National Aeronautics and Space Administration

LAGNIAPPE

John C. Stennis Space Center

Volume 10 Issue 11 www.nasa.gov/centers/stennis November 2015

Getting ready to fly

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CFC

Goal – $182,000

To-date – $73,738

(40.5% of goal) *as of 11/13/15

"We have come a long way in space travel, and Stennis has been there since the beginning, testing (rocket) engines and stages."

From the desk of
Ken Human
Associate Director, Stennis Space Center

The Martian opened in early October, and has generated a lot of excitement about our future journey to Mars. The movie is based on a best-selling science-fiction novel about an astronaut stranded on Mars in the 2030s. The NASA Exchange sponsored special showings in Picayune and Slidell for the Stennis community, as well as outreach events, to kick off the opening weekend. It was great to see families gather to watch this movie as part of the entire NASA family. Young people the age of those watching the movie will be the ones who will take us deeper into space than ever before.

I believe that movies like *The Martian* are just one way of inspiring the next generation of explorers. Earlier this month, we celebrated the 15th anniversary of continuous human presence aboard the International Space Station (ISS). An entire generation of young people has never known a day that has not had astronauts living and working in space, orbiting around the Earth every 90 minutes. My hope is that they have the opportunity to appreciate this awe-inspiring science and engineering feat as merely the first step that prepared us for longer and more distant journeys.

Research on the ISS is helping us in our journey to Mars, as well as providing many benefits that we enjoy every day. The NASA website has a feature on 15 ways the ISS is benefiting Earth (http://go.usa.gov/cgmF3) that is worth exploring. Incidentally, young people under the age of 20 are the first generation to have grown up in a world accustomed to the confirmation of exoplanets throughout the galaxy.

We have come a long way in space travel, and Stennis has been there since the beginning, testing engines and stages for the Apollo missions and then the space shuttle missions. Those shuttle missions helped to build the International Space Station. And today, our eyes are on Mars with our work on the RS-25 engines and preparations to test the core stage of the Space Launch System.

NASA's exploration of Mars began more than four decades ago when the agency's robotic explorers were the first to study the Red Planet. Just this last summer, NASA announced that NASA's Mars Reconnaissance Orbiter has found the strongest evidence yet that salty liquid water flows intermittently on the surface of present day Mars. In March of 2016, NASA will launch another mission to Mars. The InSight mission will investigate the planet's deep interior to better understand Mars' evolution as a rocky planet. This will involve placing a lander on the planet that will drill beneath the surface.

While *The Martian* is a fictional movie, it is based on real NASA data, and one day, not too far away, humans will walk on the surface of the Red Planet and help unlock its hidden secrets. Here at Stennis, we can be proud to know that we are part of this exciting journey.

Ken Human

Lagniappe is published monthly by the Office of Communications at NASA's John C. Stennis Space Center.
Access monthly copies at: www.nasa.gov/centers/stennis/news/publications/index.html
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FULFILLING NASA'S EXPLORATION MISSION

NASA delivers first RS-25 flight engine to A-1 Test Stand

NASA took the next big step on its Journey to Mars on Nov. 4 by placing the first RS-25 flight engine, engine No. 2059, on the A-1 Test Stand at Stennis Space Center. The engine will be tested in the first part of 2016 to certify it for use on NASA's new Space Launch System (SLS). The SLS vehicle is being developed in two versions to return humans to deep space. The "Block 1" version of the SLS vehicle is set to fly its first uncrewed mission in 2018. The "Block 2" heavy-lift version will be ready for flight later and will be the largest, most powerful rocket ever built, capable of carrying humans on missions to Mars. The core stage of both SLS configurations will be powered by four RS-25 engines, all tested at Stennis Space Center. The core stage for the 2018 SLS flight – Exploration Mission-1 – also will be tested at Stennis. Testing will involve installing the flight stage on the B-2 Test Stand and firing its four RS-25 engines simultaneously, just as during an actual launch. The SLS Program has an inventory of 16 RS-25 flight engines, built by Aerojet Rocketdyne of Sacramento, Calif. The engines are available for the first four SLS missions, and two development engines are available for ground tests. These engines are being adapted to SLS performance requirements, including improvements like nozzle insulation and a new electronic controller.

