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LAGNIAPPE

John C. Stennis Space Center

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X-33 components arrive at Stennis

Stennis Space Center has received the first power pack assembly for the X-33's linear aerospike engine and is moving forward with plans to begin testing in early September.

NASA's Steve Nunez, X-33 Project Manager at Stennis, said the power pack has been inspected and will be installed in the A-1 test stand the first week in August. This is one of several power packs slated for testing beginning around the first of September.

"We will have four power pack assembly configurations," Nunez said. "Plans are to perform a total of 18 tests for approximately 2,063 seconds."

Two XRS-2200 Linear Aerospike Engines, built by Rocketdyne, will power the X-33, a half-scale advanced technology demonstrator for NASA's Reusable Launch Vehicle program. The aerospike engine will burn liquid hydrogen as fuel and liquid oxygen as the oxidizer.

Stennis will first test engine components contained in the power pack before testing the fully assembled engine.

The power pack consists of several components, including liquid fuel and oxidizer pumps, a gas generator and its valves and actuators, and various vehicle connect lines and interconnecting flight ducts.



To prepare the A-1 for the power pack tests, the NASA-contractor team has been activating the test stand since February. They also performed a series of tests beginning in May to calibrate a new 12-inch liquid hydrogen flowmeter. Those tests provided information about the performance of the hydrogen discharge flare stack at maximum operating conditions.

(See POWER PACK, Page 10)



NASA's Bruce Spiering with the Earth System Science Office demonstrates the hand-held chlorophyll meter at technology commercialization briefings held June 23-24 at Stennis Space Center. The meter, developed by Spiering and Dr. Greg Carter, was one of two new technologies introduced to company representatives in attendance.

NASA introduces two new technologies

More than 40 representatives from 31 companies attended two days of technology commercialization briefings hosted by Stennis Space Center's Technology Transfer Office June 23-24.

The purpose of the briefings was to seek qualified companies interested in licensing and commercializing two NASA technologies designed to detect the relative amount of chlorophyll in plants.

"The technologies highlighted at the briefings brought out record numbers of interested companies from across the country and from Europe," said Kristen Riley with the Stennis Technology Transfer Office.

Frequently, this technology can detect plant stress before the damage becomes visible to the human eye.

Plant stress is the reaction of plants to environmental conditions that are unfavorable to growth, such as lack of sufficient nutrients, inadequate watering, disease or insect infestation.

Detecting plant stress in the early stages provides an opportunity to reverse the unsuitable conditions that inhibit growth.

Also, monitoring plant stress can help prevent overuse of fertilizers and other

chemicals while reducing groundwater contamination.

The reaction to stress with which most people are familiar is a change in leaf color. Research by Stennis scientists has found that, in many cases, previsible signs of stress can be detected using the proper instruments.

The first of the two devices developed at Stennis is a hand-held chlorophyll meter. The second device is called the Plant Chlorophyll Content Imager. Both instruments work by measuring the light reflected from leaves in key spectral bands. The ratio of reflectance in these bands gives the user an indication of plant condition.

The hand-held device provides a numerical output while the imager provides a visual representation of chlorophyll content.

Both devices can be used in such industries as agriculture, precision farming, horticulture, forestry, lawn care and research.

The basic research on which the devices were based was conducted at Stennis Space Center.

(See TECHNOLOGY, Page 4)

LAGNIAPPE Commentary

Memories of Picayune

Gator parked his old 1963 Plymouth convertible in back of my car shed, effectively blocking any quick getaway I might have had in mind. Then he pounded on the screen door of my Florida room. Oh, well, have to see what the old guy wants.

"Where you been, Gator, all dressed up?" I asked with an honest hint of sincerity and curiosity.

"Been up to Picayune, visiting friends and looking around at some real estate."

"You thinking about moving up there?" I asked, surprised that the Gator would ever consider leaving these parts down here close to the big water.

"Sure am, Mackadoo, you know us gators don't cotton too much salt water, brackish is tolerable. But those folks in Picayune are blessed with good, gooey, mushy mud up there around Boley Creek and down on the Pearl. Besides, I've got lots of good friends up there in the Piney Woods."

"You're right about that, Gator. Picayune and its environs is one of the friendliest places I've ever lived."

