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INSIDE . . .

Orion mockup makes splash at Trident Basin

By Linda Herridge
Spaceport News

The adage, "history sometimes repeats itself," rings true today for NASA's space program. The agency's Constellation Program took a giant plunge forward at Kennedy Space Center during crew module water recovery tests, last performed during the Apollo Program more than 40 years ago.

On April 8, a full-size mock-up of NASA's Orion spacecraft was lifted by crane and placed in the Trident Turning Basin at Cape Canaveral Air Force Station, towed away from shore and allowed to drift in the water for several minutes.

Then, U.S. Air Force Reserve pararescuemen from the 920th Rescue Wing at nearby Patrick Air Force Base approached in a Zodiac boat and attached a sea anchor to Orion to help keep it stationary. The pararescuemen inflated and attached a flotation collar around Orion as a means to stabilize and access the spacecraft, then climbed on to access and open the side hatch.

Later in the week, Orion was tested in the Atlantic Ocean for several days. The spacecraft was towed to gradually increasing distances from shore so that data from a variety of conditions, such as higher waves, could be collected.

These activities are part of NASA's water landing test, called the Post-landing Orion Recovery Test, or PORT, to determine the proposed capsule's "sea keeping" capability, what kind of motion astronauts can expect after splashdown and how well recovery teams can rescue astronauts in rough sea conditions.

Don Pearson is the NASA PORT project manager at Johnson Space Center in Houston, Texas. He said testing in real conditions is very important and the engineering data collected will be sent to the capsule designers.

"Early next year, we will be conducting these tests with astronauts inside Orion," Pearson said.

The Orion mock-up, built by the U.S. Navy for NASA, weighs 18,000 pounds and measures about 15 feet in diameter. It is equipped with several

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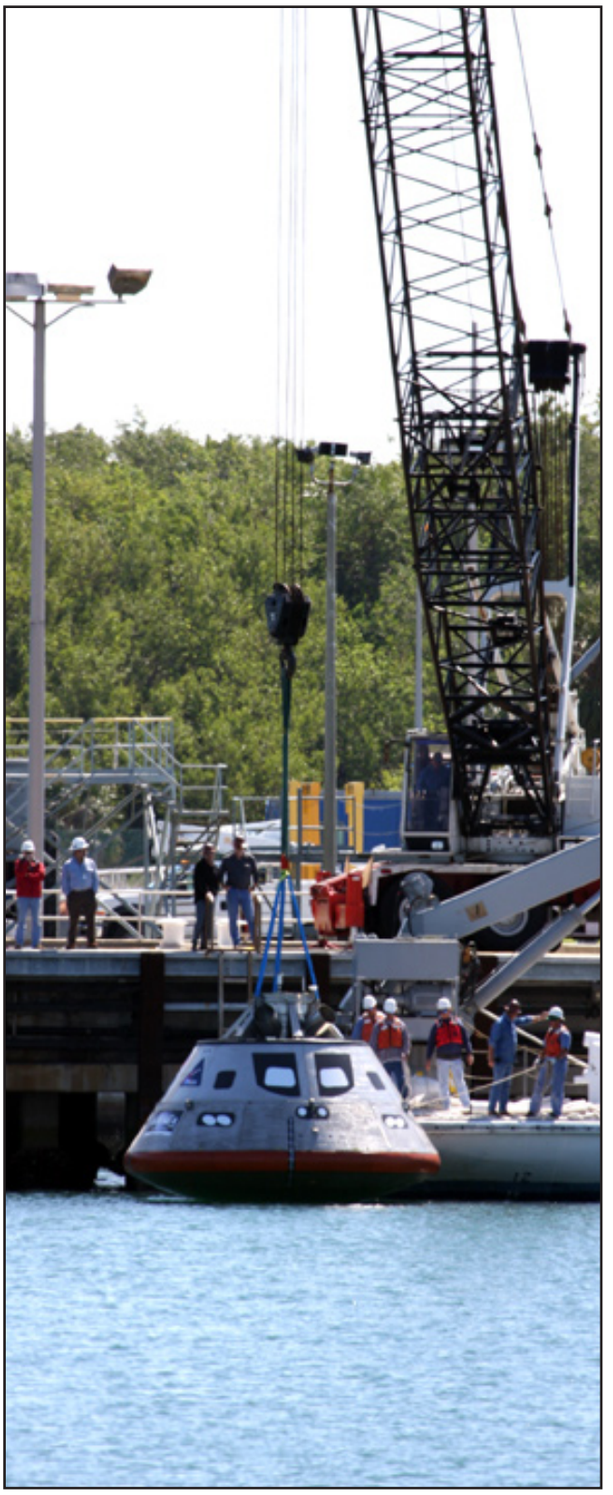
More online

