National Aeronautics and Space Administration

LAGNIAPPE

John C. Stennis Space Center

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Stennis director briefs community leaders on status of center, future of space exploration

Stennis Space Center Director Rick Gilbrech updates area leaders during a community briefing session at INFINITY Science Center on Feb. 12. Dozens of leaders attended the annual briefing, which also featured updates from Tim Galludet, commander of the Naval Meteorology and Oceanography Command at Stennis, and John Wilson, executive director of INFINITY. In his remarks, Gilbrech emphasized the bright future for Stennis and NASA. He noted that work is under way in a number of areas to develop the technology and capabilities needed to travel deeper into space than ever before. "Everybody's asking, 'Where's NASA going?'" he said. "We're going to Mars. That's the story." Gilbrech also stressed that Stennis is focused on continuing and growing its mission and will remain an economic engine for the Gulf Coast region.

CFC

Goal – $195,500

Final – $178,959 (91.5% of goal)

Thank you to all contributors!

"Opportunities lie ahead to enable Stennis to continue to elevate STEM education (and) to empower the workforce of tomorrow!"

From the desk of
Katrina Emery
Director, Office of Education, Stennis Space Center

Since my last article in Lagniappe, NASA Stennis Space Center has been very busy inspiring the next generation of STEM (science, technology, engineering and mathematics) workforce directly and via teachers who are educating students daily in the classroom and in informal education settings.

In fiscal year 2014, Stennis conducted 20 Astro Camp sessions with 544 students; 38 hands-on workshops for 790 educators; 219 Digital Learning Network programs for 4,886 students and 372 educators; and 23 informal education interactions involving 10,945 students and educators. NASA and Honeywell also celebrated an important milestone in the 10th year of the FMA Live! collaboration by reaching the 1,000th school and more than 400,000 students and teachers.

It was also a year of change and challenges. The NASA Office of Education sunset a number of programs due to a myriad of reasons, including budget reductions. For Stennis, three programs are now unavailable: the Educator Resource Center, the Digital Learning Network and Astro Camp. New models are being developed to provide these programs. In the meantime, access NASA education materials at: http://www.nasa.gov/education/materials/ and also sign up to receive announcements about NASA's education by clicking the EXPRESS email signup link.

The Astro Camp program is currently being revamped with support from INFINITY Science Center. Visit http://www.visitinfinity.com for information about Astro Camp and other camps for summer 2015. Astro Camp has been in existence since 1990. While anecdotal information suggests program success, it is time to validate these hunches with empirical data. If you are a former Astro Camper, we would love to hear from you!

Another change is how NASA has streamlined program offerings under four lines of business:

1) STEM Engagement to address national needs in STEM education and provide STEM experiential opportunities.
2) Educator Professional Development to increase an educator's confidence and enthusiasm in delivering STEM materials through interaction with NASA-unique content, facilities and personnel.
3) Institutional Engagement to build the capacity of formal (colleges, universities) and informal education institutions (museums, planetariums, science centers) to participate in NASA's mission.
4) NASA Internships, Fellowships and Scholarships to motivate students to pursue and continue careers in STEM disciplines. NASA is also committed to providing significant, direct student awards in higher education to underserved and underrepresented communities of learners, educators, and researchers. Visit: https://intern.nasa.gov/

Finally, the National Community College Aerospace Scholars program, new to Stennis this year, encourages community college students across the United States to explore the possibilities of careers in STEM disciplines while engaging in activities to experience engineering firsthand. Visit: http://ncas.aerospacescholars.org/

At the end of the day, I'm excited about the challenges because I know that opportunities lie ahead to enable Stennis to continue to elevate STEM education, to provide engaging NASA field experiences and, ultimately, to empower the workforce of tomorrow!

Katrina Y. Emery

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FULFILLING NASA'S EXPLORATION MISSION

NASA, Boeing, SpaceX outline objectives to commercial crew flights

American spacecraft systems testing followed by increasingly complex flight tests and, ultimately, astronauts flying orbital flights will pave the way to operational missions during the next few years to the International Space Station. Those were the plans laid out Jan. 26 by NASA's Commercial Crew Program officials and partners as they focus on developing safe, reliable and cost-effective spacecraft and systems that will take astronauts to the station from American launch complexes.