"You ever lived?" Gator half asked and half said. "I never knew you lived in Picayune!"

"Gator, you ain't gonna believe this, but did you know . . ."

"Don't say a word, Shelby, let me guess. Not another one of your old timer 'firsts'!"

"Well, now that you mention it, Gator, I was the first NASA man shipped in from Huntsville to live in Picayune. Of course, Mrs. Margaret McCormick Tingle was the very first NASA person to settle there, but she had lots of friends and relatives around."

"Well tell me then, Pilgrim, what was Picayune like in the 'good old days'?"

"I loved it, Gator," I began. "I rented a little all-metal house north of the main town across Boley Creek. Mr. Johnny Grice found the house for me. His son, Buzzy, and I went to school together at Alabama, and we were on the 'walk-on' team. They quickly eliminated us, but we did have that in common."

"In fact, the very first person I ever hired, Wilma Stevens, was from out toward the Palestine Community. By the way, I talked to her just last week. She lives way up in Wyoming now. Somehow, she got hold of one of our books and gave me a call. She laughed and said, 'I would have never guessed you would have slowed down long enough to write a book.' I explained that I had lots of help or the book would have never gotten off the ground!"

"Ain't that the truth," Gator agreed with a big grin.

"I was just telling Wilma on the telephone that living in Picayune was one of the happiest times of my life. I remember stopping by Jean Green's Store for coffee, as well as fishing trout lines across the Pearl and the Sunday afternoon picture show."

"As they say on TV, now for the \$64,000 Question," Gator said dramatically. "Why did you move, or did they run you off? Ark, Ark?"

"What a question to ask—it was simply time to move on. But we left a lot of good memories. Did I ever tell the story about Herring Street?" M.R.H.



NASA NEWSCLIPS

New Mars findings released—A year after the landing of Mars Pathfinder, mission scientists say that data from the spacecraft paint two strikingly different pictures of the role of water on the red planet and yield surprising conclusions about the composition of rocks at the landing site.

Similar to ongoing science results from NASA's Mars Global Surveyor spacecraft currently in orbit around Mars, Pathfinder data suggest that the planet may have been awash in water three to 4.5 billion years ago.

Several clues from Pathfinder data point to a wet and warm early history on Mars.

Magnetized dust particles and the possible presence of rocks that are conglomerates of smaller rocks, pebbles and soil suggest copious water in the distant past.

In addition, the bulk of the landing site appears to have been deposited by large volumes of water, and the hills on the horizon known as Twin Peaks appear to be streamlined islands shaped by water.

Novak and Sutton named to key NASA roles—NASA Administrator Daniel Goldin named Vicki Novak Associate Administrator for Human Resources and Education and Jeffrey Sutton Associate Administrator for Management Systems and facilities. Novak has 25 years of Federal Government service during which she has served in a variety of human resources positions at the Departments of Commerce, Housing and Urban Development, and Transportation.

Since coming to NASA in 1989, she served in several key positions before her selection as Director of Personnel in February 1993. These included Special Assistant to the Director of Personnel, Personnel Officer for NASA Headquarters, and Chief of the Agency Personnel Policy Branch.

As Associate Administrator for Management Systems and Facilities, Sutton will provide Agencywide executive leadership for the functions of facilities engineering, environmental, security, logistics and aircraft management; contractor industrial relations; and management controls and assessment.

He has been acting in the associate administrator role since November.

Stennis Partners learn about remote sensing

More than 20 members of Partners for Stennis attended a remote sensing workshop, which was coordinated through NASA's Commercial Remote Sensing Program and the Mississippi Enterprise for Technology at Stennis.

The workshop was requested by the Partners group so that members could become more aware of what remote sensing is, how it is used and what benefits can be gained by its use.

Partners for Stennis is made up of business and civic leaders from Hancock, Pearl River and Harrison counties in Mississippi and from St. Tammany Parish, Louisiana. Formed in 1995, its purpose is to inform the public about the unique multiagency facility at Stennis that provides significant economic, educational and social benefits to each of its communities.

By learning more about remote sensing, the Partners will be able to better sell Stennis' capabilities to interested businesses and entice them to consider doing business with the center's more than 30 resident agencies.

