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Spaceport News

John F. Kennedy Space Center - America's gateway to the universe

Inside . . .

Juno eyes Jupiter's makeup

By Steven Siceloff
Spaceport News

NASA's Juno spacecraft is on its way to Jupiter on a mission to look deep beneath the planet's swirling curtain of clouds to find out what lies beneath. The answer might confirm theories about how the solar system formed, or it may change some things we thought we knew.

"The special thing about Juno is we're really looking at one of the first steps, the earliest time in our solar system's history," said Scott Bolton, the principal investigator for the Juno mission. "Right after the sun formed, what happened that allowed the planets to form and why are the planets a slightly different composition than the sun?"

Starting the 4-ton spacecraft on its five-year journey to the largest planet in the solar system was the job of a United Launch Alliance Atlas V rocket equipped with five solid-fueled boosters. Even with that much power, Juno will still require a flyby of Earth to get up enough energy to swing out to Jupiter.

With three 34-foot-long solar arrays and a high-gain antenna in the middle, the spacecraft is reminiscent of a windmill. It even will spin slowly as it goes through its mission. Those arrays will be the sole power source for Juno as it conducts its mission, a first for a spacecraft headed beyond the asteroid belt between Mars and Jupiter.

NASA/Bill Ingalls

An Atlas V rocket launches with the Juno spacecaft from Space Launch Complex 41 at Cape Canaveral Air Force Station in Florida on Aug. 5 at 12:25 p.m. EDT.

The Atlas V proved again a good option for NASA's Launch Services Program (LSP), the organization which oversees NASA launches and chooses the best launchers for different spacecraft.

"It's flown 28 times, pretty challenging missions, pretty challenging payloads," said Omar Baez, launch director for Juno. "It's got a heritage that goes back to the Atlas I in some of the components and in the upper stage, so it's an evolution of a family in its current configuration and shape and form. I'd say it's pretty robust."

The spacecraft lifted off at 12:25 p.m. EDT on Aug. 5 from Space Launch Complex 41 at Cape Canaveral Air Force Station in Florida. The mission faced a limited launch window to get off Earth before Jupiter's orbit took it out of alignment.

Juno only had a 22-day launch window before entering a 13-month down period.

"It's those kinds of challenges with making sure you do all the little things necessary to maximize the opportunities you get for those 22 days," said John Calvert, mission manager for Juno.

After arriving at Jupiter in August 2016, the spacecraft will spend about a year surveying Jupiter and its moons to draw a detailed picture of its magnetic field and find out whether there is a solid core beneath its multi-colored clouds.

The research is building on what previous missions found about Jupiter, particularly the data Galileo gathered during a mission that ended in 2003. It may even provide clues about what to look for in planets outside the solar system.

"If we could start to understand the role that Jupiter played and how the planet formed and how that eventually governed the creation of the other planets and the Earth and maybe even life itself," Bolton said, "then we know a little bit about how to look for other Earth-like planets, maybe orbiting other stars and how common those might be and the roles that those giant planets that we see orbiting the other stars play."

With Juno on its way, the LSP team is looking at the moon as it prepares the GRAIL mission for launch in September. Following that, the next mission beyond Earth also is being prepared at Kennedy as teams ready the roving Mars Science Laboratory "Curiosity" for liftoff in late November.

"Really, all these missions that LSP is involved in, that NASA's involved in, they're all precursors to the bigger picture of getting humans out beyond Earth orbit, to Mars, to an asteroid," Calvert said.

Space shuttle Columbia part found in Texas

By Steven Siceloff
Spaceport News

A newly discovered aluminum tank from space shuttle Columbia's STS-107 mission has been recovered from the shoreline of Lake Nacogdoches in east Texas and eventually will likely be made available to researchers as are other parts of the Columbia debris, NASA's project manager for the recovery said.

"It's very important for us to bring all of Columbia home and we've done that since the accident in 2003," said Mike Ciannilli, the project manager for Columbia's recovery.

The sphere was one of 18 cryogenic tanks Columbia carried during its 16-day mission.

It had been underwater for the past eight and half years, having landed there Feb. 1, 2003, when the shuttle broke up over east Texas during re-entry.

It was uncovered recently when the lake's water level diminished by about 11 feet during an ongoing drought.

"Recently we got a call from the local authorities in Nacogdoches about a metal sphere and we asked the authorities to take a picture for us and send it to us," Ciannilli said. "We analyzed that with our teams here at the Cape and determined it to be a piece of space shuttle Columbia."