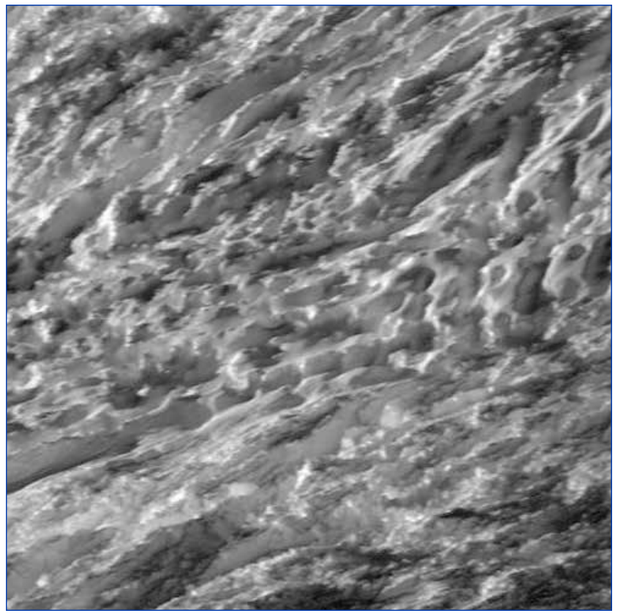
FULFILLING NASA'S EXPLORATION MISSION

Cassini spacecraft completes close flyby of Saturn moon

NASA's Cassini spacecraft successfully completed its close flyby of Saturn's moon Enceladus on Oct. 28, passing 30 miles above the moon's south polar region at about 10:22 a.m. CDT. Soon after the flyby, Cassini began transmitting images of Saturn's icy, geologically active moon Enceladus.

"Cassini's stunning images are providing us a quick look at Enceladus from this ultra-close flyby, but some of the most exciting science is yet to come," said Linda Spilker, the mission's project scientist at NASA's Jet Propulsion Laboratory in Pasadena, California.

Researchers will study data from Cassini's gas analyzer and dust detector instruments, which directly sampled the moon's plume of gas and dust-sized icy particles during the flyby. Those analyses are likely to take several weeks, but should provide important insights about the composition of the global ocean beneath Enceladus' surface and any hydrothermal activity occurring on the ocean floor. The potential for such activity in this small ocean world has made Enceladus a prime target for future exploration in search of habitable environments in the solar system beyond Earth.



The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, manages the mission for the agency's Science Mission Directorate in Washington. JPL is a division of the California Institute of Technology in Pasadena. The Cassini imaging operations center is based at the Space Science Institute in Boulder, Colorado.

