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Spaceport News

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

NASA/Kim Shiflett

Crews guide NASA's Mars Atmosphere and Volatile EvolutioN (MAVEN) spacecraft, secured inside a payload fairing, atop a United Launch Alliance Atlas V rocket at the Vertical Integration Facility at Space Launch Complex 41 Nov. 8. The Atlas V is scheduled to launch MAVEN into space and on to Mars on Nov. 18. For more on the mission, click the photo.

MAVEN to solve Martian riddles

By Anna Heiney
Spaceport News

NASA's next Mars explorer soon will leave Earth on a mission to answer one of the Red Planet's greatest conundrums: If our arid celestial neighbor once had a thicker atmosphere and a surface flowing with water, as evidence suggests, how did the climate change so dramatically?

MAVEN, which stands for Mars Atmosphere and Volatile Evolution, is slated to launch Nov. 18 aboard a United Launch Alliance Atlas V rocket from Launch Complex 41 on Cape Canaveral Air Force Station (CCAFS).

The scientists and managers behind the mission gathered in a Kennedy Space Center clean room Sept. 26 to get an up-close look at the MAVEN spacecraft and to share their enthusiasm with reporters and photographers.

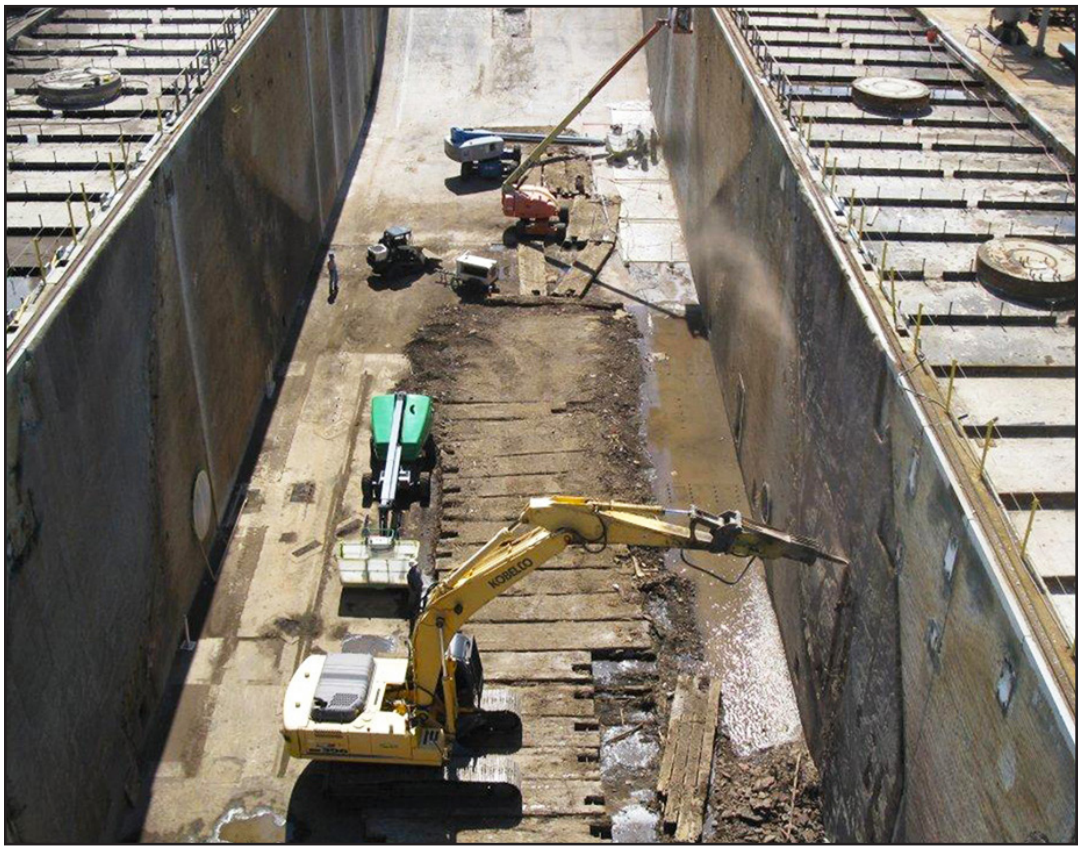
"After 10 years of working on this, I can't tell you how excited I am to see this finished spacecraft ready to go," said the mission's principal investigator, Bruce Jakosky, as he stood in front of MAVEN's outstretched solar panels in the high bay of Kennedy's Payload Hazardous Servicing Facility.

