



## Mission Success

# Bulletin

July 1, 2009

on-line

<http://www.lockheedmartin.com/michoud/>

## NASA, Lockheed Martin work to solve GH2 leaks that scrubbed launches

Again, gaseous hydrogen (GH<sub>2</sub>) leaks in the vent line at the Ground Umbilical Carrier Plate (GUCP) spoiled STS-127 launch attempts on June 13 & 17. Connected at the Intertank, the line is the overboard vent to the pad and the flare stack where vented hydrogen is burned off. Typically, excess GH<sub>2</sub> is burned off as the Liquid Hydrogen (LH<sub>2</sub>) Tank is full or almost full from tanking.

As part of the GUCP, the flight-side seal interface gets lots of attention. “The seal is most likely being breached, caused we think by a combination of misalignment of the probe-to-seal interface and relative motion between the GUCP and the tank,” explains **Jeff Pilet**, ET chief engineer.

“We think the combined effects are causing asymmetrical loading on the seal surface that’s causing one side to compress more than the other side which leads to a small gap between the sealing surfaces.”

Pilet says one corrective action being considered is to return to a two-piece flexible seal that’s been flown twice on the shuttle. “Testing and flight performance of this design has shown good capability to mitigate the potential for large, uncontrolled leakage like we observed during the STS-127 launch attempts.”

The other mitigation, he says, may be to implement a design change down at the pivot assemblies to minimize the relative motion. “We need to assess the amount of motion that we think we have – compared to previous tests on the two-piece seal – and make sure that the two-piece seal has adequate capability to handle it. Depending on the results of

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*The rotating service structure begins to roll away from Space Shuttle Endeavour on June 16. NASA scrubbed the launch early the next morning due to a second gaseous hydrogen leak at the Ground Umbilical Carrier Plate during tanking.*



# Astronauts visit Michoud

Two days after his shuttle launch was scrubbed, STS-127 Mission Specialist Tim Kopra (right) showed up at Michoud June 19 to visit production and talk with employees. Kopra accompanied STS-128 Commander C.J. Sturckow whose mission is scheduled to launch August 18 to the International Space Station. Kopra's mission is now targeted for launch July 11 where he will exchange places on the space station with Koichi Wakata. Sturckow and Kopra are seen here with NASA ET Resident Manager Pat Whipps signing TPS mechanic Verna Freeman's Honoree photo in Final Assembly next to ET-133 before it moved to Building 420.



## Final flight tank, ET-138, completes proof testing

In a major program milestone, the Liquid Oxygen (LO2) Tank and Liquid Hydrogen (LH2) Tank for ET-138 – the last ET scheduled for flight – recently completed proof testing. When a tank leaves major weld, it moves over to a proof facility where team members pressurize the vessel to simulate the stress experienced during launch.

The LO2 tank was tested in Cell F of the Vertical Assembly Building by filling the vessel with water to simulate critical tank pressure loading experienced during flight. The LH2 tank goes to Building 451 where the loading is applied through a combination of pneumatic pressure (gaseous nitrogen) and mechanical jack loads at the aft end of the tank.



The LH2 Proof Test Team poses in front of their Building 451 tooling. Sitting from left are Heather Quintini, Joseph Bordelon, Nick Waterwall and Timothy Richmond. Standing: Larry Meserve, Enrique Lacayo, Antonio Johnson, Brad Keys, Troy Franklin and William Schneider.

The teams look for leaks in the welds during and after testing. After testing is complete, the welds are inspected using Non-Destructive Evaluation techniques to ensure that the post-proof configuration is safe to fly.

Because the LH2 tank proof test is performed with pressurized gas, the test crew is located in a nearby blast-proof building – Building 452. Security is posted a safe distance away to make sure no one enters or leaves the area while testing is under way.

“Teamwork is essential during testing,” according to **Tim Richmond**, who supervises the team. “We are all trained to do each other’s jobs, and we have to look out for each other. If something should happen while we are locked in, we have to be able to take care of each other and get the situation under control.”

Employee **J.D. Bordelon** chimes in, “We’ve been a crew for 20-plus years. We’re a family out here.”

