle, will enable NASA to launch a variety of science and exploration payloads and key components needed to go to the moon.

Marshall manages the J-2X upper stage engine for NASA's Constellation Program, based at NASA's Johnson Space Center in Houston. Under a contract awarded in July 2007, Pratt & Whitney Rocketdyne Inc., of Canoga Park, Calif., will design, develop, test and evaluate the engine.

2007 in Review: Stennis g

As NASA began its 50th Anniversary celebration in 2007, Stennis Space Center experienced some historic and exciting changes.

Bob Cabana
Center director

Rick Gilbrech
Assoc. administrator
ESMD

Patrick
Scheuermann
Associate director

Leadership Changes

In September, NASA's Stennis Space Center bid farewell to its center director, Richard Gilbrech, who was named associate administrator for NASA's Exploration Systems Mission Directorate in August. Former astronaut and NASA's Johnson Space Center Deputy Director Robert Cabana was tapped to succeed Gilbrech. He assumed duties Sept. 30.

Patrick Scheuermann, former chief operating officer of NASA's Michoud Assembly Facility in New Orleans, was named Stennis' new associate director. He assumed his duties in August.

A-3 Test Stand Announcement

NASA announced in May it would build a new test stand at Stennis Space Center. While tree clearing began in June, an Aug. 23 ground-breaking ceremony marked the official beginning of construction for the A-3 Test Stand, which will provide altitude testing for the J-2X engine. The engine will power the upper stages of NASA's Ares I and Ares V rockets.

The A-3 stand is the first large test stand to be built at Stennis since it opened in the 1960s. The new test stand will be a 300-foot-tall, open steel frame structure located south of the existing A-1 Test Stand. Its 19-acre site in Stennis' A Complex will include a test control center, propellant barge docks and access roadways. The test stand will allow engineers to simulate conditions at different altitudes by generating steam to reduce pressure in the test cell. Testing on the A-3 stand is scheduled to begin in late 2010.

To validate A-3's design, Stennis prepared for tests on a miniature version of A-3's exhaust diffuser. Technicians and engineers in the E Complex married two test cells for series of tests in the fall on the subscale diffuser, which included a 1,000-pound liquid oxygen and hydrogen thruster.

A-1 Test Stand Conversion

Work to refurbish the A-1 Test Stand was well under way as 2007 began. The work that took most of the year was part of a project to convert the test stand from testing space shuttle main engines to testing J-2X engines for NASA's Constellation Program. The fast pace of the modifications paid off in the fall, when the test stand was declared ready for installation of the J-2X test article and prepared for chill tests on the J-2X Powerpack 1A. The first test, a "chill test" of the J-2X Powerpack was successfully completed on Dec. 18.

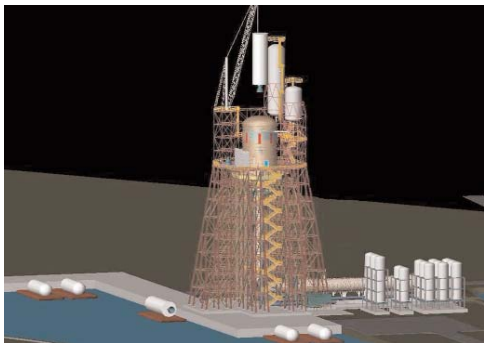
Space Shuttle Main Engine Testing

NASA's Space Shuttle Program Manager Wayne Hale Jr. visited Stennis in February to brief workers involved in testing space shuttle main engines. He spoke of 2007's five scheduled space shuttle launches, the heavy launch schedule leading

A-3 TEST STAND MILESTONES – At top, NASA officials event Aug. 23 for the A-3 Test Stand at Stennis Space Ce Administrator for Exploration Systems Doug Cooke, Pratt Director Richard Gilbrech, NASA Associate Administrator Administrator Shana Dale, Mississippi Gov. Haley Barbou Stennis Deputy Director Gene Goldman and A-3 Project M version of A-3's exhaust diffuser in Stennis' E Complex he

A test conducted Feb. 12, 2007, on Stennis Space Center's A-2 Test Stand helps engineers certify a seal inside the high-pressure oxidizer turbo pump of a space shuttle main engine. The test was part of a critical series to help keep the space shuttle's flight schedule on track.

gets new directions, work



s and government leaders participate in a groundbreaking enter. Pictured (left to right) are Deputy Associate & Whitney Rocketdyne President Jim Maser, then-Stennis for Exploration Systems Scott Horowitz, NASA Deputy r, Sen. Thad Cochran, Sen. Trent Lott, Rep. Gene Taylor, Manager Lonnie Dutreix. Above left, tests on a miniature lps validate the test stand's design, above right.

up to the shuttle's projected retirement in 2010 and the importance of keeping the program on track through a rigorous and safe testing program.