Jakosky, of the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado at Boulder, leads the mission and has been involved in the flight since its inception. The mission is designed to search for clues into the thinning of Mars' atmosphere and the disappearance of surface water over time. Scientists theorize the sun may have had a role in the escape of

To **MAVEN**, Page 4

Pad 39B ready for new flame deflector

By Linda Herridge
Spaceport News



Courtesy of Jeffry Miller

Construction workers remove Apollo-era bricks and Fondu Fyre from the flame trench walls at Launch Pad 39B at Kennedy in September.

Significant changes are happening at Launch Pad 39B at Kennedy Space Center as the Ground Systems Development and Operations (GSDO) Program prepares it to support the launch of a variety of vehicles, including NASA's Space Launch System (SLS).

A stark, gaping space can be seen between the walls of the pad's flame trench. Construction workers have completely removed the massive flame deflector structure that served to protect the pad and space shuttles during 30 years of launches from the site.

Jose Perez Morales, the GSDO Pad Element project manager, said there will be substantial changes in the design of the new flame deflector.

"We have achieved a 30-percent design review and are now moving toward a 60-percent design review," Perez Morales said. "The flame deflector is going to look very different."

With the help of NASA's Ames Research Center at Moffett Field, Calif., GSDO engineers ran computational fluid dynamic simulations of engine launches of five existing launch vehicles and discovered that the exhaust could be redirected to only the north side of the flame deflector.

Perez Morales said the new flame deflector will be positioned about six feet south of the old flame deflector's position to accommodate the design of the new mobile launcher. The design team currently is looking at various types of surfaces, including Fondu Fyre, a material that has special high-heat-resistant properties, or steel plating, for the north side of the flame deflector.

The south side of the deflector will have no lining, which, according to Perez Morales, will be a cost savings and provide easier access for inspection, maintenance and repair.

The two side flame deflectors, used for shuttle launches, will be refurbished and reinstalled at pad level on either side of the flame trench to help reduce damage to the pad and launch vehicle.

The bricks on both sides of the trench walls, dating back to Apollo days, are being removed to make way for new heat-resistant bricks. The north walls of the flame trench will be covered in bricks and Fondu Fyre, while the south side concrete walls will be left bare.

"It's been exciting to see the changes occurring at Pad B," Perez Morales said. "It's challenging and rewarding to start a job and then see it through to completion."

Other work under way includes removal of all of the crawler track panels on the pad's surface and repair of the surface beneath the panels and the catacomb roof below.

New crawler track panels will be installed.

Construction of the new flame deflector and renovation of the flame trench walls are scheduled to begin in January 2015.

NASA/Jim Grossmann

On Sept. 19, an excavator removes the remaining portions of the flame trench deflector that was below and between the left and right crawlerway tracks at Kennedy's Launch Pad 39B.

Space communicators receive Kolcum award

By Linda Herridge
Spaceport News

Two long-time space program communicators were honored with the 2013 Harry Kolcum Memorial News and Communications Award by the National Space Club Florida Committee (NSCFC) during a luncheon at the Radisson Resort at the Port in Cape Canaveral, Fla., Nov. 12.

This year's recipients were Andrea Farmer, senior public relations manager of the Kennedy Space Center Visitor Complex, which is operated by Delaware North Companies Parks and Resorts on behalf of NASA, and John Zarrella, CNN's Miami correspondent.

"It's an incredible honor to receive the Kolcum Award," Farmer said. "It's like the Emmy for communicators."

