Space Systems Company – Michoud Operations

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Bulletin

June 26, 2007
on-line
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# Hail-battered ET carries STS-117 to flawless ascent

ET-124 arrived in Florida as a sleek, clean Christmas present, delivered on dock to the Kennedy Space Center (KSC) on December 23, 2006. When it left Florida on June 8 into the blue but cloud-streaked skies, it was patched and repaired but a beautiful sight nevertheless.

Although pock-marked and scarred, ET-124 fueled the orbiter *Atlantis* and the STS-117 crew on a flawless flight to orbit.

The story has been repeatedly told. A violent storm with golf ball-sized hail on February 26 left over 4,200 impacts on the External Tank, sitting exposed on the pad. At first glance the damage appeared irreparable. But that was before teams of NASA, Lockheed Martin and United Space Alliance personnel swarmed the vehicle, first assessing the damage, and then dispositioning each individual hail strike. Finally, repairs began; more repairs than any one ET had ever seen – some repairs that had never before taken place at KSC.

It was a story that began with long hours and hardships, sacrifice, and frustration. But the ending was written with dedication, ingenuity, and more hard work. One hundred days after the most damaging weather event in the history of the Space Shuttle program, the countdown began for the STS-117 launch. And when the shuttle lifted off, ET-124 performed as expected, with all systems functioning nominally and only minor ice/frost observed.

"We are glad to report that the External Tank has performed in a magnificent manner," said Shuttle Program Manager **Wayne Hale** shortly after the launch. "I couldn't be prouder of the team, and I think this bodes well for the future as we look forward to the completion of the International Space Station."

Following initial assessment of ascent and ET separation images, it is clear that the repairs completed to nearly 1,600 impact sites performed with no significant debris losses.

Across the rest of the 2/3-acre surface area of the ET, minor debris losses were noted, but the preliminary

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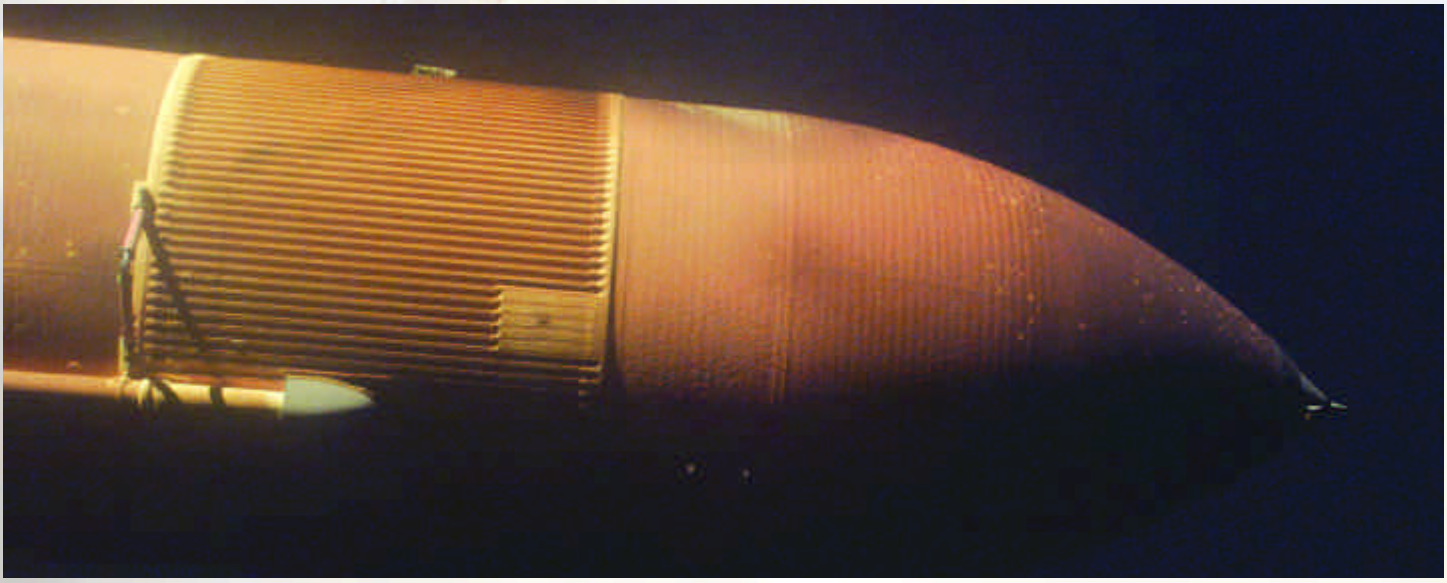

