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Focused on deep space See page 5



Goal – \$182,000
To-date – \$123,136
(67.6% of goal) *as of 12/11/15

“Planning one’s career path is a success strategy everyone should implement, but often this valuable practice is overlooked.”



From the desk of
Dorsie Jones

Manager, Office of Human Capital, Stennis Space Center

Where are you in your career, and where do you want to go in 2016 and beyond? Planning one’s career path is a success strategy everyone should implement, but often this valuable practice is overlooked. Employees without a career plan may not have enough experience to identify their preferred types of work, so they have no clear vision of potential roles five, 10 or 15 years into the future. For these employees and others with a need to develop career insight, I highly recommend engaging in short-term development activities. Why? Short-term opportunities afford a variety of experience in new roles to help refine professional interests and skills, and development opportunities for all employees are plentiful.

As we close out the 2015 calendar year, I’d like to highlight a few of the career development opportunities available. At the agency level, NASA offers high-quality programs such as NASA FIRST, the Mid-Level Leader Program and LASER; at the center level the Office of Human Capital (OHC) offers a range of training that facilitates learning at every level. In 2015, the OHC launched a developmental detail assignment program designed to provide opportunities for employees to gain experience in organizations other than their own. The OHC collaborated with Michoud Assembly Facility to include opportunities there, and six Stennis employees were subsequently selected for detail assignments in both technical and administrative organizations. This year, we also launched a pilot shadowing program, developed by the 2014 NASA FIRST team to provide short-term (eight-hour) opportunities for employees to learn from other professionals at Stennis and the NASA Shared Services Center. This program will be implemented centerwide in spring 2016. Stretch assignments provide another avenue for employees to learn about work performed in other organizations. Stretch assignments consume 10 percent

or less of a participant’s time and are typically designed for a year-long duration. Four of these opportunities were announced in 2015. For employees who feel they would benefit specifically from focused interaction with another, more experienced member of the workforce, Stennis sponsors the popular Mentoring Program. In its 10th year, program graduates continue to rate it very highly. Finally, the Stennis Systems Engineering/Project Management Leadership Development Program offers early-, mid-, and advanced-career training for those who want to focus specifically on developing leadership and technical capabilities.

Outside of formal NASA training programs, organizations such as the Office of Chief Financial Officer have adopted internal job shadowing and cross-training opportunities. Too, employees are always encouraged to consider participating in local community training such as Leadership St. Tammany, Leadership Gulf Coast or Pearl River Partners in Leadership.

Planning a career path requires a good deal of self-awareness, and the New Year holiday heralds a fresh round of opportunities for employees to gain insight into work preferences and applicable skills through multiple employee development programs. The whole idea is to gain professional insight by engaging in new, meaningful work, and at NASA there is no shortage of activity through which employees can grow to their fullest potential. If you are interested in any of the mentioned programs or would like to receive career counseling, contact the Office of Human Capital. We look forward to seeing you in the New Year!

Dorsie Jones

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FULFILLING NASA'S EXPLORATION MISSION

NASA continues preparation for SLS testing



Work is under way on the tarmac area of the B-2 Test Stand at Stennis Space Center, another step in preparation for testing NASA's new Space Launch System (SLS) core stage. NASA is developing the SLS as a vehicle for deep-space missions, to an asteroid and Mars. Prior to its initial uncrewed mission in 2018, the SLS core stage will be delivered to the B-2

stand for a series of tests. Preparation for the testing has been ongoing and has included all areas of the stand. Testing will involve installing the actual flight stage for the first SLS mission on the B-2 stand and firing its four RS-25 engines simultaneously, just as during a launch. NASA also is testing individual RS-25 engines on the A-1 Test Stand at Stennis.

Six Stennis innovation projects under way

A half dozen cutting-edge technology projects at Stennis Space Center have been selected for funding in fiscal year 2016 through NASA's Center Innovation Fund.