Farmer has inspired support for the space program and told the NASA and Kennedy story for nearly 10 years and was a key player in promoting the opening of the Space Shuttle Atlantis attraction. She is responsible for community and media relations, including social media, crisis communications and news content.

NASA/Jim Grossmann

John Zarrella, CNN Miami correspondent, and Andrea Farmer, senior public relations manager with Delaware North Companies Parks & Resorts, received 2013 Harry Kolcum Memorial News and Communications Awards from the National Space Club Florida Committee Nov. 12.

"This means more to me than any award I've received in the past because I was selected by my peers," Zarrella said. "Recognizing me in this way means everything to me."

Zarrella has been CNN's Miami correspondent since the bureau was established in December 1983. He is responsible for coverage of news in Florida, Central and South America, and the Caribbean. He is a principal correspondent for CNN's coverage of the U.S. space program, covering many significant events, including John Glenn's 1998 return to space and the Mars Pathfinder mission.

He was the correspondent on site during the 1986 Challenger accident and covered the final flights of the Space Shuttle Program in 2011.

The Kolcum award recognizes the contributions of professional Florida-based journalists and communicators who inform the public about our nation's space program with an emphasis on launch and mission operations in Florida.

The award is named for the late, veteran aerospace writer who was Cape bureau chief for Aviation Week & Space Technology from 1980 to 1993 and a founding member of the NSCFC.

NASA helps melt secrets of Great Lakes ice

Carol Rasmussen
NASA

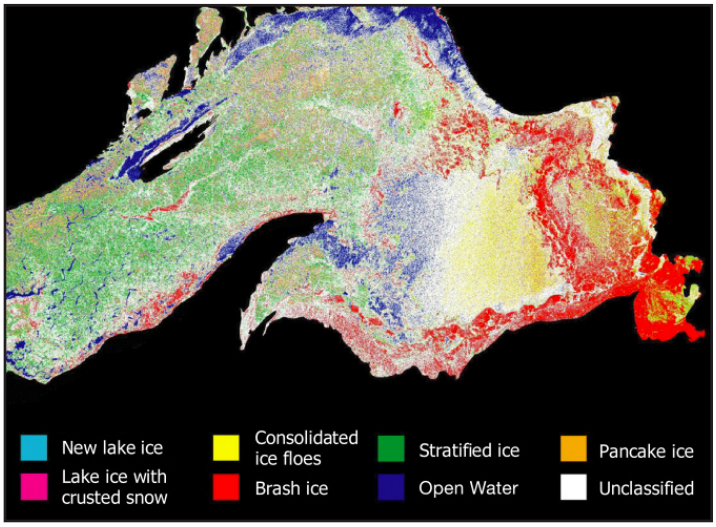
Two scientists from NASA and NOAA have developed a new space-based technique for monitoring the ice cover of the Great Lakes that is so accurate it can identify a narrow channel of open water cut through the ice by an icebreaker -- even at night.

"In the dark, it's difficult to read a map that's right in front of you," said Son Nghiem of NASA's Jet Propulsion Laboratory, Pasadena, Calif., one of the developers of the new technique. "Yet we now have a way to use satellite radars almost 500 miles out in space to see through clouds and darkness and map ice across the Great Lakes."

Ice on the Great Lakes puts a big chill on the U.S. and Canadian economies, affecting shipping, fishing and also public safety when winter and spring flooding are caused by ice jams. It has a significant impact on the regional environment and ecological systems, as well. Yet previous techniques of analyzing satellite observations of the ice sometimes misidentified ice as water and vice versa.

The new method, co-developed by Nghiem and his colleague George Leshkevich of NOAA's Great Lakes Environmental Research Laboratory, Ann Arbor, Mich., not only corrects that problem, it also gives a more accurate analysis of ice characteristics, such as whether the ice is dense or full of bubbles, and whether it has melted and refrozen.