According to Boeing, the company's schedule calls for a pad abort test in February 2017, followed by an uncrewed flight test in April 2017, then a flight with a Boeing test pilot and a NASA astronaut in July 2017.

SpaceX (Space Exploration Technologies Corp.) said they anticipate a pad abort test in about a month, then an in-flight abort test later this year as part of its previous development phase. An uncrewed flight test is planned for late 2016 and a crewed flight test in early 2017.

Speaking for the first time together since the awarding of the final development and certification contracts, officials from NASA's Commercial Crew Program, Boeing and SpaceX revealed some of the details of their plans to cross the chasm from spacecraft and launch system design to flight tests, certification and operational missions to the station.

"It's an incredible testament to American ingenuity and know-how, and an extraordinary validation of the vision we laid out just a few years ago as we prepared for the long-planned retirement of the space shuttle," NASA Administrator Charles Bolden said during the briefing at the agency's Johnson Space Center in Houston. "This work is part of a vital strategy to equip our nation with the technologies for the future and inspire a new generation of explorers to take the next giant leap for America."

Boeing and SpaceX were selected in September 2014 to finalize their respective CST-100 and Crew Dragon spacecraft along with the rockets that will lift them into orbit and all of the ground and mission operations networks essential for safe flights. Both companies have worked with NASA's Commercial Crew Program throughout multiple development phases, continuing to advance their designs before being chosen to complete their systems, reach certification and, then, fly astronauts to the station.

The goal of NASA's effort is to provide an American launch vehicle and spacecraft capable of safely carrying astronauts to the station. Unlike other NASA spacecraft, though, this new generation of human-rated vehicles will be designed, built, operated and owned by the companies themselves, not NASA. NASA will buy space transportation services from the companies for astronauts and powered cargo. It will be an arrangement like the one the agency uses already with the Commercial Resupply Services initiative that uses privately developed and operated rockets and spacecraft to deliver critical cargo to the station.

"There are launch pads out there already being upgraded, and there is hardware already being delivered," said Kathy Lueders, manager of the Kennedy Space Center-based Commercial Crew Program. "Both companies have already accomplished their first milestones."

The new spacecraft will allow the station's crew to expand to seven astronauts and cosmonauts, which means twice as much time for research aboard the one-of-a-kind scientific platform – 80 hours a week instead of the current 40. Also, the handoff of flight to low-Earth orbit will permit NASA to pursue the challenges of deep space exploration and the journey to Mars with the Space Launch System rocket and Orion spacecraft.

Boeing and SpaceX each proposed a set of objectives and milestones that suits their development, testing and flight plans. NASA's role is to evaluate progress and make sure it meets stringent safety requirements, including a safe launch abort system built in to provide astronauts a means of escaping a potentially catastrophic situation. The agency placed a premium on giving providers the freedom to come up with innovations in design, manufacturing and testing.

Ultimately, NASA expects to have two separate spacecraft and launch systems it can turn to for flights of crew to the station and low-Earth orbit. The companies also can provide space transportation services to private citizens, companies and institutions in what could become a new industry for the American aerospace sector. The STS-135 mission, the final flight of the space shuttle, delivered an American flag to the station as a prize for the first commercial crew astronauts to visit the orbiting laboratory. A second flag will be taken to the station and brought back as a symbol of success as well.

NASA's Stephanie Schierholz introduces the panel of Johnson Space Center Director Ellen Ochoa (l to r), NASA Administrator Charles Bolden, Commercial Crew Program Manager Kathy Lueders, Boeing's John Elbon, SpaceX's Gwynne Shotwell and NASA astronaut Mike Fincke.

"When we have both of these flags on the ground with their crews safely returned, we'll all be winners," Lueders said.

Boeing and SpaceX anticipate using facilities at Kennedy Space Center in Florida and the adjacent Cape Canaveral Air Force Station for aspects of processing and launch.

Boeing's CST-100 program will be based at Kennedy with the spacecraft being assembled inside one of the hangars formerly used to process space shuttles. Riding atop a United Launch Alliance Atlas V rocket, the CST-100 will launch from Cape Canaveral's Space Launch Complex 41. A tower designed for the needs of astronauts and support staff is already under construction at SLC-41.

