



LAGNIAPPE

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Sun-Earth Day at SSC

Exploring life under the sun

About 150 local students created an edible sun model during Stennis Space Center's Sun-Earth Day celebration on April 10.

With a plain cookie, the students created the sun's outer layers – photosphere, sunspots and solar prominences – by spreading white frosting and shaking yellow and red sprinkles on top. The sprinkles illustrated the granular appearance of the photosphere. A few chocolate chips served as sunspots and a few pieces of licorice formed small arches for the solar prominences.

“This was one of the students’ favorite activities, and it helped them to visualize how the Sun is structured,” said Keely Keyser, SSC’s NASA Explorer Schools coordinator. “All the hands-on activities were great learning experiences for students to have a better understanding of the relationship between the sun and Earth.”

Participating elementary schools – Second Street in Bay St. Louis, Hancock County and Nicholson – were selected from those whose teachers attended SSC’s Office of



Michael Sandras, a member of the Pontchartrain Astronomical Society, explains his solar telescope to students of Second Street in Bay St. Louis, Hancock County and Nicholson elementary schools in StenniSphere’s Millennium Hall. The students participated in several hands-on activities at Stennis Space Center’s Sun-Earth Day celebration April 10.

Education’s Sun-Earth Day workshop in February. Divided in five rotating groups and sessions, the stu-

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Applied Sciences’ new associate director visits SSC



Dr. Teresa Fryberger (center), NASA’s new associate director of Applied Sciences in NASA Headquarters’ Science Mission Directorate, meets with Mark Glorioso (left), Stennis Space Center’s Applied Research and Technology Office chief; and SSC Director Dr. Rick Gilbrech during her visit to the center March 20. Fryberger visited SSC to learn more about the people who conduct the center’s work in the program. SSC participation includes research in NASA science capabilities relevant to community concerns such as climate change and health of the planet. The work includes creating advanced computer-generated visualizations, demonstrating research results from remote sensing data and models, and managing the information used by Applied Sciences Program participants at four other centers and NASA Headquarters.

From the desk of
Gene Goldman
 Deputy Director,
 Stennis Space Center



“Can’t do it that way.” “It’s never been done.” “(Fill in blank) won’t approve it.” Have you heard, or even used, such phrases? Too often we allow these admonitions to affect our thoughts about new initiatives. It’s been said NASA is an aging agency, petrified by bureaucracy. It doesn’t have to be that way.

Challenging the nation to a race for the moon in 1961, with 15 minutes of ballistic spaceflight experience, President Kennedy charged, “We do these things not because they are easy, but because they are hard.” We work at a center raised from the muck of a cypress swamp to meet that audacious goal. Early in the program, construction of the test stands was the critical path to footprints on the moon. The Apollo Program, born of a vision, built the infrastructure, processes, work force and the flight hardware to successfully complete that mission. We “stand on the shoulders of Titans” with a quest to further prior achievements.

Many say Apollo had an unlimited budget and zero precedent; but they had slide rules and a belief they could. We have more constraints; we also have more experience, infrastructure and incredible computing power. We can’t control the budget we receive or program assignments; we

can control how we manage our efforts. I once heard a senior manager say, “We have to break the rules to get the job done.” I don’t understand that mentality. Our task is to accomplish goals within strictures. Anybody can do it by breaking rules.

We are in a pivotal era of space exploration. Nearing the end of shuttle, we are in initial phases of preparation to test engines for a new lunar program. This will be the third generation of engines tested on stands built back in the 20th century, and will require our best effort. We also have significant roles in applied science, enabling a better understanding of our planet with tremendous potential for lunar and planetary exploration. Our ability to collaborate with other federal agencies in using space-generated data is unequalled. These opportunities come with technical and resource challenges, requiring us to focus our energy and capabilities. The potential benefits are incalculable.

History is replete with civilizations that failed to accept risks and ceased to explore. The same is true for organizations. I recently attended the “For Inspiration and Recognition of Science and Technology” (FIRST) Robotics Competition at the Convention Center in New Orleans, a site once symbolic of suffering and hopelessness. Talk about inspiration! That center was filled with the enthusiasm of youth and volunteers, many from Stennis Space Center, all with a full belief in what they could accomplish together. Let’s foster that same spirit as we face these challenges. The cypress paneling in my office attests we can accomplish whatever we believe we can.

Gene Goldman

Mississippi commits \$10M to INFINITY Science Center

INFINITY at NASA Stennis Space Center moved one step closer from a dream to reality

March 30 when the Mississippi Legislature passed SB 3190.



