July 8 , 2011 Vol. 51, No. 13

Spaceport News

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

Atlantis launches on final shuttle mission

Pages 4-5

Find out what the crew thinks about the final launch of the Space Shuttle Program; read what's going up on Atlantis; follow experiments as they happen on your smart phone; and check out Atlantis' processing photos.

NASA/Tony Gray-Tom Farrar

Inside this issue ...

Kennedy hosts first forum with NASA center directors

By Rebecca Regan
Spaceport News

Kennedy Space Center Director Bob Cabana hosted his first Center Director's Forum called "Solving Today's Challenges for Tomorrow's Future" on June 29. Joining him were fellow NASA Center Directors Robert Lightfoot of Marshall Space Flight Center in Huntsville, Ala., Patrick Scheuermann of Stennis Space Center in Mississippi, Ray Lugo of Glenn Research Center in Cleveland, and Mike Coats of Johnson Space Center in Houston.

Each director talked about challenges their centers face, how proud they are of their dedicated and professional work force, and how they are working together to transition toward an affordable and sustainable future for the space agency.

"We don't back away from something just because it's hard. We decide what needs to get done and go make it happen and that's because of all of you," Cabana said. "That's what makes working here so much fun. It's a team that can take on any challenge and make it happen."

Cabana discussed Kennedy's path forward as the Space Shuttle Program draws to a close with space shuttle Atlantis' STS-135 mission. NASA's Launch Services Program will continue to launch expendable rockets with groundbreaking science missions on board, Kennedy will support commercial launches to low Earth orbit so the agency can focus on developing a heavy-lift rocket capable of taking astronauts to more distant destinations within our solar system, and facility modifications and upgrades will continue to prepare the center for a more robust future.

The center also will play a key role in processing payloads and experiments for the International Space Station as it becomes a fully functioning National Laboratory. Work also is expected to commence in the Operations and Checkout Building to build the Multi-Purpose Crew Vehicle, or MPCV.

Cabana looked to Scheuermann to talk about how becoming a more capability-centric and cost-effective center for other government agencies and commercial companies is working out for Stennis, which tested its last space shuttle main engine 2009.

Scheuermann said when it comes to others utilizing Stennis facilities, they basically "hand over the keys" or become "full partners." Currently, Stennis' test stands currently are occupied by a Department of Defense engine for the Delta IV rocket, Pratt Whitney Rocketdyne's RS-68 engine, the Aerojet AJ26 for Orbital Sciences Corp., and the J2X under development by Marshall for possible use on a heavy-lift vehicle. It's a business model that Cabana and Kennedy's Center Planning and Development Office are working to emulate on Florida's Space Coast.

Coats and Lugo said their centers are working to partner with commercial entities as well. Johnson already signed Space Act Agreements with three major car manufacturers, as well as oil and chemical companies.

"All of the commercial companies that are looking at Commercial Crew (Development) have come to JSC and we're talking about how they might be able to use our facilities, the control centers and so forth, and the skills that we've got, which would help us maintain those critical skills," Coats said.

At Glenn, aeronautics research in one of the world's most capable icing research tunnels is expected to solve the problem of ice forming on the engines of commercial airplanes. Lugo said the research center also will focus on the U.S.'s energy issues.

"We've got the ability to solve these problems in NASA," Lugo said. "We're all trying to focus on what we bring as value to the table."

Cabana will continue to answer questions about Kennedy's future on his internal blog at **https://sp.ksc.nasa.gov/sites/cdblog**

Summer of Innovation engages students in STEM activities

By Linda Herridge
Spaceport News

A group of middle and high school girls, participating in the Girls Get IT! all girl surf and science camp in Flagler Beach, Fla., were excited to get the chance to talk to a real astronaut as part of NASA's Summer of Innovation (SOI) program June 21.

Kennedy Space Center Director Bob Cabana shared his experiences as an astronaut on space shuttle missions, discussed what it takes to become an astronaut, and answered the girls' questions via teleconference from the Digital Learning Network (DLN) at the Educator Resource Center.

When asked what the best thing about going into space was, Cabana said, "I think the best part is being able to look down on the Earth from 200 miles high. It's a view that very few people have had, and the Earth is this beautiful blue planet."

The purpose of SOI, which is managed by Glenn Research Center, is to improve the skills and enhance the engagement of American middle school students in science, technology, engineering and mathematics, or STEM, education.