The tank does not hold any hazardous materials, but could have sharp edges, Ciannilli said.

In space, the supercold chemicals stored inside the tanks powered the shuttle's fuel cells to generate electricity for the spacecraft.

All the shuttles have several tanks built into their fuselages and Columbia carried an extra set in its payload bay so it could stay in space longer than usual for the research flight.

NASA worked with local authorities to pick up the tank, and now will be sending it back to Kennedy Space Center.

"We want to preserve the integrity of the piece, so we want to be very careful how we extract it, clean it up and then transport it back to Kennedy," Ciannilli said.

Searchers recovered more than 84,000 pieces of the shuttle during recovery operations, accounting for about 40 percent of the shuttle. Much of the debris was found in the Nacogdoches area.

"Lake Nacogdoches is nearby the centerline of the vehicle's track, so back in initial recovery operations in 2003, we did find a great deal of components in that area," Ciannelli said.

The pieces are stored in Kennedy's Vehicle Assembly Building and some are loaned to researchers studying spacecraft dynamics and to help with future spacecraft design.

"Much like the 107 mission was a mission of research, we like to continue and honor the legacy of the 107 crew and continue that research mission in the future," Ciannilli said.

Photo courtesy of Nacogdoches Police

This sphere was one of 18 cryogenic tanks Columbia carried during the STS-107 mission in 2003. It recently was found along the shoreline of Lake Nacogdoches in Texas during an ongoing drought. To hear from NASA's recovery project manager, click on the photo.

Atlas V could speed crewed launches to ISS

Astronauts could return to the shoulders of an Atlas rocket to get into space in the future if NASA certifies the booster for human flight. John Glenn was the first astronaut to ride an Atlas into space when, in 1962, his Mercury capsule was mounted atop an early version of the rocket.

The Atlas V NASA will consider is several generations more advanced than the one that carried Glenn into orbit, but it has to be carefully evaluated before the space agency will let its astronauts climb atop one.

That's why NASA recently signed a Space Act Agreement (SAA) with United Launch Alliance (ULA) calling on the company to share technical data about the rocket with NASA. The deal was inked July 18 at ULA's Denver headquarters as part of NASA's Commercial Crew Development Program to cultivate private companies and technology to loft astronauts to the International Space Station (ISS).

In turn, NASA will share its human spaceflight experience with the company to advance crew transportation system capabilities and draft human certification requirements. ULA will provide NASA feedback about those requirements, including input on the technical feasibility and cost effectiveness of the agency's proposed certification approach.

"I am truly excited about the addition of ULA to NASA's Commercial Crew Development Program team," NASA Administrator Charlie Bolden said. "Having ULA on board may speed the development of a commercial crew transportation system for the International Space Station, allowing NASA to concentrate its resources on exploring beyond low Earth orbit."

Atlas rockets have evolved throughout five decades to become a highly reliable launch vehicle. Since 2005, the Atlas V booster family has become a flight-proven vehicle used by NASA and the Department of Defense for critical space missions. Its Centaur upper stage engines can start and re-start multiple times in space, enabling a spacecraft to park or coast in low Earth orbit or go into a geosynchronous transfer orbit. They're also capable of direct insertion into an inter-planetary trajectory.

The Atlas V's inaugural flight for NASA was in August 2005, taking the Mars Reconnaissance Orbiter (MRO) on a seven-month cruise to Mars. In January 2006, the fast-moving rocket launched New Horizons to Pluto; and in June 2009, it took the Lunar Reconnaissance (LRO) and Lunar Crater Observation Sensing Satellite (LCROSS) to the moon. The rocket's Centaur upper stage then acted as a heavy impactor to create a debris plume for LCROSS to collect data about the presence of water ice. Last year, the more than 150-foot tall rocket launched NASA's Solar Dynamics Observatory, which now is taking unprecedented images of the sun.

"This unfunded SAA will look at the Atlas V to understand its design risks, its capabilities, how it can be used within the context of flying our NASA crew and maturing ULA's designs for the Emergency Detection System and launch vehicle processing and launch architectures under a crewed configuration," said Ed Mango, manager of NASA's Commercial Crew Program, which is based at Kennedy Space Center.

In 2010, NASA awarded $6.7 million to ULA to accompany its own $1.3 million investment to develop an Emergency Detection System (EDS) prototype test bed. The EDS will monitor critical launch vehicle and spacecraft systems and issue status, warning and abort commands to crew members during their mission to low Earth orbit. EDS is the sole significant element necessary for flight safety to meet the requirements to certify ULA's launch vehicles for human spaceflight.