“This is extremely good news,” said Leo Seal, INFINITY board chairman. “With this commitment we can now start moving ahead with plans.”

When Gov. Haley Barbour signs the revenue bill, Mississippi will increase its financial support from the \$6 million approved in 2006 to \$10 million. INFINITY’s board of directors is at work to raise at least \$8 million to qualify for additional support from NASA and other agencies.

A feasibility study for the project anticipates approximately 300,000 visitors to the site each of its first five years, producing a local economic impact of more than \$35 million annually. The science and visitors center also will produce more than 50 jobs and impact an additional 850

indirect jobs, according to the study.

Internationally respected architects and exhibit designers have already completed plans for many of the exhibit areas. U.S. Navy Seabees currently are clearing 30 of the site’s 200 acres on I-10 just outside SSC’s gates.

Apollo 13 Astronaut Fred Haise, a member of the INFINITY board of directors, emphasized the center will be unique in its offering of a family

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FULFILLING THE VISION FOR SPACE EXPLORATION

J-2X powerpack work progressing

Recent work on the J-2X rocket engine means progress in the engine's development, according to NASA's Gary Benton, J-2X project manager at Stennis Space Center.

In a fit-check exercise for the J-2X powerpack, a vintage 1960 J-2 thrust chamber was recently fitted with brackets and supports to mount fuel and oxidizer pumps onto its injector-chamber assembly. The work, which took place in Pratt & Whitney Rocketdyne's Building 9101 assembly facility, was performed with PWR technicians and welders under the direction of PWR engineers. Mississippi Space Services employees machined the brackets and supports welded to the injector-chamber assembly as part of the fit-check exercise.

"It's something new," said Brian Sproles, PWR's J-2X assembly and test Integrated Product Team manager, "for our engineers to do prototype assembly work here, then MSS' machine shop making the brackets and welders actually putting them on the test article. Even though it's not a flight engine, this is the program's first test article, and it's being fabricated and assembled here at SSC."

Together, the elements make up the J-2X Powerpack 1A, which will be fitted with gas generator, and liquid hydrogen and liquid oxygen pumps pulled from the Linear Aerospike Engine on display in SSC's visitor center, StennisSphere. Those pumps are now at PWR's Canoga Park, Calif., headquarters getting new seals, bearings and other internal refurbishments.

The oxygen and hydrogen pumps were modified from those used in the Apollo Program's J-2 engines, which helped propel Apollo's Saturn V rocket. The J-



A vintage 1960 J-2 thrust chamber is fitted with brackets and pumps recently at the Pratt & Whitney Rocketdyne assembly facility in SSC's Building 9101. Together, the parts comprise the J-2X Powerpack 1A test article. Mississippi Space Services machined the new bracket (the V-shaped arm on the right), making this the first time parts for an engine test article were machined, welded and assembled on site.

2 and the Linear Aerospike were tested at SSC. The J-2X engines, which will also be tested at SSC, will eventually carry humans back to the moon as part of America's Vision for Space Exploration.

To an untrained eye, the test article looks like a complete engine, but it's really just a nozzle and combustion chamber assembly, a "piece of metal to attach the pumps to," Sproles said. "We're using it as a hanger for the test stand," a sort of mock-up to make sure everything fits the way it should.

Powerpack 1A will be used for checking the operation of the test stand and test team operations, testing the integrated powerpack components at sea level conditions during start and shutdown sequences and studying propellant flow and turbomachinery component life.

"This all means we're about to get into our first critical component testing," Benton said. "The tests will provide baseline data to feed into the J-2X engine design."

Benton said flow and facility activation testing on the A-1 Test Stand is scheduled to take place late this summer, and the test article should be installed in August or September. "We're on track, meeting the requirements as planned," he said.

A-1 Updates

- Paint work completed on Levels 7-10
- Painting on Level 6 structure under way
- Work continues on Master Facility Panel, shop air
- Installation of auxiliary flare stack piping continues
- Preparations under way for moving the flare stack from B-1 to A-1
- Powerpack Adapter fabrication continues
- Materials on hand for pipe fabrication

SSC hosts Special Olympics



Dana Brannan (above) of Picayune displays a blue ribbon she earned competing in the Area III Special Olympics, held March 31 at Stennis Space Center. Andrew Muns (at left) of the Biloxi Indians Special Youth Team helped kick off the competition by carrying the Olympic torch into the games. Other competing athletes include Travis Ladner (far left) in the disk toss, as volunteer Steve McCord watches; Tiffany Heneger (below) in the wheelchair race as volunteer F.J. Cutting records the time; and



Luke Gray (bottom left) in the softball throw, measured by volunteers David Perkins (below) and Marina Benigno, director of SSC's Center Operations Directorate. Athlete Albert Huddleston (bottom right) had a chance to meet Cincinnati Bengals wide receiver Skyler Green, who volunteered as a marker for the softball throw event.



