National Aeronautics and Space Administration

John C. Stennis Space Center

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STS-116 hard-wiring the International Space Station

Discovery lights up the night sky

Space Shuttle Discovery lifted off at 7:47 p.m. CST on Dec. 9 in what was the first evening shuttle launch since 2002. The brilliant flight took place despite cloudy skies, gusty winds and the threat of rain to Kennedy Space Center. The launch was NASA's second attempt following the Dec. 7 try, which was scrubbed due to thick cloud cover over the area.

"I am excited we have returned to night launches," said Stennis Space Center Director Rick Gilbrech. "The liftoff of STS-116 has to qualify as one of the best shows on Earth, and made for a great start to the holiday season. This is one of the most ambitious International Space Station missions to date and I'm glad it's now underway."

The STS-116 crew inspected Space Shuttle Discovery's exterior Dec. 10 and prepared for docking with the International Space Station.

Docking preparations included checkout of rendezvous tools and the installation of equipment for use when Discovery links up with the station at 4:05 p.m. CST on Dec. 11. The astronauts' activities also included checkout of spacesuits they will use during three scheduled spacewalks to install the P5 truss structure and rewire the station's electrical system.

Since it went into orbit in 1998, the space station has been running on a temporary electrical system. But with the installation of two new electricity-generating solar array panels in September, all the pieces are now in place to switch to the permanent system.

In addition to the P5, the STS-116 mission is also delivering a new crew member, NASA Astronaut Sunita Williams, to the station. She will replace European Space Agency Astronaut Thomas Reiter.

Williams will stay on the station for about six months. Reiter will return home with the STS-116 crew.

Space Shuttle Discovery and its crew of seven astronauts lift off from NASA's Kennedy Space Center Dec. 9, beginning the STS-116 mission to the International Space Station. This is Discovery's 33rd mission and the first night launch since 2003.

Discovery is scheduled to land at Kennedy Space Center on Dec. 21 after completing the 12-day mission.

From the desk of

Dr. Richard Gilbrech

Director,
Stennis Space Center

The approaching end of 2006 provides an excellent time to reflect on major events during the year. It's difficult to imagine that next month makes a year since I was named director of Stennis. During that time, we've witnessed great accomplishments at Stennis and across NASA.

In February, the NASA Shared Services Center held a groundbreaking event for their new building. Today, construction is well under way.

April 12 marked the 25th anniversary of the first shuttle flight, STS-1. Here at home, the anniversary was recognized with the 30th anniversary of the first space shuttle main engine test at Stennis.

NASA announced in June the center responsibilities with the Constellation Program. Stennis will play a vital role in the Vision for Space Exploration, testing elements of the Constellation Program and serving as integration lead for all propulsion testing.

NASA provided a unique fireworks display on Independence Day with the launch of Space Shuttle Discovery on STS-121. The mission, the second in the Return to Flight sequence, also delivered a third crew member to the International Space Station, marking the first time a three-person crew has been aboard since 2003.

September saw the launch of Atlantis on STS-115, signaling the resumption of construction for the ISS. Stennis also marked a historic moment in September with the final SSME test on the A-1 Test Stand. In November, A-1 was transitioned for testing the J-2X for the Ares rockets.

We wind down the year with another successful launch of Space Shuttle Discovery and her crew on the STS-116 mission and are eagerly awaiting their safe return.

These are exciting times for NASA and Stennis. As we prepare to celebrate the holidays, I encourage you to do so safely and keep up the outstanding work as we begin what I predict will be another great year!