Dougles Beaven is the director of Girls Get IT!, which is a program of the Florida Endowment Foundation. He said about 50 girls attended the annual summer camp that featured NASA curriculum about aeronautics and rocketry for two days each week.

Kennedy Education Specialists Laura Colville and Amy Zimmerman, both from the University of Central Florida in Orlando, presented the SOI curriculum and activities at the camp.

"The Summer of Innovation program is important because it gets students engaged and interested in STEM careers at an early age," Colville said.

"It's a great way to get girls interested in and excited about STEM careers where women are usually the minority," Zimmerman added.

Kristina Brink, lead for K-12 projects and Kennedy's point of contact for the SOI program, said that each organization's educators were given professional development on the curriculum and hands-on activities that were developed by NASA's aerospace education specialists.

Students in grades four through six will participate in activities focused on life sciences and physical science, while students in grades seven through nine will participate in activities focused on Earth and space science and engineering.

For NASA

Students from the Girls Get IT! surf and science camp in Flagler Beach, Fla., talk to Kennedy Space Center Director Bob Cabana via teleconference from the Digital Learning Network at Kennedy's Educator Resource Center on June 21. For more on the Summer of Innovation, click on the photo.

"In each of these categories are several subcategories that educators can choose from so that the learning experience can be tailored to the needs of the students," Brink said.

For today's scheduled launch of Atlantis on the STS-135 mission, Kennedy also is hosting several Summer of Innovation sites, including 100 students with the Idaho Space Grant, 100 students with Albany State University in Georgia, and 15 students with the Fernbank Science Center.

Solar cells ready to light up Jupiter mission

By Rebecca Regan
Spaceport News

NASA's Juno spacecraft is going to Jupiter powered by an electrical source seldom deployed in deep space: solar arrays. Commonly used by satellites orbiting Earth and working in the inner solar system, solar arrays are typically set aside for missions beyond the asteroid belt in favor of generators powered by radioactive isotopes.

For Juno, however, three solar array wings, the largest ever deployed on a planetary probe, will play an integral role in stabilizing the spacecraft and generating electricity.

In order to operate five-and-a-half times farther away from its power source than Earth-observing satellites, Juno is equipped with more than 18,000 solar cells. Russ Gehling, the solar array subsystem's lead engineer with Lockheed Martin, said using the sun to generate power is an old-school, yet proven technology.

"In general, once we're out at Jupiter, we need 405 watts, which is not really enough to even run your hair dryer," Gehling said. "Of those 405 watts, about half of them go toward keeping the spacecraft warm. So, the other half, somewhere in the 250 range, is to run all of the instruments and all of the avionics."

The thousands of reddish-blue solar cells are located on 11 panels, four on each on two of the spacecraft's 250-pound wings. The third wing has three panels and is outfitted with a boom at the end that carries the spacecraft's magnetometer.

At this point, Juno is fueled and ready to embark on its five-year journey to Jupiter where it will spend at least a year investigating the gas giant's origins, structure, atmosphere and magnetosphere. Two years into the journey, it will fly back by Earth for a gravity assist and then spin through the frigid cold as it approaches its destination deep in our solar system.

CLICK ON PHOTO *NASA/Kim Shiflett*

Technicians at Astrotech's payload processing facility in Titusville, Fla., watch vigilantly as NASA's Juno spacecraft is tested for center of gravity, weighing and balancing on the rotation stand June 16. Juno is scheduled to launch aboard a United Launch Alliance Atlas V rocket from Cape Canaveral, Fla., on Aug. 5.The solar-powered spacecraft will orbit Jupiter's poles 33 times to find out more about the gas giant's origins, structure, atmosphere and magnetosphere, and investigate the existence of a solid planetary core. To view an animation of Juno's solar arrays unfurling, click on the photo.

After NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif., and the magnetometer team at Goddard Space Flight Center in Greenbelt, Md., agreed to an array design that met all of the mission's requirements, processing of these massive wings began at Lockheed Martin's main plant outside of Denver in 2006. Then, the solar cells and their miles of electrical wiring were installed to the panels in California at Spectrolab Inc., which is a division of The Boeing Company. After that, they were sent back to Denver for installation, integration, inspections, cleaning and launch acoustic testing. Gehling said one of the main processing challenges came in the fact that the wings are so large, they can't support their own weight in gravity.