For the complete story, visit **http://go.nasa.gov/1hIX2v9**



NASA/NOAA Great Lakes Environmental Research Laboratory

This color-coded image of major ice types on Lake Superior was made from a RADARSAT-1 radar backscatter image using a new NASA- and NOAA-developed technique.

More online

Results of the study were published recently in the Journal of Great Lakes Research.
For more information, visit: **http://go.nasa.gov/1hIXM3k**

From **MAVEN**, Page 1

gas from the planet's upper atmosphere -- a region that hasn't yet been studied.

Since 1964, NASA has flown a series of orbiters, landers and rovers to Mars, searching for chemical traces of water or signs that the planet once could harbor life. MAVEN stands apart from these because it is the first to focus exclusively on the upper reaches of the planet's atmosphere.

"Mars is a complicated system, just as complicated as the Earth in its own way," Jakosky said. "You can't hope, with a single spacecraft, to study all aspects and to learn everything there is to know about it. With MAVEN, we're exploring the single biggest unexplored piece of Mars so far."

The spacecraft will arrive at the Red Planet on Sept. 22, 2014, and slip into an elliptical orbit ranging from a low of 93 miles above the surface to a high of 3,728 miles. It also will take five "deep dips" during the course of the mission, flying as low as 77 miles in altitude and providing a cross section of the top of the atmosphere.

MAVEN is an eight-foot cube weighing about 5,400 pounds at launch -- as much as a fully loaded sport utility vehicle. With its twin pairs of gull-wing-shaped solar panels fully extended, it stretches 37 feet from wingtip to wingtip.

The spacecraft is outfitted with a trio of instrument suites. The Particles and Fields Package, built by the University of California at Berkeley Space Sciences Laboratory, contains six individual instruments that characterize the solar wind and ionosphere of the planet. The Remote Sensing Package, built by LASP, will determine global characteristics of the upper atmosphere and ionosphere. The Neutral Gas and Ion Mass Spectrometer, built by NASA's Goddard Space Flight Center, will measure the composition and isotopes of neutrals and ions.

Assembled by Lockheed Martin in Denver, Colo., MAVEN was blasted with sound waves, shaken on a vibration table, even put through a thermal vacuum test using liquid nitrogen to simulate the cold of space and hot lamps to mimic the sun -- all to ensure it was ready for the extremes of liftoff and spaceflight. Finally, the spacecraft was loaded onto an Air Force C-17 cargo aircraft and delivered to the Florida spaceport.

NASA's Launch Services Program oversees all aspects of launch management, including preflight processing, integration activities, countdown and liftoff. The program is headquartered at Kennedy.

MAVEN's Atlas V rocket is a reliable workhorse with a history of success for NASA missions, including the Mars Science Laboratory mission featuring the Curiosity rover. The rocket's booster and upper-stage components arrived at the Florida spaceport not long after the spacecraft.

While the Atlas V was readied for flight in a hangar at the Atlas Space Operations Center, or ASOC, on the Air Force station, MAVEN was sent to Kennedy's Payload Hazardous Servicing Facility for one last round of checkouts, tests and closeouts.

The processing team faced one significant challenge with less than two months until liftoff: a 17-day government shutdown that briefly halted prelaunch activities. But because activities had been running slightly ahead of schedule and some team members were able to quickly return to work, the shutdown did not interfere with launch plans.

"It's kind of like a hurricane," said NASA Launch Director Omar Baez. "We have hurricane plans, but we don't have a government shutdown plan. So that's a hurdle. We overcame it, we're moving forward, and we're ready to hit the beginning of the window."

MAVEN's 20-day launch window opens Nov. 18. Managers and controllers from NASA's Launch Services Program, United Launch Alliance and the U.S. Air Force, along with the spacecraft team, will report to their consoles in launch control for the countdown.

When countdown clocks tick down to zero and the Atlas V roars to life, MAVEN's mission finally will be under way, but the next big milestone comes later, when the spacecraft is released from the rocket's upper stage.

MAVEN's caretakers on the ground will wait anxiously for the spacecraft to report it is healthy and headed to Mars.