Richard J. Gilbrech

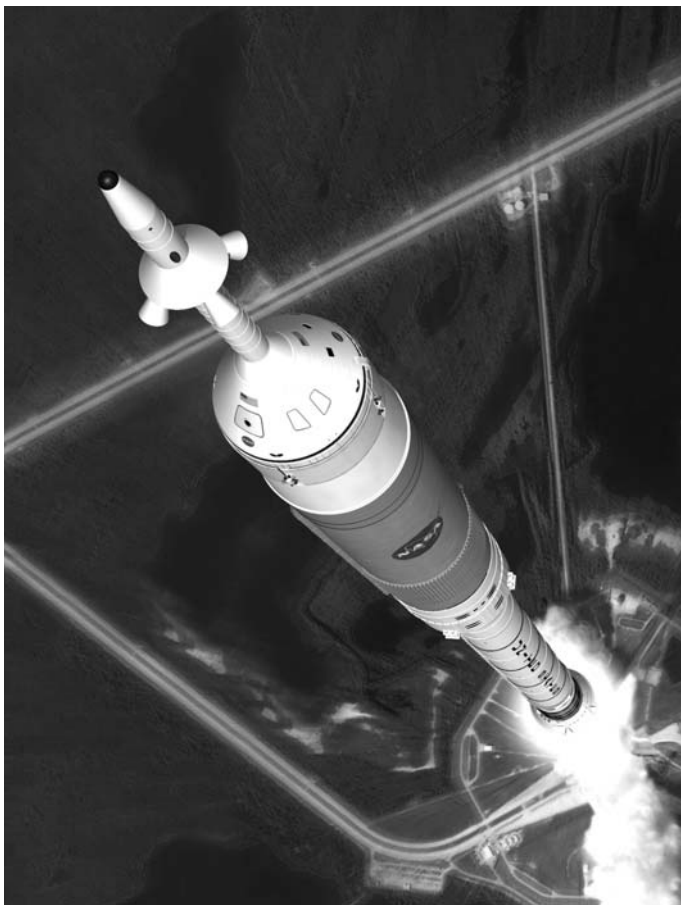
Sen. Cochran visits Stennis

Sen. Thad Cochran (R-Miss.) was at John C. Stennis Space Center on Nov. 9 for the NOAA announcement of the Northern Gulf Institute's establishment. During his visit, SSC Director Dr. Rick Gilbrech (left) presents Cochran with a collage of flags flown aboard Space Shuttle Discovery during NASA's STS-121 mission, July 4-17, 2006. The mission was the first launched on Independence Day. Gilbrech presented the collage as a 'reminder of my gratitude and that of all Stennis employees for your significant, steadfast support to America's space program, as well as to our unique federal and commercial city.'

FULFILLING THE VISION FOR SPACE EXPLORATION

NASA completes milestone systems review

NASA has completed a milestone first review of all systems for the Orion spacecraft and the Ares I and Ares V rockets. The review brings the agency a step closer to launching the nation's next human space vehicle.



This artist's concept image shows the Ares I crew launch vehicle just after launch, during its ascent into orbit. The Ares I and its companion cargo launch vehicle, Ares V, will be powered by J-2X engines tested at Stennis Space Center.

NASA completed the thorough systems requirements review of the Constellation Program in mid-November. Review results provide the foundation for design, development, construction and operation of the rockets and spacecraft necessary to take explorers to Earth orbit, the moon, and eventually to Mars.

"This review is a critical step in making the system a reality," said Constellation Program Manager Jeff Hanley of NASA's Johnson Space Center, Houston. "I am proud of this dedicated and diligent NASA-wide team. We have established the foundation for a safe and strong transportation system and infrastructure. It is a historic first step."

This is the first system requirements review NASA has completed for a human spacecraft system since a review of the space shuttle's development held in August 1973. The Constellation Program system requirements are the product of 12 months of work by a NASA-wide team.

The system requirements review is one in a series of reviews that will occur before NASA and its contractors build the Orion capsule, the Ares launch vehicles, and establish ground and mission operations. The review guidelines narrow the scope and add detail to the system design.

"We are confident these first requirements provide an exceptional framework for the vehicle system," said Chris Hardcastle, Constellation Program systems engineering and integration manager at JSC. "This team has done a significant amount of analysis which will bear out as we continue with our systems engineering approach and refine our requirements for the next human space transportation system."

An example of the activity was a review and analysis that confirmed the planned Ares I launch system has sufficient thrust to put the Orion spacecraft in orbit. In fact, the Ares I thrust provides a 15 percent margin of performance in addition to the energy needed to put the fully crewed and supplied Orion into orbit for a lunar mission. Engineers established Orion's takeoff weight for lunar missions at over 61,000 pounds.