"The entire solar arrays combined are almost 750 pounds," Gehling said. "They're a little more massive than typical solar arrays because of all these various requirements of stiffness and pointing and carrying the magnetometer."

The reason the wings have to be so stiff and strong is because Juno will be a spinning spacecraft -- another retro-aspect of this mission.

"The wings dominate how true it spins on its axis," Gehling said. "Our goal is to make it spin about the direction of our high gain antenna boresight."

NASA's last mission to Jupiter was Galileo, another spin-stabilized spacecraft and launched aboard space shuttle Atlantis on the STS-34 mission in 1989. Galileo operated on nuclear power, though.

Juno's wings arrived at Astrotech in Titusville, Fla., in March for additional checks and tests ahead of launch. About a month later, the spacecraft itself arrived and the wings were installed onto it before the entire package will be integrated into the United Launch Alliance Atlas V rocket. Juno is scheduled to liftoff Aug. 5 at 11:39 a.m. from Cape Canaveral Air Force Station. Gehling said the rocket's Centaur upper stage will help get the spacecraft spinning in orbit at about 1.4 revolutions per minute.

"After the spacecraft separates from the upper stage and starts transmitting data, then the separation nuts release and the wings deploy," Gehling said. "It only takes them on the order of a minute to deploy."

After the wings span out to 34 feet each, Gehling said actuators will help balance the spacecraft, a few degrees at most, to make sure it spins perfectly. He described the deployment much like a figure skater spinning on the ice, and once the wings deploy, the spacecraft will slow to a graceful twirl about three times slower than when it began. Initially, only two of the three inner panels will be needed to generate power, but as the spacecraft travels farther away from the sun, the remaining panels will come alive.

It will take the spacecraft half a decade to reach its destination. Then, from a very elliptical polar orbit, Juno's instruments, including a color camera that will capture images of the planet's poles, a six-wavelength microwave radiometer for atmospheric sounding and composition, plasma and energetic particle detectors, and ultraviolet and infrared imagers and spectrometers, will begin sending data back to Earth.

"The layout and size of the panels are oriented in that nice symmetrical hexagon so the instruments will have an unconstrained field of view," Gehling said.

While the Juno science team will have to wait for its gas giant data, Gehling and his team will know about an hour after launch if all their work paid off.

"In real time, we'll immediately start to see power generated, we'll see temperatures increasing on the panels, and we'll see the vehicle respond to the fact that wings deployed," Gehling said. "We'll get all that data in. That's how we'll assess that the wings are out and the spacecraft is safe."

Atlantis ready for final space shuttle flight

Final Four: 'In Their Own Words'

The experienced STS-135 crew members reflect on their astronaut careers and being selected to fly aboard the Space Shuttle Program's final mission in a Kennedy Space Center video series called "In Their Own Words." To see and hear what each astronaut says, click on their photos.

Commander
Chris Ferguson

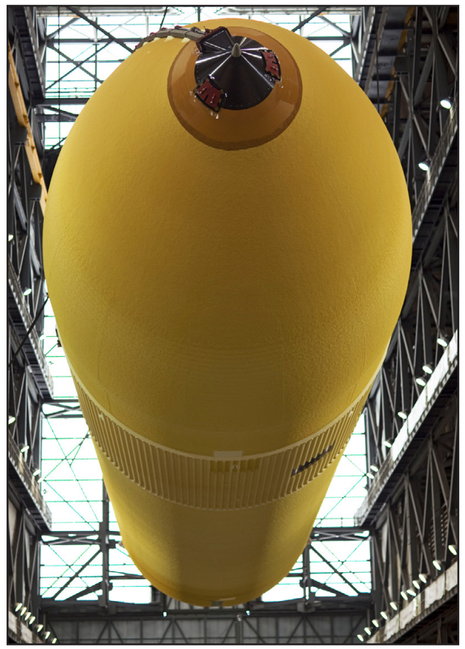
Pilot
Doug Hurley

Mission Specialist
Sandy Magnus

Mission Specialist
Rex Walheim

CLICK ON PHOTO *NASA/Kim Shiflett*

Bathed in xenon lights, space shuttle Atlantis embarks on its final journey from the Vehicle Assembly Building to Launch Pad 39A at Kennedy Space Center on March 31. To view a video of the STS-135 rollout, click on the photo.