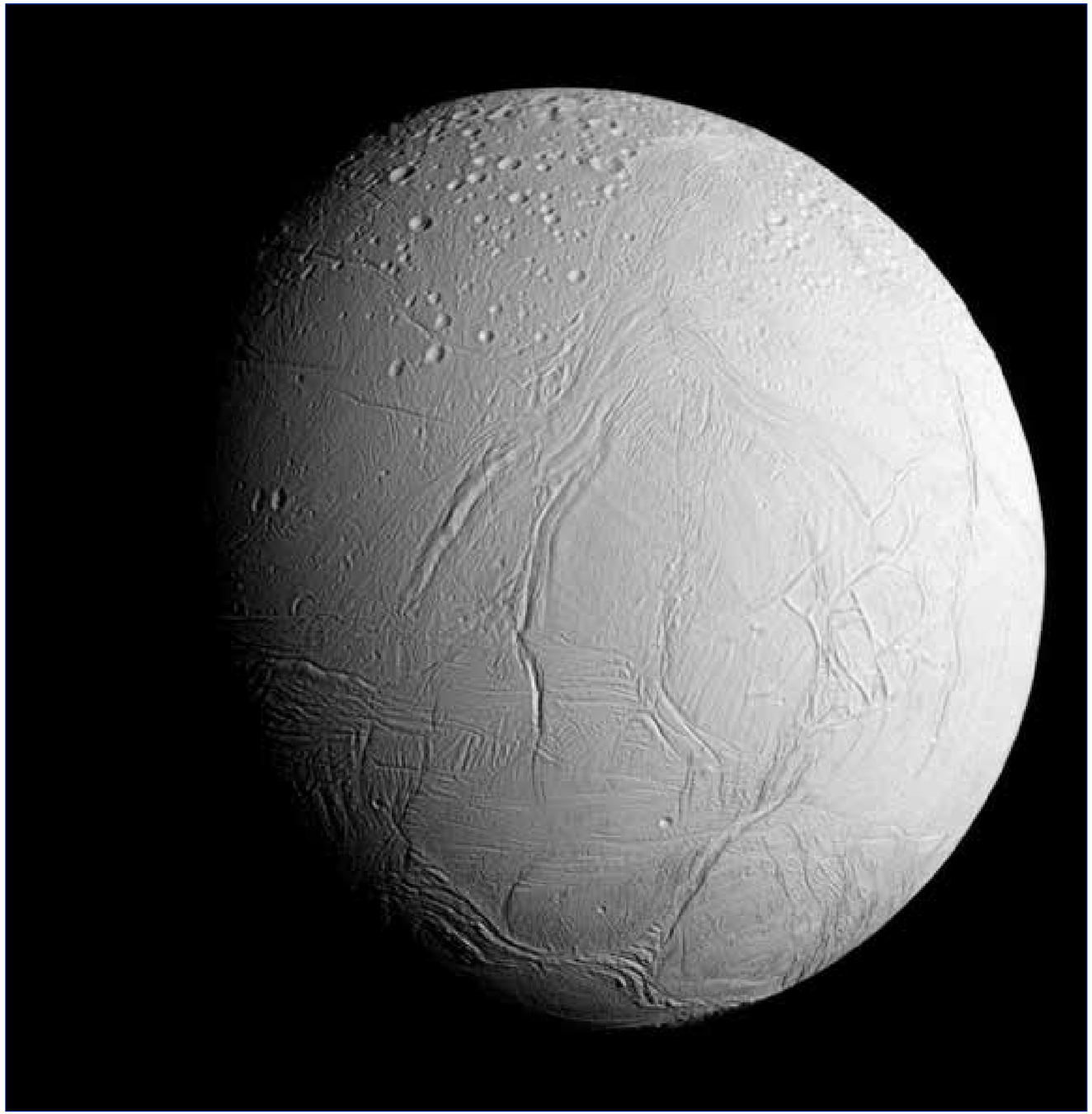
At far right is a view taken as Cassini neared icy Enceladus for its closest-ever dive past the moon's active south polar region. The view shows heavily cratered northern latitudes at top, transitioning to fractured, wrinkled terrain in the middle and southern latitudes. The wavy boundary of the moon's active south polar region – Cassini's destination for this flyby – is visible at bottom, where it disappears into wintry darkness. The image was taken in visible light with the Cassini spacecraft narrow-angle camera from a distance of about 60,000 miles from Enceladus.

The inset image was taken during Cassini's closest-ever dive past the active south polar region of Enceladus. The spacecraft quickly shuttered its imaging cameras to capture glimpses of the fast moving terrain below. This view has been processed to remove slight smearing present in the original, unprocessed image that was caused by the spacecraft's fast motion. The view from a distance of about 77 miles from the surface of Enceladus.

For more about Cassini, visit: http://www.nasa.gov/cassini or http://saturn.jpl.nasa.gov.

