



## Stennis marks 40th year as space-age proving ground

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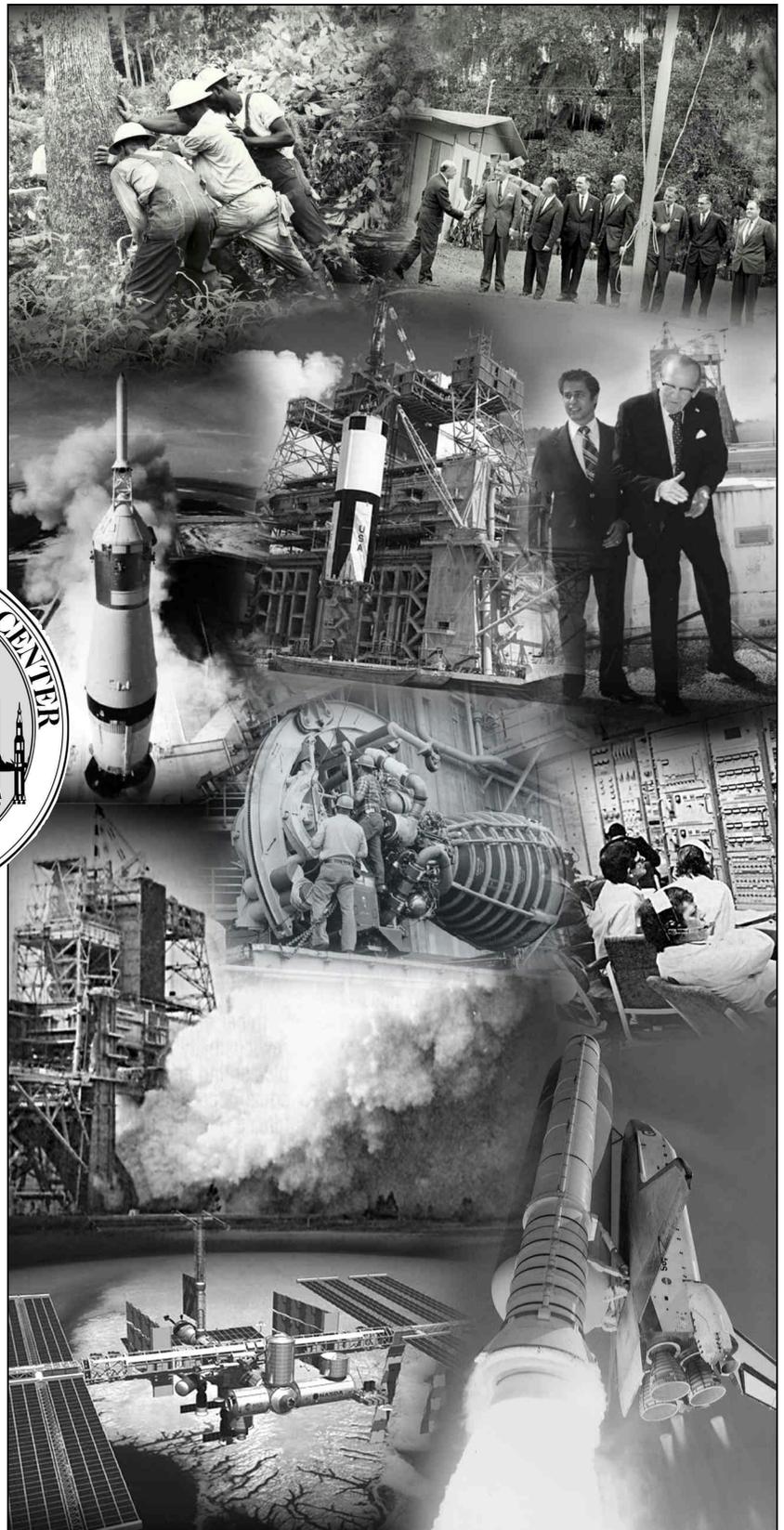
The project, placed under the auspices of NASA's Marshall Space Flight Center in Huntsville, Ala., was headed by famed German rocket scientist Dr. Wernher von Braun.