"This is a testament to the quality of ideas put forth by the Stennis engineering community," explained Duane Armstrong, chief of NASA's Applied Science and Technology Projects at Stennis Space Center. "These are small projects that explore new solutions to challenging problems. The new sensors, software, processes and tools generated by these projects may help NASA achieve its exploration goals and can be a catalyst to U.S. businesses in a competitive global economy."

The NASA innovation fund is designed to "stimulate and encourage creativity and innovation within the NASA centers in addressing the technology needs of NASA and the nation." Proposals are reviewed at the center level,

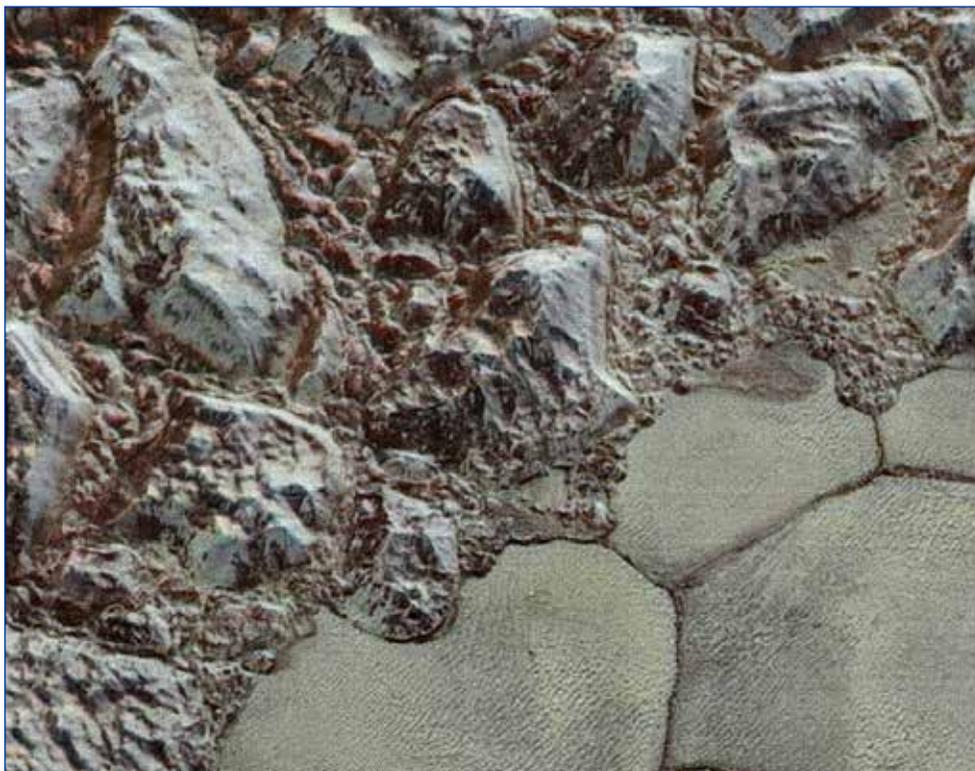
then vetted by the Space Technology Mission Directorate.

The projects help expand Stennis' design and technology expertise in areas such as computational modeling, energy harvesting, intelligent systems and advanced propulsion testing. The new projects focus on:

- Augmented control of supersonic diffuser boundary layer separation.
- Electro-thermal actuation control for unlocking memory metal power.
- Gas house autonomous system monitoring – nitrogen system.
- Investigation of radionuclide filtering technology for nuclear thermal propulsion engine testing.
- Investigation of environmental impact discharge of elevated temperature water into Stennis' canal system.
- Investigation of environmental requirements and regulations for nuclear thermal propulsion testing.

FULFILLING NASA'S EXPLORATION MISSION

New Horizons reveal features of Pluto landscape



This enhanced color mosaic combines some of the sharpest views of Pluto that NASA's New Horizons spacecraft obtained during its July 14 flyby. The pictures are part of a sequence taken near New Horizons' closest approach to Pluto, revealing features smaller than half a city block on Pluto's surface. Lower resolution color data were added to create this new image. The wide variety of cratered, mountainous and glacial terrains seen here gives scientists and the public alike a breathtaking, super-high-resolution color window into Pluto's geology. In the image, great blocks of Pluto's water-ice crust appear jammed together in the informally named al-Idrisi mountains. Some mountain sides appear coated in dark material, while other sides are bright. Several sheer faces appear to show crustal layering, perhaps related to the layers seen in some of Pluto's crater walls. This view is about 50 miles wide. The top of the image is to Pluto's northwest.

