Space Systems Company–Michoud Operations

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Mission Success
Bulletin

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on-line
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# STS-129 final launch of year

Commanded by **Charlie Hobaugh**, the STS-129/ET-133 flight with three spacewalks is being called "a big spare mission" by NASA Space Operations Associate Administrator **Bill Gerstenmaier**. The six-astronaut crew will bring up to the International Space Station two spare gyroscopes, two nitrogen tank assemblies, two pump modules, an ammonia tank assembly, a high-pressure gas tank, communications equipment for Space X, and more spares.

Rounding out the crew are pilot **Butch Wilmore** and mission specialists **Randy Bresnik**, **Mike Foreman**, **Leland Melvin**, and **Dr. Bobby Satcher**. They will return with **Nicole Stott**, who's been a member of the six-person space station crew for 2½ months. STS-129 will be the final shuttle crew rotation flight to or from the space station.

*Atlantis* will also be equipped with a new camera. "It will fly looking out the forward window to view the Intertank and LO2 tank," explained Gerstenmaier. "When you see that view, expect foam loss and thruster firing impingement. It will be normal, but dramatic."

Launch Integration Manager **Mike Moses** agreed. "This new camera will show us things we've never seen before and give us more data." Recorded imagery will be fed back to Earth on Flight Day 2.

Lockheed Martin Mission Success Director **Dan Callan** reports at press time that the launch team is not working any issues with ET-133.

Moses backed that assessment. "We've done a good number of plug pulls on this tank as we did on the last tank (ET-132, which performed superbly during STS-128's launch and ascent August 28) and have a real good story from the tank project." In addition, several Ice Frost Ramps on the Liquid Oxygen Tank were scanned and cleared three months ago.

*Atlantis* and ET-133 will try to launch within the five-day window from November 16-20. After its 11-day mission, *Atlantis* will return to Kennedy Space Center sometime after Thanksgiving, landing most likely during the holiday weekend. Should the shuttle not be able to launch within the window, a 15-day beta angle cutout begins November 20, stifling any launch attempts until the next window opens from December 6-11.

Five flights are scheduled for 2010 to end the Space Shuttle Program (see shuttle schedule on Page 4).

# *Ares I* experimental flight a success

Lifting off into the blue Florida sky, the *Ares I-X* test flight on October 28 marked NASA's first major step toward a new generation launch vehicle to power humans into space. A fundamental element to its success: the Lockheed Martin avionics and ground systems.

The 327-foot tall *Ares I-X* test vehicle produced 2.6 million pounds of thrust to accelerate the rocket to Mach 4.76, just shy of hypersonic speed. It capped its easterly flight at a suborbital altitude of 150,000 feet after the separation of its first stage, a four-segment solid rocket booster. The test flight lasted about six minutes from its launch from the newly-modified Launch Complex 39B until splash down of the rocket's booster stage nearly 150 miles down range.

The primary test objective was to demonstrate command and control of the new vehicle design as well as effective vehicle integration, ground processing and launch operations that will be used for NASA's *Ares I* launch system.

"What a tremendous accomplishment this flight test of the *Ares I-X* represents for NASA, the Constellation Program, America's space program and the entire team here at Lockheed Martin," said **John Karas**, vice president & general manager of Human Space Flight for Lockheed Martin. "The data indicate that our avionics and ground system performed outstanding throughout the launch and flight profile. NASA is well on its way to having *Ares I* ready to support *Orion* missions to the space station and human space exploration missions to a variety of destinations beyond low Earth orbit," added Karas.

Lockheed Martin provided the Avionics Integrator Services for the *Ares I-X* Development Flight Test under contract to Jacobs Technology's Engineering, Science, and Technical Services Group for NASA Marshall Space Flight Center. With the support of subcontractors United Launch Alliance, Honeywell and United Space Alliance, Lockheed Martin developed the avionics and ground system for *Ares I-X*, providing all the command and control capability on the vehicle and its integration with Launch Complex 39B.

The *Ares I-X* avionics utilizes a fully integrated system of ground, airborne and software components. At the heart of the ground system is a modified version of the *Atlas* Ground Command, Communication and Control designed for *Ares I-X*. The modified system was developed and fabricated at Lockheed Martin Space Systems at its facilities near Denver, CO, and validated in the company's System Integration Lab prior to integration in the *Ares I-X* Mobile Launch Platform.

"Throughout the flight test, we were right on the money for each of the mark events: ignition command; separation from the launch pad, roll control, algorithms for proper trajectory; and separation commands," said **Paul Sannes**, *Ares I-X* avionics and ground system program manager for Lockheed Martin Space Systems. "It was textbook perfect. At the end of the flight, there were a lot of cheers coming from the control center. We're very proud to be a part of this extraordinary NASA team." ■

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# Crew member recounts August-September mission

When STS-128 mission specialist **Patrick Forrester** spoke to Michoud employees at a General Assembly last month, he was both informative and amusing. Forrester flew on Space Shuttle *Discovery*, which lifted off August 28.

"We launched at 11:59 p.m., and I think I can say we're the only crew that launched one day and had SRB (Solid Rocket Booster) sep the next."