"This will be the largest test facility anywhere," von Braun said. "Where we are standing, there will rise a great complex of buildings, testing operations . . . to provide sufficient expansion to meet future needs."

Mississippi was a logical choice for the site. The area was sparsely populated and featured waterway access from the East Pearl River — essential for transporting large rocket stages, components and mass quantities of propellants.

When NASA announced that it would build the test facility, John C. Stennis, the late senator and distinguished Mississippi statesman, was called on to explain the reasons for the massive undertaking to the more than 2,000 families who would be asked to give up their homes for the project.

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NASA's Angela Phillips Diaz, second from left, director of the Human Space Flight and Research Division, Office of External Relations at NASA Headquarters, Washington, D.C., was guest speaker at the annual Women's Equality Day Program. The Stennis Site-Wide Planning Committee and the Federally Employed Women hosted the event Aug. 29 at Stennis Space Center. Chatting with Diaz are, from left, Defense Contract Management Agency's Brenda White; Diaz; NASA's Judy Cook; Lockheed Martin's Dr. William Corso; and Mary Snitch, director of NASA Programs, Washington Operations for Lockheed Martin.

## Stennis scientists help archaeologists search for historical Lewis & Clark sites

Researchers at NASA's Stennis Space Center have signed a Space Act Agreement with noted archaeologist Ken Karsmizki to apply NASA remote sensing technology to the task of identifying and mapping sites along the trail of the Lewis and Clark Expedition. The expedition explored uncharted territory west of the Mississippi River for the U.S. government 200 years ago.

NASA scientists at Stennis will work with Karsmizki to combine precision airborne and satellite imagery with detailed historic maps as well as Lewis and Clark journal entries to locate and preserve several sites along the trail of the Corps of Discovery, the name of the Lewis and Clark expedition team. The Montana State University TechLink Center and the NASA Earth Science Applications Directorate (ESAD) at Stennis helped facilitate this unique partnership.

Under the recently signed agreement, NASA researchers at Stennis will examine the utility of using new commercial sources of satellite remote sensing data to determine if information can

be extracted to aid the archaeological and historical investigations associated with the Lewis and Clark expedition and the subsequent settlement and colonization of U.S. western territories.

"The images we are able to provide Dr. Karsmizki's team give a very high-resolution view of the Earth," said NASA's Marco Giardino, ESAD. "Our scientists can create a 360-degree view of the landscape where Lewis and Clark traveled during their expedition. From that view, archaeologists can follow the trails Lewis and Clark pioneered as if they were flying over the actual landscape; in real time and in any direction or angle they choose."

By comparing the Lewis and Clark journal entry data and historical documents to the landscape, the team can more accurately estimate the most promising areas for their archaeological dig.

"Conducting archaeology from space is an exciting concept," Karsmizki said. "Our efforts to uncover Lewis and

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## NEWSCLIPS

**NASA comes to the aid of aircraft noise sufferers** — Engineers at NASA's Ames Research Center, Moffett Field, Calif., and the Langley Research Center, Hampton, Va., will use one of the world's largest subsonic wind tunnels to test a number of noise-control devices designed to reduce aircraft noise.

According to Bill Willshire, noise reduction program manager at Langley, the testing of these noise-control devices — developed by NASA and an industry team — will revolutionize the design of future generations of commercial aircraft. "Communities will experience less noise, and quality of life will be improved with the implementation of the advanced technologies to be demonstrated in this critical experiment," Willshire said.

**NASA satellite imagery improves rapid response to wildfires** — U.S. firefighters and land managers are using the most modern NASA satellite data to combat wildfires. NASA's Terra satellite beams images of western U.S. wildfires daily to NASA within a few hours of the time that it passes over the region. These images, showing the locations of active fires, are transmitted to the Forest Service. The data helps fire experts manage fires more effectively, both during and after wildfire events. The effort is a combined project among NASA, NOAA, the University of Maryland and the USDA Forest Service.