NASA in the News

NASA tops 'Best Places to Work' list

For the fourth year in a row, NASA has been ranked as the best place to work in the federal government, based on results of the 19th annual employee survey conducted by the Partnership for Public Service. In the same survey, Stennis Space Center ranked as the best place to work among NASA centers, one spot ahead of Marshall Space Flight Center. It also ranked sixth out of 320 as the best place to work in the federal subcomponent category.

In an email message, NASA Administrator Charles Bolden cited agency accomplishments during the past year and credited the agency's workforce for the performance and ranking. "No matter your pay grade or area of expertise, your commitment to the agency's missions in every area has made all of this possible," he said. "The credit for this success goes to you, who are on the front lines of the future. While our satellites travel to space, new technologies leap from drawing boards to implementation and we set our sights on Mars – it all begins with your hard work and innovation." The 2015 workplace survey involved almost 433,300 civil servants at 391 federal organizations. For the complete rankings, visit: <http://bestplacestowork.org>.

NASA orders SpaceX crew mission

NASA took a significant step Nov. 20 toward expanding research opportunities aboard the International Space Station (ISS) with its first mission order for California-based company SpaceX to launch astronauts from U.S. soil. This is the second in a series of four guaranteed orders NASA will make under the Commercial Crew Transportation Capability contracts. The Boeing Company of Houston received its first crew mission order in May. Determination of which company will fly its mission to the station first will be made at a later time. The contracts call for orders to take place prior to certification to support the lead time necessary for missions in late 2017, provided the contractors meet readiness conditions. Commercial crew missions, on the Boeing CST-100 Starliner and SpaceX Crew Dragon spacecraft, will restore America's human spaceflight capabilities and increase the amount of time dedicated to scientific research aboard ISS. The launches will reduce the cost, per seat, of transporting NASA astronauts to the space station compared to what the agency must pay the Russian Federal Space Agency for the same service. For the latest on Commercial Crew progress, visit: <http://blogs.nasa.gov/commercialcrew>.

Access all NASA news releases online at: <http://go.usa.gov/3f3KW>.

2015 review – Stennis moves NASA ever so closer to deep space

It has been 43 years since humans traveled to deep space, but in 2015, Stennis Space Center moved NASA ever so closer to a return to missions beyond any ever attempted. The stage is set for moving even closer to that goal in 2016.

Beginning with an initial RS-25 rocket engine test on the A-1 Test Stand at Stennis on Jan. 9, 2015, NASA conducted seven developmental hotfire tests of the engine that will help power the new Space Launch System (SLS) vehicle. When the test series ended with a 535-second firing Aug. 27, engineers had collected invaluable data for continued development of the SLS core-stage engine.

“Rocket engine testing is the work we are known for and have excelled in during our 53-year history,” Center Director Rick Gilbrech said. “This past year was critical in performing that work in order to keep moving forward in our return to deep space. This is the most exciting time you can imagine, preparing for missions never before attempted.”

Four RS-25 engines will help power the SLS on launch. The vehicle is being developed to carry humans to unprecedented deep-space destinations, including an asteroid and Mars.

Stennis will begin testing RS-25 flight engines early in 2016 and continue through the year. It also is preparing to test the SLS core stage that will be used on the first uncrewed mission. In 2015, work continued to prepare the B-2 Test Stand for that test series. In addition to modification of the stand, the effort included an upgrade of the high-pressure industrial water systems that provides the thousands of gallons needed for an engine test. Work on the systems servicing the A and B test complexes was completed this year. The focus now falls on final build up to core stage testing, which will involve installing the core stage on the stand and firing its four RS-25 engines simultaneously, just as occurs during an actual SLS launch.