For more information about the Orion crew exploration vehicle, visit: **http://www.nasa.gov/orion.**



NASA/Dimitri Gerondidakis

A crane lowers the mock-up Orion crew exploration vehicle into the water of the Trident Turning Basin at Cape Canaveral Air Force Station, for testing April 8. The goal of the operation, dubbed the Post-landing Orion Recovery Test, or PORT, is to determine what kind of motion astronauts can expect after landing, as well as outside conditions for recovery teams.

Clean rises to the top for Hubble payload

Surgical operating rooms and processing facilities for NASA's Hubble Space Telescope share a common characteristic -- they are "ultra-clean" rooms that avoid the introduction of contaminants, which could fog a camera lens or harm delicate electronics.

Processing Hubble components for launch in such an environment is just one of the many challenges engineers and technicians face as they prepare space shuttle Atlantis for NASA's final shuttle Hubble servicing mission targeted to launch May 12.

"This is probably the most challenging payload that I have worked on," said David Thompson, Boeing payload lead engineer.

Thompson has worked with NASA on the types of power, cooling and data interfaces needed for the Hubble mission. As the primary payload integrator, Boeing provides the engineering analysis and support for this complex payload.

"Before the payload even arrived, we worked closely with NASA and arranged for the requirements that they would need, from facility cleanliness to required support stands, cranes and forklifts," said Ed Baglioni, Boeing Hubble flow manager.

One of the first challenges that Boeing engineers took on was planning for the electrical, mechanical and data interfaces between the shuttle and payload. Interfaces are the lifeblood of the mission and will enable astronauts to upgrade telescope components during five spacewalks.

"Those lines have to be verified for communications downlinks, software and telemetry commands, because once they get on orbit and the Hubble is mated to shuttle then all the transmissions between the Hubble and ground are done through the orbiter," Baglioni said.

NASA/Dimitri Gerondidakis

Technicians help with the installation of the Science Instrument Command and Data Handling Unit, or SIC&DH, on the Multi-Use Lightweight Equipment Carrier, or MULE, in the Payload Hazardous Servicing Facility at Kennedy Space Center. The SIC&DH will be installed on the Hubble Space Telescope during space shuttle Atlantis' STS-125 mission. This unit will replace the one that suffered a failure aboard the orbiting telescope Sept. 27, 2008. Atlantis is targeted for launch May 12.

Imagine installing electrical wires snaking throughout your home, but leaving enough room to make sure you don't trip. Boeing engineers who integrated Hubble's payload faced a similar challenge.

"In the case of this unique flight, we do not use the same wiring as on a station mission. It all had to come out," said Charlene Miller, Boeing STS-125 lead engineer. "It presented a new host of problems for the technicians in getting everything routed properly."

Hubble's payload consists of four major elements vital to prolonging the service life of the telescope, including a rate sensor unit, or RSU, and fine guidance sensor that will keep Hubble pointed in the right direction.

Technicians are set to load those elements into Atlantis' payload bay April 18. But before doing so, Glen Glassford, Boeing cargo structural design engineer, ensured Hubble's hardware would have sufficient clearance and would not contact any shuttle surfaces during ascent.

Chip Everhart, Boeing Materials and Processes engineer, continues to monitor operations around the rest of Kennedy, including restrictions on local controlled burns and insecticide spraying.

"Our goal is to protect and maintain the integrity of the Hubble flight hardware from airborne contamination," said Everhart.

Another step to ensure a clean environment for Hubble's payload involved installing new liners in Atlantis.

An inspection of the liners using ultraviolet lights is performed several times before and after the shuttle's rollout to Launch Pad 39A.

Besides keeping everything clean, engineers have kept Hubble's replacement batteries charged and conditioned.

It's an ongoing intricate process supporting NASA and scientists around the world trying to unlock some of the mysteries of our universe.

"Hubble has had such a profound impact on the scientific community that it is neat to be a part of," Thompson said.

Hubble Space Telescope Servicing Mission 4

Hardware processing has resumed at Kennedy Space Center's Payload Hazardous Servicing Facility.