"That's the moment when we can celebrate, when everybody gets up, shouts, and shakes hands," said Baez.

Planning the MAVEN mission has been a team effort involving several partners. NASA Goddard in Greenbelt, Md., manages the project and provided two of the science instruments for the mission. Lockheed Martin built the spacecraft and is responsible for mission operations.

The University of California at Berkeley's Space Sciences Laboratory provided science instruments for the mission. NASA's Jet Propulsion Laboratory in Pasadena, Calif., provides navigation support, Deep Space Network support, and Electra telecommunications relay hardware and operations.

"The spacecraft is symbolic of the hundreds of people that have been a part of this since Day One, and all kinds of support that's needed to get us here," said David Mitchell, MAVEN project manager at Goddard.

With liftoff right around the corner, team members are eagerly anticipating the start of the mission and the promise of solving another of Mars' riddles.

"We're really excited," Mitchell said. "We're so close now. I mean, we're headed to Mars."

NASA/Kim Shiflett

NASA's Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft is hoisted to the top of a United Launch Alliance Atlas V rocket at the Vertical Integration Facility at Space Launch Complex 41 Nov. 8.

NASA/Kim Shiflett

NASA's Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft, inside a payload fairing, is placed atop a United Launch Alliance Atlas V rocket at the Vertical Integration Facility at Space Launch Complex 41 on Nov. 8.

Mission manager a modern Mr. Fix-it

By Anna Heiney
Spaceport News

Charles "Chuck" Tatro has always been a tinkerer -- an engineer at heart, even as a child. Now he's about to see nearly seven years of engineering effort take off for Mars.

Tatro is the MAVEN mission manager for NASA's Launch Services Program (LSP). MAVEN, which stands for Mars Atmosphere and Volatile EvolutioN, will study Mars' upper atmosphere for clues that may explain the planet's apparent change in climate. When MAVEN rockets away from Cape Canaveral Air Force Station aboard a United Launch Alliance Atlas V, Tatro will be one of many launch controllers and managers ensuring a smooth start to the mission.

"The best part of this mission has been working with a very small project team," Tatro said.

But technical know-how has always been a part of Tatro's life, even as far back as his childhood in Los Alamos, N.M. His father could fix anything; whether the problem was mechanical, electrical or both, his father would figure out what had gone wrong and repair it. Tatro shares these same qualities. Even some of his favorite hobbies, such as bicycling and windsurfing, include elements of engineering: These are technical sports, involving equipment that can break or be made more efficient.

"Growing up, I always liked to figure things out," Tatro recalled. "I'd take things apart and put them back together -- and I'd try to improve them. I'd think, 'How can I make this better? How can I get more out of it?' "

He earned a Bachelor of Science in mechanical engineering from the University of California, San Diego. He followed up with a master's degree in nuclear engineering from the University of Arizona, this time with emphasis on power systems. Upon graduation, he wrote to NASA's Glenn Research Center in Cleveland, Ohio, and was hired to work on the design and procurement of space station solar arrays.

Tatro came to Kennedy Space Center in 1989 to work on the tiles, reinforced carbon-carbon panels, and specialized blankets that made up the space shuttle orbiters' thermal protection system. A few years later, he switched gears by moving into Kennedy's Environmental Projects Office, which monitors the center's air and water and manages environmental resources.

Tatro's involvement with MAVEN dates back to the end of 2007.