CLICK ON PHOTO *NASA/Dimitri Gerondidakis*

External Tank-138 is lifted above the transfer aisle in the Vehicle Assembly Building at Kennedy Space Center on July 15, 2010. ET-138, the last newly manufactured tank, was originally designated to fly on space shuttle Endeavour's STS-134 mission to the International Space Station, but later reassigned to fly on Atlantis' final mission, STS-135. For more about the tank and the shuttle system, click on the photo.

Last mission's cargo includes first iPhone

By Steven Siceloff
Spaceport News

There is at least one first involved with STS-135, a mission notable for its lasts: The crew is taking the first iPhone into space to help with experiments aboard the International Space Station.

A Houston company called Odyssey Space Research developed an application for the Apple smartphone that is meant to help the astronauts track their scientific results and perhaps one day aid in navigation. The device will be housed inside a small research platform built by NanoRacks. The platform will be placed inside the station.

The app, called SpaceLab for iOS, is even available to earth-bound smartphone users to perform the same experiments with the software simulating microgravity.

According to the company, the software was designed with the iPhone's unique attributes in mind, such as the gyro, accelerometer, cameras and chip.

Atlantis launched today at 11:29 a.m. EDT from Kennedy Space Center on a mission to deliver supplies and experiments to the space station.

Along with the first iPhone, the crew of Atlantis is bringing along numerous items commemorating what will be the final mission of NASA's Space Shuttle Program. For instance, a flag from the first shuttle flight in 1981 will be carried to the station and left there until the first commercial spacecraft crew comes to retrieve it.

The shuttle's astronauts, Commander Chris Ferguson, Pilot Doug Hurley and Mission Specialists Sandy Magnus and Rex Walheim, have allocated a number of unique items that will become commemoratives for numerous organizations after they return to Earth.

For example, American flags from the Delaware Valley Historic Aircraft Association, Key Peninsula Middle School in Lake Bay, Wash., and a fire station in Houston are to orbit the Earth for 12 days before being handed over to their sponsors as symbols of inspiration.

Among the unusual things headed into space is a recipe card from one of the dishes served in the Astronaut Crew Quarters at Kennedy.

NASCAR is well-represented on the mission with a cap from Joe Gibbs Racing and black flags from Texas Motor Speedway on the roster of items.

More than 500 patches of the STS-135 mission are tucked inside Atlantis for the flight, a common take-along for all shuttle missions, along with 800 small American flags that are typically handed out after a mission as awards and recognitions.

When the crew returns, the items will be unpacked from lockers inside the shuttle and returned to the astronauts who often make personal visits to hand them back to their owners.

The tradition of carrying mementos into space is not expected to end with the end of the shuttle program. When SpaceX launched its Dragon capsule last year, for example, it carried commemorative items inside, most notably a wedge of cheese.

Download now

Smartphone users can download SpaceLab for iOS, which will track International Space Station astronauts' scientific results. The 99 cent app allows earthbound users to perform the same experiments with the software simulating microgravity.

CLICK ON PHOTO *NASA/Dimitri Gerondidakis*

Space shuttle Atlantis is lowered May 18 toward the mobile launcher platform where it will be joined with its external fuel tank and solid rocket boosters in the Vehicle Assembly Building at Kennedy Space Center. For more information on STS-135 processing, click on the photo.

CLICK ON PHOTO *NASA/Ken Thornsley*

The STS-135 crew members wave an American flag to commemorate Independence Day on the Shuttle Landing Facility at Kennedy Space Center. From left, are Commander Chris Ferguson, Pilot Doug Hurley and Mission Specialists Sandy Magnus and Rex Walheim. To watch a retrospective video on NASA's Space Shuttle Program and the final flight, click on the photo.

NASA/Frankie Martin

A technician prepares the Raffaello multi-purpose logistics module (MLPM) in the Space Station Processing Facility at Kennedy Space Center on April 13 for shuttle Atlantis' flight to the International Space Station.

NASA/Frank Michaux

After 30 years and 135 missions, residents and visitors to Florida's Space Coast crowd the new A. Max Brewer Bridge in Titusville to see the rocket's red glare of NASA's Space Shuttle Program soar for the last time. Space shuttle Atlantis launched at 11:29 a.m. EDT from Launch Pad 39A at Kennedy Space Center.