Each Constellation project is also preparing for a narrower, project-level systems review, according to the following schedule:

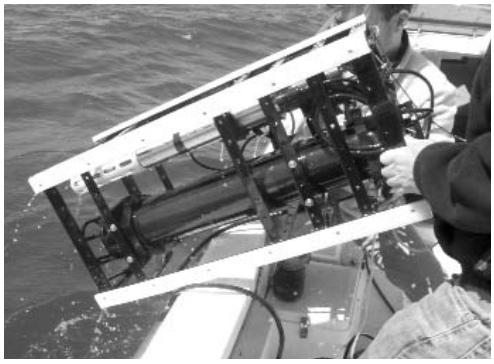
- Orion crew exploration vehicle, February 2007
- Ground operations (launch support), February 2007
- Mission operations (mission support), March 2007
- Extravehicular activity (space suits), March 2007

Once the project-level reviews are complete, the Constellation Program will hold another full review to reconcile the baseline from this first review with any updates from the project reviews. A lunar architecture systems review of equipment associated with surface exploration and science activities on the moon is expected in the spring of 2009.

Versatile tool 'sees' fluorescence

After nearly six years of research and development, a unique portable instrument for analyzing water is a step closer to commercial production, thanks to scientists at NASA Stennis Space Center.

In November, SSC signed a Space Act Agreement with WET Labs Inc. of Philomath, Ore., that allows oceanographers in SSC's Science & Technology Division to spend the next year working with the company to prove and improve the eXcitation-emission Matrix Fluorometer – XMF.



Scientists can use the XMF instrument in the water or in the laboratory. The portable, versatile fluorometer is the product of a successful partnership between NASA and WET Labs Inc. of Philomath, Ore., and has been hailed as a benchmark of cooperation between NASA and private business.

XMF is the first-ever combination lab and in-water, high spectral resolution (many colors) instrument able to measure the fluorescence of water samples.

The XMF's development is a big success story for NASA's Innovative Partnership Program and WET Labs. Hailed as a benchmark of cooperation between NASA and private business, the prototype was developed under a Small Business Innovation Research project beginning in 2001.

"The XMF is the result of a successful partnership born out of the SBIR program," said oceanographer Dr. Richard Miller of the Science & Technology Division. "Together, we're developing a high-quality instrument to meet NASA's needs and those of the scientific community. We felt so strongly about the potential of the XMF that we initiated a Dual-Use Technology Development project that led to signing the Space Act Agreement."

Many natural and synthetic compounds fluoresce – exhibit a glow sometimes visible to the naked eye – at unique wavelengths or colors. By "exciting" the molecules in a substance with light, then identifying the wavelengths at which it emits light, a fluorometer helps scientists identify substances in a sample by reading its signature excitation and emission wavelength responses (or colors).

The XMF is novel because it expands on the power and capabilities of previous instruments. It has the capacity to read a wide range of fluorescent signatures. Its special software can extract individual compound signatures from water samples. The software can also create 3D models or "contour maps" of each compound based on its excitation and emission responses (previous instruments were much more limited). The XMF is small, portable and versatile. It can be lowered into the water for underwater sampling and data transmission, or taken out and set atop a laboratory table. And it analyzes samples much more quickly than similar instruments.

Like the human eye, "the XMF is very sensitive," Miller said. "It can help us 'see' the fluorescence of substances in water samples. The challenge is to tease out the signatures of each of those compounds in the water. If we can develop a library of signatures of known substances, we can see what's in and possibly threatening our waters."

Likening the coastal waters he studies to a soup, Miller said the XMF will be used to partition a water sample into the substances that comprise it, "like picking out the carrots and the potatoes."

Analyzing water samples to see how light behaves in them is an effective way to measure water quality, crucial to Earth's overall health.

The usefulness of the XMF feeds into the study of climate change by NASA and its partner agencies. The goal of NASA's Science Mission Directorate is better weather predictions, resulting in less loss of life and property.

Contract awarded for emergency ops center

On Nov. 17, NASA awarded a two-year, $19.04 million contract to Starks Contracting Company Inc., Biloxi, Miss., for construction of a new emergency operations center at Stennis Space Center near Bay St. Louis, Miss.