This was Forrester's third flight into space. He recalled his second flight (STS-117) in June 2007 when a repaired, patched, hail-damaged ET-124 carried he and fellow crew members to orbit. "I know of the heroic efforts you've made on the tanks, especially on the STS-117 mission, and we appreciate it."

Forrester narrated a mission video with fascinating commentary that included images of space that employees had not seen previously. He reminded everyone that in space it goes from light to dark every 45 minutes and vice versa because the space station is traveling at 17,500 mph – 25 times the speed of sound. "We had three spacewalks on our mission. Outside when it's dark, it's minus 250 degrees in space. When it's light, it's plus 200 to 300 degrees. So for spacewalkers your body constantly goes through a 500-degree swing."

Among other things, Forrester's crew brought science racks and a second treadmill to the space station. One video clip showed astronauts carrying supplies between their legs while moving along with their hands. "It's easier to carry things with your legs and walk with your hands in space – just the opposite on Earth."

*STS-128 mission specialist Patrick Forrester explains his August-September mission and narrates the video while sitting next to ET Deputy Program Manager Mike McBain.*

Forrester's crew of seven joined six others on the space station for a crowd of 13, representing the U.S., Russia, Canada, Sweden, and Belgium. One video sequence showed the crew in a circle with straws. "We gave everyone a chance to drink the new water, which of course is recycled urine. As one of the other astronauts said, 'Today's coffee is tomorrow's coffee.'"

Forrester wrapped up his talk by reminding employees that the space station is truly a wonderful creation at 361 feet across with 250 feet of habitable modules up there now.

On the subject of manufacturing quality, safe tanks, he added, "We just thank you so much for everything you do here." ■

# Along for the ride

***On October 15, ET-134 rolled to the barge and departed for KSC three days later when north winds eased. A newcomer to the sea – Steve Roy of MSFC Communications – rode with the tank and the* Liberty Star *on the six-day, 900-mile passage to Florida. You can read and comment about Steve's trip on his blog at http://blogs.nasa.gov/cm/blog/sailing_with_nasa***

***ET-134 is targeted to fly with* Endeavour *on February 4, 2010.***

# Space Shuttle schedule

| Mission | Launch Date | Tank | Tank Delivery Date |
|---|---|---|---|
| STS-129 | November 16, 2009 | ET-133 | July 29, 2009 |
| STS-130 | February 4, 2010 | ET-134 | October 14, 2009 |
| STS-131 | March 18, 2010 | ET-135 | December 23, 2009 |
| STS-132 | May 14, 2010 | ET-136 | February 24, 2010 |
| STS-134 | July 29, 2010 | ET-137 | May 5, 2010 |
| STS-133 | September 16, 2010 | ET-138 | June 29, 2010 |
| | | ET-122 | *September 30, 2010 |

** Launch-on-need tank for STS-133/ET-138*

# *Mission Success Bulletin* announcement

As the Space Shuttle Program continues to wind down, the Communications Department will end the printed version of the *Mission Success Bulletin* in January 2010. The on-line version will continue and be sent to employees monthly via *Info SPACE*. The *Mission Success Bulletin* will also be posted each month on Gumbo at http://gumbo1.maf.nasa.gov/303x/msb/msbhome.htm as it has been the past 11 years. The *Mission Success Bulletin* has enjoyed 28 years of communicating with employees. ■

# ET Incentive Plan milestones

| | | |
|---|---|---|
| 1. | 4/25/08 | Base Incentive |
| 2. | 5/31/08 | STS-124 launch/ land 6/14/08 |
| 3. | 7/10/08 | ET-127 delivery |
| 4. | 8/6/08 | ET-129 delivery |
| 5. | 11/14/08 | STS-126 launch/ land 11/30/08 |
| 6. | 11/19/08 | ET-130 delivery |
| 7. | 2/14/09 | ET-131 delivery |
| 8. | 3/15/09 | STS-119 launch/ land 3/28/09 |
| 9. | 4/28/09 | ET-132 delivery |
| 10. | 5/11/09 | STS-125 launch/ land 5/24/09 |
| 11. | 7/15/09 | STS-127 launch/ land 7/31/09 |
| 12. | 7/29/09 | ET-133 delivery |
| 13. | 8/28/09 | STS-128 launch/ land 9/11/09 |
| **14.** | **10/14/09** | **ET-134 delivery** |

# Milestones

*Employees celebrating anniversaries with Lockheed Martin in November and December 2009*

**30 Years**
Elias Atilano
Donald Dawes
James Dillon
Robert Eagan
Ben Ferrell
Donald Kerlec
Ashok Prabhakar
Terry Sherman
Eugene Sweet

**25 Years**
Donald Baxter
Dee Geraci
Charles Hoffman
Brian Piekarski

**20 Years**
Mark Knoblach
Jeff Pilet
Melanie Powell

**15 Years**
Kristen Cowen
Ernest Dawkins
William Landwehr
Monte Smith

**10 Years**
Scott Naylor
Chris Strain

**5 Years**
Tiffany Layne
Donald Piglia
Nichole Rairigh

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