STS-135 astronauts to test new method for recycling 'used' water

By Cheryl Mansfield
Spaceport News

Water -- it's essential for life. When future space explorers venture beyond low Earth orbit, their only water supply will be on board their spacecraft. During the final space shuttle flight, STS-135, NASA scientists plan to have astronauts test in microgravity a new method for recycling "used" water.

The idea is to make a fortified drink that provides hydration and nutrients from all sources available aboard a spacecraft, such as wastewater and even urine. The method set for testing uses a process known as forward osmosis.

"Forward osmosis is the natural diffusion of water through a semipermeable membrane," explains Michael Flynn, research scientist at Ames Research Center. "The membrane acts as a barrier that allows small molecules, such as water, to pass through while blocking larger molecules like salts, sugars, starches, proteins, viruses, bacteria and parasites."

The forward osmosis method already is used for earthbound applications, allowing water of unknown purity to be changed into drinkable water in six to eight hours using a bag containing two chambers separated by a membrane.

The commercial technology aids in diverse settings, from outdoor sports like hiking, to the military, to natural disasters where water purification is essential for survival.

The membrane alone can work for most water, but a two-stage system is necessary when recycling urine. It must first be filtered using an activated carbon bed, which removes urea and alcohol that would pass through the membrane alone.

A group of scientists at Kennedy Space Center, led by NASA Project Manager Spencer Woodward, will include in Atlantis' cargo six forward osmosis bag kits for the astronauts to test. The bags' manufacturer, Hydration Technology Innovations of Albany, Ore., made a few adaptations to their commercial product for spaceflight.

"It's the same membrane, but the bag was remanufactured out of plastic that doesn't 'off gas' or burn," says Woodward, explaining that the fittings also were changed to a quick-release version already used in space to make it easier for the astronauts to work with in weightlessness.

CLICK ON PHOTO *NASA/Monica Soler*

Astronauts aboard space shuttle Atlantis will knead three water bags to see if the action aids in the forward osmosis process.

The testing will come toward the end of the STS-135 mission, after undocking from the International Space Station. An astronaut will inject a prepared mixture of a lower concentration liquid containing dye into the outer chamber of the apparatus, which will represent the "dirty" water. Then, a higher concentrated "draw" solution will be injected into the bag's inner chamber. This process will be repeated six times.

"Some of the unknowns are, if you get an air and a fluid mixture in space it can turn to foam instead of a liquid, so then what will that do as it sits on the membrane?" Woodward questions. "Will it still be drawn across the membrane just like it is in 1g?"

The plan is to have astronauts knead and manipulate three of the bags to assist in the transfer of the liquid through the membrane to see if it helps the process work better in the absence of gravity.

"The experiment that we're going to be looking at is the effect of mechanical mixing on the membrane, as far as if that's going to increase the flux rate. Half of them are going to get shaken and hand-kneaded for a couple minutes," explains Project Engineer Monica Soler, who works under Kennedy's Engineering Service Contract with Team QNA.

Soler says if the mixing helps, then the hope is that a long-term application would be in a spacesuit, which would induce the mechanical mixing as astronaut moves around during a spacewalk.

To conclude the experiment, after five hours, the crew member will use sample syringes to connect to the inner chambers of each bag and remove 60 milliliters of the sample from each of the six bags and stow them for landing. Once the samples are returned to Earth aboard Atlantis, Project Scientists Dr. Howard Levine and Dr. Michael Roberts from Kennedy's Space Life Sciences Lab will conduct postflight analysis of the samples to see how well forward osmosis worked in microgravity.

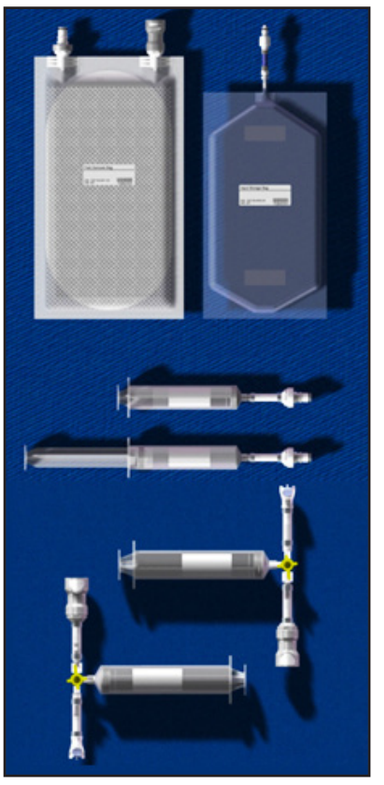
Results could prove that the device can have several applications for NASA in addition to the spacesuits. It could serve as an emergency backup source for water aboard the space station, provide hydration and nutrition during emergency return-to-Earth scenarios, as well as aid during future long-term space exploration.