"We believe this effort will demonstrate to NASA that our systems are fully compliant with NASA requirements for human spaceflight," said George Sowers, ULA's vice president of business development. "ULA looks forward to continued work with NASA to develop a U.S. commercial crew space transportation capability providing safe, reliable, and cost effective access to and return from low Earth orbit and the International Space Station."

To learn more about NASA's Commercial Crew Program, go to **www.nasa.gov/offices/c3po/home**.

Final mission included Kennedy-developed experiment

By Linda Herridge
Spaceport News

Atlantis carried many science and research experiments in its middeck during NASA's last space shuttle flight, STS-135, in July. Among these was a plant experiment developed at Kennedy Space Center's Space Life Sciences Laboratory (SLSL) that could have an impact on long-duration missions to the moon or Mars.

Principal Investigators Dr. Gary Stutte and Dr. Michael Roberts with QinetiQ North America with the Engineering Services Contract, and NASA Project Scientist Dr. Howard Levine created the Biological Research in Canisters-Symbiotic Nodulation in a Reduced Gravity Environment (BRIC-SyNRGE).

A first of its kind to fly on a space shuttle, the purpose of the experiment was to study the symbiotic relationship between plants similar to alfalfa, which is in the legume family, and specific nitrogen-reacting bacteria in microgravity.

"It's a distinct honor to have had an experiment on board Atlantis, the final space shuttle mission, and I am indebted to everyone who worked so hard to make it possible to be a part of this historic mission," Stutte said.

About four hours after Atlantis landed at Kennedy's Shuttle Landing Facility on July 21, the BRIC-SyNRGE experiment was retrieved and returned to the SLSL. Stutte said initial reviews show there was 100 percent germination of the plant seeds and excellent growth was observed.

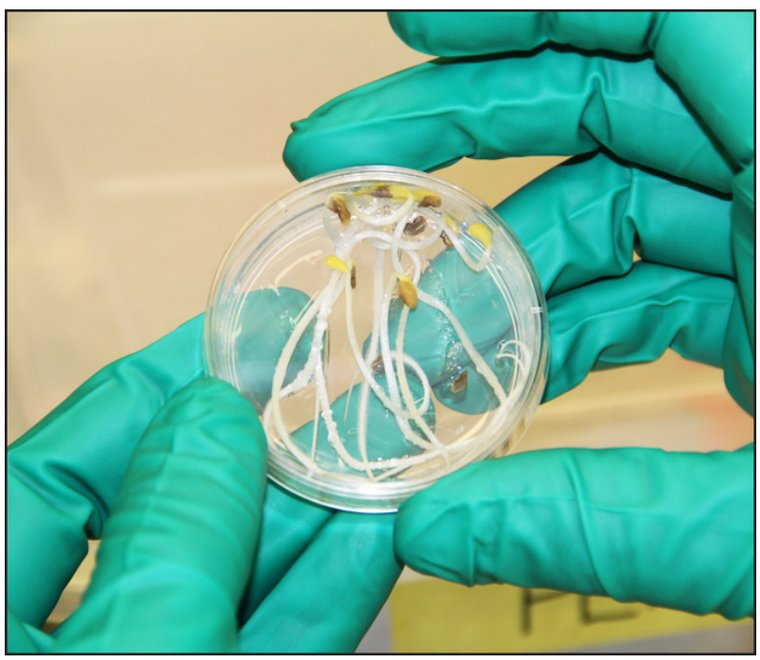
"The SyNRGE science team has begun processing the samples and looks forward to learning the effects of microgravity," Stutte said. "Plants and the microbial world have been of interest at Kennedy for many years."

According to Stutte, the bacteria were introduced to each plant sample's root hairs in order to study the effect. What he and the SyNRGE team are hoping to find is that the plants have formed specialized nodules where the bacteria can convert atmospheric nitrogen into a form the plants can use to produce proteins.

The alfalfa-like plant, Medicago truncatula, was grown in a plant chamber at the SLSL. The day before Atlantis' launch, several laboratory rooms were abuzz with activity. In one lab, samples carefully were harvested and inserted into petri dish units. In another lab, technicians added the nitrogen-fixing bacteria and a liquid preservative to the dishes. In another room, plant units were inserted into the canisters. A total of 120 petri dishes were installed in eight canisters. Each canister contained five units and a temperature sensor. The experiment was transported to the launch pad and added to Atlantis' middeck as a late stowage item the evening before launch.