The 71,000-square-foot facility will house the Stennis Space Center Fire Department, Security Office and Medical Clinic.

The project is registered under the Leadership in Energy and Environmental Design, a rating system developed by the U.S. Green Building Council for the design, construction and operation of high-performance green (energy efficient) buildings.

Improving fiscal management

Business office upgrades systems

NASA's Integrated Enterprise Management Program (IEMP) is transforming the agency's business systems and processes to improve fiscal and management accountability. IEMP launched Release 7.1 on Nov. 15.

Release 7.1 is composed of the Systems Applications and Products (SAP) Version Upgrade's (SVU) and the Contract Management Module's (CMM) implementation of CompuSearch PRISM software.

Stennis Space Center's CMM includes contract writing, data management, procurement workload management and contract administration for NASA nationwide. It also interfaces with electronic commerce systems; incorporates proper security measures and allows for standardized communication between the agency's procurement personnel and customers.

SVU supports NASA's Vision for Space Exploration by providing agency mission directorates and mission support areas with financial information and tools for effective program planning and decision making. It also streamlines funds distribution; stabilizes the impact of full cost on programs and projects; and enables implementation of Full Cost Reform policy changes.

Team members who supported the SSC implementation of Release 7.1.

SSC's Office of the Chief Financial Officer (CFO) program analyst Tim Pierce is program manager for IEM and the Center Implementation Project Manager (CIPM) for SVU. CIPMs for CMM are lead contract specialist for the Center Management Support Division Penny Parker and contract specialist for the Program Management Support Division Carol Burnside. The SVU and CMM implementation teams provided data cleanup and migration, training, business process changes and legacy system updates, enabling SSC to support the agencywide implementation of Release 7.1.

"I am confident that everyone will continue to work hard now that the systems are back up," Pierce said.

IEMP is working on stabilization of SVU and CMM and preparing for implementation of Integrated Asset Management (IAM) and eTravel systems, both scheduled for go-live in fiscal year 2008.

SSC taps 9 innovative small business projects

NASA recently selected 260 proposals for negotiation of Phase 1 contract awards in the Small Business Innovation Research (SBIR) program, and 27 proposals for negotiation of Phase 1 contract awards in the Small Business Technology Transfer (STTR) program.

Six of the selected SBIR proposals will develop technologies for NASA Stennis Space Center under the management of its Innovative Partnership Program:

- Combustion Research and Flow Technology, Pipersville, Pa.;
- Lake Shore Cryotronics Inc., Westerville, Ohio;
- Mobitrum Corp., Silver Spring, Md.;
- Payload Systems Inc., Cambridge, Mass.;
- Terrametrics Inc., Littleton, Colo.; and
- Vcrsoft LLC, Naperville, Ill.

In addition to the SBIRs, three selected STTR research proposals will be managed by SSC's Innovative Partnership Program:

- "Novel Instrumentation for Rocket Propulsion Systems," written by Los Gatos Research of Mountain View, Calif., in collaboration with the University of Wisconsin-Madison;
- "Quantum Fingerprint-Based Air Quality Monitoring in Coastal Environments," written by US Semiconductor of Independence, Mo., in collaboration with Nuclear Engineering, University of Missouri-Columbia; and
- "TDLAS Test-stand Diagnostics Development for Velocity, Temperature, Efficiency, and Erosion for Space Shuttle Main Engines," written by Zolo Technologies Inc., Boulder, Colo., in collaboration with Stanford University, California.

Phase 1 is a feasibility study to evalu-

*See **SBIRs,** Page 6*

Sea captain helped settle Pearlington

Editor's Note: *Archaeologist Dr. Marco Giardino of NASA's New Business Development Office at SSC provides this LAGNIAPPE column dedicated to the history of Stennis Space Center and the surrounding area.*

Christian Koch was a prominent citizen of Logtown in the mid-1800s. He was a Danish sea captain who first visited the area around Pearlington in the early 1830s.