**Galileo's flyby reveals Callisto's bizarre landscape** — A spiky landscape of bright ice and dark dust shows signs of slow but active erosion on the surface of Jupiter's moon, Callisto, in new images from NASA's Galileo spacecraft. Pictures taken by Galileo's camera in May give the highest resolution view ever seen of any of Jupiter's moons. One scientific goal from the high-resolution images is to see how many small craters are crowded onto the surface. Crater counts are one way to estimate the age of a moon's surface. NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Galileo project.

## International Space Station Status Report

Pioneering research in space begun by two previous crews aboard the International Space Station (ISS) was expanded by the Expedition Three mission when Space Shuttle Discovery launched Aug. 10 at 4:10 p.m. (CDT).

With the launch, the station's third crew began its four-month mission and will



continue through the landing of Space Shuttle Endeavour (STS-108) in early December.

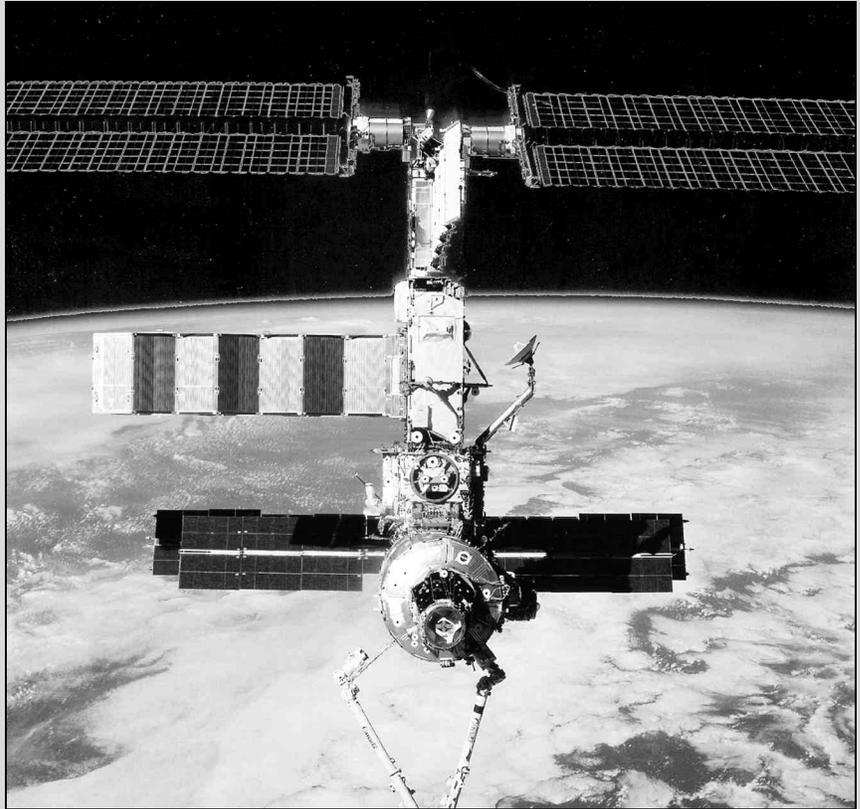
Expedition Three crew members are Commander Frank Culbertson, an astronaut, Soyuz Commander Vladimir Dezhurov and Flight Engineer Mikhail Tyurin, both cosmonauts.

The newest component of the ISS — a Russian docking compartment known as Pirs, meaning pier or port — arrived at the outpost at 8:05 p.m. (CDT) Sept. 16 as the station orbited 250 miles above Mongolia.

The new compartment serves both as a new docking port for future Russian Soyuz and Progress vehicles arriving at the space station and as a second airlock, enabling spacewalks to be conducted from the Russian segment of the station. The first airlock, known as Quest, was installed in July.

Three spacewalks are to be conducted in October and November from Pirs by the Expedition Three crew — two by Dezhurov and Tyurin and one by Culbertson and Dezhurov — to electrically mate the docking compartment to Zvezda.

Sighting opportunities from the ground for the ISS in many cities around the world can be viewed at: <http://space-flight.nasa.gov/realdata/sightings/>.