***After separation from* Atlantis, *ET-124 shows that hail storm repairs remained intact.***

# *Orion* program takes up historic quarters at KSC

For nostalgic space buffs, it's pretty hard to beat the Operations & Checkout (O&C) Building at Kennedy Space Center. Constructed in the mid-1960s to process space vehicles during the *Apollo* era, employees in the low bay and high bay buildings have since tested and checked out *Apollo* capsules, an *Apollo/Soyuz* docking module, a lunar rover vehicle, Space Shuttle payloads, and space station modules and hardware.

Now it seems fitting that the historic building will transition to serve as Lockheed Martin's final assembly facility for the *Orion* crew exploration vehicle. To modernize the O&C bays, crews have started refurbishing the factory – an 18-month job.

"We're replacing the high bay crane; redoing the floor, walls, and ceiling; replacing the lighting; consolidating electrical stations, and installing a new HVAC system," explains **Jules Schneider**, *Orion* Assembly, Integration, & Production senior manager.

The low bay is 85 feet wide, about 300 feet long, and 70 feet high. The high bay is about the same size, but 25-30 feet taller.

O&C remodeling will be completed by November 2008. The new factory will feature eight processing stations that measure 35 by 35 feet.

**Richard Harris**, *Orion* deputy program director for production, says the goal is to make the O&C Building fully operational and certified for *Orion* production.


***The* Orion *banner hangs in the low bay of the near-empty O&C Building now. Renovation began June 11.***

Construction begins on the first *Orion* test article in 2009, and the first *Orion* manned flight to the International Space Station is on the books for 2014.

"We will build the crew module and service module here and are also responsible for final assembly completion of the launch abort system," Harris explains. "Those three modules will be stacked and mated together at KSC, and then mated to *Ares I*, the crew launch vehicle.

"If there's any kind of an anomaly, we'll have the spare parts, the processes, and the people to handle it. What better place to have a factory than from where you're launching."

Today, 28 *Orion* people work at the O&C Building. That number will grow to around 50 by year's end. By March 2010, about 300 to 400 employees will be on board building the first *Orion* test article in the O&C. Peak production shows about 100 salaried and 300 United Space Alliance craft workers.

Harris says the USA workers highlight one of the program's advantages. "These are some of the same USA employees working shuttle. When they are not deployed with *Orion*, they can work on shuttle as it gets closer to fly-out of the program.

Several weeks ago when visiting KSC, Vice President **Manny Zulueta** told the *Orion* group, "You really have a great opportunity here to do things from scratch that many organizations don't have."

Harris agrees. "One of the benefits of starting a new factory is that we can incorporate the latest manufacturing processes and production support systems that have been developed throughout Lockheed Martin's manufacturing operations.

***Michoud Operations Vice President Manny Zulueta makes a point while meeting with* Orion *employees at Kennedy Space Center. From left are Richard Harris, deputy program director for production; Sandy Hammonds, planner; Mark Sexton, planning and integration; and Jules Schneider, Assembly, Integration & Production senior manager.***

"The challenge is to bring all these new systems on-line and thoroughly checked out in time to build the new vehicles." ■

# Let the astronauts snooze...

Attached to the Operations & Checkout low and high bay factory is a large four-story office building where engineers and planners work. The building is also part of the O&C complex. Located on a secure part of the third floor is the Astronaut Crew Quarters.

Here, astronauts are sequestered together during their final days prior to launch so they can gradually switch their sleeping patterns on Earth to the nocturnal schedule they will share in space.

When it's launch time, astronauts exit the O&C and stride to the transport that will take them to the launch pad – the first video the world sees of the flyers in their spacesuits on launch day.