Beyond water recycling, the results from the experiment also could shed light on several other aspects of life in space.

"Forward osmosis is the process that is responsible for the uptake of water from the human intestine into the blood. It is also the process that allows the root zones of plants to take up water from soil," explains Flynn. "In addition, many drug delivery capsules use forward osmosis."

Learning how forward osmosis is affected by weightlessness might give scientists insight into the effects zero gravity have on space-grown plants and the digestive system function of humans in space -- all of which might help future space travelers adapt better on long-duration missions.

So in the end, the testing of this one simple device during the last days of the space shuttle's final voyage could provide key information for future exploration beyond our planet.



NASA/Todd Mortenson

Six forward osmosis kits will fly aboard space shuttle Atlantis on the STS-135 mission.

Remembering Our Heritage

STS-78 landing marked shuttle program halfway point

By Kay Grinter
Reference Librarian

As history would have it, the halfway point in NASA's Space Shuttle Program came 15 years ago when space shuttle Columbia touched down at Kennedy Space Center's Shuttle Landing Facility on July 7, 1996, concluding the STS-78 mission.

Aboard was an international crew of seven: Commander Tom Henricks; Pilot Kevin Kregel; Payload Commander Susan Helms; Mission Specialists Richard Linnehan and Charles Brady; and Payload Specialists Jean-Jacques Favier of the French Space Agency and Robert Thirsk of the Canadian Space Agency.

Five space agencies and research scientists from 10 countries worked together on the mission's primary payload, the Life and Microgravity Spacelab (LMS). The more than 40 experiments flown were grouped into two areas of investigation: life sciences and microgravity science.

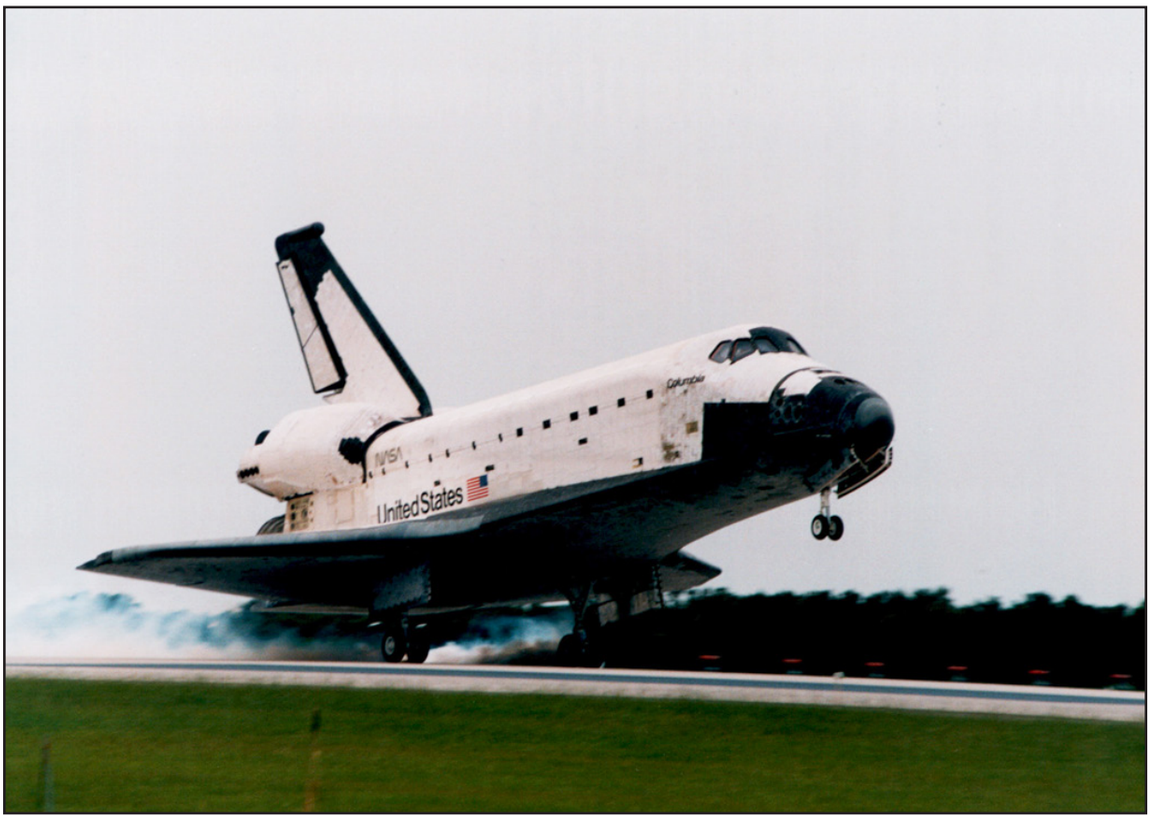
The mission was good practice for the international cooperation anticipated to become routine during the assembly and operation of the International Space Station. After years of deliberation, the station's design had been finalized during the Clinton administration in 1993. LMS investigators were located at four remote locations in both Europe and the U.S.