Remote sensing is the observation of the surface of the Earth from distant vantage points, usually from sensors mounted on aircraft or satellites. The images gathered by the sensors are used to make detailed maps of selected study areas.

The process of remote sensing uses



Richard Campanella with the Institute for Technology Development-Spectral Visions, second from left, explains how remote sensing information is collected to Partners for Stennis members (from left) Irma Cry, executive director Slidell Chamber of Commerce and former chair of Partners; Randy Holland, assistant secretary/treasurer of Partners; and Bill Stallworth, president of Partners for Stennis. Partners requested the workshop be conducted for their members to better understand remote sensing technology and how it is used.

different wavelengths of light from the electromagnetic spectrum to identify and record the characteristics of an object on the surface of the Earth.

The workshop outlined how the information is gathered, processed and put into a form or product that can be used to solve many problems or challenges. The detailed images can help foresters determine which areas of the forest are unhealthy or help engineers plan the siting of

a transportation corridor.

"It was an excellent presentation," said Bill Stallworth, president of Partners for Stennis. "Remote sensing is an excellent opportunity for new business. It holds the potential for making our area the new Silicon Valley for remote sensing."

The workshop was presented by members of the Enterprise, the Institute for Technology Development-Spectral Visions and Lockheed Martin.



Former NASA Apollo astronaut and native Biloxian Fred Haise, right, signs his autograph for master sergeant Jimmy Mizell. Haise was the guest speaker at the 403rd Airlift Wing's annual dining out event July 11 at Keesler Air Force Base in Biloxi, Miss. The 403rd is a 1,200-member reserve unit of the U.S. Air Force. The unit includes transport aircraft for mobilizing U.S. forces and the "Hurricane Hunters" that fly into hurricanes to obtain vital information about the deadly storms. Haise told the 300 people in attendance about his experience on board the near-fatal Apollo 13 mission in 1970.



Stennis Space Center Director Roy Estess, left, presents a Space Act Award to Harvey Smith with Lockheed Martin Stennis Operations. Smith received the award for his work on the development of a hand-held hydrogen fire imager that can detect invisible hydrogen fires.

X-33 thermal protection system passes critical flight tests at beyond Mach 1

A NASA test aircraft completed six flights to test materials that will be used as the thermal protection system on the X-33 Advanced Technology Demonstrator.

The flights at NASA's Dryden Flight Research Center at Edwards Air Force Base in California were conducted at speeds beyond Mach 1, faster than the speed of sound, to provide information to the X-33 demonstrator program team.

Thermal protection systems protect spacecraft during flight, primarily as a heat shield during reentry into Earth's atmosphere. Though the X-33 will not reach full orbit, it will encounter extreme heat similar to what a spacecraft encounters during reentry.

The F-15B reached an altitude of 36,000 feet and a top speed of Mach 1.4 during the flight series. No damage or signs of wear from high speed or maneuvering were apparent on any of the thermal protection materials.

X-33 program managers said that the successful test flights "provide further confidence to the X-33 team in the ability of the materials to successfully protect the X-33 and follow-on vehicles in the harsh environment in which they will fly."

The material samples were attached to the forward-left side position of the F-15B's Flight Test Fixture II, a device attached underneath the aircraft to carry



A NASA F-15 test aircraft completed six flights to test materials that will be used as the X-33's thermal protection system. The F-15 reached an altitude of 36,000 feet and speeds of Mach 1.4.

experiments. The aircraft's on-board video system and chase aircraft cameras documented the condition of the materials during the flight tests.

"This is an excellent example of all the testing the X-33 program is performing on the challenging technologies we need for a reusable launch vehicle," said Dan Dumbacher, NASA's X-33 deputy program manager.

"With the F-15B, we were able to accomplish the X-33 thermal protection system durability flights in a timely and cost-effective manner," said Roy Bryant, Dryden's F-15B project manager.

TECHNOLOGY...

(Continued from Page 1)

"We've done a good deal of research during the last 10 years on how plant optical properties respond to various causes of stress," said Dr. Greg Carter, an aerospace technologist specializing in plant physiology with the Earth System Science Office at Stennis.

"We found that plant stress is indicated most consistently by reflectance at wavelengths near 700 nanometers," Carter said.

