Space Systems Company – Michoud Operations

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Mission Success Bulletin

August 24, 2006

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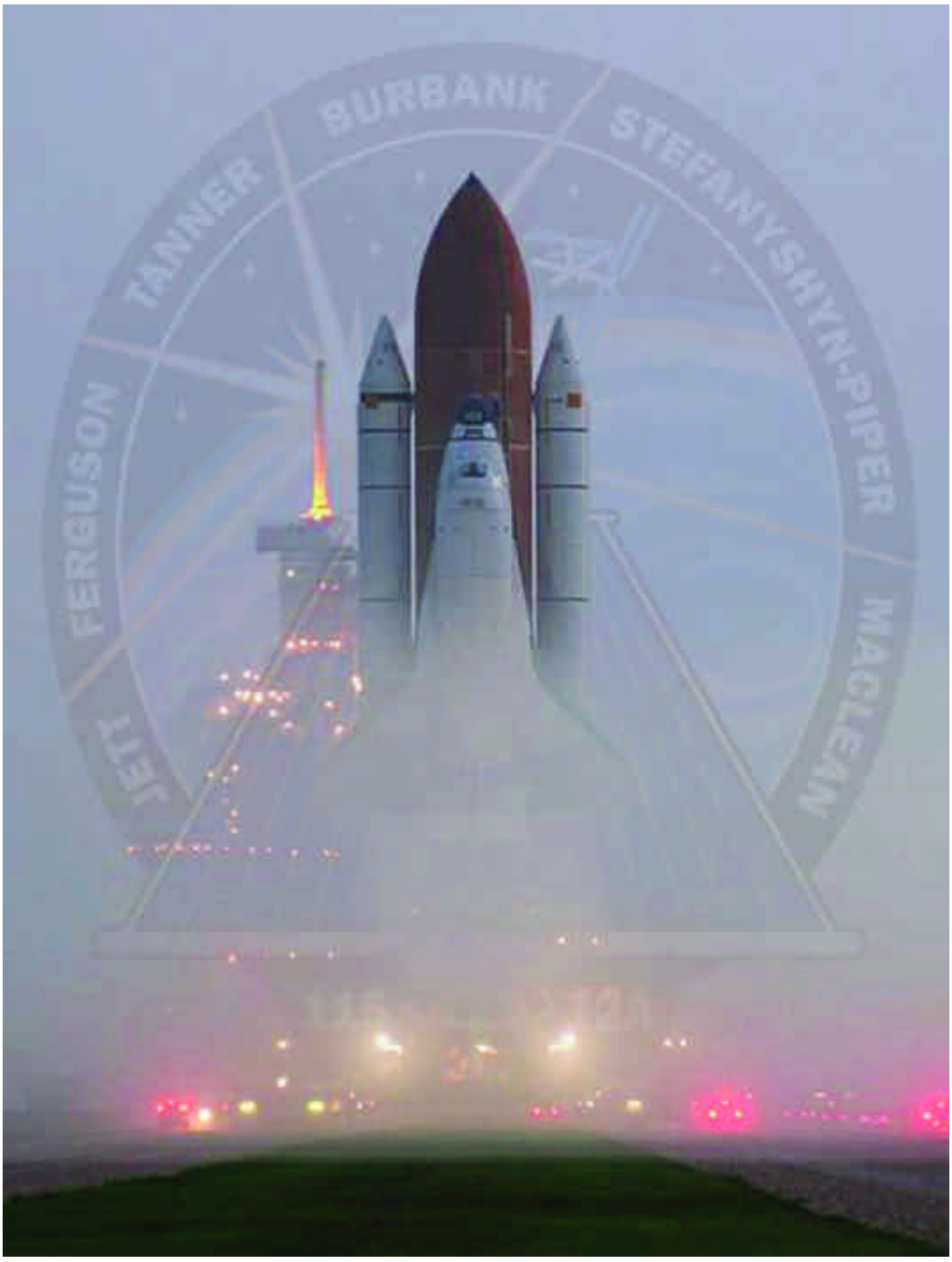


Atlantis ***and ET-118 approach the launch pad at Kennedy Space Center on rollout day, August 2.***

Attention turns to ET-123

With *Atlantis* and ET-118 securely on the pad awaiting Sunday's 3:30 p.m. CDT launch, the focus at Michoud also includes finishing the work on ET-123, the launch on-need tank.