STS-78 was the longest shuttle flight to that date at 16 days, 21 hours, 47 minutes. For the first time, an in-cabin camera provided images from the flight deck, beginning with crew ingress and continuing through main engine cutoff, as well as the first live downlink video during the shuttle's descent.

After landing, Henricks and Kregel participated in the Olympic Torch ceremony at the Kennedy Space Center Visitor Complex extending the U.S. Independence Day euphoria just a little longer.

The shuttle program was in its prime, and for the Kennedy work force, all was right with the world.

The design deficiencies that caused the Challenger accident in 1986 had been corrected, and the flight rate was stabilizing.



NASA file/1996

Space shuttle Columbia touched down after its STS-78 mission at Kennedy Space Center's Shuttle Landing Facility on July 7, 1996. The landing marked the midway point of NASA's Space Shuttle Program.

Seven shuttle launches in 1995 and 1996 were followed by eight launches in 1997, the first year since 1992 that eight flights were accomplished in a calendar year, and the *pièce de résistance*, all eight of the flights in 1997 launched on the dates set in their respective flight readiness reviews.

NASA alum Jim Harrington was shuttle launch director from 1995 through 1997. From the retirement community of Solivita on the outskirts of Kissimmee, Fla., he recalled: "In '95 and '96, the team was building itself up to a peak, so that in '97, we could successfully process the shuttles from landing, through the orbiting processing facility (OPF) to the Vehicle Assembly Building (VAB) and out to the pad, and launch on time every time. The team gelled into a smooth-running operation, and eight on-time launches showed how great the launch teams were during that era."

The shuttle's heyday also was a great time to be one of NASA's female astronauts.

Eileen Collins made NASA history in February 1995 as the first female shuttle pilot of STS-63, the first approach and flyaround of the Russian space station Mir by a shuttle.

A continuous U.S. presence aboard Mir started in 1996 with the March 22 launch of Atlantis on the STS-76 mission and one of its passengers, NASA astronaut Shannon Lucid, arrived on station.

Not only did Lucid become the first American woman to live on the station, but her 188-day long-duration spaceflight set a new U.S. record, as well as the world record for a woman, after an unplanned six-week extension to her stay. She returned to Earth aboard Atlantis on Sept. 26, 1996, with the STS-79 crew.

"We couldn't go get her on schedule," Harrington said, "because there were concerns with a new adhesive used to assemble the solid rocket boosters (SRBs), and during hurricane season that summer, we had to roll the vehicle back from the pad twice."

Atlantis returned to the shelter of the VAB on July 10 as Hurricane Bertha approached, where the SRBs were swapped with those slated to fly on STS-80, and again on Sept. 4, to elude the threat of Hurricane Fran.

The STS-80 mission in November/December 1996, which immediately followed Lucid's return, broke the long-duration record set by STS-78 and at 17 days, 15 hours, and 18 seconds retains the record for the longest shuttle flight.

During a recent media briefing, Space Shuttle Program Manager John Shannon announced that the program officially will come to an end 30 days after wheelstop of space shuttle Atlantis concluding the STS-135 mission.

"The launch teams who have nurtured the shuttles through the last 30 years have reason to be proud," Harrington said.