In his research, Carter also found that this reflectance response can often be measured by instruments before it can be seen by the human eye. This response is explained by the light absorption properties of chlorophyll.

Because all plants contain chlorophyll, the new devices can be used in a wide variety of plant stress applications.

The new technologies' compactness and ease of use make them especially suitable for work in the field.

"These devices can immediately provide the user with an indication of the amount of chlorophyll in the plant's leaves," Bruce Spiering, lead engineer with the Earth System Science Office at Stennis, and designer of both devices, explained.

"Previously, the process required the recording of multiple measurements and images. Now, the relative health of a plant can be determined in a matter of seconds," Spiering said.

Through NASA's Technology Transfer Program, commercialization opportunities for the devices exist through licensing, cooperative development and technical consulting.

"Now, the relative health of a plant can be determined in a matter of seconds."

NASA's Bruce Spiering

The next step in the process is to select a company or companies to enter into a partnership with NASA to develop the new technologies for commercial application.

"The outlook is very promising for the commercialization of both devices," said Riley.

"In fact, the potential for global use is high. The innovators are due credit for the development of sound technologies meeting several needs," she said.

For more information about the NASA Technology Transfer Program at Stennis, call (228) 688-1929.



EDITOR'S NOTE: The information contained in this special insert was provided by NASA's Environmental Office at Stennis Space Center. The information focuses on the role Stennis Space Center plays in protecting the environment where we work, the men and women who make the program work and how each of us can help.

Magee, Gordon lead environmental effort at Stennis

Leading the environmental effort at Stennis Space Center is NASA's Environmental Officer Ron Magee and NASA Environmental Specialist Jenette Gordon. Both Magee and Gordon started work at the space center in the mid- to late-1970s.



Gordon and Magee

NASA-contractor team works closely

Joining NASA in its implementation of the environmental assurance program are personnel with Johnson Controls World Services, Lockheed Martin Stennis Operations and Boeing/Rockwell International Propulsion and Power.

According to Magee, the "environmental program's success is due primarily to the dedication of the many environmental and laboratory professionals found in our contractor work force. Without them, NASA would not be able to achieve the high levels of compliance we have in our programs."

Further adding to the environmental program is the Stennis Environmental Working Group that consists of environmental coordinators from on-site federal agencies, universities and contractors.



Compliance is only one part of effort

Compliance with the laws and regulations is only part of the program at Stennis.

As NASA's lead center for rocket propulsion testing, NASA has air and water permits that cover the testing of rockets needed for current and future missions in space, as well as the operation of the various activities around the center.

The center also manages its own drinking water system and wastewater treatment systems, the latter of which is based on the chemical-free, NASA-developed artificial marsh system now used in various forms all over the world.

Cleaning up the past step-by-step

A great deal of sampling activity has been occurring in the field recently to look for any potential contamination that could have resulted from historic operations at the center.

After conducting preliminary site assessment work, NASA cleaned up various areas on-site included closing rock/reed treatment systems and neutralization pits, replacing above-ground storage tanks with state-of-the-art systems, and conducting soil removal activities.

Areas that will require extensive clean-up have undergone additional studies to determine the extent of contamination and to evaluate clean-up options.

Five areas will require cleanup:

- Area A—near Buildings 2501, 2502;
- Area B—Building 2205;
- Area C—near Building 2207;
- Area D—Cypress House;
- Area E—near Building 3308.

Clean-up methods have been selected for areas B and D with clean-up activities starting as early as October of this year.

Public information sessions have been held and will be conducted for the remaining sites by the end of 1998, with cleanup to be well underway by mid-1999. Sessions are held to inform Stennis employees and residents of area communities about the clean-up process, to present results from investigations and to answer questions. For more information about the activities of the NASA Environmental Office at Stennis, contact Magee at Ext. 7384 or Gordon at Ext. 1416.



Soil samples are taken in the field to look for any potential contamination that could have resulted from historic operations at the center.

Pollution prevention starts with you

To minimize the impact that Stennis operations has on the environment, NASA is continuously looking for ways to reduce waste produced from specific activities and to operate in a way that preserves the center's natural resources.

To this end, NASA, along with the entire resident agency and contractor population at the center, has established a recycling program. The matrix at the bottom of this page will help you find the appropriate avenue to recycle items employees may generate in the course of doing their jobs.