The work comes at a time when NASA is marking significant progress in a number of areas. For instance, the space station has housed crew members for 14 straight years and a NASA astronaut and Russian cosmonaut are getting ready for a yearlong residency there. There also is a NASA spacecraft already in development to carry astronauts on deep space missions, along with a massive new rocket for it in manufacturing. Not to mention the New Horizons probe closing in on Pluto.

"Never before in the history of human spaceflight has there been so much going on all at once," said John Elbon, vice president and general manager of Boeing's Space Exploration division. "NASA's exploring places we didn't even know existed 100 years ago."

SpaceX leased Launch Complex 39A at Kennedy and will build a facility at the base of the pad that will be used for processing its Falcon 9 rockets and Crew Dragon spacecraft for launch. The company launches cargo-carrying Dragons and other uncrewed spacecraft from Space Launch Complex 40 at Cape Canaveral. "We understand the incredible responsibility we've been given to carry crew," said Gwynne Shotwell, president of SpaceX.

Speaking in front of the agency's astronaut corps, the panelists offered an appealing vision of space travel including long-term spaceflight research and deep space missions.

"It's a great time to be a part of the American space program, which is on its way to Mars," said astronaut Mike Finke, who commanded the International Space Station and flew aboard the space shuttle. "There's not another group on this planet, or off this planet, that wants the success of the Commercial Crew Program more than we do."

The flights to the station are vital to NASA's goals, Bolden reiterated, and as the agency sets its eyes firmly on the Red Planet.

"It takes a lot of stuff to get off this planet and a whole lot more to get to Mars," Bolden said. "But that is the ultimate destination."

FULFILLING NASA'S EXPLORATION MISSION

NASA unveils budget for fiscal year 2016

In a presentation at Kennedy Space Center in Florida on Feb. 2, NASA Administrator Charles Bolden announced details of the Obama administration's fiscal year 2016 agency budget proposal recently submitted to Congress. Bolden emphasized that the recommended increase of about a half-billion dollars over last year's enacted budget would provide the necessary resources to continue advancing America's bipartisan space exploration plans. The ongoing programs will ensure that the United States remains the world's leader in space exploration and discoveries benefiting all humankind.

"Today, President Obama is proposing an additional $18.5 billion for NASA, building on the significant investments the administration has made in America's space program over the past six years," Bolden said. "NASA is firmly on a journey to Mars. Make no mistake, this journey will help guide and define our generation."

Bolden noted the budget allows NASA to continue development of the Orion crew vehicle, Space Launch System and Exploration Ground Systems that will one day send astronauts beyond low-Earth orbit. The Space Launch System is a new heavy-lift rocket that will be capable of sending humans to deep-space destinations such as an asteroid and Mars.

Bolden said the budget proposal also supports the administration's commitment to serve as a catalyst for the growth of a vibrant American commercial space industry, including development of commercial crew transportation.

The 2016 budget will allow NASA to continue developing and testing transformative capabilities and cutting-edge technologies crucial to future exploration initiatives as well. The NASA budget also funds continued work toward a 2018 launch of the James Webb Space Telescope, which will be the largest observatory ever put in space.

Each of NASA's 10 field centers were connected to Bolden's presentation via a multicenter television simulcast. Bolden emphasized his belief that NASA is an incredible investment for the nation and world. "NASA is an incredible investment for our nation because what we do not only uncovers new knowledge, it helps raise the bar of human achievement," he said. "People everywhere are attracted to what we do, because exploration embodies our values as a nation – resilience, hope, and overcoming the challenges faced."

(Top photo) Stennis Space Center employees view a live Feb. 2 broadcast of NASA Administrator Charles Bolden presenting details of the agency's fiscal year 2016 budget.

(Bottom photo) Stennis Space Center Director Rick Gilbrech speaks with employees about future work at the center following presentation of NASA's fiscal year 2016 budget.

