Space Systems Company – Michoud Operations

LOCKHEED MARTIN

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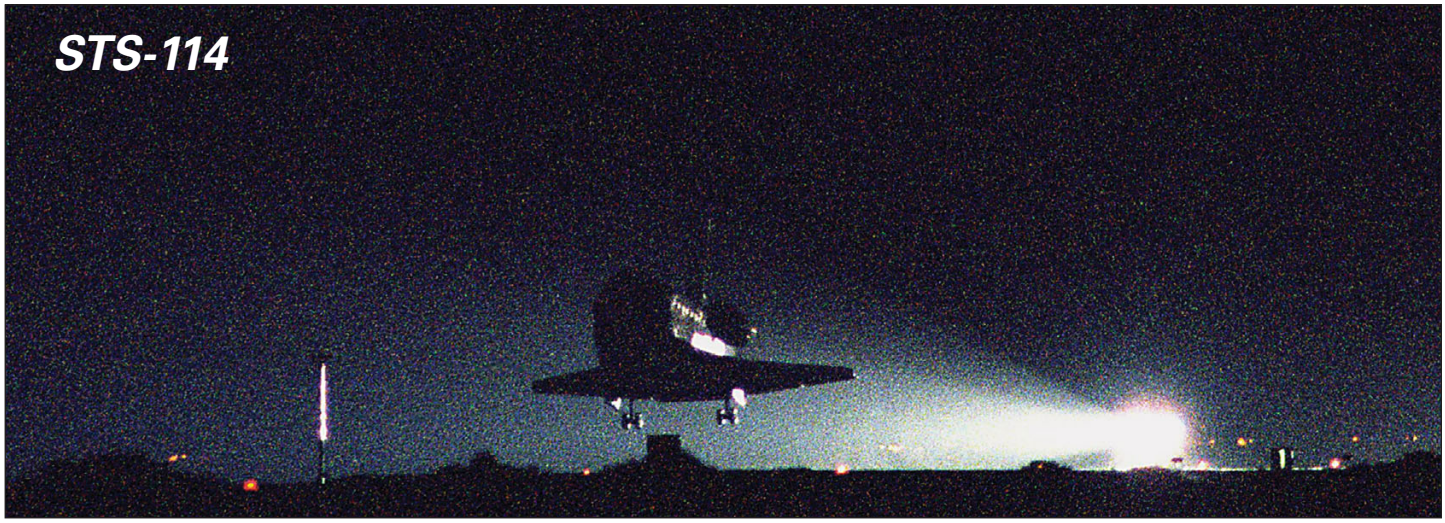
Mission Success Bulletin

August 29, 2005

Volume 24, No. 6

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



Discovery **prepares to touch down at Edwards Air Force Base in California at 5:11 a.m. on August 9 after completing a successful 13-plus day Return to Flight mission to the International Space Station.**

Successful mission ends - challenges continue

Even as Space Shuttle *Discovery* safely touched down before dawn August 9 at Edwards Air Force Base, teams at Michoud had already formed to explore the reason for unexpected foam loss on some areas of the External Tank.

Despite the handful of losses, the ET project had much to be proud of.

In a General Assembly a week after liftoff, Return to Flight Manager **Ron Wetmore** praised employees, listing everything that had gone right on STS-114 from an ET retrofit standpoint.

- No foam loss from re-applied 10 feet of PAL ramp
- An essentially clean LH2/Intertank flange
- An instrumentation package that provided important data about PAL ramp environments
- No ice on bipod heater
- No ice on forward Liquid Oxygen feedline bellows heater and minimal frost build-up on drip lip
- No foam loss on longeron closeout
- 80 percent performance improvement in Orbiter impacts

Wetmore also noted five areas where foam came off the tank: the Liquid Hydrogen Protuberance Airloads (PAL) ramp, left bipod area, ice frost ramps, flange area and acreage foam. In response to these losses, NASA and Lockheed Martin have organized teams to study each area (see box, page 2).

In subsequent news briefings, NASA Administrator **Michael Griffin** remained impressed with overall foam performance. "This was the first try that the tank team, the shuttle team, the NASA team ever really made to reduce the foam shedding to a minimum and acceptable level. I think they did pretty darn well for the first try, and that's how I'd like people to view it."