The LH2 proof test team has seen its share of challenges. Richmond remembers testing the first Super Lightweight Tank when an alarm went off. The crew had to take over manual control of the test.

“We raised the load in 20 percent increments,” he said. “Our eyes were glued to the strain gauges that measure the stress applied to the tooling. We were more worried about breaking the tool rather than the tank.”

Then the wrath of Hurricane Katrina struck, demolishing Building 451. The building is designed to blow apart in the event of an explosion and is therefore susceptible to high winds. The team worked for a year rebuilding and refurbishing the tools. Once the facility was rebuilt, then they worked the bugs out of the new hydraulics systems.

While performing the final LH2 proof test, the team’s devotion to Mission Success showed. “During ET-138’s test, we watched the console closely,” said **Enrique Lacayo**. “As soon as the needle passed 100 percent load, we all cheered. I’m glad I got to be here for the last External Tank.” ■

# Michoud prepared for 2009 hurricane season

Hurricane season begins each year on June 1; however, Michoud Assembly Facility personnel have been preparing for months to protect the facility in the event of storm. Michoud's hurricane preparedness begins with planning and is deemed successful when the facility can quickly resume normal operations following a storm.

steps needed to protect the facility in the event of an emergency. Turner pointed out that "this is a plan that is not cast in concrete; there is flexibility that allows the crew to deviate as necessary, especially to protect people over property."

After the kickoff meeting, hurricane "tours" allow for facility housecleaning

facility for 10 to 15 years. This team has proven itself through Katrina, Rita, and Gustav in the last few years and is ready for the next storm that may threaten MAF.

In addition to a well-seasoned ride-out crew, the facility and NASA have some new features this year to provide greater support in the event of an emergency. Michoud has recently taken ownership of three new NASA support vehicles. The Communications Response Vehicle can restore communications with the outside world if telephone and Internet systems are lost, while the Data Response Vehicle can provide the equipment to send important production and facility data from local servers to Marshall Space Flight Center.

The NASA Mobile Command Center will create temporary headquarters for communications and data retrieval while MAF is being restored. When a storm is eminent, the command center can be staged outside the storm zone and then return to Michoud once the storm passes. The vehicles are self-powered and can be operating within hours of arrival.

"I'm optimistic about MAF; we're well prepared, and NASA has given us nearly everything we need to prepare for a storm," Turner said. MAF operates in normal condition for most of the hurricane season because of early planning and dedicated personnel.

To monitor the status of MAF during an emergency, check [www.mafstatus.com](http://www.mafstatus.com). This site will be updated soon, so stay tuned to *Info SPACE* and ETV for more information. ■



*One of NASA's three emergency response vehicles is tested on site in preparation for the hurricane season. The vehicles will be dispatched from MSFC and arrive at MAF after an emergency to restore communications and recover computer data.*

As **Steve Turner**, NASA Michoud safety manager explains, the hurricane preparedness procedure at Michoud has become a near "ritual." Each year, a Hurricane Kickoff meeting is held June 1 where Lockheed Martin, facility tenants, and NASA distribute the Emergency Operating Procedure (EOP). This document is revised and submitted to NASA each year using lessons learned from past experiences and the National Incident Management System (NIMS) guidelines.

The EOP provides general directions, checklists and outlines of the

to begin. Loose and lightweight items on the grounds are picked up or secured so they can't cause damage in high winds.

During a storm, the ride-out crew conducts the functions needed to keep the facility safe and secure. The crew is comprised of skilled personnel, including carpenters, electricians, plumbers and security.

"The ride-out crew is an experienced, highly-skilled and motivated group," Turner explained. Most of the team is comprised of people who have been working storms together on the

## Emergency Information

To find out work status during hurricane season at Michoud, go to [www.mafstatus.com](http://www.mafstatus.com) or call 257-1MAF or 1-800-611-3116, check ETV or listen to WWL-870 radio or visit [wwl.com](http://wwl.com) or watch WWL-TV, Channel 4 or go to [wwlvtv.com](http://wwlvtv.com)

# Space Systems Award Night

Representing Michoud Operations at Space Systems Awards Night in Philadelphia on June 12 were eight individuals and three teams. Congratulations to all!