"When a mission is close to launch day, we'll have to be careful that our demolition and operations do not disturb a shuttle crew in their sleep cycle conditioning," says **Richard Harris**, *Orion* deputy program director for production. "It may be a challenge since they immediately overlook the factory."

Nothing to worry about though for the mission just completed. The STS-117 crew launched Friday, June 8. Factory remodeling did not begin until Monday, June 11. ■

# ET-117 to fly in August


***After ET-124's successful mission with* Atlantis *earlier this month, attention now turns to ET-117, which is scheduled to fly with* Endeavour *as part of the STS-118 mission. Liftoff is tentatively set for August 7. NASA plans to fly three more missions this year. Above, ET-117 mates with the Solid Rocket Boosters on June 17. The tank is scheduled to mate with* Endeavour *on July 3 and roll to the pad on July 12.***

# STS-120 crew members check their tank

*The STS-120 crew visited Michoud June 1 and got an up-close look at the tank, ET-120, that is scheduled to fly them into space in October. The astronauts heard about Ice Frost Ramp improvements and other enhancements to the tank. ET-120 will be the launch-on-need tank for the STS-118 mission scheduled for August 7. Bottom row from left: Stephanie Wilson, mission specialist; Pam Melroy, commander; and George Zamka, pilot. Top row: Paolo Nespoli (Italy), Doug Wheelock, and Scott Parazynski – all mission specialists.*

# AEHF-1 completes successful mate

On June 4 at Space Systems in Sunnyvale, a team comprised of Lockheed Martin, Northrop Grumman, and U.S. Air Force personnel accomplished two first-time events: one being the inaugural mating of an Advanced Extremely High Frequency (AEHF) spacecraft, and two being the largest A2100 satellite platform ever to be mated.

The mating joined Lockheed Martin's AEHF-1 propulsion core with Northrop Grumman's System Module (payload). The mating represents the first major milestone of the satellite's integration and test phase.

Michoud Operations employees at the Mississippi Space & Technology Center at Stennis Space Center built the AEHF-1 satellite core and shipped it to Sunnyvale in March to undergo final assembly, integration, test, and solar array installation.

The significance of mating is that the System Module and the A2100 platform are one, creating a new generation space vehicle. All spacecraft activities are now critical path to the planned launch date in April 2008 on an *Atlas V*.

Executive management praised the integration of the technically-complex hardware and the AEHF team's relentless focus on operational excellence and Mission Success for the Air Force customer.

AEHF satellites will provide greater total capacity and offer channel data rates much higher than that of the current Milstar communications satellites. The higher data rates permit transmission of tactical military communications such as real-time video, battlefield maps, and targeting data. ■

***Workers carefully mate the AEHF-1 satellite core with its payload in Sunnyvale earlier this month.***

# Cell A transitions back to “normal” production

*ET-128 pulses the in-line readiness of Cell A*

External Tank-128's Liquid Hydrogen Tank slowly shifted into Cell A recently – marking the end of a four-year era of Return to Flight modifications in the cell and triggering the resumption of “in-line” production activities.

***Ricky Whittington replaces the Solid Rocket Booster inserts.***

Cell A's primary function is to stack and fasten the LH2 tank to a previously-joined Liquid Oxygen Tank and Intertank. Following the *Columbia* accident, engineers modified Cell A to allow entry of completed or near-completed External Tanks back into the cell to perform Intertank flange rework. The change required the removal of platforms and Orbiter hardware pedestals to accommodate the attached ET feedlines and cable trays that are installed post-Cell A in a normal production flow.

“Reversing the modifications to the cell was easier than creating them,” explained **Mike Howard**, associate manager, Cell A Operations. The removed elements were restored within a week to accommodate the towering foam-clad hydrogen tank.

A few issues arose in the restart of in-line production operations. Once ET-128's hydrogen tank arrived, technicians removed masking to reveal slight corrosion on the aft Orbiter fitting inserts. The culprit – moisture from Hurricane Katrina roof damage in the Vertical Assembly Building. This discovery impacted engineers working to meet schedule milestones of reducing time in the cell from 39 to 33 manufacturing days. The fitting inserts had to be replaced, and other tank components stored in the VAB cells also were inspected.