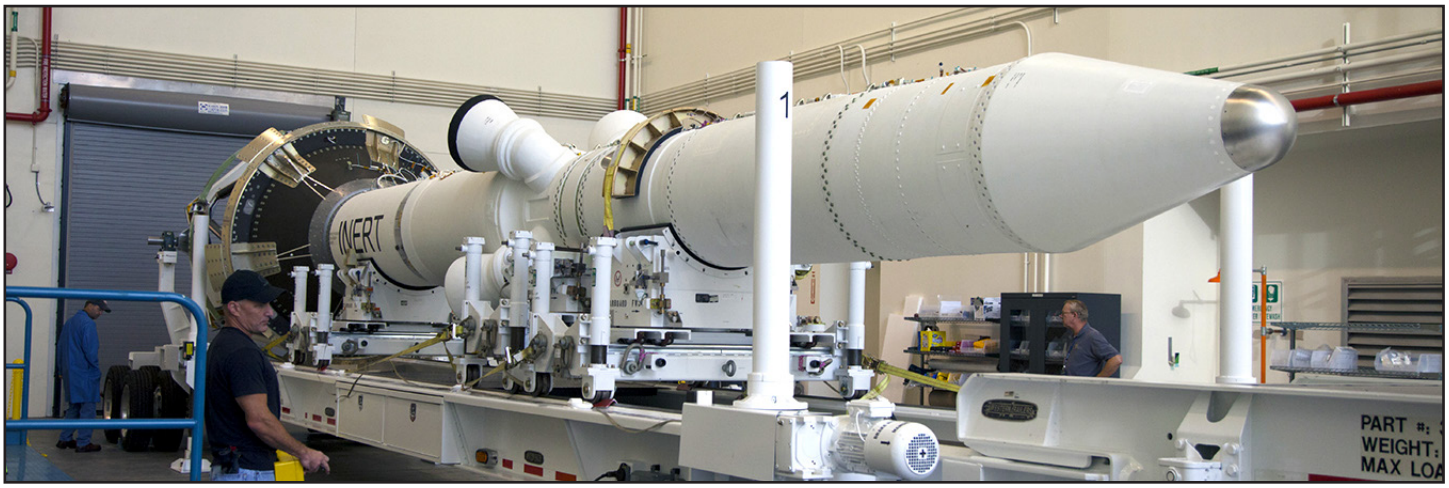
"You follow where you think the excitement is, and you follow good people," Tatro said of the change.

With the MAVEN launch scheduled for Nov. 18, Tatro is busy. Once the mission is under way and the pressure is off, he plans to spend some extra time with his three high-school-aged sons and playing more tennis.

But until then, he remains focused on ensuring a successful launch for MAVEN.

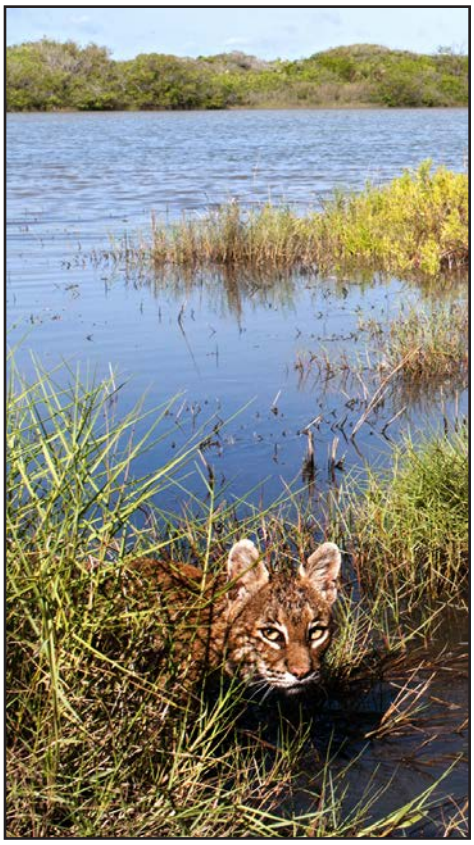
"Launch is very exciting," he said, "but there's nothing like the sense of accomplishment and relief when you get confirmation of spacecraft separation -- that it's alive and healthy, on the right trajectory, and on its way to Mars."