**Backdropped against the clouds of Earth and sporting a new Canadarm2, or Space Station Remote Manipulator System, the International Space Station was photographed April 29 following separation from the Space Shuttle Endeavour.**

## A letter from the NASA Administrator

A year ago, we were facing one of the most ambitious and challenging manifests in the short history of our International Space Station (ISS) program. You rose to the challenge and now, with the addition of the Joint Airlock, we have safely and successfully completed Phase Two of our International Space Station. What an extraordinarily breathtaking milestone!

In the past year, you — as a truly international team forged under the pressures and rigors of human space flight — have flown 14 flights safely and successfully. Together, you have overcome many daunting technical and programmatic challenges on Earth and in space as we stepped up to committing to permanent human presence in Earth orbit. In fact, as I write this, preparations are under way to launch the third increment crew to the ISS with five more permanent crews in training to follow.

I am incredibly proud of the entire NASA/Contractor Team. Your efforts in so many different disciplines, so many places, so many projects and tasks have made the dreams of the International Space Station a reality. Each and every day you take the complex challenges of human space flight and break them down and solve them. You make even the most complex tasks look routine. Your technical successes have been all the more impressive against a background of tightly constrained funding over the past decade.

Walk outside tonight. As you watch the space station glide across the night skies, please take the time to appreciate this signpost in the heavens and make note of what we, as a team, have accomplished.

Daniel S. Goldin  
Aug. 6, 2001

▶ In the photo at right, from left, Boeing's Mechanical Lead Technician Wayne Giveans, Instrumentation Technician Ed Peterson and Instrumentation Lead Technician Al Pittman examine the low-pressure fuel duct on SSME 0526.

▶▶ Center photo, SSME 0526 is moved from its vertical position on the rollover sling to be placed on the engine transporter to be moved to the A-2 test stand.



▲ Mechanic Renee LeFrere conducts soap checks while the engine is under pressure.

▼ Quality Control Technician Tony Mendez double-checks the process.



▲ Mendez and Mechanic Jim Ball check the engine's low pressure pump components.



▶ Boeing engineers, from left, Josh Hansell, Charlie Gandy, Russ Rizzo and Ralph Gonzalez review a schematic design of the engine to confirm location of a leak in the fuel bleed valve system.



# A Day in the Life of ...

## The Engine Processing Building

# 3202



Every piece of flight hardware that comes to Stennis Space Center for testing comes to Building 3202 for buildup prior to going to the test stand for check-outs and hot-fires.

In the cavernous 158,391-square foot building, Boeing Company crews work in three shifts preparing flight engines and flight components for ground test instrumentation checks, torque checks and flight-readiness tests.

"This is the beginning and end of the life cycle of an engine at Stennis," Boeing's Site

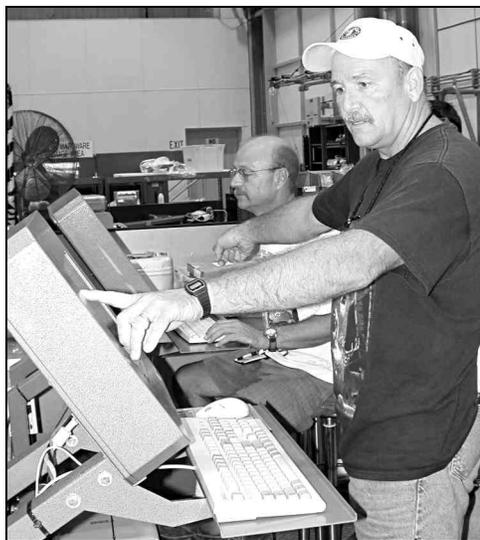
Director Dave Geiger said. "It is all about flying safely. Our people are keenly interested in making sure that every process in securing a safe flight is undertaken with care."

This particular day, first-shift was preparing Space Shuttle Main Engine (SSME) demonstrator 0526 sent from Boeing's fabrication facility in Canoga Park, Calif., to receive a new Pratt and Whitney high-pressure fuel turbopump.

"As a demonstrator, this engine will remain on the stand and undergo a total of 15 tests to certify various flight assets between now and the end of November," NASA's Pat Mooney, manager of the Space Shuttle Main Engine Project Office at Stennis, said. "The first test will be to flight certify the Pratt and Whitney high-pressure fuel turbopump 8114. Once flight certified, it will be shipped to Kennedy Space Flight Center."