In his diary, Koch described Pearlington as a small, insignificant town, where the only trade was in wood and cotton with New Orleans. He commented that it was situated "in the midst of a large pine forest owned mostly by the government."

In 1841, Koch married 15-year-old Annette Netto of Bay St. Louis. They settled at Logtown in 1854 at a place called Bogue Houma, that being the name of the bayou that bounds Logtown on the north.

Lifelong Logtown resident Roy Baxter recalled in 1991 that the Koch estate was a sizable homestead with a lake and fruit trees. Beautiful gardens were full of plants grown from seeds Koch had sent home during his numerous travels around the world. (Baxter's comments are recorded in an unpublished document held by the Hancock County Historical Society.)

Stennis Space Center HISTORY

The Koches were letter-writers. Hundreds of their correspondences covering a period from 1829 to 1883 have been collected and preserved. Many letters were written during the Civil War, when Koch and his schooner were embargoed at nearby Fort Pike by Union troops while Annette struggled to raise her many children and to keep their farm running at Logtown. The Koch family letters, together with many other family papers and artifacts, are housed in the Hill Memorial Library at Louisiana State University in Baton Rouge.

Koch died after his wife, in 1893, and is buried next to her on a small, serene knoll just west of the original homestead. The cemetery is in two sections, one smaller but older than the other. They are on high ground, just before the terrain drops off into ravines, not far from the site of the Koch house. The original house was moved by their descendants to Vicksburg when NASA purchased the land for what would later become Stennis Space Center.

NASA family celebrates holidays

Members of Picayune's Bethlehem Baptist Church Choir kick off the NASA Stennis Space Center Holiday Village by singing Christmas carols to employees during lunch in Building 1100's Atrium on Dec. 11. Various community and employee groups will provide entertainment periodically through Dec. 22.

NASA employees and their families gathered for a traditional Thanksgiving dinner in Building 1100's Atrium on Nov. 16. Musicians Jim and Kay Lafferty provided entertainment.

SBIRs

Continued from Page 5

ate the scientific and technical merit of an idea. The SBIR awards may last up to six months while STTR awards may last up to one year. Both programs award Phase 1 contracts up to $100,000. Phase 2 expands on the results of Phase 1. Phase 2 Awards are for up to two years in amounts up to $600,000. Phase 3 is for the commercialization of the results of Phase 2 and requires the use of private sector or non-SBIR federal funding.

For information about NASA's SBIR and STTR programs, and a complete list of selected companies, visit: http://sbir.nasa.gov.

Many faiths, cultures mark holy days during this season

Because of its cultural diversity, America celebrates the winter holiday season in many different ways. Some of the most popular holidays celebrated during this season are:

– Bodhi Day, marking Buddha's enlightenment, is observed on a date from the Japanese Buddhist calendar.

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

– Christmas, celebrating the birth of Jesus of Nazareth, is observed Dec. 25 (Jan. 7 in the Eastern Orthodox Church)

– Hanukkah, the Festival of Lights commemorating the Jews' second-century B.C. victory over the Syrians, starts the 25th of the month of Kislev (November/December) and lasts eight days

– Kwanzaa, founded in 1966 by Dr. Maulana Karenga, observed Dec. 26-Jan. 1 by African-Americans who focus each day on one of seven principles

– Las Posadas, the Mexican procession reenacting the Holy Family's search for room at the inn, celebrated Dec. 16-24

– Ramadan, Islam's most venerated and blessed "Month of Fasting," is observed in the Islamic calendar's ninth month, and ends with the Feast of Breaking the Fast.

Guidelines for respecting different faith traditions include:

Be accurate and sensitive: Cultural differences are wonderful family learning opportunities.

Avoid sterotyping: Many groups celebrate the same holiday in different ways.

Be appropriate: Religious symbols such as crosses, menorahs and crescents should not be used at public events.

Recognize people's individual needs: Fixed public holidays, when public offices are closed, offer employees time to acknowledge a divine presence, give thanks, seek blessings and draw together different faiths.

During this holiday season, see all festivities as displays of faith representing the rich diversity of our nation. Take time to reflect on one of the precious foundations of our country: freedom of religion.