## Exceptional Service

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### **Faye Baillif**

Materials Science engineer, for leadership in the redesign and process change in the Liquid Oxygen Tank to Intertank flange Thermal Protection Systems (TPS) foam closeout



### **Dion Lee**

Project Management and Planning Operations, for innovative and sustained performance in his planning role on the Collaborative Work Cells, resulting in timely delivery of External Tanks



### **Ralph Tortorich**

Quality Assurance manager, for commitment, dedication and significant leadership in the fly-out of the ET Program



### **Andrew Williams**

TPS mechanic, for excellence in the manufacture of External Tanks and TPS applications

## Technical Excellence

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### **Scooter Clifton**

Test engineer, for executing test operations projects and in developing follow-on opportunities at Marshall Space Flight Center



### **Ed Dragon**

Facilities Engineering manager, for exceptional performance in successfully managing complex facility infrastructure and process system designs



### **Johnny Milien**

Design engineer, for developing a major structural design modification of the Orion Service Module Propulsion Sub-Assembly through persistent and detailed modeling concepts



### **William Torres**

Structural engineer, for outstanding structural analysis support to the Large Cryogenic Launch Vehicle IR&D and Orion Program

## Teams Awards



**Ben Ferrell**

Engine Cut-Off (ECO) Sensor Investigation & Redesign Team, for the team's dedication, innovation and technical excellence, leading to successful root cause testing, redesign, certification and flight of the Space Shuttle ECO System. Represented by Ben Ferrell, Systems Engineering manager.

Ken Barkman  
Dawn Diecidue-Connors  
Kenneth Ezell  
David Harris  
Mark Javery  
Brian Knipfing  
Mike McBain  
Gregory Vinyard  
John Varriello  
James Kerr  
Terry Clausing  
Tommy Barrett

Jeff Pilet  
Steve Enxing  
Angelo Greconia  
Patrick Garrity  
Jeremy Kelley  
Fred Lockhart  
Kenny Reaume  
Francisco Gutierrez  
Mike Berger  
Raymond Clark  
Dudley Royal  
Tim Harper



**Leon Richard**

Large Acreage Gun Room Team, for excellence in support of External Tank automated and manual TPS applications. Represented by Leon Richard, Multi Functional Manufacturing senior manager.

Margaret Legnon  
Jeff Beck  
Keith Bracey  
John Edwards  
Robert Fowlkes  
Chau Luong  
Jason Meyers  
Keith Phillip  
Raphael Russell  
Peter Vu  
James Zeringue  
Richard Roberts

Jeff Beale  
Richard Boni  
Wesley Brown  
Peter Ferrell  
Andrew Garaudy  
Wesley McCellon  
Joan Miller  
Cort Phillips  
Robert Goodwin  
Reginald Williams  
Eric Matherne  
Von Boudreaux



**Chris Bourgeois**

Shuttle Transportation System Debris Reduction/Elimination Team, for outstanding efforts in the Validation and Verification operations required to implement the TPS redesigned processes to minimize ET debris loss. Represented by Chris Bourgeois, materials engineer.

Harry Nelson  
Lance Manalo  
Nhan-Quyen Nguyen  
Ed Newman  
Karen Laurant  
Charles Kirch  
Roseann Augustin  
Camille McConnell  
Rashonda Dukes  
Jason Holbrook  
James Duke  
Molen Ursin

José Bueiz  
Christina Bain  
Patrick Garrity  
James Hart  
Ron McQueen  
Frank Cousé  
Peter Perbes  
Benjamin Hendrick  
Fred Ubas  
Jeffrey Pfrimmer  
Angela Stull  
Pat O'Rourke

## Leak probe

Continued from Page 1



*Teams work to repair the 7-inch quick disconnect on the hydrogen vent line to the Ground Umbilical Carrier Plate on ET-131. Workers removed the hardware to change out seals in the internal connection points where a hydrogen leak during tanking caused the first mission scrub June 13.*

these analyses, we may require a change to the pivot assembly hardware or the interface with the hinge pins.”

To demonstrate root cause and the two-piece seal, teams are setting up cryogenic tests at Marshall Space Flight Center.