Join the team

There is a new look around the center. Recycling bins are showing up at every desk, copier and vending area.

In 1997, 110 tons of paper were recycled. Thanks to NAVOCEANO, new cardboard recycling bins were in place at the beginning of this year, and NASA is purchasing more bins due to the high demand.

Almost 40 percent of what goes into our landfill is paper and cardboard.

"Our hats are off to the folks at United Services Associates, Inc. (USA), our new custodial contractor," said Ron Magee. "They have agreed to take cardboard created by the offices out to the cardboard recycling bins if the cardboard boxes are first broken down."

Veronica Fleeton, USAI manager, and all the employees are to be commended for their extra efforts to do the right thing for the environment, Magee said.

The recycling bag is also catching on with the vendors in Building 1100 who are now recycling their cardboard.

We need your help

To save our landfill and to save countless numbers of trees in the future, every Stennis Space Center employee needs to:

- Recycle all white paper in new desk recycling bins;
- Carry recycled paper to the large recycling collection bins located in work areas;
- Break down boxes and place them next to office trash cans;
- Place aluminum cans into the can recycling bins.

Non-hazardous solid waste disposal at Stennis Space Center

It is NASA's goal to maximize the quantity of materials recycled and minimize the quantity of solid waste sent to our on-site landfill. The table below explains where to send waste products. Remember, the success of our recycling program depends upon the availability of markets for secondary materials, so buy and use products with recycled content whenever possible.

Material	Dumpsters	Landfill	Rubbish Site	Designated Containers	Recycle Bins	Other	Conditions
Aerosol cans				X			
Aluminum cans					X (1)		Call x1503 for pick up
Antifreeze, used					X (1)		Call x1503
Batteries, alkaline					X (1)		Call x1503
Batteries, lead-acid					X		Please break down boxes
Batteries, other					X (3)		Recycled through JC-HVAC shop
Cardboard					X (3)		Take to storage rack at B2210
CFC refrigerants					X (4)		Excluding fluorescent bulbs
Fluorescent bulbs					X (5)		Take to storage rack at B2210
Glass					X (5)		Must be > 99% pure
Lighting ballasts					X (5)		Call x1503
Mercury					X (5)		Must have < 1/2 inch dried residue in can
Metal drums, empty					X (5)		Call x1309 for pickup when full
Metal paint cans-empty					X (5)		Call x1503 for pickup when full
Office paper, white				X (5)			Call Supply Operations x3264 or x1530 for pickup
Oily rags				X			Call Supply x3264 or x1530 for pickup
Pallets, unbroken				X			Put in outgoing mail box
Scrap metal (ferrous)				X			Call x1303 or x1503
Telephone books				X			Call Supply x3264 or x1530 for pickup
Tires				X			Call x1503 for pickup when full
Toner cartridges				X			See note (8)
Used oil				X			Green, limbs, stamps, leaves, etc.
Wood debris	X		X				
Yard waste		X					

(1) Send a completed Waste Removal Form (SSC-WRF) to JC-EH at fax 1326, or call 7945 or 1503.

(2) Residue from surfaces with lead coatings must be treated as potentially hazardous waste - contact JC-EH at 7945 or 1503.

(3) Fluorescent bulbs and lighting ballasts should be taken to the storage rack at the north end of B2210.

(4) Waste elemental mercury must be at least 99% pure to be recycled. Send WRF form to JC-EH.

(5) Drums that stored nonhazardous material go to the recycling facility at the landfill to be crushed and put in the scrap metal bin. Drums that stored hazardous materials must be treated as potentially hazardous waste - contact JC-EH at 7945 or 1503.

(6) Metal paint cans can be recycled ONLY if they are EMPTY (less than 1/2 inch dried residue); otherwise contact JC-EH at 1503.

(7) Employees are encouraged to use the recycling bins located at the south gate.

(8) Unpainted, untreated wood goes to the rubbish site, otherwise to the landfill - contact the landfill operator.

Powe is helping build a 'road map to the future'

Dr. David Powe, chief of Education and University Affairs, truly loves his job. Powe, who has lived in Mississippi his whole life, has dedicated his entire career to education.