A series of tests throughout the year on a redesigned knife-edge seal within the shuttle engine's high-pressure oxidizer turbopump did exactly that. NASA called the tests critical to meeting the space shuttle flight schedule and fulfilling the nation's obligations to its International Space Station partners.

NASA's STS-117 mission, which launched in June, carried a sophisticated monitoring system for Space Shuttle Atlantis' three main engines. Stennis certified and developed the Advanced Health Management System, a combination of computer and sensors built into the main engine controller.

Employees of contractor Pratt & Whitney Rocketdyne Inc. spent most of the summer consolidating its Stennis engine processing and assembly into one facility, Building 9101, aiming to streamline the simultaneous operation of three engine programs.

Advancing Earth-Observation

Scientists and technicians in Stennis' Applied Research and Technology Program Office and the Science and Technology Division played an integral role in developing, prototyping and implementing the Applied Sciences Program's Rapid Prototyping Capability process. By doing go, they helped accelerate the research results of NASA Earth-observation data to contribute to national priority applications with societal benefits, moving NASA research results into practical application.

In March, NASA's new associate director of Applied Sciences, Dr. Teresa Fryberger, visited Stennis to observe firsthand the development and use of the RPC, advanced computer-generated visualizations, demonstrating research results from remote sensing data and models and to learn more about the work and people at Stennis.

Outreach and Education

Representatives from Stennis traveled to Jackson, Miss., on Feb. 28 to participate in "SSC Day at the Capitol." They

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Astronauts visit Stennis

STS-116 crewmembers visited NASA Stennis Space Center on Jan. 30. Pictured (from left) are Commander Mark Polansky, Pilot Bill Oefelein, Mission Specialist Robert Curbeam, Stennis Center Director Dr. Richard Gilbrech, and Mission Specialists Joan Higginbotham, Nicholas Patrick and Christer Fuglesang.

Astronauts Rick Sturckow (right) and Pat Forrester visited Stennis on Aug. 2 to talk about their space shuttle mission, STS-117.

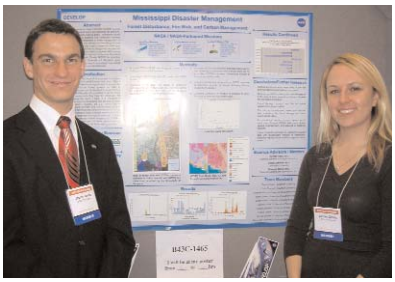
STS-120 crew members visited Stennis on Dec. 13. Pictured (from left) are Doug Wheelock, Stephanie Wilson, Commander Pam Melroy Stennis Director Bob Cabana, George Zamka, Scott Parazynski and Paolo Nespoli.

EOC construction update

Work on Stennis Space Center's new Emergency Operations Center is progressing on schedule, according to Robert Perkins, construction manager with Jacobs Technology. At the turn of the New Year, construction contractors had completed the pervious paving for the north and west parking lots. Part of the facility's 'green' design, pervious paving allows water to pass through and be absorbed directly into the ground below, preventing erosion from runoff. Through January, workers will concentrate on installing the roof, sprinkler piping and overhead cable trays for electrical and communication lines. Once the roof is on, they'll proceed with interior work, erecting wallboard and installing electrical equipment. Perkins said NASA seeks to earn a Silver LEED (Leadership in Energy and Environmental Design) Rating for the project's environmentally-friendly and sustainable design, construction and operation. The facility has a projected completion date of February 2009.