"We're working hard, trying to recover ET-123's schedule," according to **Wanda Sigur**, ET Project vice president.

She says ET-123 remains four days down to schedule. But a whirlwind of activity surrounds the tank now as employees work hard to make up ground. Technicians are performing foam sprays on the tank each day.

"We're working on longeron, bipod, bellows drip lips, camera wiring, general wiring, shakedown, and Discrepancy Check and Review items," Sigur explains. "Things are moving along," she says, noting that the L-2 review, "which establishes our readiness for launch, is Friday, August 25."

ET-123's scheduled delivery date is September 3 with a ship date to Kennedy Space Center on September 5. The tank is scheduled to propel the STS-116 crew into space and toward the International Space Station no earlier than December 14. ■

Factory resuming External Tank production

External Tank weld operations are heating up following a lull caused by a production slow-down after the *Columbia* accident and the impact of Hurricane Katrina.

Earlier this year technicians began regaining tool qualifications and welding certifications that had expired. Then each tool went through a Katrina-related maintenance and operational test.

"The department now is ramping up in terms of people resources," says **James Moffett**, senior manager, Weld Operations. "Some employees have retired, some have transferred to other departments and others have left the company."

With the help of Human Resources-sponsored job fairs, Moffett is hiring supervisors and welders. "We're building strength."

In Weld Sub-Assembly (WSA) I where Michoud builds the Liquid Oxygen (LO2) Tank dome and the Liquid Hydrogen (LH2) Tank forward and aft domes, all tools are now up and running. Technicians currently are building domes for ET-135 and ET-136.

In WSA II, Moffett reports that the department is still in the process of certifying the forward and aft ogive tools. Certification panels have been submitted for test.

In the Friction Stir Welding (FSW) area of WSA II, Michoud welds the four LH2 barrels and the single LO2 barrel. One of the two FSW tools is certified to build all barrel configurations; the other is about half-way there. On the certified tool, technicians are working on ET-134 barrels. Moffett wants to get to the point where both tools are multi-functional.

Looking down the production line, Moffett describes major weld or WSA 3 as "fully functional." Here, technicians guide the giant tools as they perform circumferential welds, giving the LO2 and LH2 tanks shape for ET-132 and ET-133.

"This is where we take large barrel sub-assemblies or domes and weld them together," Moffett explains.

Rotational tools used during x-ray and dye-penetrant operations are also on-line to find weld defects of any kind in WSA III.

"We're putting people back to work, and that's a good feeling," Moffett observes. "We've assembled a strong Build Process Team, and we're making changes and improving some of our processes. And that's a good thing too." ■

Technician monitors weld on dome tool.

Michoud welders strike the first arc since the Columbia ***accident on a dome tool in the factory back on March 18, 2005, before Hurricane Katrina.***

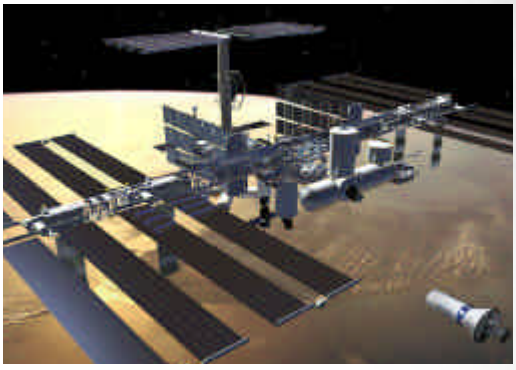
Michoud has direct ties to one of COTS winners

Lockheed Martin pivotal member of Rocketplane Kistler team

Bob Simms paced the hall, waiting nervously for the NASA announcement this past week about which companies would win the Commercial Orbital Transportation Services (COTS) contract.

Then NASA announced the two winners – Rocketplane Kistler (RpK) and SpaceX – and Simms, the director of Program Management & Advanced Programs, beamed. Michoud Operations is an important member of RpK's team.