Crews follow a paperless procedure — designed by Boeing personnel at Stennis and implemented three years ago throughout the test complex — in accomplishing their preparations.

"Once, the process for accomplishing the necessary procedures to prepare an engine for testing generated reams and reams of paper," Boeing engineer Russ Rizzo explained. "Today, every step of the process is guided by computer programming. Each mechanic or technician checks, double-checks and then checks again every step and then 'buys off' on the completion of that step



▲ Mechanical Technician Videt Robbins, foreground, and Mechanic Jim Ball check and double-check every step before "buying off" on their work with their individual computerized stamp and date of completion before proceeding to the next step.



## Saving lives and dollars

### CAMEX-4 improves storm forecasting

NASA's fourth Convection and Moisture Experiment (CAMEX-4), is designed to better understand hurricane intensification, movement and what happens when hurricanes come ashore. NASA's Earth Science Enterprise recognizes that understanding these phenomena will result in improved hurricane forecasting and real savings to the American taxpayer in terms of dollars and human lives. The 2001 campaign spans from Aug. 16 to Sept. 24, traditionally the most active part of the hurricane season.

NASA is collaborating with the National Weather Service/Tropical Prediction Center/National Hurricane Center, and the U.S. Air Force. Field experiment operations are based out of Jacksonville Naval Air Station, Fla. As done in previous CAMEX missions, NASA will fly a DC-8 airborne laboratory. An ER-2 aircraft will operate as a "virtual satellite" observing hurricane formation and movement above the storms.

NASA expects its Earth science remote sensing instruments will yield high spatial and temporal information on hurricane structure, dynamics and motion. NASA's Earth Science Enterprise brings expertise in airborne and spaceborne remote sensing. With this unique expertise, NASA's Earth scientists are able to observe and understand the interactions between Earth's complex land, atmospheric, oceanic and biotic systems from a vantage point and scale that is attainable no other way.

NASA's unique Earth science, technology and application capabilities complement the operational capabilities of NASA's sister



**The photo of Hurricane Bonnie, 1998, was taken by a NOAA-12 satellite and produced by NASA's Goddard Space Flight Center. During August and September, 1998, the CAMEX-3 experiment studied the power and nature of hurricanes Bonnie, Danielle, Earl and Georges. For the first time ever, hurricane data sets were taken at altitudes never before sampled. CAMEX-3 results found the wind flow pattern was more varied and complex than previously thought.**

federal agencies. Hurricane research is translated into applications, like improved forecasting, that yield taxpayer benefits and help improve our daily lives.

## Hydrogen peroxide release at E-Complex under investigation at Stennis Space Center

At approximately 12:25 p.m. Aug. 20, an incident occurred at the E-Complex testing area at the John C. Stennis Space Center involving high concentration hydrogen peroxide used as a fuel grade propellant for testing or enrichment to higher concentrations. After transfer of the chemical from a vendor's tanker at the unloading station to a storage tank, a line ruptured at the site, releasing hydrogen peroxide.

Although personnel at the site were evacuated as a precautionary measure,

there were no injuries as a result of the incident.

The E-Complex serves as a developmental component test facility for future generation rocket engines. The flexible three-stand complex can carry out rocket engine testing or other types of testing involving ultra high-pressure gases and high-pressure, super-cold fluids.

NASA managers are investigating the incident to determine the cause of the transfer line rupture.

## LMSO wins 2-year contract extension

NASA's Stennis Space Center recently awarded a two-year option extension of the Test and Technical Services Contract to Lockheed Martin Space Operations, Stennis Programs, Houston. The original contract was awarded Sept. 1, 1994.

The total estimated contract value of the two-year extension is \$77,824,865. This brings the total estimated contract value to \$309,249,109 for the base period and three option periods. The period of performance of the extension is from Sept. 1, 2001 through Aug. 31, 2003.

Lockheed Martin will provide support to propulsion test operations, systems engineering, operator maintenance and test technology development in support of Stennis.