As in previous Hubble servicing missions, the SM4 payload is highly sensitive to contamination in all forms that can be generated during nominal area activities.

These activities include:

Controlled burns
Asphalt, concrete work
Lawn maintenance
Exterior paint spraying
Welding
Diesel generators
Soil excavation or transfer
Insecticide, fungicide and herbicide

Industrial Area restrictions imposed last June will continue until July 14.

Restrictions relative to Launch Complex 39A run until the STS-125 launch.

Restrictions relative to Orbital Processing Facility-1 begin on launch day and last until nine days after Atlantis returns to Kennedy.

GOES-O to keep watchful eye on hurricanes

By Linda Herridge
Spaceport News

We often see local meteorologists pointing to an image of Florida with streams of red, yellow and green moving across the television screen, indicating severe weather. The series of satellites that provide those images is about to get a much-needed addition with the launch of Geostationary Operational Environmental Satellite-O, or GOES-O, no earlier than May 12.

The satellite will ride aboard a Delta IV expendable launch vehicle from Cape Canaveral Air Force Station, and provide the National Oceanic and Atmospheric Administration, or NOAA, with enhanced coverage of Earth's western hemisphere.

"After launch and checkout, GOES-O will be available to be moved to either the east or west position, as needed," said Marty Davis, who is the senior advisor to the GOES-O project at NASA's Goddard Space Flight Center in Greenbelt, Md. "GOES satellites are crucial, especially to those living in Florida and along the coast, because they provide advance warning of hurricanes."

GOES-O arrived at Kennedy Space Center on March 3, after a 2,500-mile journey across the country, and was then transferred to the Astrotech facility in Titusville, Fla. Since then, a team of NASA, Boeing and United Launch Alliance technicians and managers has been working nonstop to process the satellite for launch.

GOES-O is one of a series of three satellites that includes GOES-N and GOES-P.

Charlie Maloney is the GOES N-P program manager with Boeing Space and Intelligence Systems. He said the Boeing launch team has a total of 55 members working on the satellite.

"Of that group, there are anywhere from three to 35 team members on-site at any time," Maloney said. "There are also as many as 30 ULA technicians and managers on-site working on the launch vehicle adapter and fairing."

Processing activities to ready GOES-O for its mission included a complete spacecraft functional test to ensure that it arrived safely at Kennedy, a fit check of the spacecraft to the payload adapter, and loading of propellants into the spacecraft fuel tanks. Boeing and ULA technicians worked to mount the spacecraft onto the payload adapter and encapsulate the assembly into the launch vehicle fairing.

According to Maloney, the GOES N-P satellite series represents the most advanced weather satellites ever built, with significant improvements over earlier environmental systems.

The most important improvement is in the Image Navigation and Registration system. This system will enhance accuracy and repeatability of the images taken by the spacecraft's primary instruments: an imager that produces visible and infrared images of Earth's surface, ocean, cloud cover and severe storm developments; and a multispectral solar X-ray imager that monitors the sun's X-rays for early detection of solar flares. The GOES-O spacecraft will not be affected by the normal thermal variations that occur in space.

After the satellite achieves orbit it will be renamed GOES-14. When it becomes operational in 2010, GOES-14 together with the on-orbit GOES-13 will provide improved weather monitoring, as well as earlier and more accurate predictions of severe weather.

NASA/Dimitri Gerondidakis

The first half of the payload fairing is moved around the Geostationary Operational Environmental Satellite-O, or GOES-O, in the Astrotech payload processing facility in Titusville, Fla. The fairing is a molded structure that fits flush with the outside surface of the rocket and forms an aerodynamically smooth nose cone, protecting the spacecraft during launch and ascent. GOES-O is targeted to launch from Cape Canaveral Air Force Station's Launch Complex-37 no earlier than May 12, aboard a United Launch Alliance Delta IV expendable launch vehicle.

Scenes around Kennedy Space Center

NASA/Dimitri Gerondidakis

Alessandro DeCamargo puts a spacesuit glove on Raul Batista during the "Overview of USA and Russian EVA Space Suits," as Jose "Joey" Marmolejo watches via tele-conference from Johnson Space Center, on April 9. The event at the Operation and Support Building II compared past, present and future spacesuits of the United States and Russian space agencies.