Scenes Around Kennedy Space Center



NASA/Daniel Casper

The launch abort system (LAS) for the Orion Exploration Flight Test-1 is being loaded onto a flatbed truck inside Kennedy's Launch Abort System Facility high bay Oct. 24. The LAS will be moved to a low bay at the facility to complete processing. Orion is the exploration spacecraft designed to carry crews to space beyond low-Earth orbit. It will provide emergency abort capability, sustain the crew during space travel and provide safe re-entry from deep-space return velocities. The LAS is designed to safely pull the Orion crew module away from the launch vehicle in the event of an emergency on the launch pad or during the initial ascent of NASA's Space Launch System (SLS) rocket. Orion's first unpiloted test flight is scheduled to launch in 2014 atop a Delta IV rocket. A second uncrewed flight test is scheduled for 2017 on the SLS rocket. For more information, click on the photo.



NASA/Tony Gray

A bobcat wades through one of the waterways near Kennedy's Launch Pad 39B in June. The center overlaps with the Merritt Island National Wildlife Refuge. The Refuge, established through an agreement with NASA in 1963, celebrates its 50th anniversary this year. The refuge encompasses 140,000 acres that are a habitat for more than 330 species of birds, 31 mammals, 117 fishes, and 65 amphibians and reptiles. It contains more than 1,000 known plant species.

NASA/Jim Grossmann

Ground support equipment technicians assist as a crane moves a new jacking, equalizing and leveling (JEL) hydraulic cylinder close for installation on crawler-transporter 1 at the crawler transporter maintenance facility at Kennedy Nov. 5. New JEL hydraulic cylinders will be installed on CT-1 to test them for increased load-carrying capacity and reliability. The Ground Systems Development and Operations (GSDO) Program at Kennedy continues to upgrade CT-1 as part of its general maintenance. CT-1 could be available to carry a variety of launch vehicles to the launch pad. Two crawler-transporters were used to carry the mobile launcher platform and space shuttle to Launch Complex 39 for space shuttle launches for 30 years. For more information about the GSDO Program, click on the photo.

Fire Rescue earns special accreditation

By Linda Herridge
Spaceport News

NASA's Fire Rescue Services at Kennedy Space Center recently achieved Pro Board Accreditation in aerial fire truck operations. Mark Huetter, with G4S Government Solutions on the Kennedy Protective Services Contract, is the assistant chief of training and helped lead the efforts to receive the accreditation.

"Pro Board is a globally recognized agency that a majority of fire departments throughout the world recognize and use to train their personnel," Huetter said. "At Kennedy, we are currently aerial apparatus certified, but our near future goals and objectives are to become accredited in many other areas of fire service."

Fire Chief Rick Anderson, also with G4S Government Solutions, said he is very pleased that Kennedy's Protective Services was able to facilitate NASA's accreditation with Pro Board.

"Doing so enables us to certify our personnel at a local level, and we expect we will have the ability to support other NASA centers with our certification endeavors in the future," Anderson said.

On Oct. 23, fire rescue workers prepared the new aerial fire truck for training exercises at Fire Station No. 2 near the center's Shuttle Landing Facility. They conducted a vehicle inspection, checked the equipment on the fire truck and reviewed procedures for properly operating the 100-foot extendable ladder and bucket.

The firefighters drove the vehicle out of the bay and deployed the stabilizers on either side of the fire truck. Two firefighters climbed up to the bucket at the end of the ladder and practiced harness procedures, as well as water and rescue operations. Several other firefighters operated the ladder controls.

Photos by NASA/Kim Shiflett

Above: A bird's-eye view reveals the aerial fire truck ladder has been extended during a training exercise at Fire Station No. 2 on Oct. 23. The stabilizers have been deployed on either side of the fire truck. **Below:** Fire Rescue Services personnel lower the extendable ladder on the aerial fire truck so that two fire rescue workers can exit the bucket during training at Fire Station No. 2 near Kennedy's Shuttle Landing Facility Oct. 23.

Huetter said the aerial fire truck is a great asset to the center because of its ability to perform certain types of rescues and fire application that other vehicles can't provide, including access to taller facilities, egress onto large aircraft such as a C-5 and special technical rescues.

"Our future goal is to open up other test banks and courses such as fire instructor, fire officer, fire inspector, fire safety and aircraft rescue firefighting," Huetter said. "We look forward to opening up the training beyond Kennedy, to other NASA facilities and outside agencies."