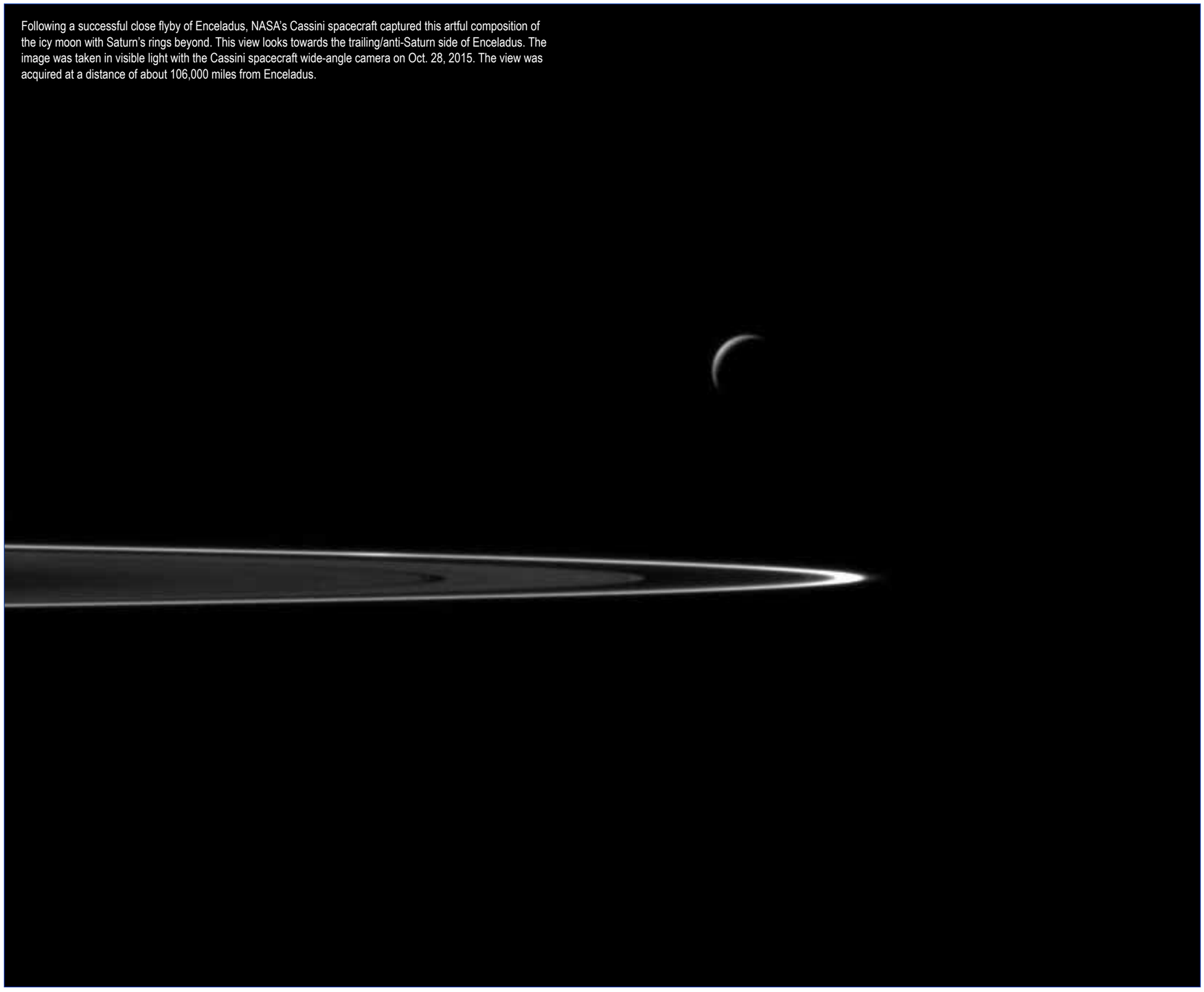
In addition to processed images released by NASA, unprocessed, or "raw," images appear on the Cassini website at: http://saturn.jpl.nasa.gov/mission/flybys/enceladus20151028.

Information on Cassini's final flybys are available at: http://solarsystem.nasa.gov/finalflybys.



FULFILLING NASA'S EXPLORATION MISSION

Following a successful close flyby of Enceladus, NASA's Cassini spacecraft captured this artful composition of the icy moon with Saturn's rings beyond. This view looks towards the trailing/anti-Saturn side of Enceladus. The image was taken in visible light with the Cassini spacecraft wide-angle camera on Oct. 28, 2015. The view was acquired at a distance of about 106,000 miles from Enceladus.



Seven key facts about Cassini's Oct. 28 'plume dive'

Cassini launched in 1997 and entered orbit around Saturn in 2004. Since then, it has been studying the huge planet, its rings and its magnetic field. Here are some things to know about the mission's recent close flyby of Enceladus:

- Enceladus is an icy moon of Saturn. Early in its mission, Cassini discovered Enceladus has remarkable geologic activity, including a towering plume of ice, water vapor and organic molecules spraying from its south polar region. Cassini later determined the moon has a global ocean and likely hydrothermal activity, meaning it could have the ingredients needed to support simple life.