After receiving a bachelor's degree in social work and psychology, a master's degree in social science from Mississippi State University, and a doctorate in education administration from the University of Southern Mississippi, Powe furthered his studies at the Columbia Teachers College in New York.

In 1969, Powe became the first school social worker in Mississippi. He later became the Superintendent of Education for the McComb public schools and then served as the president of Mississippi Delta Community College for three years.

Powe joined NASA in 1992 as the site program manager for the Tri-State Education Initiative (TSEI). A national effort that began in Mississippi, Tennessee and Alabama, TSEI was implemented at Stennis Space Center by NASA Headquarters to serve as a model for school districts. The program is being replicated in 14 other locations, including places located outside of the United States.

A new initiative that began recently is called the Gulf Coast Education Initiative, which encompasses the Mississippi Gulf Coast and two parishes in Louisiana. The mission of the initiative is to provide innovative efforts to promote and support the efforts of the school districts to develop a quality education system that will permit their students to obtain the necessary skills for future gainful employment in America's high-tech economy.

"We're here to support and enhance education in Mississippi and the nation."

Dr. David Powe



SSC Employee Profile



Powe's department also works closely with the Department of Education, community colleges and universities to offer research opportunities to faculty and students. His office also conducts a gap analysis to help schools determine how to maximize their resources to resolve problems such as personnel and equipment shortages.

"We help build a road map to the future," said Powe, whose office has been responsible for transferring millions of dollars in technology and computer equipment to K-12 schools.

According to Powe, one of the most exciting rewards of the education initiative at Stennis is that so many teachers and students have benefited from the advanced technology and information.

"We are so excited that we can bring what we've been successful in throughout the country to the Gulf Coast, and work very closely with the school systems here," he said.

Powe said he is also pleased to see the combined efforts of the more than 30 Stennis resident agencies, NASA and area schools. "It's a good marriage," he said.

Powe's office has received numerous awards including one from the Society

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Editor's note: As part of Stennis Space Center's celebration of the 40th Anniversary of the National Aeronautics and Space Administration, the Lagniappe will publish monthly throughout 1998 significant dates in NASA's history.

Feb. 24, 1988—Rocketdyne test team conducts 1,000th firing of a Space Shuttle Main Engine during a highly active "return-to-flight" period, following the Challenger accident, in which many rocket testing records were set.

National attention was focused on the National Space Technology Laboratories (NSTL) during this time.

May 20, 1988—NSTL was renamed John C. Stennis Space Center by Executive Order of President Ronald Reagan. The renaming was championed by U.S. Senator Thad Cochran, a friend of Senator Stennis, and by NASA Administrator James Fletcher, who wanted to recognize Stennis for his "years of support" to America's space Program.

Sept. 29, 1988—The Space Shuttle Discovery (STS-26) was launched from Kennedy Space Center in

Florida signifying America's "return-to-flight" following the Challenger accident.

Jan. 18, 1989—Construction began on the Component Test Facility (CTF) to test turbopump machinery for rocket propulsion systems. CTF is now a world-class facility hailed internationally for its capability.

July 28, 1990—Tests were conducted on all three test stands at Stennis Space Center in one day: a 771-second test on the B-1 position, an ignition test on the A-2 stand, and a 530-second static firing on the A-1 stand were accomplished.

The Summer High School Apprenticeship Research Program (SHARP) is designed to attract and increase student participation and success rates in mathematics and science courses, as well as to encourage career paths that help build a pool of under-represented science, mathematics, engineering and technical professionals. Selected area high school students serve as paid apprentices to scientists and engineers for eight weeks. Pictured front row from left: Angela Baldree, Tasha Payton and Lauren Pigott. Second row: Renee Jarvis, Mariana Evans, Thea Rayford and Kimberly Jackson. Back row: Ivory Smith and Angel Koonce.



Glenn, STS-95 crew prepare for mission

John Glenn, 77, who 36 years ago made history when he strapped himself into a 9-by-7-foot capsule atop an experimental rocket and became the first American to orbit the Earth, will make his second flight into space when the Space Shuttle Discovery lifts off October 29.