FULFILLING NASA'S EXPLORATION MISSION

NASA in the News

NASA launches groundbreaking satellite

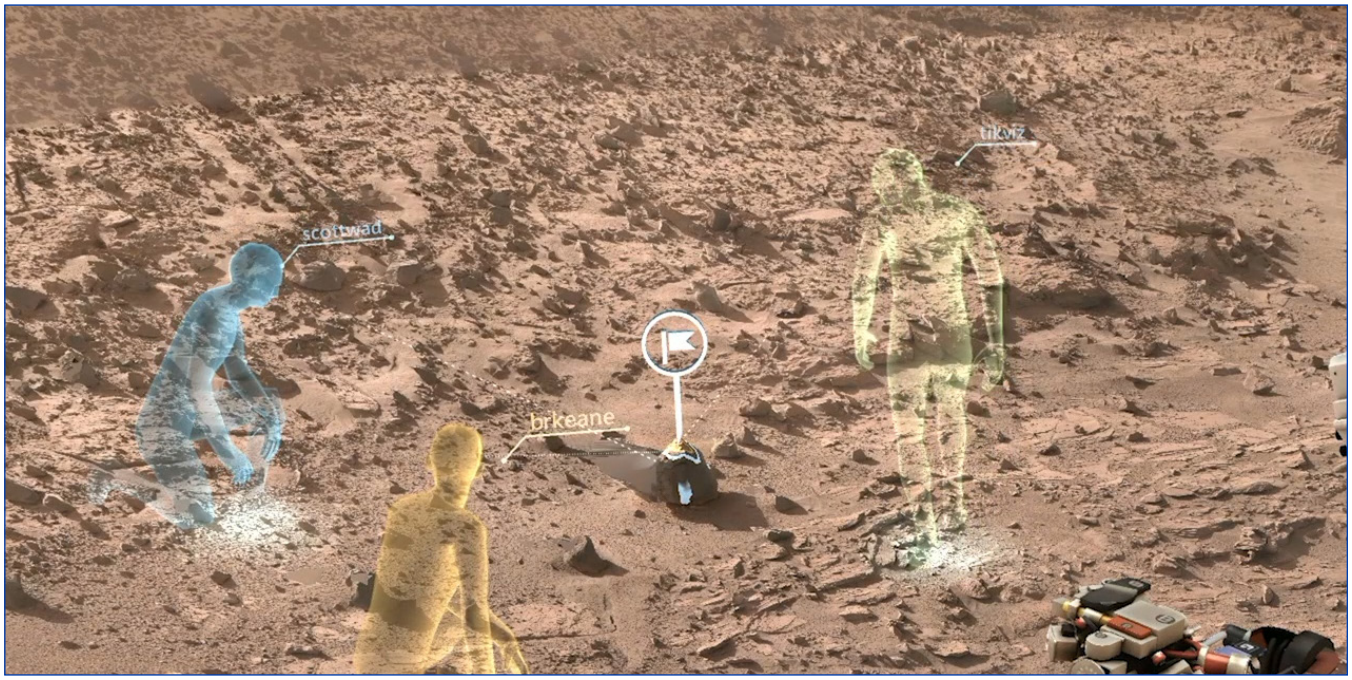
On Jan. 31, NASA successfully launched its first Earth satellite designed to collect global observations of the vital soil moisture hidden just beneath our feet. The Soil Moisture Active Passive (SMAP) observatory has broad applications for science and society. Its three-year mission studying soil moisture is expected to help improve climate and weather forecasts and to allow scientists to monitor droughts and better predict flooding caused by severe rainfall or snowmelt – information that can save lives and property. SMAP data also will allow nations to better forecast crop yields and assist in global famine early-warning systems. The first release of SMAP soil moisture data products is expected within nine months. Fully validated science data are expected to be released within 15 months. For more information about SMAP, visit: http://www.nasa.gov/smap. For more information about NASA's ongoing Earth science activities, visit: http://www.nasa.gov/earthrightnow. Follow SMAP on Twitter at: https://twitter.com/NASASMAP.

Hubble photos capture Jupiter rarity

Firing off a string of action snapshots like a sports photographer at a NASCAR race, NASA's Hubble Space Telescope captured the rare occurrence of three of Jupiter's largest moons racing across the banded face of the gas-giant planet: Europa, Callisto and Io. These so-called Galilean moons, named after the 17th century scientist Galileo Galilei, who discovered them with a telescope, complete orbits around Jupiter with durations ranging from two days to 17 days. They can commonly be seen transiting the face of Jupiter and casting shadows onto its cloud tops. However, seeing three moons transiting the face of Jupiter at the same time is rare, occurring only once or twice a decade. Missing from the sequence of photos is Ganymede, one of the four Galilean moons that was outside Hubble's field of view and too far from Jupiter to be part of this conjunction. For images and more about Hubble, visit: http://www.nasa.gov/hubble or http://hubblesite.org/news/2015/05..