2 innovations earn awards

NASA's Innovative Partnerships Program under the Science and Technology Division at Stennis Space Center recently presented Tech Brief and Software awards to Elizabeth Valenti of WorldWinds Inc., Patrick Fitzpatrick of Mississippi State University's GeoResources Institute and Bruce Farner of NASA.

Valenti and Fitzpatrick were awarded for their collaborative development of an interactive database containing atlases of storm surge flood levels for the Louisiana-Mississippi Gulf Coast region. These atlases aim to make flood forecasts more accurate, thus improving severe storm preparedness and evacuation scenarios.

Using an algorithm to derive elevation measurements from Interferometric Synthetic Aperture Radar remote sensing data, Valenti and Fitzpatrick developed the storm surge simulation, "Forecasting of Storm-Surge Floods Using ADCIRC and Optimized DEMS."

Their invention was published in NASA Tech Briefs magazine's December 2006 issue.

Bruce Farner of NASA's Engineering

and Science Directorate at SSC received a Tech Brief Award for his innovation, Balanced Piston Relief Valve with Side Vented Reaction Cavity.

He developed the theoretical valve to greatly reduce the force within the piston area of high-pressure, high-flow relief valves in SSC's E Test Complex. Farner theorizes a small shoulder put on the side of the piston would create a differential to produce reactive force to move the valve piston and relieve the pressure. The cavity created by this shoulder must be vented to atmospheric conditions. This provides a tunable force at valve lift points and may provide higher reseal pressures.

The valves could be used in any large pressurant piping delivery system. The E Complex most commonly uses nitrogen, helium, oxygen or hydrogen to keep cryogenic fuels pressurized within its test facility. SSC's test area



Elizabeth Valenti (left) of WorldWinds Inc. and Patrick Fitzpatrick (center) of Mississippi State University's GeoResources Institute recently received Tech Brief and Software awards for a database they developed. NASA's Bruce Farner (second from right) also received a Tech Brief Award for his technology innovation. The awards were presented by NASA's Ray Bryant, SBIR/STTR program manager at SSC; and Ramona Travis, SSC's Innovative Partnership program manager.

has experienced several failures of high-pressure, high-flow relief valves due to the large forces exerted on the piston within them.

Farner's invention is scheduled for publication in an upcoming issue of the NASA Tech Briefs magazine.

Ray Bryant, Small Business Innovation Research/Small Business Technology Transfer program manager, and Ramona Travis, is the Innovative Partnership Program manager, presented the awards on behalf of NASA's Inventions and Contributions Board.



Kennedy Space Center technicians carefully sand away the external tank's red dye to help expose cracks and dents caused by golf ball-sized hail during a Feb. 26 storm.

STS-117 launch update

NASA is targeting June 8 as the next possible launch opportunity for Space Shuttle Atlantis' STS-117 mission.

The decision by agency management followed a meeting that reviewed the progress in repairing insulating foam on the shuttle's external fuel tank, damaged during a hail storm Feb. 26 at Kennedy Space Center, Fla. That damage required engineers to repair approximately 2,660 sites on the tank.

The launch window extends from June 8 to July 18. Wayne Hale, manager of the Space Shuttle Program, said, "What we're doing is letting the work drive the schedule, not the other way around."

NASA engineer serving in Kuwait

Editor's Note: NASA wants to highlight SSC employees who are serving our country. If you know of someone who is serving or will serve in Operation Iraqi Freedom or Operation Enduring Freedom, contact NASA News Chief Paul Foerman at 688-3333.

In January, NASA engineer Kevin Power traded cubicle walls and a computer screen for camouflage and camels to take on the full-time role of Cmdr. Kevin Power, U.S. Navy.

Power, a member of the technical management team in the Project Integration Office of Stennis Space Center's Project Directorate, has had his boots on the ground at Camp Arifjan, Kuwait, since February. He is one of a handful of SSC employees who have been or will be mobilized to the Middle East in support of U.S. efforts in the region.

