Space Systems Company - Michoud Operations

Mission Success Bulletin

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Return to Flight Takes Center Stage

Michoud making significant progress in numerous areas

The eyes of the NASA world are on the Michoud Operations Return to Flight (RTF) activities. In the past several weeks, both Marshall Space Flight Center (MSFC) Director Dave King and Shuttle Program Manager Bill Parsons visited Michoud to review status of the multi-front activities.

High on the list of activities is the bipod ramp redesign. Goals of the redesign are to create no new risks; to eliminate possible causes of ramp failure; to be capable of certification and implementation by late summer; and to have the ability to retrofit the existing fleet.

Following selection of a preferred option at the June Preliminary Design Review, Michoud Operations has conducted "quick look" thermal tests for heater and structural capacity. Test articles have been fabricated and thermal qualification testing has begun at Eglin Air Force Base, Fla. A bipod ramp redesign Critical Design Review is scheduled for August 19-21.

Michoud Operations is performing an assessment of ET Protuberance Airloads (PAL) ramp configurations in order to reduce potential sources of Thermal Protection Systems (TPS) debris. The current activity focuses on two redesign paths: enhancing the present PAL ramp design; and assessing the feasibility of eliminating or redesigning the ramp. Modal and wind tunnel testing has begun on both liquid oxygen (LO2) and liquid hydrogen (LH2) articles.

A team is also evaluating methods to reduce potential TPS debris from the LH2 tank/Intertank flange area. Test requirements to explore flange failure mechanisms have been completed, and work continues on Intertank purge and other flange tasks.

In a task related to those listed above, Michoud is reassessing verification and certification of TPS components in critical debris zones. The team has established a methodology and developed a schedule to prioritize critical TPS applications and identify elements that require additional data to support RTF.

A NASA/Lockheed Martin team is also developing non-destructive evaluation (NDE) techniques for TPS. Numerous NDE techniques are being considered, test articles have been developed and a qualification test plan begun.

Another team is developing a method to contain ice that could potentially form on the LO2 feedline bellows. The team is currently assessing both near-term retrofit and long-term

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Shuttle Program Manager Bill Parsons (left) and Michoud Shuttle Upgrades Manager Dave Hartley discuss features of the Friction Stir Weld process.

After his recent tour of the ET production line, MSFC Director Dave King encouraged employees to meet the Return to Flight challenge with the statement, "We've got to get this vehicle ready to fly."

Receiving the President's Award for their response to a medical emergency are (from left) Allen Gusman, Don Grogan, Hayward Ducre, Mark Evans, Dr. Marleece Barber, Leon Morgan and Bill Schneider.

Seven Receive President's Award

President **Dennis Deel** presented Michoud Operations' highest form of recognition - the President's Award - to seven employees for their response to a medical emergency.

On June 17, **Ray Lacour**, a Facilities carpenter, suffered cardiac arrest and collapsed in Building 103.

Working nearby, Safety engineers **Don Grogan** and **Bill Schneider** promptly called the emergency response unit and began initial treatment.

First responders **Leon Morgan** and **Mark Evans** arrived in an ambulance and took over treatment, followed shortly by **Dr. Marleece Barber**.

Lt. Hayward Ducre and **Allen Gusman** maintained order and access to the area throughout the incident.

"In this case, with a man's life on the line, each of you demonstrated the professionalism, concern and commitment that I believe best reflects what Michoud Operations is all about," Deel said.

"Sadly, Ray passed away later that day at a nearby hospital. Despite the unfortunate outcome, your efforts gave him a fighting chance to survive. That is the most that he – or any of us – could ask for." ■

Flight

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candidate configurations. Team members have created thermal models and predictions, completed a matrix of design solutions and identified wind tunnel requirements.

In the final area of focus, an ET Shuttle observation camera is being evaluated to increase NASA's ability to determine the health status of the Orbiter during ascent. NASA accepted a recommended location in the LO2 feedline fairing and Michoud Operations continues to investigate future camera enhancements and locations such as on the LH2 tank and aft crossbeam.

"Completion of work in these areas is critical if we are to support NASA's RTF plan," said **Ron Wetmore**, ET RTF Manager. "It is important that we do all we can to succeed in these efforts and return the Space Shuttle to safe flight." ■

Orbiter Equipment Arriving at Michoud

Nearly 400 truckloads expected

The tractor-trailer rigs started rolling in in June, and the convoy will continue until December.

A total of 387 trucks loaded with Space Shuttle Orbiter hardware and equipment are scheduled to arrive at the NASA Michoud Assembly Facility.

The trucks are coming here because NASA relinquished its lease on a General Services Administration (GSA) warehouse that housed the Orbiter inventory in California. NASA is now vacating the warehouse and has contracted with Michoud Operations to handle the relocation effort.

NASA decided to permanently move the Orbiter inventory to Michoud to save money. The majority of the 51,000 items will be stored in the southeast corner of Building 103 and in Building 303 – Bays 2, 3 and 4.

The items range in size from a CD case to a large delivery truck and have a total value of $137 million.

"The hardest part of transferring the inventory is squeezing 160,000 square-feet of storage in California into 85,000 square feet at Michoud," said **Elliot Perret**, program manager, Shuttle Hardware Relocation.

The items, which began arriving in June, are used to build and maintain the Orbiter fleet including tooling, special test and ground support equipment, material and flight hardware.

"Because of the demanding schedule, we couldn't have pulled this off without the tireless efforts and support of Production Operations, Program Management & Technical Operations, Business Operations, Materiel Sourcing and Facilities & Environmental Operations personnel," Perret said.