Additionally, the company will provide support to test-article contractors in the evaluation of liquid, hybrid, solid and other propulsion systems, subsystems and components; and provide technical services for research and development, administrative and institutional program activities in a broad range of science, engineering and technology requirements for Stennis Space Center and the center's resident agencies and commercial customers.

## BLDG. 3202 . . .

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The system, dubbed SAMS for Stennis Automated Managing System, allows engineers throughout the test complex, as well as engineers across the Agency, to keep track of preparations through a single network. Included in the network are mobile stations that are on the floors of the processing building and on the decks of the test stands.

"Through SAMS, we are able to tap unlimited resources in terms of problem solving skills," Boeing's Mechanical Lead Technician Wayne Giveans said. "We are very conscious of the fact that the astronauts' lives ride on the quality of the work we accomplish here."

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The sacrifice of those families provided the 13,500-acre test facility with a natural acoustical buffer zone of more than

125,000 acres, making it a national asset.

Nearly two years later, construction began May 17, 1963, as workmen cut the first tree to begin clearing the land for the nation's new rocket test facility.

The construction project was an enormous one, taking almost another three years to complete. However, the workmen, scientists and engineers were diligent, and the first rocket test was conducted April 23, 1966.

Soon afterwards, the test site became a bustling center of activity, with every booster rocket used in America's lunar landing missions being static fired and flight certified at what was then known as the Mississippi Test Facility. All first- and second-stage rockets of the Saturn V tested at the center flawlessly performed their missions.

Over the course of time, the facility grew and prospered under five different names: the Pearl River Site (1961); the Mississippi Test Operations (1961-1965); the Mississippi Test Facility (1965-1974); the National Space Technology Laboratories (1974-1988); and the John C. Stennis Space Center (1988-present).

Forty years after the announcement to build the facility, Stennis Space Center continues to serve as the place where various space-bound rocket engines breathe their first fiery breath, serving as NASA's lead center for rocket propulsion testing.

Now, the ghosts of the early settlers, river pirates and outlaw bands who once inhabited this area along the Pearl River hear the shake, rattle and roar of Space Shuttle Main Engines being tested as our nation continues to explore the boundaries of space.

But, in addition to serving the needs of NASA, the unique test stands at Stennis also pave the way to space for some Department of Defense and commercial customers. In recent years, commercial rocket firms have invested more than \$40

## Stennis History at a Glance

**Oct. 25, 1961:** NASA announces decision to establish a national rocket test site in Hancock County.

**April 23, 1966:** First Saturn V rocket booster (S-II-T) tested at Mississippi Test Facility (MTF).

**March 1, 1971:** Space Shuttle Main Engine (SSME) testing assigned to the center.

**May 19, 1975:** First SSME test fired at National Space Technology Laboratories (NSTL).

**May 28, 1976:** Flag-raising ceremony marks the official move of the Naval Oceanographic Program to NSTL.

**April 21, 1978:** First system test of Space Shuttle Main Propulsion Test Article conducted — including three SSMEs tested simultaneously.

**May 9, 1988:** NSTL assigned key roles for space remote sensing commercialization.

**May 20, 1988:** NSTL renamed John C. Stennis Space Center by Executive Order of President Ronald Reagan.

**May 30, 1996:** NASA names Stennis as lead center to manage capabilities and assets for rocket propulsion testing.

**Feb. 21, 1997:** Stennis Space Center designated NASA's lead center for commercial remote sensing.

**March 17, 2000:** Assembly and testing of RS-68 engines for Delta IV rockets begins at Stennis.

**June 16, 2000:** The world's fourth fastest supercomputer is installed in the Naval Oceanographic Office/Department of Defense supercomputer center.

**July 1, 2000:** Stennis named lead center for remote sensing applications research and development.

**Sept. 1, 2000:** Lockheed Martin Propulsion, Thermal and Metrology Center at Stennis announced.

**Sept. 29, 2000:** \$25 million construction project begins for Naval Small Craft Instruction and Technical Training School and Special Boat Unit 22 in support of Navy SEAL activity.