AROUND NASA

■ **Images suggest water still flows on Mars:** NASA photographs have revealed bright new deposits seen in two gullies on Mars that suggest water carried sediment through them sometime during the past seven years. Liquid water, as opposed to the water ice and water vapor known to exist at Mars, is considered necessary for life. The new findings heighten intrigue about the potential for microbial life on Mars. The Mars Orbiter Camera on NASA's Mars Global Surveyor provided the new evidence of the deposits in images taken in 2004 and 2005. The atmosphere of Mars is so thin and the temperature so cold that liquid water cannot persist at the surface. Researchers propose that water could remain liquid long enough to carry debris downslope before totally freezing.

■ **Public offers answers about return to the moon:** During the past year, NASA has asked more than 1,000 scientists, engineers, entrepreneurs and space advocates from around the world why we should return to the moon. Starting with those responses, NASA worked with 13 world-space agencies to develop a Global Exploration Strategy that explains why the global community believes we should explore space, how space exploration can benefit life on Earth and how the moon can play a critical role in our exploration of the solar system. Six lunar exploration themes evolved: to extend human civilization, to pursue scientific knowledge, to prepare for further exploration, as a forum for global partnerships, to expand Earth's economic sphere and to engage the public and encourage students. NASA also compiled a comprehensive database of almost 200 things we could do on the moon. Access it at http://www.nasa.gov/mission_pages/exploration/mmb/why_moon_objectives.html and click on "Download the Lunar Objectives."

■ **GeneSat-1 to ride Air Force rocket:** NASA's GeneSat-1 is set to launch into orbit on an Air Force rocket Dec. 11 from NASA's Wallops Flight Facility, Wallops Island, Va. The 10-pound satellite will carry bacteria inside a miniature laboratory to study how the microbes may respond in spaceflight. The knowledge gained from GeneSat-1 will help scientists understand how spaceflight affects the human body; specifically, the intestinal bacteria that help human beings digest food.

Hail & Farewell

NASA welcomes the following to SSC:

Michelle Stracener – Business Management Directorate
Ralph Gonzalez – Safety & Mission Assurance
Monti Mushin – Center Operations
Teenia Perry – Center Operations

And bids farewell to the following:

Anita Harrell – Office of Human Capital
Olivia Moreaux – Business Management Directorate

FIRST teams seek volunteers

The FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition season begins Jan. 6, 2007, with a regional kickoff at Stennis Space Center.

The 26 Louisiana and Mississippi teams scheduled to participate need help to design, build and program their robots in six weeks. Prior to the kickoff, students need to gather mentors, funds and other support. Because NASA advocates robotics and science-technology-engineering-mathematics education, the agency and SSC support FIRST by providing volunteer staff personnel.

NASA's Katie Wallace, SSC's FIRST coordinator, said engineering mentors will be crucial during the design and construction process, but other volunteers will be valuable, too.

To volunteer, contact Wallace at 228-688-7744.

LITTLE LEAGUE ROBOTICS – Twenty-four teams from 19 Mississippi schools and home-school groups competed in FIRST (For Inspiration and Recognition of Science and Technology) LEGO League's Mississippi Championship Event on Dec. 2 at Mississippi Gulf Coast Community College's Gautier campus. FIRST LEGO League, the 'little league' of the FIRST Robotics Competition, partners FIRST with the LEGO Group. Teams build and program robots from LEGO Mindstorms kits, then test their creations in competitions. The 2006 FIRST LEGO League competition, 'Nano Quest,' was the result of the teams' eight weeks of preparation. The Dec. 2 competition involved about 200 students.

Leadership Class makes educational trek to SSC

Nearly 35 members of the Hancock County (Miss.) Chamber of Commerce 2006-07 Leadership Class visited NASA Stennis Space Center on Nov. 15. While here, the group received a tour of the A Test Complex from Mike Nichols, NASA's A Complex facility manager. Center Operations Director Marina Benigno presented an overview of SSC. The class learned about SSC's role in the Constellation Program and the work of many of SSC's resident agencies. The group's tour was part of their involvement in the Hancock County Chamber of Commerce's nine-month program of developing leaders by familiarizing them with their community.

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