Power is an individual augmentee in the Navy's Facilities Engineering Detachment Kuwait. He and 13 other IAs work directly for the U.S. Army Area Support Group Kuwait, filling personnel gaps for other branches of service. They are responsible for all military construction projects

in Kuwait in direct support of Operation Iraqi Freedom.

From the permanent base at Camp Arifjan (about 10 miles from the Persian Gulf), Power manages projects at the Kuwait Naval Base and at the Sea Port of Debarkation, where all equipment, materials and supplies go into and out of the area of operations.

The scope of support required by troops in Iraq has been "the most eye-opening thing for me," Power said. "The equipment, materials, supplies and per-



Cmdr. Kevin Power
serving with the U.S. Navy's Facilities Engineering Detachment in Kuwait

sonnel required ... are incredible."

A reservist since 1988, Power said the biggest adjustment has been the separation from his family. At home in Mandeville, La., his wife Susan and the couple's three children, Brandon, Madison and Devin, have a strong network of support from their church, neighbors and extended family.

"Kevin is very committed to his mission," Susan said. "He totally believes in it, and believes he's there for a reason. That makes it easier to put up with the hardship of the distance."

"This is a big endeavor on his part," said Kevin's father, World War II veteran Michael Power. "When he told me he was going to be deployed, he wouldn't harbor a thought of getting out of his duty. He's got a lot of integrity about him."

When Power returns to the states in September, he'll resume his civilian duties at SSC. He said the skills he's learned in his 18 years with NASA have helped him jump into the work and keep his projects moving.

"Kevin led an agency-wide team this past year studying the Constellation Program's requirements for J-2X altitude testing," said NASA's David Brannon, head of SSC's Propulsion Test Integration Group. "His leadership was instrumental in resolving our plans to test the J-2X engine on the appropriate altitude facility. We miss his contributions to the work here, and we miss him."

Others who serve

Ray A. Billeaud III

The Paragon Systems employee at SSC has served in the military for 18 years. The Mississippi Army National Guardsman is a sergeant with the 155th Brigade, 155th Infantry Battalion. Deployed to Bosnia in 2001, the 35-year-old was mobi-



Sgt. Ray A. 'Skip' Billeaud III
with children Nick, Mea and Louis

lized to Iraq in December 2004, returning to help his family deal with Katrina's aftermath. In Iraq, he worked with the mechanized infantry in the Battalion Tactical Operation Center. The Kiln, Miss., resident and single father kept up with his three children via Webcam and e-mail while he was away. "That helped a lot."

SUN-EARTH DAY

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dents enjoyed a half-day of fun-filled experimental activities that aligned with this year's national celebration of Sun-Earth Day, "Living in the Atmosphere of the Sun," on March 20.

Other SSC-sponsored activities included solar clocks, where students created a small paper sundial to indicate the time based on the position of the sun in the sky. Students also observed the changes in shadows over time to develop a sense of the earth's motion. SSC's staff presented a cryogenics demonstration that showed cryogenics' relationship to solar exploration and the extreme environment of space.

SSC's portable planetarium was used for the students to view the solar system and its constellations, and members of the Pontchartrain Astronomical Society brought solar telescopes for students to view the sun.

"Sun-Earth Day allows us to explore ways to bridge the gap between solar exploration and education. It's interesting to learn about the sun's impact on the earth," said NASA SSC Education Officer Dr. Dewey Herring. "Teachers and students, who participated in both the workshop and this event's educational activities, can continue to apply what they have learned in their classroom."

Sun-Earth Day is a national celebration of the sun, the space around the earth, and how it affects life on Earth. The purpose of Sun-Earth Day is to educate the public on how the sun, which is a magnetic star, impacts the earth and other planets in the solar system, and that all humans use technology to understand the sun and the universe.

INFINITY

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entertainment attraction and an educational center for science and technology students. "We say that INFINITY will be a place to visit, play and learn. That's a combination that ensures our success."

Though still two years from its anticipated opening date, INFINITY already operates a Web site providing educational tools for families and teachers. To learn more about INFINITY and follow its progress, visit InfinityScienceCenter.org.

AROUND NASA

■ Team checking on Odyssey's power supply:

Engineers for NASA's Mars Odyssey mission are examining data from the orbiter to determine whether onboard backup systems never used by the 6-year-old spacecraft could still be available if needed. Odyssey reported recently that a power processing component of the backup, or "B-side," systems had stopped working. The component, the high-efficiency power supply, has a twin that is continuing to serve the "A-side" hardware, which is operating normally. Odyssey has stayed on its A-side systems, including the A-side flight computer, since launch in 2001. However, the A-side power supply cannot serve most systems on the B-side, including the backup B-side computer. If engineers do not determine a way to restore the B-side power supply, most of the backup hardware would not be available, if it were ever needed.