The mission's objective is to conduct a variety of science experiments carried in the pressurized Spacelab module, the deployment and retrieval of the Spartan free-flyer payload, and operations with the Hubble Space Telescope Orbiting Systems Test and the International Ultraviolet Hitchhiker payloads carried in the payload bay.

The STS-95 crew will be commanded by Curt Brown, and the pilot will be Steve Lindsey.

Three mission specialists assigned to the flight are Scott Parazynski, Steve Robinson and Pedro Duque from the European Space Agency. Payload specialists are Glenn and Chiaki Mukai, from the Japanese Space Agency.

Since aging and space flight share several similar physiological responses, the study of space flight may provide a model system to help scientists interested in understanding aging. Some of these similarities include bone and muscle loss, balance disorders and sleep disturbances.



John Glenn

Funds will enhance incubator services

Stennis Space Center is one of six NASA centers that received funds that will enhance services to firms in existing business incubators.

The incubators provide business development support services to start-up companies or small existing high-technology firms and educational institutions in the U.S. for the purpose of commercially applying NASA technology.

"Stennis' incubator, the Mississippi Enterprise for Technology, will use our augmentation to enhance and expand our local incubator in support of propulsion test and remote sensing technology development," said Kirk Sharp, NASA Technology Transfer Officer at Stennis.

Existing NASA-sponsored incubators other than Stennis are located at the Ames Research Center, Johnson Space Center, Kennedy Space Center, the Lewis Re-

POWE...

(Continued from Page 7)

tary of Education, one from the Lieutenant Governor and five Hammer Awards from Vice President Al Gore "for making government better."

Powe said his career is very rewarding. "It's a person's dream to work with people of such stature," he said, noting that he is proud to work at one of NASA's lead centers. "It's a different level of opportunity for me from the standpoint of technology and its global effect on the entire world," he said. "Every fabric of our lives is being changed by the work that's

search Center and the Marshall Space Flight Center.

NASA also awarded cooperative agreements to three entities that will establish a high-technology business incubator at one of three NASA centers—Goddard Space Flight Center, Langley Research Center or the Jet Propulsion Laboratory combined with the Dryden Flight Research Center.

With the three new business incubators, NASA now has a nationwide resource to expand the growing high-technology interests of small businesses and educational institutions.

NASA will provide \$400,000 per year for fiscal years 1998 and 1999 to each new business incubator. Each new incubator will match or exceed NASA's contribution through cash or in-kind funding from non-federal sources.

happening right here at Stennis Space Center."

Powe recently moved to Gulfport from Booneville, Miss., where he had been very active in a host of community organizations. He said he plans to continue his community involvement by becoming active in several Gulfport organizations.

Powe loves Mississippi and is proud to live in the state. "Mississippi's the best kept secret anywhere because of its people and what we're doing here," said the married father of three. "Almost everywhere you go, you have people from Mississippi leading and doing great things."



More than 140 children from Mississippi, Louisiana, Alabama, North Carolina and California participated in NASA's AstroCamp 1998 this summer at Stennis Space Center and the Lynn Meadows Discovery Center in Gulfport, Miss. This year's theme was "Mission to Mars: The Red Planet." Campers participated in projects such as building and launching their own model rockets, as well as attending field trips.

NASA Spinoffs

Did You Know?...

Temperature PII - An ingestible thermometer capable of accurately measuring and relaying deep internal body temperatures was co-developed by NASA and the Johns Hopkins University. The thermometer enables improved patient care in hospitals and offers opportunities in medical experimentation.

Space Technology for Firefighting

NASA helped improve the portable breathing systems used by firefighters to protect their lungs from the smoke and toxic gases of a fire. The improvements applied technology from the portable life support systems used by Apollo astronauts.

Air/Wastewater Purification Systems - A system to purify the air and wastewater of an enclosed system was developed at NASA's Stennis Space Center. This system could clean and recycle a spacecraft's oxygen and water, reducing the amount that needs to be carried, thereby reducing the amount of fuel needed to launch the spacecraft.

Erosion-Resistant Coating - A coating developed by NASA in the early 1970s to reduce maintenance costs at Kennedy Space Center, was used on the Statue of Liberty and the Golden Gate Bridge to protect them from salt spray, wind and fog.