The Fire Rescue Services team continues its tradition of ensuring the safety of Kennedy Space Center's workforce and facilities and leads the way in aerial fire truck training and certification.

Anderson said, "The aerial class is our first step in securing a successful partnership with the Pro Board certification process."

Centaur celebrates its 50th anniversary

By Rachel Hojnacki
Spaceport News

On Nov. 27, 1963, NASA successfully launched its first Atlas-Centaur rocket. The success of Centaur not only has helped NASA develop technologies and gain knowledge of deep space but soon will be used to send astronauts and continue to launch interplanetary missions into space. Providing NASA with the capability to explore deep space, Centaur continues its mission 50 years after its first launch.

Centaur will be used when the Mars Atmosphere and Volatile EvolutioN mission (MAVEN) takes flight Nov. 18. With only one exception, every NASA spacecraft bound for the outer planets has used a Centaur rocket.

Centaur also is planned for use as part of the United Launch Alliance Atlas-V launch system with the Sierra Nevada Corp. Dream Chaser and the Boeing CST-100, both of which are being developed and tested to send astronauts into space from U.S. soil.

Centaur, atop the Atlas, has been responsible for many interplanetary missions including Mariner 6 and 7 flybys of Mars and Mariner 9 to Mars, the first spacecraft to orbit another planet. The rocket also launched Pioneer 10, the first spacecraft to visit Jupiter and the first to exit the solar system. It has become so common to launch the Atlas and Centaur together that the Centaur name is not used in the commercial Atlas family of launch vehicles, although the Centaur continues to be used as the powerful upper stage of these rockets.

Centaur has been used as the upper stage in 128 missions for NASA during the past 50 years. This number does not include all of the missions that the U.S. Air Force and the commercial industry launched aboard the Atlas and Titan, both of which use the Centaur as their upper stage.

Though it has been 50 years since a Centaur first launched, it still is America's most powerful upper stage and is valuable for advancing NASA's mission today.

NASA file/2000

The second stage of an Atlas II/Centaur rocket is lifted at Launch Pad 36-A at Cape Canaveral Air Force Station March 29, 2000.

NASA file/2013

The Centaur is America's most reliable upper stage and is valuable for advancing NASA's missions today. Shown is the Landsat Data Continuity Mission spacecraft lifting off atop a United Launch Alliance Atlas V rocket.

NASA Employees of the Month: October

NASA/Carl Winebarger

Employees of the Month for October are, from left, Michael C. Davis, Office of the Chief Financial Officer; Karen L. Rivaud, Procurement; Kay L. Craig, Center Planning and Development; and Elias Victor, Engineering and Technology. Not pictured are Brian A. Daniel, Commercial Crew Program; Elizabeth A. Cook, Ground Processing; Kent D. Beringer, Ground Systems Development and Operations; Frederick W. Kienitz, Engineering and Technology; Martin J. Jones, Safety and Mission Assurance; Robert G. Cummings, Center Operations; and Jose A. Ramirez, Launch Services Program.

Looking up and ahead . . .

Nov. 18
Mission: Mars Atmosphere and Volatile EvolutioN (MAVEN)
Launch Vehicle: Atlas V
Launch Site: Cape Canaveral Air Force Station
Launch Pad: Space Launch Complex 41
Launch Time: 1:28 to 3:28 p.m.
Description: MAVEN is the first mission devoted to understanding Mars' upper atmosphere. The mission's goal is to determine the role that loss of atmospheric gas to space played in changing the Martian climate through time.

Nov. 20
Mission: ISS Resupply
Launch Vehicle: ISS Progress 53
Launch Site: Baikonur Cosmodrome, Kazakhstan
Launch Time: 3:52 p.m.
Description: Progress 53 will carry supplies, hardware, fuel and water to the International Space Station.

To watch a NASA launch online, go to **http://www.nasa.gov/ntv**.

John F. Kennedy Space Center
Spaceport News

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