**Jan. 18, 2001:** Stennis selected as site for Space-Based Laser Performance Test Facility.

**Feb. 14, 2001:** As part of NASA's Advanced Space Transportation Program, groundbreaking began to construct a facility for testing Rocket-Based Combined Cycle engines.



# You can help prevent accidents!

Accidents are the result of unsafe acts, unsafe conditions or both. Whatever the reasons, we want to eliminate them to keep everyone safe — and you can help!

Unsafe conditions are physical hazards such as missing machine guards, exposed electrical circuits, damaged equipment, slippery floors, improper storage of material or inadequate training.

Unsafe acts are things people do that are obviously not safe. Examples are:

- ✗ using shortcuts in procedures,
- ✗ not wearing proper Personal Protective Equipment,
- ✗ using damaged tools,
- ✗ not lifting properly, or
- ✗ ignoring safety rules.

Accidents can result in injury or death to you or another employee. It's important to immediately report any unsafe conditions to your supervisor.

### Smart Safety Rules

1. Follow all specific safety rules.
2. Report all unsafe acts or unsafe conditions.
3. Encourage others to work safely.
4. Ask for help when you need it.
5. Ask questions when you are not sure.
6. Report any injuries immediately.
7. Don't create trip hazards — keep your work area neat and clean.

## QUICK LOOK

✗ **NASA's Employee Appreciation Ice Cream Social** is scheduled from 12:30 p.m. to 1:30 p.m. in the Atrium of Bldg. 1100 Tuesday, Sept. 25. The event is open to NASA employees.

✗ **September is National Cholesterol Education Month.** The Wellness Center is offering Blood Lipid Profile screenings from 7 a.m. until 8:30 a.m. Tuesday, Sept. 25. The cost is \$15. Call Ext. 8-3950 or e-mail the Wellness Center to schedule an appointment.

✗ **The Stennis Combined Agency Campaign — Giving Makes Great Things Happen** begins at 10 a.m. Wednesday, Sept. 26, in the StennisSphere auditorium.

✗ **NASA Honor Award ceremonies are scheduled Sept. 28** at 1:30 p.m. in the StennisSphere auditorium.

✗ **The 2001 NASA Golf Tournament is scheduled Oct. 8** at the Oaks Golf Club in Pass Christian. Contact Marina Benigno at Ext. 8-2387 for more information. The tournament is open to NASA employees, spouses and retirees.

✗ **The NASA 6th Annual Mission Family Picnic** is scheduled for Oct. 13 at Jazzland Theme Park in New Orleans. The annual picnic is open to NASA employees, contractors and their families.

## SITES . . .

(Continued from Page 2)

“Our efforts to uncover Lewis and Clark expedition outposts are enhanced using this technology. Many of Lewis and Clark’s journal entries were written after long grueling days on the trail, and reporting inaccuracies about their actual locations did occur. So, finding a Lewis and Clark outpost, even with the excellent journal data they left behind, is like trying to find the proverbial needle in a haystack. By comparing data from the expedition archives to NASA imagery, we improve our probability of finding an outpost location dramatically.”

Stennis Space Center, NASA’s lead center for Earth science applications, has been using remote sensing applications to aid in archaeological finds since 1974. Additionally, ESAD manages a demonstration program called the Scientific Data Purchase Project. Initiated in 1997, this project involves the acquisition of remotely sensed data sets from commercial providers. This program helps the researchers by providing low-cost, high-quality remote sensing data, and it helps the commercial remote sensing industry by developing new markets for their products.

TechLink is located at Montana State University in Bozeman and funded by NASA and the Department of Defense to link companies in Montana and the surrounding region with federal laboratories for joint research and technology transfer.

## LAGNIAPPE

*Lagniappe* is published monthly by the John C. Stennis Space Center, National Aeronautics and Space Administration. Mark Craig is the acting director, Myron Webb is the public affairs officer, and Lane Cooksey is the news chief. Comments and suggestions should be forwarded to the Lagniappe Office, Building 1200, Room 208D, Stennis Space Center, MS 39529, or call (228) 688-3585.

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