NASA/Cory Huston

STS-125 crew members review procedures for entry into space shuttle Atlantis with a trainer inside the White Room on Launch Pad 39A at Kennedy Space Center. From left are, Pilot Gregory C. Johnson, Mission Specialist Megan McArthur, Commander Scott Altman, and Mission Specialists Andrew Feustel and Mike Massimino. Not seen clearly are, Mission Specialists Michael Good, left, and John Grunsfeld, right. Atlantis' 11-day flight is targeted for launch May 12, and will include five spacewalks to refurbish and upgrade NASA's Hubble Space Telescope with state-of-the-art science instruments.

NASA

Members of the general public and organized groups picked up trash during the Merritt Island Wildlife Refuge's Clean Up Day on March 27. For more information on future clean-up days, call (321) 861-5601.

NASA/Ben Smegelsky

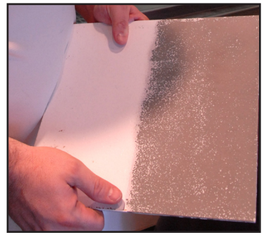
A Great Blue Heron takes to the air as it leaves the shallow water behind the NASA News Center at Kennedy Space Center. A frequent sight around Kennedy, this large heron inhabits lakes, ponds, rivers and marshes from Alaska south to Mexico and the West Indies. It frequently is found standing at the edge of a pond or pool, watching for fish or frogs, its principal food.

Spaceport News wants to know about your special talent

If you have a hidden talent or an interesting hobby, Spaceport News would like to share it.
Send your information to
KSC-Spaceport-News@mail.nasa.gov
or mail it to Spaceport News at:
IMCS-440, Kennedy Space Center, FL 32988.

Corn Hybrid Polymer Blast Media Demo

The NASA Technology Evaluation for Environmental Risk Mitigation, or TEERM, held an environmentally preferable corn-based media blasting event at the Space Station Processing Facility on April 2. Corn Hybrid Polymer is an environmentally friendly media blast being evaluated by NASA as a viable "drop in" replacement to current media blasting being use to de-coast and strip delicate substrates.



Photos by NASA/Jack Pfaller

Mike Williams of Midvale Technologies, shows Kennedy Space Center workers the ability of Corn Hybrid Polymer to quickly de-coat this sample piece of aluminum 6061-T6.

A worker decoats a sample of aluminum 6061-T6, coated with epoxy primer with a white urethane topcoat, which is typical of materials used on ground support equipment, with Corn Hybrid Polymer, which is an environmentally preferred blast media currently being evaluated by NASA.

Endeavour rolls over April 10, rolls out April 17

1 Space shuttle Endeavour is ready for its rollover from Orbiter Processing Facility-2 to the Vehicle Assembly Building at Kennedy Space Center on April 10.

2 The first motion of Endeavour out of its hangar was at 6:56 a.m. EDT.

3 Endeavour, on its way to the Vehicle Assembly Building, will roll out to Launch Pad 39B on April 17.

4 Workers accompany Endeavour during its move.

5 In the Vehicle Assembly Building, workers mate Endeavour to its external tank and solid rocket boosters April 10. Endeavour will be prepared on Launch Pad 39B for liftoff in the unlikely event that a rescue mission is necessary during space shuttle Atlantis' STS-125 mission to service NASA's Hubble Space Telescope. After Atlantis is cleared to land, Endeavour will move to Launch Pad 39A for its upcoming STS-127 mission to the International Space Station, targeted to launch June 13.

Photos by NASA/Jim Grossmann

From **ORION,** Page 1

sensors, including a Global Positioning Satellite, or GPS, and an inertial measurement unit that measures movement and wobbling.

Alan Rhodes, deputy lead for PORT, said it's important to learn everything there is to know about Orion spacecraft landings and learn it early.

"I'm excited about testing Orion in the open water and building on what we learned from previous tests," Rhodes said.

Chris Seinkner, one of the pararescuemen, said it's important to use caution and make sure recovery is done safely.

"We're training in rough conditions so we're ready for the real thing," Seinkner said.

The spacecraft mock-up was initially tested in a pool at the Naval Surface Warfare Center's Carderock Divison in Bethesda, Md., then transported and placed on display at the Kennedy Space Center Visitor Complex before the PORT tests.

Rhodes and astronaut Dan Burbank were on hand to meet visitors and answer questions about Orion.

"The data we're getting from these tests are a vital part of the design," Burbank said. "Being able to recover Orion quickly after landing is crucial. I'm delighted that Orion is being tested in real waters this early."

According to Mike Generale, Kennedy's PORT test director, the goal is to learn how to get astronauts out of the capsule as quickly as possible.