At press time, NASA was also considering a tanking test for ET-131. Pilet believes if the teams make progress, a launch is possible on July 11, the first opportunity after a three-week beta angle cut-out when the shuttle can not launch.

“We’re jumping in to find the right answer,” says **Mark Bryant**, ET program manager. “The approach is that it’s up to us to solve the problem. We’ve done it on the ECO (engine cut-off) system and also on the Orbiter Flow Control Valves; we’ll do it here.” ■

## Lorio wins Lockheed Martin scholarship



Lockheed Martin has chosen 18-year-old Eric Lorio for a National Merit Academic Scholarship. Eric, a recent graduate of Jesuit High School, is shown here with his dad, Paul Lorio. Eric plans to attend LSU to pursue a degree in pre-medicine. Funded by the Lockheed Martin Foundation, the program awards each winner \$3,000 per year for up to four years of undergraduate study. This year Lockheed Martin chose 72 children of employees for scholarships.

## MSFOC Transition news corner

On July 1, 2009, Jacobs Technology, Inc. assumed full responsibility for the MAF Manufacturing Support & Facility Operations Contract (MSFOC), effectively ending the two-month transition period from Lockheed Martin.

### Contact Information

Please use the following phone numbers to access information and site services until current phone numbers are updated over the next few weeks:

Jacobs Transition Office 257-6202  
Jacobs General Manager 257-6200  
Jacobs Site Services 257-6208

### Building 351 Cafeteria Repairs

Riverbend Bistro, the food vendor for the new MSFOC will close Building 351 Cafeteria for repairs until Monday, July 6. During this time lunch will be provided in nearby tents. Employees can enjoy lunch with a soft drink for \$5.

## Transportation and Handling team is BPT of Year



For outstanding support and contribution to ET quality, safety, and productivity, the Transportation & Handling Move/Proof Load/Forklift Operations team has been named the Build Process Team of the Year. Congratulations to the team! From left are Al McCrear, team lead Pat Pansano, Matt Wallo, Dan Huffman, Fred Walker, Dameon Bickham, VP & Site Executive Manny Zulueta, Randy Pretlove, Steve Boudreaux, assistant team lead Tim McCaffery, Damien Smith, Ronnie Rome, Malcolm Bech, Richard Augustin, Calvin Madison, John Singelmann, Steve Wilson, Operations Director Hal Simoneaux, BPT Administrator Cheryl Iwanczyk, Perry Degelos, Craig Jenkins and Joseph Simon. Not pictured: Clarence Barva, Robert Conzonire, Linda Laborde, Patrick Martin, Mike Nye, Dale St. Romain, Kirk Streetman, Irvin Verdin, Willie Whittington and Gary Wild.

# Michoud rated “Excellent” on Award Fee periods

Once again, Lockheed Martin employees performed in an outstanding manner as determined by our Award Fee. NASA rated Michoud Operations “Excellent” in three separate Award Fee periods recently ended.

- Established weekly sub-contract management team meeting to discuss supplier issues with NASA, Materiel, Production, Engineering, Quality and field personnel

lation identified when an employee used a lumicolor marker to fill in a small area of missing conathane. Several other Weaknesses noted a few quality and process escapes, a NASA Discrepancy Report, and a process control breach.

For **Michoud Operations & Maintenance** from April to December 2008, NASA pegged Lockheed Martin with four Significant Strengths:

Category	Score	Period
Production	95	Oct. 1, 2008 – March 31, 2009
Operations & Maintenance	97	April 1, 2008 – Dec. 1, 2008
Operations & Maintenance	97	Dec. 2, 2008 – March 31, 2009

- Contributed in major way to Constellation Program Environmental Impact Statement, thus receiving NASA “Blue Marble” award
- Supported ET transition manager in exemplary fashion in area of MAF Transition and filled numerous data requests
- Provided support to NASA on MSFOC as-is, where-is property validation with professionalism, efficiency and courtesy
- Comprised of 90 percent first-time members, Hurricane Gustav Ride-Out Crew safely secured facility and operated flawlessly, activating new Incident Command Center for first time since Katrina/Rita using multi-contractor response team

Award Fee Areas of Emphasis included:

- Development and implementation of ET producibility enhancements to support Space Shuttle manifest
- Retention of critical skills
- Timely reporting of schedule impacts
- Effective implementation of transition activities associated with Manufacturing Support & Facility Operations Contract (MSFOC)

For **Production**, NASA listed 13 Lockheed Martin Significant Strengths. Some of these included:

- Demonstrated commitment to culture of continuous improvement with Production Weld Test Panel Kaizen event and improved Ice Frost Ramp applications
- Improved delivery of parts from backshop areas through use of integrated value stream mapping, resulting in upgraded manufacturing performance to deliver ETs on schedule
- Managed critical skills retention to complete shuttle manifest

- Motivated remaining suppliers to provide quality hardware
- Launched STS-126/ET-129 on Nov. 14, 2008 with all systems performing as expected
- Scrubbed STS-119/ET-127 first launch attempt March 11, 2009 due to excess GH2 detected in LH2 tank Ground Umbilical Cover Plate; after flight seal and quick-disconnect replacement, launched second attempt successfully March 15
- Demonstrated exceptional performance on Orbiter Flow Control Valve Problem Resolution Team
- Decreased Non-Conformance Documents on ET-130 & ET-131, showing commitment to continuous improvement

A Strength had the Day Away from Work rate at 0.12, significantly lower than industry average of 0.3. No OSHA reportable incidents occurred during period. However, three NASA reportable incidents did occur – increasing rate from previous periods – and were listed as a Weakness.

Another Weakness – a process vio-

For the second Operations & Maintenance period from December 2, 2008 through March 2009, NASA noted one Significant Strength in preparing 26 of 36 jointly-identified Turnover Plans on an accelerated schedule to support the MSFOC award. The evaluation listed a number of Strengths but no Weaknesses during either of the two O&M periods. ■

## Space Shuttle Schedule

Mission	Launch Date	Tank	Tank Delivery Date
STS-127	July 11, 2009	ET-131	February 14, 2009
STS-128	August 18, 2009	ET-132	April 28, 2009
STS-129	November 12, 2009	ET-133	August 4, 2009
STS-130	February 4, 2010	ET-134	October 27, 2009
STS-131	March 18, 2010	ET-135	December 18, 2009
STS-132	May 14, 2010	ET-136	February 24, 2010
STS-133	July 29, 2010	ET-137	May 5, 2010
STS-134	September 16, 2010	ET-138	June 29, 2010



# Launch Awardees see Kennedy Space Center



*Selected for outstanding performance, the STS-127 awardees included front row from left: Henry Seymour, Ricky Hinson, Debbie Houchin, Dan Swords, Richard Walker, John Moore and Manny Zulueta. 2nd Row: Al Labat, Graf Weller, David Clack, Lillian Baham-Gosin, Fulvio Manto and Lowell Howard. 3rd Row: Matt Wallo and Paul Cooper. Unfortunately, Endeavour did not launch June 13 so this group and 49 other Michoud employees (most of whom had never seen a launch) missed a viewing opportunity. However, Michoud plans to continue sending large groups of employees to KSC to see launches as the program winds down.*

## Milestones

*Employees celebrating anniversaries with Lockheed Martin in July 2009*

### 35 Years

Jimmy Hart

### 30 Years

Randall Axelsen

Jeanne Jean

Bob Simms

### 25 Years

Dustin Emanis

Larry Jones

William Mattheessen

Robert Officer

Laurence Rando

Scott Schieben

### 20 Years

Kellie Alleman

Sandra Blanchard

Kerry Miller

### 15 Years

Joseph Carbo

David Knapp

Drew Roussel

### 5 Years

Crystal Catania

Darryl Chauvin

CarJonne Cooper

Craig Palmisano

Mark Russell

Donovan Thomas

## ET Incentive Plan Update

Milestone	Event Date	Description
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

Mission Success

# Bulletin on-line

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**Director of Communications:** Marion LaNasa

**Editor:** Harry Wadsworth

**Graphics, Photography:** Eric Bordelon, Andre' Bourdier, Chip Howat, Tim, Jacobs, Shannon Jurado, NASA, Brian Peterson, Steve Seipel

**Contributors:** Kevin Barré, Eric Bordelon, Chip Howat, Jeff Pilet

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