Members of the NASA Summer Faculty Program gathered in the Stennis Space Center Atrium during a recent workshop. The Summer Faculty Program provides a means for college faculty to conduct research, design studies, engage in product development and other activities in conjunction with Stennis scientists and engineers during a 10-week period in the summer. Pictured (front row, from left): Ronald Marcy and Jason Pugh, MS Gulf Coast Community College; Dr. Pretap Puri, University of New Orleans; Michael Pratt, Xavier University; and Dr. William Ringle, Davidson College. Back Row: Dr. Charles Komer, University of Southwestern Louisiana; Dr. John Schmalzel, Rowan University; Dr. Stephen Duplantier, Xavier University; Dr. Gregory Easson, University of Mississippi; Dr. Ramanthan Sampath, Clark Atlanta University; Dr. James Miller, University of Southern Mississippi; Dr. Armond Joyce, Stennis Space Center; Dr. Kimbrell Marshall, Jackson State University; and Dr. Ronald Luna, Tulane University.

Safety
Corner

Information provided by NASA's Safety Reliability and Quality Assurance Office

Beware of heat index when outdoors

The South has been suffering from terrible heat and humidity this year. Temperatures have been near 100 degrees most of the month.

It is important to get the word out to Stennis Space Center employees to take it easy and to take proactive steps to prevent heat illness.

Heat illnesses are a spectrum of disorders that range from the very mild heat rash and heat cramps to the serious heat exhaustion and life-threatening heat stroke.

Be alert to the symptoms of heat exhaustion and heat stroke which are as follows:

■ Heat exhaustion symptoms: nausea, vomiting, irritability, headache, rapid heart rate, weakness, difficulty breathing, dizziness, chills and dehydration.

■ Treatment: Rest, cool down (shade, air conditioning) and increase fluids.

■ Heat stroke symptoms: lack of coordination, bizarre behavior, confusion, seizures, coma, vomiting, elevated body temperature.

■ Treatment: Immediate cooling. This is a medical emergency. Get medical attention as soon as possible.

LAGNIAPPE

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Comments and suggestions should be forwarded to the Lagniappe Office, Building 1290, Room 308, Stennis Space Center MS 39529, or call (228) 688-3583.

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QUICK LOOK

■ **Stennis Space Center's Center of Higher Learning** announces full registration for Mississippi State University, the University of Southern Mississippi's Hattiesburg and Gulf Park campuses and the University of New Orleans. Registration for all universities will be held from 10 a.m. to 1 p.m. on July 28 in Building 1103. For more information, call Keri Hensarling at the Center of Higher Learning at Ext. 3366.

■ **The next blood drive will be held by the Blood Center of New Orleans** on Sept. 1 and 2. This is the first two-day blood drive to be held at Stennis. For more information, contact Elizabeth Valenti at Ext. 1468.

■ **Hancock Bank at Stennis Space Center** is offering free mortgage check-ups from July 13 through August 31. For more information, call Ext. 3053.

■ **Keesler Federal Credit Union** currently has financing as low as 6.95% APR for new and used autos. (Rates and terms vary based on credit history. Limited time offer.) For more information, call Beth McGregor at Ext. 3478.

POWER PACK...

(Continued from Page 1)

Getting the A-1 stand ready for testing has required a great deal of coordination and teamwork between NASA and its three main contractors—Boeing/Rocketdyne Propulsion and Power, Lockheed Martin Stennis Operations and Johnson Controls World Services.

"Our team has worked some long, hard hours to get A-1 ready for testing. They should be recognized for a job well done," said Nunez.

The Reusable Launch Vehicle program is a joint NASA-industry partnership with the goal of developing a new generation of rockets expected to dramatically cut the cost of putting payloads into space.

The X-33, currently being built by Lockheed Martin Skunk Works in Palmdale, Calif., will be a test vehicle only. It will be used to conduct flight and ground research for a full-scale vehicle named "VentureStar," which the company plans to develop early in the next century.

The X-33 will provide information needed for industry to decide by the year 2000 whether to proceed to the development of a commercial, single-stage-to-orbit reusable launch vehicle.

This vehicle will reduce the cost of access to space, thus enabling a whole new range of space business and science endeavors.

X-33 test flights will begin in mid-1999. It will launch from Edwards Air Force Base in California.



National Aeronautics and Space Administration

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