Meanwhile, Stennis continues to partner with commercial companies to perform testing for their space projects. For instance, in 2015, a successful series of tests on an oxygen preburner component was conducted for the Raptor rocket engine under development by SpaceX. The testing comes on the heels of a series of main injector tests conducted for SpaceX on the E-2 Test Stand in 2014.

“Stennis continues to be sought out as a center of excellence for rocket engine and vehicle development of all kinds,” Gilbrech said. “That’s a credit to the talent and commitment of the engineers and support teams here. It also means the center plays a key role in the future of American space exploration.”

In August, NASA Deputy Administrator Dava Newman traveled to Stennis to gain a glimpse of that future during an RS-25 test. She was joined by more than 1,000 elected officials, community leaders, media and social media representatives, and NASA and contractor employees and family members who witnessed the successful 535-second test. In the same month, Stennis also focused on its own future with the naming of former Engineering and Test Directorate Director Randy Galloway as the center’s new deputy director.

In addition to inviting leaders to view engine tests, Stennis also carried its story to people through a variety of outreach events and education programs in 2015. One of the largest efforts came in July, as Stennis joined with other NASA centers to present the agency’s story and plans at the New Orleans Essence Music Festival. Offerings included displays and information; a NASA Night film viewing; hands-on exhibits; an astronaut photo-and-autograph session; educator workshops; and NASA’s Journey to Tomorrow traveling trailer exhibit.

Part of the story told is how NASA – and Stennis – impacts its immediate community and the world. As in previous years, in 2015, Stennis contributed to the technological spinoffs that bring NASA innovation into daily life in hundreds of ways. It also partnered with schools on a range of efforts, from working with a Mississippi elementary school on an award-winning robotics project to teaming with the Naval Research Laboratory and Texas A&M University at Galveston to develop a first-of-its-kind web app to alert coastal residents of impending landings of bothersome Sargassum seaweed.

“Everybody sees the engine testing work done at Stennis, but the impact of the center involves so much more,” Gilbrech said. “It’s for good reason that Stennis is consistently recognized as one of the very best places to work in the federal government.”



NASA conducts the first of a series of developmental tests on the RS-25 rocket engine on the A-1 Test Stand at Stennis Space Center on January 9, 2015.



(Top left photo) NASA Administrator Charles Bolden speaks to NASA Advisory Council members during the group's Jan. 14 meeting at Stennis.

(Bottom left photo) Apollo 13 astronaut Fred Haise speaks to Mississippi legislators during NASA Day at the State Capitol on March 18.

(Top right photo) A March 31 photo shows the sun rising above the A-2 Test Stand at Stennis.

(Bottom right photo) Kids enjoy a NASA exhibit during NASA Week in NOLA, held June 30 through July 5 in conjunction with the 2015 New Orleans Essence Music Festival.





(Top left photo) Stennis Space Center employees install a 96-inch valve March 26 as part of an ongoing project to upgrade the high-pressure industrial water system that serves the site's large rocket engine test stands.

(Top center photo) NASA Deputy Administrator Dava Newman talks with social media representatives during a visit to Stennis Space Center on Aug. 13.

(Bottom center photo) Astronaut Jeanette Epps visits with a young girl Aug. 13 during a day of activities that culminated with a successful test of an RS-25 rocket engine.

(Far right photo) NASA engineers conduct a test of a methane-fueled 2K thruster on the E-3 Test Stand at Stennis Space Center in early May. Engineers tested the thruster over a four-day span May 6-9.



(Top left photo) Middle-school students participate in hands-on activities during an education outreach effort in Tupelo on Oct. 5-6.
 (Top center photo) NASA's Pegasus barge arrives at Stennis on Aug. 13. Pegasus barge was built in 1999 to transport space shuttle external tanks. It has been modified to carry the Space Launch System core stage between NASA sites in Louisiana, Mississippi, Alabama and Florida.
 (Top right photo) A structural steel frame is lifted into place on the B-2 Test Stand in preparation for Space Launch System core stage testing.
 (Bottom left photo) Former Stennis Director Jerry Hlass speaks during an April 8 ceremony naming a site road in honor of his service.
 (Bottom right photo) Operators at the E-2 Test Stand at Stennis conduct a test of the oxygen preburner component being developed by SpaceX for its Raptor rocket engine, which is being built to power flights to Mars.