- The flyby was Cassini's deepest-ever dive through the Enceladus plume, which is thought to come from the ocean below. The spacecraft has flown closer to the surface of Enceladus before, but never this low directly through the active plume.

- The flyby was not intended to detect life, but it will provide powerful new insights about how habitable the ocean environment is within Enceladus.

- Cassini scientists are hopeful that flyby data will provide insights about how much hydrothermal activity – that is, chemistry involving rock and hot water – is occurring within Enceladus. This activity could have important implications for the potential habitability of the ocean for simple forms of life. The critical measurement for these questions is the detection of molecular hydrogen by the spacecraft.

- Scientists also expect to better understand the chemistry of the plume as a result of the flyby data. The low altitude of the encounter was intended, in part, to afford Cassini greater sensitivity to heavier, more massive molecules, including organics, than the spacecraft has observed during previous, higher-altitude passes through the plume.

- Data is expected to help solve the mystery of whether the plume is composed of column-like, individual jets, or sinuous, icy curtain eruptions – or a combination of both. The answer should make clearer how material is getting to the surface from the ocean below.

- Researchers are not sure how much icy material the plumes are actually spraying into space. The amount of activity has major implications for how long Enceladus might have been active.

FULFILLING NASA'S EXPLORATION MISSION

Three years and counting, Curiosity still at work

A new study from the team behind NASA's Mars Science Laboratory/ Curiosity has confirmed that Mars was once, billions of years ago, capable of storing water in lakes over an extended period of time. Using data from the Curiosity rover, the team has determined that, long ago, water helped deposit sediment into Gale Crater, where the rover landed more than three years ago. The sediment deposited as layers that formed the foundation for Mount Sharp, the mountain found in the middle of the crater today. The findings build upon previous work that suggested there were ancient lakes on Mars, and add to the unfolding story of a wet Mars, both past and present. Last month, NASA scientists confirmed current water flows on Mars. This view from the "Kimberley" formation on Mars was taken by the Curiosity rover. The strata in the foreground dip towards the base of Mount Sharp, indicating flow of water toward a basin that existed before the larger bulk of the mountain formed. This image was taken by the Mast Camera (Mastcam) on Curiosity on the 580th Martian day, or sol, of the mission. For more information, visit online at: http://www.nasa.gov/msl.

NASA in the News

Mission yields new info on Pluto

From possible ice volcanoes to twirling moons, NASA's New Horizons science team outlined more than 50 exciting discoveries about Pluto at the 47th Annual Meeting of the American Astronomical Society's Division for Planetary Sciences on Nov. 8-13. "The New Horizons mission has taken what we thought we knew about Pluto and turned it upside down," said Jim Green, director of planetary science at NASA Headquarters in Washington. "It's why we explore – to satisfy our innate curiosity and answer deeper questions about how we got here and what lies beyond the next horizon." For one such discovery, New Horizons geologists combined images of Pluto's surface to make 3-D maps that indicate two of Pluto's most distinctive mountains could be cryovolcanoes – ice volcanoes that may have been active in the recent geological past. If Pluto proves to have volcanoes, it will provide an important new clue to its geologic and atmospheric evolution. To view images and graphics being presented by New Horizons scientists at the annual meeting, visit: http://goo.gl/B1u0tq. For additional information regarding NASA's New Horizons mission, including fact sheets, videos and images, visit online at: http://www.nasa.gov/newhorizons.

ISS marks 15 years of habitation

The White House and NASA Administrator Charles Bolden issued statements Nov. 2 marking 15 years of human habitation aboard the International Space Station. "The international partnership that built and maintains the station is a shining example ... of what humanity can accomplish when we work together in peace," said John Holdren, director of the White House Office of Science and Technology Policy. "The International Space Station, which President Obama has extended through 2024, is a testament to the ingenuity and boundless imagination of the human spirit," Bolden added. "The work being done on board is an essential part of NASA's journey to Mars, which will bring American astronauts to the Red Planet in the 2030s. For 15 years, humanity's reach has extended beyond Earth's atmosphere. Since 2000, human beings have been living continuously aboard the space station, where they have been working off-the-Earth for the benefit of Earth, advancing scientific knowledge, demonstrating new technologies, and making research breakthroughs that will enable long-duration human and robotic exploration into deep space." For more information regarding ISS, visit: http://www.nasa.gov/station.