SSC DEVELOP students brief national audience

Two local college students recently briefed a national audience about their efforts to read post-Katrina forestry changes using NASA's rich store of remote sensing data. Lauren Childs, DEVELOP team leader at NASA's Stennis Space Center, and Jason Jones, assistant team leader, represented the Stennis DEVELOP team at the American Geophysical Union (AGU) Fall Meeting in San Francisco, Calif., held Dec. 10-14.



Jason Jones, left, and Lauren Childs with their presentation during the poster session at the American Geophysical Union Fall Meeting, Dec. 10-14.

During the "Remote Characterization of Vegetation Structure" poster session of the meeting, Childs and Jones discussed their poster, "Mississippi Disaster Management," with visitors. The poster focused on the team's research on forest disturbance, fire risk and carbon management. Childs, a graduate student at the University of New Orleans; Jones, a junior geography major at the University of Southern Mississippi; and other team members compared satellite imagery before and after Hurricane Katrina, reading changes in canopy heights to build a model that could accurately predict fire hazards.

Statesman called Laurel Wood home

Editor's Note: *Dr. Marco Giardino of SSC's Engineering and Science Directorate provides this column dedicated to the history of Stennis Space Center and the surrounding area.*

John Claiborne moved to Hancock County at age 40, after a brilliant career as a statesman. In 1849, he and his wife Martha bought Laurel Wood Plantation on Mulatto Bayou in Hancock County. The house, built by Francois Saucier with slave labor in 1800, was a "small house with pitched tin roof… supported by high brick piers joined by iron bars to hold Negroes brought ashore from slave ships…. Slave quarters were located to the rear of the main structure."

Claiborne spent much of his early time at Laurel Wood writing about Mississippi's history. In 1860, he published "The Life and Times of General Sam Dale, the Mississippi Partisan and The Life and Correspondence of John A. Quitman." Two years before, together with other notable Mississippi scholars, he had organized the Mississippi Historical Society.

Stennis Space Center HISTORY

Like many of his neighbors along Mulatto Bayou, Claiborne successfully raised Sea Island cotton, a type of cotton exported worldwide and highly prized for its quality. Claiborne reported in 1861 that with the help of 100 slaves, he "was out of debt and had an annual income of $6,000." His cotton production averaged 800 pounds per acre.

The New Orleans Picayune reported: "We yesterday examined the sample of 22 bales of Sea Island cotton, sold in this city a few days since. This cotton was grown upon the plantation of Col. J.F.H. Claiborne and Maj. Andrew Jackson, on Pearl River…, the whole consignment of 22 bales netting to the enterprising planters something over $2,250." In future columns we will recount the fascinating relationship between Col. Claiborne and Andrew Jackson Jr., the adopted son of the 7th U.S. President, and briefly a resident of Hancock County.

King holiday offers day for reflection on nonviolence

Dr. Martin Luther King Jr.'s birthday observance is on Jan. 21 with the continuing theme, "Remember! Celebrate! Act! A Day On, Not a Day Off!"

2008 also marks the 40th anniversary of King's assassination. The proponent of nonviolence at age 39 lost his life by violence when he was assassinated by James Earl Ray Jr. on the balcony outside Room 306 at Memphis' Lorraine Motel.

From the **Office of Diversity and Equal Opportunity**

Following in his footsteps, we must all make an effort to practice nonviolent actions. The annual King holiday affords us all an opportunity to reflect upon the past while seeking hope, determination and an opportunity to act upon the promise of the future.

The Seven Steps of Non-Violent Action:

1. Know all sides of the issue, including the other person's position.
2. Educate others about your issues to minimize misunderstandings, solidify your resolve and gain support and assistance.
3. Eliminate hidden motives and prepare yourself to accept suffering, if necessary, in your quest to resolve your problem.
4. Use grace, humor, intelligence to confront the other party with your list of injustices and a plan for resolving wrongs.
5. Use "direct action." This imposes "creative tension" into the conflict. Most people will change their behavior once they know that you are determined to make things right.
6. Aim for reconciliation. Nonviolence does not seek to defeat the opponent, but to gain their understanding. It is directed against evil systems, policies and acts, not against persons.
7. Final preparation. Live each day using techniques of nonviolence. If ill will or physical harm confronts you, protect yourself, but refrain from initiating harsh or threatening language or violent reactions. Report unprovoked acts. Stay calm.

"Hatred paralyzes life; love releases it. Hatred confuses life; love harmonizes it. Hatred darkens life; love illuminates it."