"Great news – I'm glad for the opportunity to finish the K-1 program and help RpK meet their demonstration goals," he said.



Now each company will build a vehicle to demonstrate its capability to service the International Space Station with cargo, and perhaps crew, after the shuttle program ends in 2010.

Lockheed Martin started work on RpK's K-1 vehicle in 1997 and partially completed the first shipset of hardware. Funding limitations put the program on hold until now.

Michoud will build and assemble the vehicle's propellant tanks and perform final assembly and integration activities for the two-stage rocket. Simms, also the K-1 program manager since its inception, says the program will begin in early September.

"We'll plan our activities, understand what work we've done previously, check the status of the hardware (still on site), look at any engineering issues and finalize the follow-on activities."

Simms said he would expect to begin building hardware very early in the program in order to be ready for a demonstration flight in 2008. He anticipates a small group of employees to be involved with initial activities, and that others will be added as the program ramps up.

"Lockheed Martin has an unparalleled workforce at Michoud, and we are very pleased to have them undertaking K-1 fabrication, assembly and integration," said **Randy Brinkley**, RpK's president. "Applying their experience with large space systems to the K-1 will ensure the on-schedule demonstration of RpK's ISS servicing capability."

Simms will meet with Rocketplane Kistler and its other subcontractors next week to finalize start-up activities. Orbital Science Corporation, another member of the team, recently announced that it will serve as the primary industrial partner for RpK and will oversee final development, integration, testing and launch of the K-1 vehicle.

Simms said the K-1 vehicle will be launched from Woomera, Australia, and that the completed stages will most likely be barged from Michoud to a nearby airfield for delivery to Australia. ■

MS&TC transition almost done; satellite work abounds

Densmore named new site director

The transition of 95 employees at Lockheed Martin's Mississippi Space & Technology Center (MS&TC) at Stennis Space Center to Michoud Operations is almost complete.

Thirty-five employees transitioned to Michoud in December 2005, and the remaining number will complete transition by the end of this month.

The 95 are part of the 250-person Lockheed Martin workforce at the center, which includes 21 other Space Systems Company employees working on MS&TC programs. The remaining employees will continue to report to their respective Lockheed Martin lines of business such as LM Technical Operations, LM Space Operations, and LM Corporate Properties, Inc.

"We anticipate the transition will be complete by the end of August," explains **Larry Knauer**, director, Small Launch Vehicles Integration. "All of the personnel actions are in place, and the facility and capital actions are also in place."

The center's business focuses on satellite propulsion subsystem integration and thermal blankets for spacecraft. Knauer believes the transition will lower costs to satellite customers and create career paths and opportunities for employees at both Stennis and Michoud.

Densmore

"We've identified a pool of 16 technicians who will work at both sites – back and forth across the lake to support production activities at MS&TC at Stennis and also lab activities and other functions at Michoud."

The space and technology facility also has a new site director in **Laryssa Densmore**, most recently from Space Systems in Denver, whose expertise is in satellites and rockets.

A mechanical engineer with 23 years of experience, Densmore has worked in the satellite, spacecraft design and rocket field, and served stints at both Vandenberg AFB and Cape Canaveral AFB in spacecraft integration. She joined Lockheed Martin in 1995 accepting a position as launch operations manager supporting the Proton Rocket program in Baikonur, Kazakhstan where she oversaw ground operations and launch of the first American satellite on a Russian rocket.

Conceptual image of a Lockheed Martin satellite

"I learned a lot about cultural diversity in dealing with other entities – the Kazaks, the Swedish and working with the Russians on a daily basis," Densmore recounts. "It taught me a lot about contingency planning and negotiation skills."

She used those skills following her three-year Russian assignment by heading up Production Engineering in Denver, becoming deputy director of Welding Operations and Final Assembly for Atlas II, III & V rocket lines, and supporting the Boost Vehicle and Targets organization as program manager for Russian long-range target acquisition.

Currently, employees at MS&TC are busy working on five satellites. The schedule for each is 15 weeks to install the propulsion systems and complete thermal blanket and assorted work.

"The forecast is at least two military and two commercial spacecraft for next year," Densmore predicts. "That's pretty much what we're trying to go for as our base. Anything on top of that would be wonderful."