Stennis, Loyola announce partnership

NASA's Stennis Space Center and Loyola University in New Orleans announced Nov. 19 a partnership agreement to educate young entrepreneurs and tomorrow's industry leaders about the benefits of NASA research and development and the use of NASA intellectual property in commercial applications.

Under a recently-signed Space Act Agreement, students in the Loyola College of Business will select a Stennis-developed technology and build a business plan for its commercial use. The effort is part of NASA's Technology Transfer University (T2U) initiative, which seeks to engage business students to use NASA intellectual property and spur economic development and growth. The Loyola College of Business has embraced the initiative as part of its Master of Business Administration (MBA) program.

"This kind of effort is built on the understanding that NASA technology not only enables space exploration but impacts and benefits all areas of daily life," Stennis Center Director Rick Gilbrech said. "We are proud to work with Loyola University and look forward to a successful partnership."

"We are thrilled to have a working relationship with one of the most important agencies in the United States," said Bill Locander, dean of the Loyola College of Business. "NASA's patents and technologies are the kinds of things that show promise for the future. This is an opportunity for our MBA students to be a part of that promise and to learn through real experiences."

T2U brings NASA technologies "down to Earth." The effort already has resulted in the successful commercial

marketing of a product, using technology developed at Kennedy Space Center.

Under the agreement announced Nov. 19, Loyola MBA business students will review the portfolio of Stennis' patented technologies. Once a technology is selected, the students will work next spring to develop a viable business plan for bringing that technology to market.

"Ideally, they will generate ideas for the intellectual property that we have not considered," said Duane Armstrong, chief of NASA's Applied Science and Technology Projects at Stennis Space Center. "At the same time, the students will learn about the value and benefit of NASA technology."

The current agreement calls only for the development of a business plan. However, thanks to a new NASA initiative, the plan could become a reality. Startup NASA was launched by the agency to help new companies take NASA technology to market. Under the initiative, startup companies can be granted a license

to NASA intellectual property without the usual up-front costs that pose a financial challenge in many instances.

"There are a few rules, but Startup NASA has really generated a lot of interest," Armstrong said. "It's an exciting opportunity for new companies who want to help transfer NASA technologies and intellectual properties into the world."

For more information about Startup NASA, visit: <http://technology.nasa.gov/startup>.

For information about Technology Transfer University, visit: <http://technology.nasa.gov/t2u>.



Stennis Space Center Director Rick Gilbrech (seated, center) welcomed Bill Locander, dean of the College of Business at Loyola University in New Orleans, onsite Nov. 19 to sign and announce a Space-Act Agreement between the two entities. Under the agreement, Loyola Master of Business Administration students will select a Stennis technology and develop a business plan for bringing that technology to market. Others participating in the signing were: Ashley Francis (seated, left), director of graduate programs at Loyola College of Business; Kevin Pollard (standing, left to right), executive mentor at Loyola; Stacy Savoie, Loyola MBA student; Duane Armstrong, chief of NASA's Applied Science and Technology Projects at Stennis; Jon Atkinson, Loyola College of Business professor; Mike Guerrere, Loyola MBA student; and Lauren Underwood, technology transfer partnership manager with NASA's Engineering and Test Directorate at Stennis.

December 1965 – acquiring test fire data

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.

Another important building onsite at the then-Mississippi Test Facility was completed 50 years ago this month. The Data Acquisition Facility (DAF), also known as the nerve and brain center, was described as a sensitive system. It was constructed with miles of underground wiring, electronic systems, monitors, terminals and a vast array of recorders and computers used for rocket stages during “hot” firings.