Kennedy adds unique touch to 'Transformers'

By Steven Siceloff
Spaceport News

NASA's historic adventures and cutting-edge technology provide some of the underpinnings for "Transformers: Dark of the Moon." There also are some star turns of a different sort for some of Kennedy Space Center's workers who appeared as extras in the film.

Director Michael Bay and his production team all but moved in to the space center for a week in October 2010. There were casting calls, costuming and catering tents, and of course a flotilla of high-performance cars and trucks.

Employees at the center were able to see the outcome of all the effort during a sneak preview of the movie June 28 at the Kennedy Space Center Visitor Complex's IMAX theater.

"I thought they did a great job," said Mike Cianilli, a NASA test director (NTD) at Kennedy who appears in the movie. "It was fun to see the production and then to see the end product."

The cast and crew filmed inside the Vehicle Assembly Building (VAB), an orbiter processing facility, at the Space Station Processing Facility and at Launch Pad 39A where space shuttle Discovery stood ahead of its STS-133 mission.

Bill Heidtman, also an NTD, said the agency shined in the feature.

"It was kind of an homage to the space program," Heidtman said.

The feature film is the third installment of the "Transformers" franchise, covering the life-and-death battles of a species of robots that bring their war to Earth.

"It all looked good," said Ron Feile, lead air traffic controller at the Shuttle Landing Facility, who helped coordinate the setup for the scenes shot there. He was particularly pleased with the role a trio of NASA helicopters played in the film. "That was impressive."

The Shuttle Landing facility's role in the movie was short, but Feile said it was worth the effort.

"It was an interesting endeavor," he said. "We had fun."

For Bay, the science fiction elements bring out the most in what audiences go to movies to see.

"The highest grossing films of all time are science fiction movies and things that are in space. I think it's something we still have to discover," Bay said.

The film's leading characters played by Shia LaBeouf, Rosie Huntington-Whitely and Josh Duhamel were on set at Kennedy at different times.

It was easy to get excited about real-life space technology during the filming, even though they were acting opposite computer-generated creatures that convert from robots to vehicles and back.

"It's hard to believe that you're standing in front of the shuttle over here," said Paul Turturro, who plays Agent Simmons. "When you see something for real you kind of have to keep looking at it, walk around."

Kennedy was a natural backdrop for a science fiction story, said Lorenzo di Bonaventura, one of the film's producers.

"The idea of the space program always was how to get in contact with others, so we've brought the 'Transformers' to the shuttle," said di Bonaventura. "The Kennedy Space Center has always been this sort of mythical thing, I think, for me. You imagine it out there and then you come here and you realize how many people are working here and what this kind of endeavor entails."

The production called for dozens of extras who were volunteers from Kennedy. They spent long days on the sets running inside the VAB, working at computers and performing other tasks at the other locations.

The "Transformers" films are a mix of live-action and computer-generated characters based on a cartoon series and toy line. Many of the people who took part in the filming got to relive a bit of their childhood when they played with the metamorphosing robots.

The movie opened nationwide June 29 and is expected to be a major summer blockbuster.

Looking up and ahead . . .

* All times are Eastern

Planned for July 20	Landing/KSC: Atlantis, STS-135; 7:06 a.m.
No Earlier Than July 14	Launch/CCAFS: Atlas V, GPS IIF-2; Launch window: 2:51 to 3:10 p.m.
Aug. 5	Launch/CCAFS: Atlas V, Juno; Launch: 11:40 a.m.
No Earlier Than September	Launch/CCAFS: SpaceX Falcon 9, Dragon C2; Launch window: TBD
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.
Late 2011	Launch/CCAFS: SpaceX Falcon 9, Dragon C3, C4; 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
February 2012	Launch/CCAFS: Atlas V, MUOS; Launch window: TBD
May 2012	Launch/CCAFS: Atlas V, RBSP; Launch window: TBD

John F. Kennedy Space Center

Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published online on alternate Fridays by Public Affairs in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted **three weeks** before publication to Public Affairs, IMCS-440. E-mail submissions can be sent to **KSC-Spaceport-News@mail.nasa.gov**

Managing editor . . . . . Candrea Thomas
Editor . . . . . Frank Ochoa-Gonzales
Copy editor . . . . . Rebecca Regan

Editorial support provided by Abacus Technology Corp. Writers Group.
NASA at KSC is on the Internet at www.nasa.gov/kennedy
USGPO: 733-049/600142