In the future she hopes MS&TC can attract new rocket and missile business. "Propulsion and thermal blankets are our expertise, but we want to open the aperture." ■

Michoud's recovery post-Katrina – a year in review

Nearly a year has passed since Hurricane Katrina inflicted her wrath upon the Michoud Assembly Facility.

Since that time, the facility has rapidly recovered from the initial damage and brunt of the storm. Maintenance work has progressed steadily on buildings and facilities.

Ongoing work is just that – a process of recovery that continues on the eve of Katrina's first anniversary.

"Michoud experienced over $100 million in hurricane damage between hardware and the facilities," according to **Patrick Scheuermann**, NASA chief operating officer at Michoud. "The good news is that it wasn't catastrophic damage so we were in a strong position to recover."

Just four weeks after the storm, a number of Michoud employees returned to perform limited production operations. Michoud had electricity but no water or sanitary sewer service from the city. Then on October 3, ET-119 arrived from Kennedy Space Center. Two weeks later, ET-120 landed. With tanks returning from KSC, there was plenty of retrofitting work to be done. In early October employee numbers grew to 400 on-site with another 200 in Huntsville and smaller groups at Stennis and in Houston.

Scheuermann

ET-120 returns in October from KSC.

Employee numbers continued to increase and by November 1 nearly the entire workforce was back at work.

"We are indebted to the production crew who came back on-site so quickly," adds Scheuermann. "That demonstrated to NASA that Michoud could do the repairs quickly. It was important to prove that to the shuttle program, and it meant a lot to the workforce."

Production Operations Director **Hal Simoneaux** backs up Scheuermann's statement. "It was crucial to all of us to keep the tank work here at Michoud, where it belongs. The effort put forth by the people able to get to Michoud after the storm and those assigned to remote sites was amazing."

According to Scheuermann, employees returned highly motivated – the recovery team, the production teams and the Transportation & Handling team that accomplished 15 tank moves in September and early October to keep the tanks safe from damage. "What that team did was an incredible feat," Scheuermann says.

Transportation & Handling Senior Manager **Lonnie Harness** agrees. "We got a hold of the crew members after the storm. A whole bunch of them had lost their houses, but they knew the criticality of the mission – that the tanks had to be protected so they came in and did their job. I mean what can you say? It was outstanding."

The Transportation & Handling team moved tanks everywhere. One went temporarily into an empty cell in Building 420, another into a factory aisle. Crews moved tanks quickly into Final Assembly for inspection and out again. Building 303 also suffered roof damage so those tanks had to be moved and rearranged. A plan had to be developed to remove ET-122 from Cell A. ET-119 and ET-120 arrived from KSC. A place was found for them.

Amidst all the tank moves and other emergency work that was going on, Michoud employees worked safely side by side. Safety & Product Assurance Director **Paula Hartley** says this is when safety training really pays off.

"In this emergency environment our employees demonstrated they could work safely and follow proper procedures. People were super focused – everyone very aware of what had to be done to keep the plant viable. Even with all the stress from flooded and damaged homes, our employees worked professionally and safely without any loss-time accidents. This was a real credit to our workforce in that time of duress."

Today, repair work to building roofs is progressing well, according to **Malcolm Wood**, senior manager, Critical Operations & Maintenance. Since Katrina, maintenance crews have made repairs to all Michoud buildings, including the pumps in the boiler house.

"Our overall goal is to make Michoud as safe and self-sufficient as possible

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Recovery

Continued from Page 5

during any upcoming storm," says Wood. "We not only dug our own well for water, but we have the new Incident Command Center (see story below) on site so that we are now mobilized, and our facilities can remain on-line in the event of an emergency."