NASA

Dr. Gary Stutte, a principal investigator of the Biological Research in Canisters-Symbiotic Nodulation in a Reduced Gravity Environment (BRIC-SyNRGE) experiment, displays two of the canisters containing plant samples returned to the Space Life Sciences Laboratory at Kennedy Space Center after STS-135.



NASA

A lab technician displays sprouts in a petri dish from the Biological Research in Canisters-Symbiotic Nodulation in a Reduced Gravity Environment (BRIC-SyNRGE) experiment at the Space Life Sciences Laboratory at Kennedy Space Center. To learn more about the STS-135 mission, click on the photo.

> *"Plants and the microbial world have been of interest at Kennedy for many years."*
>
> **Dr. Gary Stutte, QinetiQ North America**

Stutte said this kind of study could provide a path for better food production, improve agricultural areas in third world countries, and reduce resupply costs for fertilizer. It could also have an impact on how food sources are grown during long-duration space missions.

"Legumes are a major direct source of food for humans," Stutte said. "These include soybeans, peas and beans. Also, forage for livestock, including alfalfa and clover."

During the STS-135 mission, crew members monitored the temperature of the BRIC-SyNRGE samples, added a fixing liquid to half of the samples to preserve them and left the other half untouched.

"We hope that our results provide information on how synergistic relationships form between plants and bacteria, and that we use that knowledge to benefit food and fiber production on Earth," Stutte said. "We hope our research brings us closer to achieving sustainable life support systems that permit long-term habitation and colonization of space."

Levine said funding for the project was initiated in September of 2010 for the experiment to fly in July of 2011.

"It took an incredible amount of skill and effort on the part of both the science and engineering teams. They are all to be commended," Levine said.

Teams practice lifting space shuttles at airports

By Steven Siceloff
Spaceport News

NASA

Landing support workers rehearsed the careful processes that will be needed to lift the space shuttles off Shuttle Carrier Aircraft when they are taken to new homes at museums across America. The process was practiced at the Shuttle Landing Facility on the ramp near the permanent Mate-Demate Device on June 16. For up-to-date transition and retirement milestones, click on the photo.

It will take two large cranes, a specially built sling, four masts and about 45 people to perform the complex maneuvers to safely lift a space shuttle off the back of a modified 747. Because it hasn't been done in more than 20 years, teams rehearsed the lift on the Shuttle Landing Facility's ramp at Kennedy Space Center in Florida.

It is a scene coming soon to Washington, D.C., Los Angeles and New York as NASA's shuttles are handed over to museums for public display. Each of those cities will receive one of the shuttles, including Enterprise, the prototype shuttle used to prove the design could glide safely to a landing after returning from orbit. One of the shuttles, Atlantis, will be displayed at Kennedy.

"People have different emotions about it, but I'm kind of honored to put them in their final display location," said Casey Wood of United Space Alliance's Integrated Landing Operations. He is part of the team that will oversee the work.

During the more than 30 years the space shuttles were in development and launching, they have been lifted onto and off of 747s numerous times, most often when the shuttle landed at Edwards Air Force Base in California. Those moves were performed by specially designed structures at Kennedy and in California called "mate-demate devices." The MDD, as they are called, are shaped to let the 747, called the Shuttle Carrier Aircraft (SCA,) wheel in beneath a sling that lifts and holds the shuttle.

NASA file

On Nov. 18, 1985, shuttle Enterprise was the last to be lifted off a 747 carrier aircraft using a mobile crane when it was taken to Dulles International Airport near Washington, D.C., ahead of its display at the Smithsonian Institution. It's been more than 20 years since some of the machinery was used to lift a shuttle.

Only once did a shuttle not land in either location, and that was back in 1983 at White Sands Space Harbor in New Mexico. Had the shuttle made an emergency landing overseas or at a different runway, the mobile system would have been taken there to load the shuttle to the SCA.

The mobile lift system was used in 1985 when Enterprise moved to Washington, D.C.

"This system has been stored in cargo containers for more than 20 years, and that's why we wanted to do the test," Wood said. "We were just missing the plane and the orbiter."

The shuttle will weigh about 175,000 pounds -- more than 87 tons -- when it is readied for public viewing. That's a heavy enough load to cause a crane's boom to flex slightly.

"The actual lift is probably the biggest challenge," Wood said. "With our lift, we can only go directly up or directly down. It's strictly vertical, there's no lateral movement."