Hardware issues were not the only concern. A number of Thermal Protection Systems (TPS) technicians had transferred to other Michoud retrofitting activities over the past few years, which meant hiring and training new employees. And progress is being made: several new hires have already soloed in trimming their first cryoflex manual closeout spray.

“These are examples of continual new challenges we face on the External Tank Project – even as the program begins to wind down,” stressed **Mark Bryant**, ET deputy program manager.

Enhanced process improvements will help shorten ET-128's stay in Cell A. The point-fill process of injecting small amounts of foam into 180 gaps in the flange closeout is now being performed in Cell J rather than in Cell A. Also, a new three-step closeout will now be performed on 360 degrees of pristine flange as opposed to stripping a previously-applied foam closeout. These enhancements will shave several days off the schedule that has ET-128 leaving Cell A on July 9.

***James Duke, Production Operations, inspects the flange pockets in preparation for the foam closeout spray.***

In addition, ET-128 will be the first tank to use the new Ice Frost Ramp design and 178 solid-fill bolts. The tank is scheduled to fly aboard STS-124 in April 2008.

“The talent is rejuvenated,” said Howard. "The momentum is picking up, and there's a changing of the guard feeling in Cell A as we transition back to in-line production." ■

## August Launch Trip

Any employee interested in traveling to Florida with the LMents organization, take note. The group will host a trip to KSC and the Space Coast/Orlando area to include a possible viewing of the STS-118 launch set for August 7. If interested in finding out more about discounted block hotel rooms during launch week or planning your vacation around this event, contact kelly.m.buck@maf.nasa.gov ■

# Flawless ascent

*Continued from Page 1*

assessment indicates that debris mass values are within expected performance limits and/or occurred after the critical debris transport time – 135 seconds into flight.

"Recovering from that storm damage was a phenomenal effort," said **Wanda Sigur**, ET program manager. "It was no small success considering the magnitude of the work that had to be done. There are dozens if not hundreds of individuals who made this launch possible, and I'd like to thank every one of them for an outstanding job."

The successful conclusion of the STS-117 mission will keep NASA on course for the next shuttle flight – STS-118 – currently scheduled for launch no earlier than August 7. ■

# Launch Honorees pose before shuttle stack

***Nominated for their outstanding performance, honorees Tim McCaffery, Kirk Hill, Yeung Lee, Barbara Phillips, Keith Savoy, Susan Daigle, Tim Harper (red hat), Mark Heinsz, Karen Surbeck, Ben Ferrell, Karen Poy, Mark Peno, Roy Higginbotham, and Bill Ohler spent the week at Kennedy Space Center and saw Space Shuttle* Atlantis *lift off on its first try June 8.***

# Safety & Health Fair offers massages, screenings, and more


***Trina Baptiste with the USDA receives a spinal massage at Michoud's 13th annual Safety & Health Fair, which featured vision, diabetes, blood pressure, and cholesterol screening. The fair offered information on smoking cessation, alcohol, asthma, mental health, aging, sleep disorders, organ donation, stress management, jazzercise, yoga, recycling, Weight Watchers, and hurricane preparedness.***

# Details on *LM HealthWorks* fitness reimbursement

The recently announced *LM HealthWorks* Fitness Reimbursement Program is now providing $250 per calendar year for employees' expenses associated with membership in eligible fitness centers, including annual membership and initiation fees.

The reimbursement program applies to eligible incurred expenses retroactive to January 1, 2007. You are eligible even if your Lockheed Martin facility has a fitness center. A new corporate-wide policy governing this program, CPS-547, is now in effect. All active Lockheed Martin employees except casual part-time employees may request reimbursement. An eligible fitness center is one that has cardiovascular equipment, muscular conditioning equipment and aerobic conditioning training programs. Examples include the YMCA, Bally, World Gym, 24 Hour Fitness, LA Fitness, Curves, and fitness centers on Lockheed Martin premises.

Examples of clubs and activities that are not eligible fitness centers are aquatic centers, racquetball clubs, golf clubs, ski resorts, in-home personal trainers and recreational sports. The company will not reimburse expenses for personal fitness equipment. The business unit program administrator will determine whether expenses submitted for reimbursement are eligible under this policy.