– Dr. Martin Luther King Jr.

AROUND NASA

■ **Unidentified flying object hits satellite:** NASA scientists said while they aren't sure what damaged a research satellite, it was likely a collision with man-made space junk. The Upper Atmosphere Research Satellite was decommissioned in 2005 but is popular among amateur astronomers because it is easy to see from Earth. In November, several pieces flew off the satellite. While the breaks may be the result of natural decay or a self-contained structural problem, NASA scientists said the most likely cause was a collision with debris trapped in Earth's orbit.

■ **NASA awards microgravity craft contract:** NASA has awarded a contract to Zero Gravity Corp. of Las Vegas to manage and operate an aircraft to perform reduced gravity parabolic flights carrying NASA-operated experiments and personnel. Parabolic flights replicate the reduced-gravity environment of space to further NASA's understanding of space travel. Work done during these flights will help engineers develop NASA's Crew Exploration Vehicle and contribute to improved flights for astronauts.

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presented displays, held a news conference and talked to legislators and the public about the center's vital role in NASA's Constellation Program, as well as its impact on the state's economy.

NASA and Stennis supported the first-ever FIRST Robotics Competition Bayou Regional event March 8-10 in New Orleans. Stennis has been involved in FIRST (For Inspiration and Recognition of Science and Technology) for the past nine years, and since 2005 has hosted regional high-school students in a season kickoff event in its visitor center, StenniSphere. In addition to funding, NASA supports FIRST by providing team coaches and mentors, competition judges, referees and other volunteer staff.

Members of Team 1421 of Pearl River County, Miss., watch their robot, 'Katastrophic,' complete a point-scoring move at New Orleans' inaugural FIRST Robotics Bayou Regional Competition in March.

Deadlines near for education programs

NASA has announced application deadlines for two of its funded programs – Motivating Undergraduates in Science and Technology (MUST) scholarships and the Undergraduate Student Research Program (USRP).

Application deadline for MUST is Feb. 1. A joint partnership with NASA, the Hispanic College Fund, the United Negro College Fund Special Programs and the Society for Hispanic Professional Engineers, MUST awards scholarships and internships to undergraduates pursuing degrees in science, technology, engineering and math. For MUST information, visit: http://www.nasa.gov/audience/forstudents/postsecondary/programs/Motivating_Undergraduates_Science_Technology.html

Deadline to apply for USRP is Jan. 31. The 10-week summer internship offers the opportunity to work with NASA scientists and engineers. Applicants must be U.S. citizens and a U.S. college sophomore, junior or senior with concentration in engineering, math, computer science or physical or life sciences.

For USRP information, visit: http://www.nasa.gov/audience/forstudents/postsecondary/programs/Undergraduate_Student_Research_Project.html

Master of ceremonies Steve Culivan, an aerospace education specialist, talks about the 2008 challenge to attendees at the FIRST Robotics Competition season kickoff held Jan. 5 at NASA's Stennis Space Center.

FIRST Robotics kicks off '08

Season goes into 'Overdrive'

More than 300 students, coaches and mentors from Louisiana, Mississippi and Florida converged on NASA's Stennis Space Center on Jan. 5, to kick off the 2008 FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition season.

During the kickoff, teams watched a live broadcast from FIRST's Manchester, N.H., headquarters that revealed this year's competition challenge. They also received parts kits from which each team – with the help of their engineer mentors – must build a robot to meet the challenge. The competition aims to inspire students in the pursuit of engineering and technology.

The kickoff event held at Stennis' visitor center, StenniSphere, begins a frenzied six weeks leading up to regional competitions in New Orleans and cities around the nation.

This year's "Overdrive" game challenges teams to build robots that can speed in counterclockwise loops around a course while carrying, lifting or throwing large, inflatable "Trackballs." Teams score points by crossing "finish lines" within their lane of traffic, or by placing their Trackballs on an overpass.

Because NASA advocates robotics and technology education, Stennis supports FIRST Robotics Competition by providing volunteer support. NASA also gave teams $117,000 in grants, $125,000 to sponsor the Bayou Regional FIRST Robotics competition in New Orleans in March, and will offer $200,000 worth of in-kind support by season's end.

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