When the last of the items arrive at Michoud in early December, Lockheed Martin will then manage the Orbiter inventory on a recurring basis. Michoud will also be responsible for supporting ongoing shuttle maintenance and manufacturing operations throughout the country. ■

A subcontractor employee inspects a support member in the cavernous storage system currently under construction in Building 303 that will house thousands of Space Shuttle Orbiter inventory items at Michoud.

Michoud to Design Hybrid Rocket for Norway

Offset program includes design and vehicle assembly plan

Lockheed Martin is taking its Hybrid propulsion expertise to Norway.

Michoud Operations is set to design a Hybrid Sounding Rocket for Nammo Raufoss AS, a Norwegian company that will build the vehicle that is approximately 25 feet long, 10 inches in diameter and weighs about 1,000 pounds.

"We'll design it, provide the engineering drawings and deliver a vehicle assembly plan," said Program Manager **Joe Arves**, Program Management & Technical Operations. "Then the Norwegians will build it, test it and launch it from their Andoya Rocket Range."

Norway regularly launches sounding rockets to study the Northern Lights and the Aurora Borealis.

"Those are small, solid-fueled rockets," said Arves. "The Norwegian Hybrid Sounding Rocket will use HTPB (hydroxyl-terminated polybutadiene) or plain rubber as the fuel with liquid oxygen, have a 7,000-pound thrust and a burn time of approximately 30 to 35 seconds."

The altitude depends on the payload, but Arves estimates the rocket could go 55 to 75 miles high.

The Hybrid project is an offset program that came about as a result of the Norwegian Ministry of Defense buying Pantera pods (long-range precision targeting systems) from Lockheed Martin Missiles & Fire Control in Orlando, Fla.

"Countries that buy U.S. products typically want something to offset those costs, like technologies and services or products that they can manufacture and sell," said **Michael Gnau**, manager, Business Development. "Building a rocket in Norway to launch on their range with advanced technology is prestigious to the Norwegians."

"We're using our technology to support another Lockheed Martin business unit's sale, and in turn gain a foreign partner for an international program."

- Mike Gnau

In support of the offset, Michoud Operations agreed to transfer the small diameter hybrid propulsion technology it has developed over the past 15 years to Norway.

To transfer the technology, Lockheed Martin had to request an ITAR (International Traffic in Arms Regulations) Manufacturing License Agreement from the U.S. Government, who granted the request earlier this year.

The 17-month project recently kicked off with a four-day meeting in Norway. The Michoud and Norwegian teams are currently defining the engineering requirements. Once these are complete, the design effort will begin.

"This program gives the Norwegians experience in Hybrid propulsion technology and allows us to flight test several refinements to our design," Arves said.

Lockheed Martin and Nammo Raufoss are currently exploring additional offset programs that could result in a two-stage vehicle being developed.

Gnau also sees the project as a win-win situation. "We're using our technology to support another Lockheed Martin business unit's sale, and in turn gain a foreign partner for an international program. It's a good story." ■

Lockheed Martin gives grant to study microcracking
Dennis Deel, president of Michoud Operations, presents a $50,000 Lockheed Martin university grant to Greg O'Brien, chancellor of the University of New Orleans, to develop a model to predict composite microcracking in laminates. UNO's Mechanical Engineering department will subject various laminates to a range of loads to induce microcracking. Understanding and predicting microcracking will improve future composite designs and performance.

Michoud Preparing for ISO Audit

British Standards Institution auditors will visit Michoud, Huntsville Technical Operations and Kennedy Space Center Operations the week of August 25 to evaluate processes and systems for possible upgrade to the ISO 9001:2000 standard.

The higher standard focuses on continual improvement and customer satisfaction. The final phase of the four-part upgrade includes a "Resource Management" element that spotlights Human Resources, Infrastructure and Work Environment. ■

Milestones

Employees celebrating anniversaries with Lockheed Martin in July and August

25 years
Russell Arthur
Bernard Caruso
Rudolph Casimier
Walter Chin
Donald Clark
Howard Cornett
Chester Crook
Deborah Dauth
John Ellis
Ricky Hinson
Cheryl Iwanczyk
Ernest Jarreau
Leo Jarrell
Joseph Johnson
Mark Kirincich
John Labanosky
Gerard Logreco
Shannon Maheia
Lance Mercier
David Navo
Maxson Roche
Barry Rousseve
Molen Ursin
Michael Van Peski
Richard Walker
Tony Winn
Alfred Young

20 years
David Anderson
Richard Augustin
Floyd Bromwell
John Broussard
Belinda Chaplain
Byron Craddock
Dewey Crosby
Eddie Davis
Rodney Dominique
Karen Goga
Henry Hall
Simmie Herrin
Donna Hutson
Rodney Johnson
Rebecca Jordan
Donna Knezevich
Kyle Lynch
Kenneth Mayfield
Carol McCall
Michael McGehee
Yolanda Miller
Kevin Montelepre
Christopher Nicoll
Berry Patterson
Henry Phillips
Earl Pratz
Edward Saglibene
Gary Sharp
George Tassin
Harold Thomas
William Torres
Terrance Vallelungo
William Walsten
Myrtle Wheeler
Johnny Woods
Raymond Zibilich

15 years
Danny Huffman
Lynda Morris
Rhonda Smitherman-Hickman
Lisa Thonn

10 years
Mark Heinsz

5 years
Todd Bologna
Jeffery Garth
Glenn Lapeyronnie
Karen Laurant
Laurie Surla
Teddy Wilburn

Diversity Council spreads message to kids

Kevin Pierre (left), Production Operations, and Mike Sullivan, Safety & Product Assurance, talk with summer campers at the University of New Orleans' *Space Quest* about the importance of utilizing the full potential of each member of diverse teams to reach a common goal. Pierre and Sullivan are members of Michoud's Diversity Council, which has started bringing the diversity message to younger audiences. Michoud Operations has sponsored *Space Quest* the past 13 years.

Emergency Information

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

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