To get it right, the team trucked all the gear out of storage over to the Shuttle Landing Facility and set it up.

The sling is almost identical to the ones used at the MDDs, used to hoist the shuttle and mate or demate to the SCA. This sling was used in Palmdale, Calif., where the shuttles were built.

The setup includes four masts that connect to the sling.

"That gives us our steadiness and wind restraint," Wood said.

They had to drill about 200 holes in the ramp to anchor the different elements firmly. With everything in place, they can perform the work in winds up to about 20 mph.

With this test accomplished, Wood said the team is reworking a few procedures to adapt them to the different locations.

Discovery is scheduled to be the first shuttle to go through the operation for real, when it is ferried up to Washington, D.C., for display at the Smithsonian's National Air and Space Museum Steven F. Udvar-Hazy Center in Chantilly, Va., in the spring of 2012.

Scenes Around Kennedy Space Center

NASA/Frank Michaux

Technicians secure shuttle Endeavour's left-hand orbital maneuvering system, or OMS, pod onto a transporter in Orbiter Processing Facility-1 at Kennedy Space Center on July 28. It will then be moved to the Hypergol Maintenance Facility. The work is part of Endeavour's transition and retirement processing. The spacecraft is being prepared for public display at the California Science Center in Los Angeles. For up-to-date transition and retirement milestones, click on the photo

NASA/Kim Shiflett

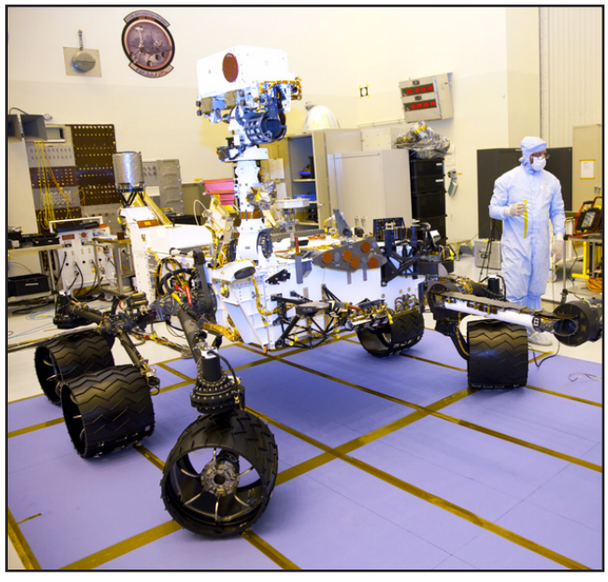
Apollo 15 Commander Dave Scott and Command Module Pilot Al Worden, along with an elite gathering of Apollo-era astronauts celebrate the 40th anniversary of NASA's Apollo 15 mission at Kennedy Space Center's Apollo/Saturn V Center on July 25. Seen here are Apollo 15 astronaut backup support crew members, Jack Schmitt (left), Vance Brand and Dick Gordon; Worden and Scott. Worden circled the moon while Scott and the late Jim Irwin, the mission's lunar module commander, made history when they became the first humans to drive a vehicle on the surface of the moon. To learn more about Apollo 15, click on the photo.

NASA/Kim Shiflett

The Office of Personnel Management (OPM), NASA and Brevard Workforce host a job fair for former and current Kennedy Space Center aerospace workers at the Radisson Resort at the Port in Cape Canaveral, Fla., on July 26. More than 60 private industry employers and federal agencies recruited for local and worldwide positions, and more than 1,000 job seekers attended.

NASA/Jim Grossmann

NASA and Sierra Nevada Space Systems (SNSS) of Sparks, Nev., enter into a Space Act Agreement on July 7 that will offer the company technical capabilities from Kennedy Space Center's uniquely skilled work force. Sitting, from left, are NASA Administrator Charlie Bolden; Kennedy Center Director Bob Cabana; and Mark Sirangelo, head of Sierra Nevada. Standing, from left, are Kennedy Deputy Director Janet Petro; Jim Voss, vice president of Sierra Nevada's Space Exploration Systems; and Merri Sanchez, senior director of Sierra Nevada's Space Exploration Systems.



CLICK ON PHOTO NASA/Frankie Martin

Technicians in Kennedy Space Center's Payload Hazardous Servicing Facility put the instrument mast and science boom on NASA's Mars Science Laboratory (MSL) rover, known as Curiosity, through a series of deployment tests July 18. A United Launch Alliance Atlas V rocket is scheduled to launch MSL from Cape Canaveral Air Force Station in Florida on Nov. 25. To find out more about MSL, click on the photo.