The pulse-taking center was the “brain” of the contractor-operated facility for acceptance testing the structures and liquid-fueled rocket engines of the S-1C and S-II upper stages of the giant Saturn V space exploration vehicle. Co-aligned with the first 200-foot high test stand, the two-story concrete building with a basement was nearly equidistant from the two S-II (A Complex) test stands, the dual position S-1C (B Complex) test stands, and the two test control centers or “Blockhouses” in the Saturn V test complex. Its connection to the first S-II Test Stand was accomplished with more than 4,545 miles of wiring through concrete tunnels large enough for human passage.

Designed with ultra-modern electronic equipment inside, technicians recorded more than 2,000 simultaneous stage and rocket engine performance measurements during and after firings. The two-foot-thick walls protected operators and equipment from shock, vibration and intense noise levels generated by engines producing up to 32 million

horsepower each. Circuitry in similar tunnels connected the DAF with the second S-II test stand, both test positions of the S-1C test stand and the test control centers.

During tests, transducers (pickups) on the test stand measured strain, pressure, temperature, position, fluid flow, vibration and even data. About 300 cables, each containing 50 wires, transmitted measurement data from hundreds of points on the stand, stage and engines to terminal points in the lower floor of the DAF. From there, the signals fed into the oscillographs, high-speed tape recorders, digital

and analog computers, data conditioning and related equipment on the second-floor acquisition room.

Technicians monitored the recording process. Data acquired and recorded in the DAF was relayed to the Data Handling Center, located several miles west in the Laboratory and Engineering Complex, then correlated with other data received via telemetry (radio) direct from the test stand and converted into “quick-look” printouts and plots

for NASA evaluation.

The C.H. Leavell-Peter Kiewit firm of El Paso, Texas, built the DAF, and instrumentation was provided by the Aetron Division of Aerojet General Corp. in Covina, California.

A half century ago, the DAF was operated and maintained by about 65 engineers and technicians of the General Electric Company's Mississippi Test Support Department. GE was the prime contractor to NASA for plant and technical support and technical systems at the test facility. Without the DAF, testing would be meaningless.



An employee works with Data Acquisition Facility instrumentation in 1965.

Hail & Farewell

NASA bids farewell to the following:

Ted Mason

AST, Experimental Facilities Development

Engineering & Test Directorate

And welcomes the following:

Michael Bednarczyk

Pathways Intern

Office of the Chief Financial Officer

Rachel Clayton

Contract Specialist

Office of Procurement

Office of Diversity and Equal Opportunity

National American Indian Heritage Month (Part 2)

The following article on National American Indian Heritage Month represents part 2 of 2.

Our first teacher is our own heart. (Cheyenne)

Last month, we looked at the historical milestones that led to the establishment of National American Indian Heritage Month. This month, we will look at three individuals who made a difference in helping their people transition into a new way of living. Here are the stories of three such individuals.

• **Sadie Neakok – educator, community activist and magistrate.** Sadie Neakok walked a challenging path as Alaska’s first Native woman magistrate in 1960.

In 1959, when Alaska became a state, there were many changes in the legal system. On one side were the demands of “white” law in a state just emerging from federal jurisdictions; on the other side were the needs of an Alaskan Native community living at the very edge of American civilization.

One well-known episode involved village-wide civil disobedience over federal game regulations restricting the season for hunting waterfowl, which was a primary food source for the community. When an Alaskan Native hunter was arrested for violating the law, Neakok quietly organized the rest of the village to protest, overwhelming the game warden. Her efforts pressured the state to change the regulation.

Neakok worked constantly to reconcile demands that often clashed. She was instrumental not only in introducing and implementing the American legal system among the Inupiat people in Alaska but also in helping the community learn how to benefit from the system. Altogether, Neakok served as Alaska’s northernmost magistrate for 17 years.

• **Wilma Mankiller – American Indian community activist, tribal chief and tribal legislator.** Wilma Mankiller was the first woman elected principal chief of the Cherokee Nation. She worked to improve the lives of American Indians by helping them receive better education and health care, and she urged them to preserve and take pride in their traditions.

Mankiller overcame many hardships to become a guiding power for the Cherokee people of Oklahoma, and she became a symbol of achievement for women everywhere. Throughout her life, Mankiller worked to improve the lives and status of her fellow American Indians. Although she declined to seek another term as principal chief in 1995 for health reasons, she remained in the public eye, writing and giving lectures across the country.