For NASA news releases, visit: www.nasa.gov/news/releases/latest/index.html.

Collaboration will allow scientists to 'work on Mars'



NASA and Microsoft recently announced they have teamed up to develop software called OnSight, a new technology that will enable scientists to work virtually on Mars using wearable technology called Microsoft HoloLens. Developed by NASA's Jet Propulsion Laboratory in Pasadena, California, OnSight will give scientists a means to plan and, along with the Mars Curiosity rover, conduct science operations on the Red Planet. OnSight will use real rover data to create a 3-D simulation of the Martian environment (as seen in above simulation) where scientists around the world can meet. To view this holographic realm, members of the Curiosity mission team don a Microsoft HoloLens device, which surrounds them with images from the rover's Martian field site. They then can stroll around the rocky surface or crouch down to examine rocky outcrops from different angles. The tool provides access to scientists and engineers looking to interact with Mars in a more natural, human way. Learn more about NASA's journey to Mars at: http://www.nasa.gov/mars.

Stennis hosts Industry Day business event

NASA's Office of Small Business Programs and Stennis Space Center hosted a one-day Service-Disabled Veteran-Owned Small Business Industry Day on Feb. 3 at INFINITY Science Center. The event provided participants a chance to collect information on small business opportunities and to network with NASA personnel and contractor representatives from NASA's field centers, as well as representatives from NASA's Office of Small Business Programs and Office of Procurement.

(Top right photo) Glenn Delgado, associate administrator of NASA's Office of Small Business Programs, speaks to Industry Day participants.

(Bottom right photo) Industry Day participants collect information on small business opportunities.

(Top photo below) Glenn Delgado, associate administrator of NASA's Office of Small Business Programs, presents the Small Business Champion Award to Rob Harris, NASA procurement officer at Stennis Space Center. The Champion Award is a personal recognition by the associate administrator for sustained excellence in the area of small business programs. The Feb. 3 presentation marked only the third time Delgado has bestowed the award during his eight-year tenure as associate administrator.

(Bottom photo below) Rob Watts, small business specialist in the NASA Office of Procurement at Stennis Space Center, receives NASA's Small Business Specialist of the Year Award from Glenn Delgado, associate administrator of NASA's Office of Small Business Programs.

Stennis companies receive NASA Small Business Awards

NASA presented 2014 Office of Small Business awards to three Stennis Space Center companies on Jan. 26. Each year, NASA recognizes companies who support the agency in achieving or exceeding its small business goals.

(Top photo) Stennis Deputy Director Jerry Cook (third from right) and Stennis Small Business Specialist Rob Watts (second from left) present the Stennis Small Business Prime Contractor of the Year award to A^{2}Research. Accepting the award are A^{2}Research representatives: (l to r) Allen Hines, President Autumn Sellers, Program Manager Al Watkins, Mark Edwards and Mike Vanhooser.

(Top right photo) Stennis Deputy Director Jerry Cook (r) and Stennis Small Business Specialist Rob Watts (l) present the Stennis Large Business Prime Contractor of the Year Award to Clyde "Chip" McCutcheon of Harry Pepper and Associates.

(Bottom right photo) W.L. "Bud" Nail of Technological Services Co. receives the Stennis Small Business Subcontractor of the Year award from Stennis Deputy Director Jerry Cook (r) and Stennis Small Business Specialist Rob Watts (l).

Developments under way at Stennis in 1965

Note: For more than 50 years, NASA's John C. Stennis Space Center has played a pivotal role in the success of the nation's space program. This month's Lagniappe provides a glimpse into the history of the south Mississippi rocket engine test center.

(Top photo) A 1965 aerial view of the B-1/B-2 Test Stand (foreground) and the A-2 Test Stand under construction in 1965. The stands were built to test the engines and rocket stages used for Apollo Program missions.

Thousands of miles away on the West Coast, developments were being made that would impact NASA's Apollo Program and the then-Mississippi Test Operations facility, a division of Marshall Space Flight Center. The first ground test model of the Saturn V moon rocket's second stage (S-II) had been completed at Seal Beach, Calif.

Marshall program managers announced 50 years ago this month that the S-II-S would be used for structural testing for the Apollo Program. The unit, 33 feet in diameter and about 80 feet in length, had no engines and would not be fired. The powered versions of the rocket would develop 1 million pounds of thrust from five Rocketdyne J-2 engines burning liquid hydrogen and liquid oxygen. The S-II-S was built by the S-II prime contractor, the Space and Information Systems Division of North American Aviation Inc.