STS-134 crew members return to thank Kennedy workers

By Linda Herridge
Spaceport News

During a crew return event in Kennedy Space Center's Operations and Support Building II, July 12, STS-134 Mission Specialist Michael Fincke said that the International Space Station was a lot bigger than the last time he was there.

Fincke and Pilot Greg H. Johnson returned to the center to share their experiences and thoughts about the mission with workers.

"They are the best," said Kennedy Director Bob Cabana. "They did a superlative job on orbit. Thank you for coming back and sharing your experiences."

Crew members not able to return were Commander Mark Kelly, and Mission Specialists Drew Feustel, Greg Chamitoff and European Space Agency astronaut Roberto Vittori.

The STS-134 mission, which launched May 16, was Endeavour's last flight and NASA's last station assembly flight. Endeavour also flew the first space station assembly mission, STS-88, in December 1998, and delivered the U.S. Unity module to connect with the Russian Zarya control module.

NASA/Kim Shiflett

Walter "Buddy" McKenzie shakes hands with STS-134 Pilot Gregory H. Johnson as Mission Specialist Michael Fincke, right, looks on following the STS-134 Crew Return event. The astronauts visited with employees inside Kennedy's Orbiter Processing Facility-1 on July 12, where space shuttle Endeavour is being prepared for public display. learn more about the STS-134 mission, click on the photo.

After Endeavour landed at Kennedy's Shuttle Landing Facility on June 1 Fincke became the U.S. astronaut with the most time in space: 381 days, 15 hours and 11 minutes in orbit. Though STS-134 was Fincke's first space shuttle flight, he launched to the space station twice aboard Russian Soyuz spacecraft from the Baikonur Cosmodrome in Kazakhstan. He served as an Expedition 9 crew member from April 18 to Oct. 23, 2004, and the Expedition 18 commander from Oct. 12, 2008, to April 8, 2009.

Johnson's previous flight was Endeavour's STS-123 mission in March 2008.

"I thought I had experienced a launch and I wouldn't be surprised," Johnson said. "However, the energy of a launch, 7 million pounds of thrust, I was really, really surprised."

Johnson said Flight Day 3, which was rendezvous day with the space station, was really exciting.

"You see the station out there about the size of a football field as we got closer and closer until the decreasing rate was about one inch per second," Johnson said.

Referring to the cupola, Johnson said he underestimated the window in space.

"It's probably the most important module on the station," Johnson said. "It was magnificent seeing the Earth through this window in space."

During the mission, Pope Benedict XVI spoke to and shared words of advice with the shuttle and station crews, the first time ever.

"He thanked everyone who has worked on the space station and what it means to all of humanity," Fincke said. "It was really touching to all of us."

Endeavour was docked to the space station for 11 days while mission specialists performed four spacewalks to complete mission objectives. The shuttle's orbiter boom sensor system remained on the station for future use by Expedition crews.

The STS-134 crew members delivered the Alpha Magnetic Spectrometer-2 and critical supplies, including two communications antennas, a high-pressure gas tank and parts for the Dextre robotic arm, to the space station.

Child Development Center delves in 'Adventure Week'

Children at Kennedy Space Center's Child Development Center celebrate "Adventure in Space Week" July 11-55. Kennedy's Education Office planned and coordinated the week's events to ignite excitement in science, technology, engineering and mathematics (STEM) at a young age. Students had the opportunity to launch balloon rockets (left), ride on a "hovercraft" (below), listen to former astronaut Rick Searfoss share his spaceflight experiences (bottom right), and launch their own "soda-straw rockets" (right). These events incorporated the training and tools of the Kennedy Educate to Innovate (KETI) Program, which has been instrumental in helping employees share real-world experiences with NASA's next generation of explorers.

NASA photos

Remembering Our Heritage

MILA celebrates 45 years of service, prepares to close

By Cheryl Mansfield and Rebecca Regan
Spaceport News

With its beginnings rooted deeply in the historic days of Apollo, the MILA Spaceflight Tracking and Data Network Station has played a key role throughout the 30 years of NASA's Space Shuttle Program. Now, with the shuttle's final flight complete, MILA too will close its doors for good and become a part of U.S. space history.

"We are here to celebrate 45 years of excellence," Gary Morse, MILA station director, said during a closing ceremony in front of a two signature 30-foot steerable S-band antenna on July 28. "It's remarkable what this team has accomplished."