Mankiller stressed that American Indians could influence policymakers and enact change through the power of collective suffrage. She also championed for an end to the increasing problem of violence against women.

Mankiller was inducted into the National Women’s Hall of Fame in New York City in 1994 and was awarded the Presidential Medal of Freedom in 1998.

“One of the things my parents taught me, and I’ll always be grateful for the gift, is to not ever let anybody else define me.”
(Wilma Mankiller)

• **Retired U.S. Navy Lt. Michael E. Thornton.** Thornton enlisted in the Navy in 1967 after graduating from high school. Upon completion of Basic Underwater Demolition training, he was assigned to SEAL Team ONE and served several tours in Vietnam and Thailand.

In the spring of 1972, Petty Officer Thornton was assigned to a mission under the command of Lt. Thomas Norris. On his last tour to Vietnam, at the age of 23, Thornton saved the life of his senior officer on an intelligence gathering and prisoner capture operation.

A small team of two Navy SEALs and three South Vietnamese commandos were discovered by a larger North Vietnamese Army force, and a fierce firefight ensued. Norris finally ordered his outnumbered team to retreat to the sea. Norris, who had earned the Medal of Honor just months earlier, was shot in the face. A South Vietnamese commando told Thornton that Norris was dead.

Thornton refused to leave without his lieutenant, upholding the pledge that no SEAL would ever be left behind by a brother. Although the wound was grievous and Norris was unconscious, he was still alive. Thornton carried his lieutenant into the water and inflated his lifejacket, swam with him until they were out of the range of fire and continued to swim for two hours until they were rescued.

Thornton was awarded the Medal of Honor in 1973. He was the first person in more than a century to receive that high honor for saving the life of another Medal of Honor recipient.

“I feel honored, but I’m not a hero. This medal belongs to every man and woman who died serving their country. I feel honored to represent them.”
(Michael Thornton)

(Information for this article was gathered from the Society of American Indian Government Employees.)

Stennis participates in Pathways event



Students attend a demonstration during the recent Pathways2Possibilities event in Biloxi on Nov. 18-19. Pathways is an interactive career expo designed to introduce eighth-grade students from six Mississippi counties to various career possibilities. NASA and other Stennis Space Center companies hosted exhibits and activities for hundreds of visiting students during the two-day event. NASA also announced the winner of a design competition, which challenged students to design and build a bridge using K'NEX construction kits. The bridges were judged based on the weight they could hold, with students at Colmer Middle School in Pascagoula claiming first place.



Stennis hosts area educators for STEM workshop at INFINITY

A pair of area educators participate in a hands-on activity during a NASA workshop hosted by Stennis Space Center at INFINITY Science Center on Nov. 19. The "Launch Into Learning Forces and Motion: Rocketry 101" workshop drew two dozen educators from the surrounding area. During the day, educators were presented information and activities focused

on the new NASA Space Launch System vehicle, being developed to return humans to deep-space missions. The workshop was part of an ongoing commitment by the Stennis Education Office to deliver NASA education content and provide support to teachers in STEM (science, technology, engineering and mathematics) studies.



NASA graduates 2015 FIRST leadership class

Members of the 2015 NASA FIRST class participated in a graduation ceremony at Stennis Space Center on Dec. 10, culminating their year-long participation in the agency leadership development program. FIRST (Foundations of Influence, Relationships, Success and Teamwork) is focused on developing the leadership capabilities of junior NASA professionals. The program involves training modules, shadowing of senior leaders, group projects, and individual development. Participants are chosen from NASA centers across the country.

Stennis lights 2015 holiday tree

Stennis Space Center Director Rick Gilbrech (center, right of tree) and Deputy Director Randy Galloway (center, left of tree) join other NASA employees to celebrate lighting of the center's annual holiday tree in the front lobby of the Roy S. Estess Building on Dec. 1. Participants enjoyed refreshments sponsored by the NASA Exchange during the annual lighting ceremony.