Generale was responsible for integrating the PORT test plans with NASA, the U.S. Air Force, the U.S. Navy and United Space Alliance.

NASA awarded Lockheed Martin the contract to design, develop and build Orion, and the spacecraft will be processed inside Kennedy's Operations and Checkout Building.

Orion, along with the Ares I and V rockets and the Altair lunar lander, is part of NASA's Constellation Program.

The Orion spacecraft will carry up to six astronauts to the International Space Station beginning as soon as 2015, and four astronauts to the moon by 2020.

Remembering Our Heritage

Apollo-era secretaries pushed boundaries of change

As America salutes its administrative professionals on April 22, Spaceport News pays tribute to the secretaries of the Apollo Program

By Kay Grinter
Reference Librarian

NASA file/1976

Apollo-era secretary Pat Lowry receives the Member of the Year Award for 1976 from the local chapter of the Federally Employed Women. From left are, Walter Kapryan, director of Launch Operations for the Apollo Program, and secretaries Claudia Kowal, Lowry, Betty Hudick and Zoa Dodd. Inset photos are Lowry (left) and Dodd, today.

Today, NASA's Sue Gross supports Kennedy Space Center's associate director for Business Operations in her capacity as an executive information specialist. However, she served as a secretary from 1962 until after the Apollo 11 mission. She resigned when she was eight-months pregnant in August 1969 to raise a family.

She returned to Kennedy's work force nearly 20 years later.

"The culture was considerably more formal then, especially in Headquarters Building," Gross said. "The way a secretary dressed was extremely important. I wore flats into the office one day, and my supervisor sent me home on my own time to get my high heels."

NASA alumna Zoa Dodd entered Kennedy's work force as a secretary in 1964.

"When we moved into the new facilities, the Headquarters Building had a pond in front with a resident alligator where we could take our breaks," Dodd said. "It was the fashion to wear these wiglettes anchored to our hair with a comb to add height and curls. Once, a confused blue jay landed on my head and started pecking my hair. I grew to appreciate that the space center coexists with a wildlife preserve."

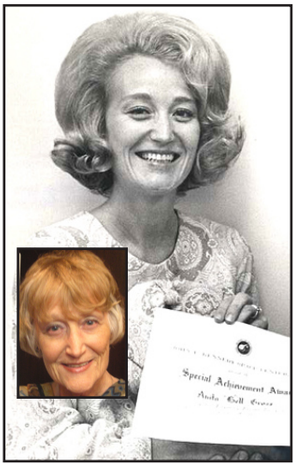
Pat Lowry, now also retired from NASA, began as a secretary in 1966.

"Women weren't allowed to wear pants, but I was a bit of a rebel," Lowry said. "One day I wore a pantsuit to work. They didn't send me home, but I got a few looks."

The smaller Apollo astronaut crews interacted more regularly with the support staff than the larger crews of today's space shuttle missions.

"We were closer to the astronauts then," Dodd said. "We were so proud and felt we were part of their mission."

Lowry remembered testing the boundaries of the established practices: "A luncheon was held in the O&C (Operations and Checkout Building) with the Apollo crews after they returned. It was understood that only men were invited. I contacted Public Affairs to ask if I could go and was told, 'Well, Pat, we've never had a woman attend, but we guess you can.' At first, I was totally ignored. I was the lone female in this batch of men. It took a while for anyone to talk to me."



NASA file/1969

Sue Gross earns a Special Achievement Award in August 1969. Today, Gross (inset) works in Kennedy Space Center's Business Operations.

Lowry also recalled that achieving equal opportunity in the workplace was not easy: "There were some rough times, but the NASA people were good to me. I started my college degree during the Apollo days through a brown-bag lunch program and earned my bachelor's degree in professional studies."

Dodd also completed a bachelor's degree by attending night classes at Patrick Air Force Base.

Apollo-era secretaries were required to type fast and to take shorthand.

"One night, I was working late," Dodd said. "The directors were having a meeting and asked me to take transcription. My shorthand was rusty, and understanding (Albert) Zeiler and (Dr. Kurt) Debus with their German accents was a challenge."

Shorthand no longer is required, and office equipment has changed significantly in the past 40 years.

"We had telephones with dials," Gross said. "We learned to dial the numbers using some sort of implement, like a pencil or dowel, to protect our nails. There were also no answering machines, and most offices had a requirement that all calls must be answered.