While progress continued at the new MTO, many visitors began to flock to the place where a static test facility for launch vehicles to be used in the Apollo manned lunar landing program was being constructed. MTO would test the first two stages of the Saturn V moon rocket.

Besides school groups, very important people like FBI Special Agent Roy K. Moore of the Jackson office and Senior Resident Agent William F. Dukes of Gulfport came on the scene to view the largest construction project in the state of Mississippi and the second largest in the United States at that time. William C. Fortune, MTO's first manager, briefed the agents on the facility's mission and described construction progress of various test facilities. They also toured the test complex and support areas at MTO.

In other matters, a U.S. Army Corps of Engineers officer assigned to help oversee construction was recognized with a military award before joining the staff at MTO. Captain Charles B. Eastburn was bestowed the honor of the Army's Bronze Star Medal on Feb. 16, 1965, at the Army Engineers Mobile District headquarters.

Eastburn served as an adviser to the armed forces of Vietnam before reporting for duty with the Mobile Engineer District. The medal cited Eastburn for "outstanding meritorious service in connection with ground operations against a hostile force in the Republic of Vietnam from 1963 to November 1964 while serving as a member of a military assistance advisory group responsible for engineer counterinsurgency operations."

Hired by NASA for the construction of the site that would eventually be named the John C. Stennis Space Center, the Corps of Engineers Mobile District was responsible for design and engineering, and also served as the real estate agent for acquiring titles and easements for acres of land in Hancock County.

Transitioning from the construction phase to completed projects in certain areas of the test facility, the district office also continued to announce and receive bids for construction that included guard houses, south and north main entrance reception buildings and parking areas.

Stennis hosts Black History Month program

Stennis Space Center Director Rick Gilbrech and Naval Meteorology and Oceanography Command Commander Rear Admiral Timothy Gallaudet stand with Anthony Alfred, guest speaker for the Black History Month Program at Stennis on Feb. 10. Alfred is a Louisiana educator who was the first African-American to serve on the St. Tammany Parish Council.

Office of Diversity and Equal Opportunity

Do you know the story of Vernon Dahmer?

Minnijean Brown-Trickey was invited by the Stennis Diversity Council for the Martin Luther King Jr. Day program on January 14.

Brown-Trickey made history in 1957 as one of the Little Rock Nine, the nine African-American students who desegregated Little Rock Central High School. The world watched as they braved constant intimidation and threats from those who opposed desegregation of the formerly all-white high school in Little Rock, Ark.

During her presentation, Brown-Trickey asked the audience if it was familiar with Vernon Dahmer, a civil rights activist from Hattiesburg, who lost his life to the cause. Many in attendance were not, so this month's article will focus on the history of Dahmer and some of his work.

Dahmer was born March 10, 1908, in the Kelly Settlement, Forrest County, Mississippi, the son of Ellen Louvenia (Kelly) and George Washington Dahmer, who were both biracial.

Dahmer attended Bay Spring High School. He was light-skinned enough to pass as white but chose to forgo the privileges of living as a white man, and, instead, faced the challenges of being a black man in Mississippi at that time.

In March 1952, Dahmer married Ellie Jewell Davis, a teacher from Rose Hill, Miss. The couple had eight children in their family, and their home in north Forrest County was part of the Kelly Settlement area (named for Dahmer's maternal grandfather). Ellie Dahmer taught for many years in Richton, Miss., and retired in 1987 from the Forrest County school system.

Dahmer was a member of Shady Grove Baptist Church, where he served as a music director and Sunday School teacher. Dahmer became the owner of a grocery store, sawmill, planing mill and 200-acre cotton farm.

On the night of Jan. 10, 1966, the Dahmer home was firebombed. As Ellie Dahmer and her children escaped the inferno, gunshots were fired from the streets, and Vernon Dahmer returned fire from inside the house. He was severely burned from the waist up before he could escape and died the next day. The Dahmer home, grocery store and car were destroyed in the fire.