Reconstruction included repairs to Buildings 451, 420, and 103. The following is a list of ongoing repair and facility work:

- Building 450 – temporarily hardened pumphouse; cages installed to protect pumps and cooling system; engines automated so Ride-Out Crew can remotely control them from Incident Command Center
- Building 320 – new Incident Command Center; also satellite dish farm adjacent to building undergoing repairs
- Building 303 – repairs to roof nearing completion
- Buildings 101 and 102 – repairs underway on office complex interior after extensive roof damage; also conducting permanent repairs to building interiors
- Building 485 – starting process of repairing barge dock facility in conjunction with U.S. Coast Guard move
- U.S. Coast Guard Command – work nearly complete on interim modular facility on 16½-acre site near Mercury Drive and Saturn Blvd. intersection

Michoud's levee system also sustained considerable damage from Hurricane Katrina. Over the year, the U.S. Army Corps of Engineers has overseen the refortification of the flood protection system at Michoud. Repair work has progressed on the earthen levee that supports the concrete 'I' wall. Scheuermann reports work is nearly complete on short-term repairs with sheet pilings that help shore up the base. The goal is to rebuild the levees five feet higher by 2010, the height of the original levees pre-Katrina.

Boh Brothers shores up Michoud levees.

Bright spots have emerged since Katrina. The Coast Guard's Integrated Support Command will soon call Michoud home. And the facility now hosts FEMA's transportation center, accounting for nearly 300 vehicles.

No one will ever forget the past year. After the storm, Michoud employees banded together to produce in extraordinary circumstances. The successful STS-121 mission that began on July 4 became a resounding testament to Michoud's work ethic, both now and for the future. ■

New Incident Command Center ready for use

To kick off this year's hurricane season, NASA and Lockheed Martin opened Michoud's new Incident Command Center (ICC) on the second floor of Building 320.

The new center replaces the Emergency Operating Center (EOC), which during the weeks following Hurricane Katrina proved challenging in supporting the long-term recovery at Michoud.

"The demand for information was overwhelming," remembers **Steve Turner**, Michoud incident commander and a member of the Ride-Out Crew. "Requests were coming in around-the-clock and the EOC became very busy and very noisy. For many of us we never left that room for days, and that became a challenge."

As a result, Facilities & Environmental Operations constructed a new ICC in a different area of Bldg 320 and designed the center around the 'lessons learned' from Katrina. The focus was on improving equipment, increasing protection of the center and providing better working conditions for occupants.

The 1,700-square-foot area of the new center is double that of the old EOC, and includes a spacious and well-equipped command center, isolated radio room, conference room and four satellite offices.

Steve Turner makes presentation in new ICC.

The primary tools - radios, telephones, computer network connections, weather test and measurement instruments and media channels – that the ride-out crew relied on during Katrina have all been upgraded with state-of-the-art emergency equipment.

To ensure that all of the equipment and facilities remain on-line during an emergency, back-up power systems have also been upgraded to provide more reliable power.

In addition, a remote control system to operate and monitor the drainage pumps has been installed to safeguard the operators who would ordinarily man the pump house during the early stages of a hurricane or tropical storm.

Turner commented that plans were in place to safeguard the facility and for Michoud's recovery, but no plans were in place to address the flooding around Michoud and resulting isolation of the plant after Katrina.

The ICC is now capable of coordinating the efforts of multiple agencies including the U.S. Dept. of Agriculture/National Finance Center and the Defense Contract Management Agency in the event of an emergency.

Long-term emergency events, whether manmade or natural, can happen at any time. "To that end, the ICC is ready to protect the facility and the dedicated employees who work here", Turner said. ■

Milestones *Employees celebrating anniversaries with Lockheed Martin in September 2006*

30 Years
Danny Lapeyrouse
Richard Nelson
Otis Welsh
Rickie Zerkus

25 Years
Pamela Anderson-Behrens
Ginger Ben
James Bullington
Keith Campo
Michael Fields
Timothy Flannery
Mikel Lero
Timothy Livingston
Herman Lockhart
Manuel Martinez
Charles McElroy
John Nuccio
Genetta Price
Doris Revere
William Schneider
Karen Surbeck
William Whittington
Richard Wust

20 Years
Kathy Eaton
Charles Huff
August Mangiaracina
Leslie Pontillas
William Winsor

10 Years
Dennis Bales
John Giveans
Richard Hibbs
Dion Lee

5 Years
Cassandra Allen
Michael LeBlanc
Myron Mitchell
Vivian Norris
Gil Roberts

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Volume 25, No. 13 • August 24, 2006

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Mission Success Bulletin is published by the Communications Department.