"The secretaries had to cover for each other during breaks or lunch."

Today, the average office at Kennedy is replete with personal computers, fax machines, photocopiers and e-mail accounts.

"During Apollo, everything had to be done manually," Gross said. "Now, we have the immediacy of online communications. It's funny to think that, somehow, we got to the moon without all that."

Make plans for Earth Day 2009

Kennedy Space Center will celebrate Earth Day on April 22, from 10 a.m. to 2 p.m. in the Operations and Checkout Building's Mission Briefing Room (Room 1144), and April 23, from 11 a.m. to 5 p.m. in the Multi-Functional Facility cafeteria. The theme for this year is "You Can Make a Difference from Earth to Space." Kennedy will participate in this nationwide event by hosting about 20 vendors, including local and county government personnel, to showcase environmental activities. The celebration will include information about natural resources, energy conservation, recycling and environmental stewardship, including alternative fuel vehicles and environmentally friendly products. Kennedy wildlife tours also will be offered daily to a limited number of personnel. For more information, call Alice Smith at (321) 867-8454.

It's About Ability! event April 30

Listen to the inspiring story of a mother and innovator who possesses the courage, capability and desire to break barriers. Rachel Coleman of Signing Time!, will share her story and how, through innovation and love for her children, built a bridge to communicate with those who cannot hear. The event is April 30, 2009, from 10 to 11:30 a.m. in the Kennedy Space Center Training Auditorium. For more information, call Bonni McClure, office of Diversity and Equal Opportunity, at (321) 867-2569.

Looking up and ahead

No earlier than May 5	Launch/VAFB: Delta II, STSS-ATRR; TBD
No earlier than May 12	Launch/CCAFS: Delta IV, GOES-O; 6:24 p.m.
Targeted for May 12	Launch/KSC: Atlantis, STS-125; 1:31 p.m.
Targeted for May 23	Landing/KSC Shuttle Landing Facility: 9:55 a.m.
June	Launch/CCAFS: Falcon 9; TBD
No earlier than June 2	Launch/CCAFS: Atlas V, LRO/LCROSS; 5:32 p.m.
Targeted for June 13	Launch/KSC: Endeavour, STS-127; 7:19 a.m.
No earlier than July 8	Launch/CCAFS: Delta IV, WGS SV-3; TBD
Target July 11	Launch/KSC: Ares I-X flight test/Launch Pad 39B; TBD
No earlier than July 29	Launch/CCAFS: Delta II, STSS Demo; TBD
Target Aug. 6	Launch/KSC: Atlantis, STS-128; TBD
No earlier than Aug. 14	Launch/CCAFS: Delta II, GPS IIR-21; TBD
No earlier than Sept. 29	Launch/CCAFS: Delta IV, GPS IIF-1; TBD
No earlier than Oct. 1	Launch/VAFB: Taurus, Glory; TBD
No earlier than Oct. 14	Launch/CCAFS: Atlas V, SDO; TBD
No earlier than Nov. 1	Launch/CCAFS: WISE; TBD
Target Nov. 12	Launch/KSC: Discovery, STS-129; TBD
No earlier than Nov. 12	Launch/CCAFS: Delta IV, GOES-P; TBD
December	Launch/CCAFS: Atlas V, Commercial Payload; TBD
Target Dec. 10	Launch/KSC: Endeavour, STS-130; TBD
Target Feb. 11, 2010	Launch/KSC: Atlantis, STS-131; TBD
Target April 8, 2010	Launch/KSC: Discovery, STS-132; TBD
Target May 31, 2010	Launch/KSC: Endeavour, STS-133; TBD
No earlier than 2011	Launch/CCAFS: Atlas V, Mars Science Laboratory; TBD

WORD ON THE STREET

What do you think your family is most interested in seeing during the KSC/CCAFS 2009 Family Day?

"They want to see everything, but they really are looking forward to the two shuttles on display."
Wes Reynolds, with NASA

"The two shuttles on the launch pads. They've seen them on TV, but never in person."
Kris Nelson, with Analex Corp.

"My brother's in construction and he's looking forward to the mobile launcher platforms."
Gordy Degear, with NASA

"My kids equate where I work with the shuttle, so they're really looking forward to seeing them."
Jennifer Bixby, with REDE Critique Inc.

"My family is really excited to finally see all the items related to the Constellation Program."
Beau Charvet, with NASA

John F. Kennedy Space Center

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