To request reimbursement, complete form C-547-1, available in the Fitness section of *LM HealthWorks*. To access *LM HealthWorks*, log on to LMPeople and click on *My Health and Wellness* in the Benefits section. Attach supporting receipts and a copy of the contract or documentation showing the amount paid and date of the payment. Submit the request and attachments to **Debbie Berkman**, Michoud's fitness center reimbursement program administrator in Human Resources.

Please note the following:

- Requests may be submitted for eligible expenses incurred on or after January 1, 2007.
- If membership payments are made by automatic payroll or bank account deduction, submit the request form, contract, and a receipt or bank/billing statement showing the total amount paid and the name of the fitness center.
- To be considered for reimbursement, the deadline for submitting requests is February 15 of the year following the year in which the expenses are incurred. For 2007 expenses, that means you have until February 15, 2008, to submit the reimbursement request form.

The program administrator will review the request and determine whether the expenses are reimbursable. If they are, the administrator will authorize Payroll to make payment directly to you. If the expenses are not reimbursable, the program administrator will notify you in writing, including the reason for the denial.

***Michoud's fitness center***

If you have any questions about the Fitness Reimbursement Program, please refer to Frequently Asked Questions on the *LM HealthWorks* website or contact Debbie at 7-1056 in H.R. ■

# New physician joins Michoud Operations

A physician with extensive experience in government, military, and private practice medicine, **Dr. Winston Levy** started work at Michoud on June 11 as director of Medical Services. He succeeds Dr. Troy Hutchinson who transferred to Lockheed Martin Space Systems in Denver.

In the clinic, Dr. Levy's goals are to assess employee lifestyles, provide guidelines on diet and exercise, review medications, and ensure that employees are safe and healthy in their line of work at Michoud.

Previously, Dr. Levy worked at the Military Entrance Processing Command in New Orleans and Salt Lake City for five years before joining Lockheed Martin.

Prior to that, he worked at the Southeast Louisiana Hospital, a psychiatric facility in Mandeville from 1985 to 1998. He attended flight surgeon training in 1998 and has served for many years in the Army Reserve and Air National Guard.

Activated for both Desert Storm in 1991 and Operation Enduring Freedom in 2003, Dr. Levy has also traveled to Saudi Arabia, Panama, and several other Latin American countries while in the military.

Dr. Levy graduated from medical school at the Autonomous University of Guadalajara and then spent three years in a pediatrics residency at LSU in New Orleans and a fourth year in a child psychiatry fellowship. ■

***Dr. Levy checks an x-ray in the Michoud clinic.***

# EVO takes pledges for Children's Hospital

*Lockheed Martin's Dionne Butler and Dave Willick talk with pledge donors during the Children's Miracle Network Telethon at WDSU-TV studios on June 3. EVO volunteers assisted in raising over $1.3 million for Children's Hospital.*


A new site is up and running with the latest Transition information on Gumbo at http://gumbo/ Check it out.

## Emergency Information

To find out work status during hurricane season at Michoud, go to **www.mafstatus.com** or call 257-1MAF or 1-800-611-3116, check ETV or **www.maffamily.com**, listen to WWL-870 radio or WWL-TV, Channel 4 or **www.wwltv.com**

## Milestones

*Employees celebrating anniversaries with Lockheed Martin in July 2007*

**30 Years**
Joseph Bordelon
Karen Cline
Stanley Ebert
Walter Johnson
Enrique Lacayo
Jerry Landry
Barry Pearson
Ronald Schaff
Terry Spitelera

**25 Years**
Bruce Abney
Judy Beale
Jack Burks
Frank Couste'
George Cromer
Diane Davey
Francisco Gutierrez
Preston Landry
Charles Moore
Robert Pedeaux
Dennis Whitchurch
Virgil Williams
Billy Young

**20 Years**
Mala Bhattacharya
Alvin Christophe
David Daniels
Walter Dufour
Barry Keegan
Keith Marx
Elana McGregor
Will Wolner

**10 Years**
Hale Davidson
James Layton
Margaret Legnon
Michael Parquet
Darrel Pearson

Mission Success Bulletin on-line

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Volume 26, No. 6 • June 26, 2007

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***Mission Success Bulletin*** is published by the Communications Department.