MILA officially will close its doors about six weeks after the wheelstop of shuttle Atlantis on the STS-135 mission, which occurred July 21 at 5:57 a.m. EDT.

"That's it. We hand the keys back to Kennedy Space Center and we walk away," said MILA Station Manager Martyn Thomas. "The MILA mission ends."

Although the Merritt Island Launch Annex, simply known to most as MILA, is at Kennedy, for most of its history it actually served as a Goddard Space Flight Center operation. The tracking station originally was established in 1966 by the NASA center as part of a global, ground-based data network of 17 tracking stations that provided orbital support to the Apollo Program and Earth-orbiting scientific satellites.

Those stations gradually were phased out with the creation of the Tracking and Data Relay Satellite (TDRS) constellation, but MILA remained operational to serve NASA's Space Shuttle Program.

MILA sits in an area somewhat remote from the main hub of processing and launch facilities at Kennedy Space Center. Located west of Kennedy's Visitor Complex and about a mile south of NASA Causeway, the small building is surrounded by a field of complex antennas, dishes and arrays, which were used to perform a vital role: tracking a space shuttle during launch and landing.

"It's a combined effort between the Mission Control Center and the Launch Control Center getting together. The interface to those facilities is MILA, because it gets them their data they need to make those decisions," said Morse. "We're getting command to the space shuttle, we're getting telemetry from the space shuttle, were getting TV from the external tank, which is looking down at the leading edges of the wing surfaces to see if any foam or ice comes off. We are getting tracking data as soon as we lift off from our signal and sharing that with the flight dynamics facility at Goddard as well as the Mission Control Center in Houston."

NASA/Kim Shiflett

At the Merritt Island Launch Annex (MILA) Spaceflight Tracking and Data Network Station at Kennedy Space Center, one of two signature 30-foot steerable S-band antennas is slewed from the horizontal to the vertical position for the last time during a closing ceremony on July 28. The antenna was pointed at Kennedy's Shuttle Landing Facility as it was for its last assignment, support of the landing of space shuttle Atlantis, concluding the STS-135 mission. To watch a video about MILA, click on the photo.

The tracking station served as the primary voice, data and telemetry communications link between the shuttle and the ground from launch until seven and a half minutes into flight. Millions of clues about the performance of the shuttle's main engines and other components were communicated to launch managers, technicians and engineers on the ground, who had to keep their fingers on the pulse of the shuttle during the critical ascent.

Beginning with the first shuttle launch on the STS-1 mission in 1981, the Ponce DeLeon Inlet Tracking Annex at New Smyrna Beach, Fla., was added to MILA's support capability. Located 30 miles north of Kennedy, the station was needed to track a shuttle during the second and third minutes of flight when the highly reflective plume of a shuttle's solid rocket boosters would impede S-band radio transmissions to MILA.

MILA also provided communications during shuttle landings, beginning about 13 minutes before touchdown on Kennedy's Shuttle Landing Facility runway.

"It's an interesting period of time," Thomas said. "You're sitting there watching and watching the displays. And you're waiting for the signal light to come on -- that one little light. Then it flickers . . . and it flickers again . . . then it goes green and we've got them! Everybody's watching that one little light."

MILA's history of supporting NASA's human and scientific missions also includes Skylab, Mariner, Viking, Surveyor, the Hubble Space Telescope, and rocket launches.

"The important part is its people. It's people who know what they're doing and are capable of isolating problems quickly, solving problems in real time," said Morse. "That's what this business is about. Everybody has problems. It's how well you deal with those problems on a daily basis. And what a record here."

NASA/Kim Shiflett

Media representatives, family members, and current and former employees, attend a closing ceremony for the Merritt Island Launch Annex (MILA) Spaceflight Tracking and Data Network Station at Kennedy Space Center on July 28. NASA Station Director Gary Morse presides over the ceremony recognizing the station's 45 years of service. The station originally was established by NASA's Goddard Space Flight Center as one of 17 Space Flight Tracking and Data Network stations around the world. Commissioned for the Apollo Program, the first launch it supported was the Apollo/Saturn 203 test flight from Launch Complex 37 on July 5, 1966. It also provided orbital support for low Earth-orbiting scientific satellites. In recent history, the station has been used almost exclusively for space shuttle launch and landing support.

Time capsule to hold Space Shuttle Program artifacts for 50 years

By Linda Herridge
Spaceport News

If you were going to lock some things away in a Space Shuttle Program time capsule that wouldn't be opened for 50 years, what would they be?