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

Stennis hosts Family Day activities at INFINITY Science Center

Stennis Space Center hosted a day of activities for employees and families at INFINITY Science Center on Nov. 7. During 2015 Family Day, visitors had the opportunity to view space-related exhibits, participate in hands-on activities, meet Stennis mascots Orbie and Starla, and learn about the American space exploration program. The day also featured a presentation by Apollo 13 astronaut Fred Haise, a native of Biloxi, as well as remarks by Stennis Director Rick Gilbrech (right photo). More than 900 people attended the Family Day event.


The Mystical Magician


Kidz Zon

November 1965 – New faces and the weather

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.

New faces began to trickle in at NASA's Mississippi Test Facility (MTF) during the final phases of development. Still operating under the auspices of Marshall Space Flight Center in Huntsville, Alabama, MTF Manager Jackson Balch announced six key appointments in November 1965. Balch's management team members included:

• Vicksburg, Mississippi, native and Mississippi State University (MSU) graduate Henry Auter was named deputy manager and chief of the projects control office. Auter transferred from Marshall, where he was chief of the electric systems engineering branch.

Employees work in one of the Weather Bureau labs in 1965.

• Frederic Frech, the new assistant manager for construction and installation, had been an area engineer for the Army Corps of Engineers at the Air Force's Arnold Engineering Development Center in Tullahoma, Tennessee.

• Waldo Dearing, the new chief of management support office, was formerly executive assistant to the Depot Commander at the Sioux Army Depot in Nebraska. He was the top ranking civilian official.

• S-1C Project Manager Myron Myers transferred to MTF from Marshall, where he was the S-1C facilities manager under the Saturn V program.

• S-II Project Manager Robert Bush, another transferee from Marshall, had been involved in the erection of S-II facilities throughout the country.

• MSU graduate Myrl Sanders, project manager for support activities, worked formerly with the Resources Management Office at Marshall. He had been one of the key figures in the development of MTF.

In existence three years prior to the arrival of NASA's team managers, another prestigious group onsite was the Atmospheric Measuring Group. Under contract to NASA, the U.S. Weather Bureau was originally designed to gather atmospheric data to support acoustic testing at the ground space vehicle testing facility.

The unit was also responsible for gathering background climatology information for this particular location to assist in weather forecasting. Both surface and upper air data were gathered by the atmospheric station at MTF with almost 4,000 weather balloons being released during the three-year period.

One of the complex roles played by MTF's weather team for NASA was a series of 10-day tests of the upper air to collect information on a round-the-clock program. During these tests, the atmospheric station conducted atmospheric soundings every hour and a half to obtain information for the nation's space agency.

Other weather bureaus at NASA installations and military units across the south and southeastern United States also participated in the 10-day tests. When the data was compiled, the MTF crew processed more than 50 percent for NASA's Aerospace Environment Office of the Aeroastrodynamics Laboratory.

During the early days at MTF, the weather bureau was the only building with telephones and teletype equipment. Indirectly, it served as a communication center for MTF.

John Rhyne led pioneering efforts to establish the MTF bureau. Charles B. King was the meteorologist in charge of the station under the supervision of NASA's L.W. Nybo. The six members of the original weather team were Albert Bianchi Jr., Leon Brock, Fred Cherry, Raymon Corey, John Rhyne Jr. and Sidney A. Strickland. Other members of the weather watchers included William E. Higgins, Charles B. King and Alton M. Redd. M.L. Paul was the electrical technician with the acoustics laboratory.

Office of Diversity and Equal Opportunity

National American Indian Heritage Month (Part 1)

The following article on National American Indian Heritage Month represents part 1 of 2.