■ NASA chooses firms for contracts:

NASA has awarded 45 commercial, fixed price, indefinite delivery, indefinite quantity contracts to 37 vendors under the Solutions for Enterprise-Wide Procurement IV. The principal purpose of the SEWP IV contracts is to provide customers with state-of-the-art computer technologies, high-end scientific and engineering processing capabilities, network equipment and peripherals. These Government-Wide Acquisition Contracts are available for ordering by all NASA centers, all federal agencies and their contractors. The period of performance for each of the contracts is seven years. The minimum amount of supplies or services that may be ordered is \$2,500 with a maximum of \$5.6 billion per contract.

■ Astronaut runs Boston Marathon in space:

NASA astronaut Suni Williams went faster than anyone has ever gone in the Boston Marathon on April 16. She ran the famed race this month as an official entrant from 210 miles above Earth aboard the International Space Station. It was the first time an astronaut in space was an official participant in a marathon. Williams, an accomplished marathoner, has served aboard the space station since December 2006 as a member of the Expedition 14 crew. She ran the race on a station treadmill, circling Earth at least twice in the process, running as fast as 8 mph but flying more than five miles each second.

■ NASA extends contract with Russian counterpart:

NASA has signed a \$719 million modification to the current International Space Station contract with Russia's Federal Space Agency in Moscow for crew and cargo services through 2011. The firm-fixed price extension covers crew rotations for 15 crew members, six in 2009, six in 2010 and three in 2011, delivery and the removal of 5.6 metric tons of cargo. U.S. Commercial Orbital Transportation Services are still planned to provide the bulk of cargo transportation needs from 2010 and beyond to the space station. With the modification, NASA also is purchasing the capability for the Russian Docking Cargo Module to carry 1.4 metric tons of NASA cargo to the space station. That module is scheduled to fly in 2010.

Dominique Dawes signs a poster for students of the Brook-Lin Gymnastics Center after Dawes' presentation in the StenniSphere auditorium March 27. The girls heard the Olympic gymnast speak about setting goals and pursuing dreams.



National Women's History Month Gold medalist speaks at SSC

"There's purpose, there's power, there's progress, but before you can ever have any initiative, you need to have a passion for what you are doing."

Those inspiring words were spoken by motivational speaker Dominique Dawes, the featured guest during a National Women's History Month program presented by NASA Stennis Space Center's Office of Diversity and Equal Opportunity on March 27.

Dawes, the nationally renowned Olympic-gold medalist who now heads the Women's Sports Foundation (WSF) in East Meadow, N.Y., elaborated on personal experi-

ences in her presentation, "Success is a Journey, Not a Destination."

"I learned more from falling in a competition," said Dawes. "I encourage all of you to find a passion, whatever it might be. You are worth the journey. Start taking steps to make it happen."

Dawes advanced to the international spotlight during the 1992 Barcelona Olympics, where she made history as the first African-American gymnast to qualify and compete in the Olympic Games. She was the first African American to capture a bronze medal in a solo floor exercise during the 1996 Olympic Games in Atlanta.

FMA Live! coming to Moss Point

FMA Live! is coming to Moss Point, Miss. The award-winning live stage show supported by NASA and the Honeywell Corp. will perform its unique version of hip-hop science education May 10 at Magnolia Junior High School. Performance times will be 8:45 and 10:15 a.m.

FMA Live! strives to engage middle-school students in math and science through a live, stage show demonstrating the amazing science in kids' everyday lives. Featuring high-energy actors, music, video and demonstrations, FMA Live! teaches Forces and Motion and the process of scientific inquiry in an innovative, entertaining and memorable way. Showgoers witness Sir Isaac Newton's legendary Three Laws of Motion and experience science in a brand new way.

Astro Camp booked; Astro Camp Plus open

All Astro Camp sessions for children ages 7 through 12 are completely full for summer 2007.

There are still openings in sessions of Astro Camp Plus for teens ages 13 to 15. Those sessions begin June 25 and July 9. For fees, information or to register, call 688-7623.

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Comments or suggestions should be forwarded to:

NASA PUBLIC AFFAIRS OFFICE
Attn: LAGNIAPPE
Mail Code IA10
Building 1100, Room 306
Stennis Space Center, MS 39529
or call:
228-688-3749



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