The Hattiesburg area was stunned by the attack. The Chamber of Commerce, under William Carey College President Ralph Noonkester, led a community effort to rebuild the Dahmer home. Local and state businesses, such as the Masonite Corp., Alexander Materials and Frierson Building Materials, donated materials for the effort. Local unions donated their services, and students from the University of Southern Mississippi volunteered unskilled labor.

Authorities indicted fourteen men, most with Ku Klux Klan connections, for the attack on the Dahmer home. Thirteen were brought to trial, eight on charges of arson and murder. Four were convicted, and one, Billie Roy Pitts (Ku Klux Klan Imperial Wizard Sam Bowers' body guard), entered a guilty plea and turned state's evidence.

In addition, 11 of the defendants were tried on federal charges of conspiracy to intimidate Dahmer because of his civil rights activities. Bowers, who was believed to have ordered the murder, was tried four times, but each ended in a mistrial.

Based on new evidence, the state of Mississippi reopened the case and, in 1998, tried Bowers for the murder of Dahmer and assault on his family. The jury convicted Bowers and the judge sentenced him to life in prison. He died in Mississippi State Penitentiary on Nov. 5, 2006.

After Dahmer's death, a street and park in Hattiesburg were named in his honor. On July 26, 1986, a memorial was also dedicated at the park. On Feb. 3, 2007, Dahmer was posthumously honored for his heroic contributions to the civil rights movement at a celebration announcing the Vernon Dahmer Collection at William Carey College in Hattiesburg. The collection was funded in part by a grant from the Mississippi Humanities Council.

Hail & Farewell

NASA bids farewell to the following

Larry LaFrance	Contract Specialist	Office of Procurement

And welcomes the following:

Theresa Smith	Student Trainee	Office of Communications

Spinoff 2015: NASA technologies benefit society

The 2015 edition of NASA's annual *Spinoff* publication highlights technologies, including some related to Stennis Space Center, whose origins lie in space exploration but now have broader applications in all areas of life.

"The game-changing technologies NASA develops to push the envelope of space exploration also improve our everyday lives," NASA Chief Technologist David Miller said. "*Spinoff 2015* is filled with stories that show there is more space in our lives than we think."

Spinoff 2015 tells the story of shock absorbers used during space shuttle launches that are now being used to brace buildings during earthquakes, preventing damage and saving lives. The book also features a NASA-simplified coliform bacteria test that is being used to monitor water quality in rural communities around the world, as well as cabin pressure monitors that alert pilots when airplane oxygen levels are approaching dangerously low levels in their aircraft.

Published every year since 1976, *Spinoff* offers a closeup look at how NASA's initiatives in aeronautics and space exploration have resulted in technologies with commercial and societal benefits across the economy. Spinoffs are featured in areas such as health and medicine; transportation; public safety; consumer goods; energy and environment; information technology; and industrial productivity. These varied spinoffs contribute to the country's economic growth by generating billions of dollars in revenue and creating thousands of jobs.

Stennis-related technologies featured in *Spinoff 2015* are:

- Using NASA satellite data to develop innovative crop management tools to aid in understanding crop growth around the world. LandViewer software developed by Genscape Inc. uses additional NASA geospatial data to provide more detailed information about crop production than many other weather-based prediction yield modeling packages.
- Development of an affordable integrating sphere to accurately calibrate cameras as needed for scientific observations. The new sphere developed by Innovative Imaging and Research Corp. (I2R) has a range of potential uses from space-based satellite systems to cell phone cameras.
- Two Spinoffs of Tomorrow (technologies and tools developed by NASA and now available for licensing by commercial companies) are Stennis products: 1) a revolutionary cryogenic butterfly cam valve and 2) a wireless health-monitoring system. Both have been recognized for innovation at Stennis.

Free print copies of *Spinoff 2015* can be requested and digital versions downloaded at: http://spinoff.nasa.gov. An iPad version of *Spinoff 2015*, also is available for download in the Apple iTunes store.

Stennis observes Day of Remembrance

Stennis Space Center Director Rick Gilbrech (l) and Deputy Director Jerry Cook place a memorial wreath during a Day of Remembrance ceremony Jan. 28. The annual ceremony included a moment of silence in memory of NASA family members who lost their lives while furthering the cause of exploration and discovery, including the crews of Apollo 1 and shuttles Challenger and Columbia. The NASA Day of Remembrance is observed each year in January. During the Stennis ceremony, the names of the fallen crew members were read, followed by the tolling of a bell.