For Jorge Rivera in Kennedy Space Center's Engineering Directorate, it would be launch debris from a pad post- launch walk down. He and coworkers are part of a team that works to reduce launch debris at the pad.

"I'm hoping that 50 years from now, there will be vehicles that launch without creating any debris," Rivera said.

For Jennifer Nufer, from the operations integration division of the Launch Vehicle Processing Directorate it would be a "remove before flight" tag.

"It's something from shuttle processing that we often see in the vehicle during the flow," Nufer said. "It is something that I felt was important to the shuttle program."

These and many other artifacts will be on display during the "We Made History! Shuttle Program Celebration," which will be Aug. 13, at the Kennedy Space Center Visitor Complex.

NASA photos

From left, Kennedy Space Center's Engineering Directorate photo cube, 45th Range Management Squadron coin and a NASA Kennedy Space Center Gold Dollar coin are among items that will be put in a Space Shuttle Program time capsule. These and the rest of the items going into the capsule will be on display during the "We Made History! Shuttle Program Celebration," which will be Aug. 13, at the Kennedy Space Center Visitor Complex. For videos and features on the space shuttle era, click on the NASA coin photo.

After it is filled and sealed, the time capsule will be placed in a location at the visitor complex.

The idea for a time capsule came about two years ago when Launch Vehicle Processing Director Rita Willcoxon and United Space Alliance Deputy Associate Program Manager of Ground Operations Patty Stratton started brainstorming ideas to celebrate space shuttle accomplishments.

"The purpose of gathering items for the time capsule was for people 50 years from now to be able to open it up and get a feel for what the Space Shuttle Program and Kennedy Space Center was like," Willcoxon said.

In July, the Education and External Relations Directorate asked NASA and contractor employees representing all directorates to submit their suggestions for the top three items they think best represent 30 years of NASA's Space Shuttle Program for inclusion in the time capsule. The items were to reflect the work force and tell the story of what it meant to work at Kennedy during the shuttle program.

Submitters also were asked to include a short write-up describing where they see Kennedy in 50 years in order to provide more thoughts and information to those who will open the time capsule in 2061.

According to Project Control Officer Sheryl Koller, in the Education and External Relations Directorate, the items needed to be small, and not include technology that may not be around when the time capsule is opened, such as a DVD, CD or USB.

"We're hoping that 50 years from now some of our great traditions are still in place and the items in the capsule will confirm that," Willcoxon said. "We also hope that 50 years from now people can read what we predicted would be taking place and they will have surpassed our visions."

Looking up and ahead . . .

* All times are Eastern

Sept. 8	Launch/CCAFS: Delta II Heavy, GRAIL; Launch: 8:35 a.m. and 9:14 a.m.
Oct. 25	Launch/VAFB: Delta II Heavy, NPP; Launch window: 5:47 to 5:57 a.m.
No Earlier Than Nov. 7	Launch/CCAFS: Delta IV, WGS 4; Launch window: TBD
No Earlier Than Nov. 25	Launch/CCAFS: Atlas V, Mars Science Laboratory; Launch: 10:21 a.m.
No Earlier Than Nov. 30	Launch/CCAFS: SpaceX Falcon 9, Dragon C2/C3; Launch window: TBD
Early 2012	Launch/CCAFS: Atlas V, AEHF 2; Launch window: TBD
Early 2012	Launch/CCAFS: Delta IV-Heavy, NROL-15; Launch window: TBD
Feb. 3, 2012	Launch/Kwajalein Atoll: Pegasus XL, NuSTAR; Launch window: TBD
February 2012	Launch/CCAFS: Atlas V, MUOS; Launch window: TBD
May 2012	Launch/CCAFS: Atlas V, RBSP; Launch window: TBD

'We Made History! Shuttle Program Celebration'

Thousands of Kennedy Space Center workers who committed themselves to making NASA's Space Shuttle Program a success will gather to celebrate their hard work at the Kennedy Space Center Visitor Complex next weekend.

The "We Made History! Shuttle Program Celebration" is Aug. 13 at 6 p.m. to include astronaut appearances, great food, music and entertainment, educational activities, giveaways, a military jet flyover and thank you program. There also is a Starfire Night Skyshow planned, which will feature spectacular night aerobatics with special computer-controlled lighting and firework effects on a plane flown by experience pilot Bill Leff.

For more information, visit **http://nasaexchange.ksc.nasa.gov/rsvp.htm**.

John F. Kennedy Space Center

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