We will be known forever by the tracks we leave. (Dakota)

The American Indian cultures are known for the rich oral tradition used to share their history, customs, rituals, and legends through vivid narratives. Each time a story is told, it breathes life into their culture, cultivates their verbal language, gives meaning to the tribe's history and teaches life lessons about leadership and honor.

This article reviews the historical milestones that led to establishment of National American Indian Heritage Month. It also describes various aspects of American Indian and Alaska Native life.

In 1914, Red Fox James, a Blackfeet Indian, rode on horseback from state to state, seeking support for a day to honor American Indians. A year later, James presented the endorsements of 24 state governments to the White House. There is no record of a national day being proclaimed, despite his efforts.

In 1915, the Congress of the American Indian Association approved a formal plan to celebrate American Indian Day. Rev. Sherman Coolidge, an Arapaho tribal member, asked the country to formally set aside a day of recognition.

In 1924, Congress enacted the Indian Citizenship Act, but it took no action to establish a national American Indian Day. It was not until 1986 that Congress passed a proclamation authorizing American Indian Week.

In 1990, the month of November was designated as National American Indian Heritage Month. The title has since expanded to celebrate Alaska Natives as well. National American Indian and Alaska Native Heritage Month is celebrated annually to recognize native cultures and educate the public about the heritage, history, art and traditions of American Indians and Alaska Natives.

Did you know American Indians have the highest population per capita of any ethnic group serving in the military? Today, 22,248 American Indians serve in the Armed Forces, making up 1.7 percent of the military population. Additionally, according to the Department of Defense, there were 156,515 American Indian veterans as of March 2012. American Indians have participated with distinction in U.S. military actions for more than 200 years. Their courage, determination, and fighting spirit were recognized by American military leaders as early as the 18th century.

The nation's population of American Indians and Alaska Natives, including those of more than one race, was 5.2 million, making up about two percent of the total population in 2012. By 2060, the population of American Indians and Alaska Natives is expected to be 11.2 million.

Currently, there are 566 federally recognized American Indian and Alaska Native tribes and more than 100 state-recognized tribes across the United States. Native Alaskan tribes belong to five geographic areas, are organized under 13 Alaska Native regional corporations, and speak 11 different languages and 22 different dialects. They also have 11 distinct cultures.

Federally recognized tribes retain certain inherent rights of self-government (i.e., tribal sovereignty) and are entitled to certain federal benefits, services and protections because of their relationship with the United States. Sovereignty is the right of a nation or group of people to be self-governing and is the most fundamental concept that defines the relationship between the government of the U.S. and governments of American Indian tribes. American Indians and Alaska Natives are U.S. citizens and citizens of their tribes. They are subject to federal laws, but they are not always subject to state laws.

Did you know that the Iroquois League of Nations government was a model for the development of the U.S. government? Benjamin Franklin said the idea of a federal government, in which certain powers are given to a central government and all other powers are reserved for the states, was adapted from the system of government used by the Iroquois League of Nations.

Hail & Farewell

NASA bids farewell to the following:

Kimberly Johnson	AST, Facility Systems Safety	Safety & Mission Assurance Directorate
Sonia Rushing	Contract Specialist	Office of Procurement
Theresa Smith	Student Trainee	Office of Communications

Stennis hosts awareness events

National Disability Employment Awareness Month

(Top photo) Dorothy Roberts McEwen, owner of Robin's Nest jewelry showcase gallery in Pass Christian, speaks to Stennis employees during a National Disability Employment Awareness Month program Oct. 21. McEwen is former director of the South Mississippi Regional Center, which serves people with intellectual and developmental disabilities.

Energy Awareness Day

(Middle photo) Stennis employees Robert Fowler (l) and Mike McKinion review the Stennis energy management and control system during 2015 Energy Day Awareness activities Oct. 21. A number of area companies and organizations visited Stennis during the day to provide exhibits and information on various energy-related topics, such as conservation and renewable energy.

Native American Heritage Month

(Bottom photo) Stennis employees gathered Nov. 10 for a lunch-and-learn session in observance of Native American Heritage Month. The program included a viewing of the documentary film "Two Rivers," an award-winning film about a Native American reconciliation group. The film tells the true story of how people from different worlds have created profound, lasting friendships by learning to speak, listen and act from their hearts.