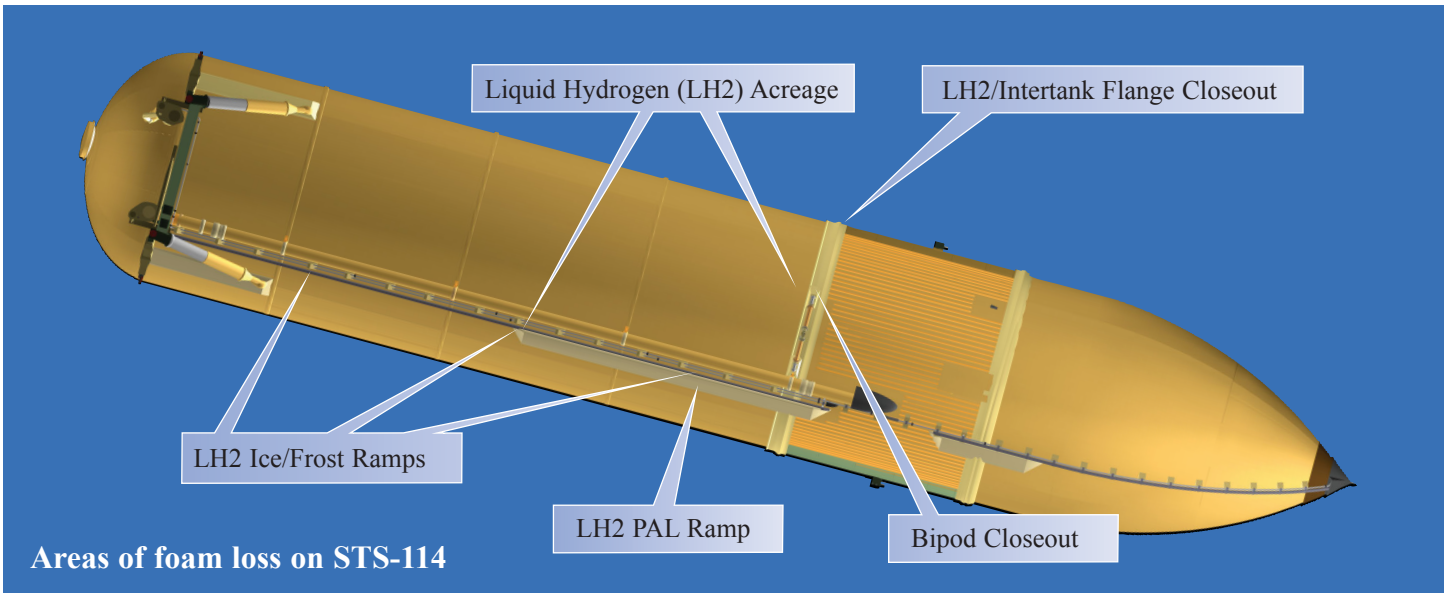
Likewise, **Bill Gerstenmaier**, associate administrator of Space Operations who is overseeing the foam investigation, called it a "pretty phenomenal job." Of 4,192 pounds of foam applied to the ET, only 1.9 pounds are in question.

Each team is making progress, Gerstenmaier said, "We're starting to make some sense of data and understand where things are coming together, how the mechanism for the foam loss was."

On the PAL ramp, Gerstenmaier said the ramp on the next tank (ET-119) will be removed and a new one installed. As part of the process, the team will perform Non-Destructive Evaluation and then dissect the ramp to gather more information.

"Before we pick a particular repair technique, we're going to understand every bit of data that we can get out of

Continued on Page 2



Areas of foam loss on STS-114

STS -114

Continued from Page 1

existing tanks," he said.

The five teams at Michoud report to an Integration Management Team headed by NASA's **Dr. Corky Clinton**.

Paula Hartley, the independent Lockheed Martin lead, explained that the teams are going through a rigorous fault tree process and hope to have all the blocks closed by the end of September. Major testing will follow.

"Each of the teams is identifying test programs to ensure they have resolved all the issues associated with foam loss," Hartley said.

Independent representatives from other NASA and Lockheed Martin sites have brought fresh eyes to the problem solving, she noted.

"Everyone has the same goal: find the root cause, get it fixed, get it demonstrated, get it on the tank and start flying again.

"The NASA teams have said that our foam technicians are extraordinary because it is not an easy job to do. This is not a people issue. This is a 'fix the process' issue." ■

Investigation teams, leads, areas of study

PAL Ramp
- NASA lead - Charlie Harris
- LM lead - Kevin Montelepre

Large piece of foam off LH2 PAL ramp at third ice frost ramp

Bipod Closeout
- NASA lead - David Wood
- LM lead - Matt Wallo

Small divot in upper left corner of -Y bipod, closeout

LH2 Ice Frost Ramp
- NASA lead - Mike Tinker
- LM lead - Ben Ferrell

Minor foam loss on three ramps

LH2/Intertank Flange
- NASA lead - Jay Sambamurthi
- LM lead - Eugene Sweet

Two losses (within requirement) on -Y thrust panel in upper closeout area

LH2 Acreage
- NASA lead - Mindy Niedermeyer
- LM lead - Chris Bourgeois

One loss below -Y bipod at site of PDL repair; second adjacent to ice frost ramp

NASA Deputy Shuttle Manager Wayne Hale (standing second from right) makes a point during a discussion with employees about the STS-114 mission and the foam investigation.

Parsons, Hale encourage teams in recent visit to MAF

NASA Shuttle Program Manager **Bill Parsons** and Deputy Program Manager **Wayne Hale** visited Michoud August 17 to talk individually with the teams investigating the foam loss.

During a question and answer session with the PAL Ramp team, Parsons said, "There's a lot of good work that went on here," referring to the ET Return to Flight effort. "We've got to keep building on that.

"I think we did a pretty good job of fixing failure modes on foam. Now we've got another failure mode. And we may have another one in the future. We will always fly with some risk."

Hale told the team that "we've got to make this right. It's more important to do it right than to do it fast.

"It's important for this country to go forward in space. It's important for us to fly the shuttle. The space station when we (STS-114) left was like a brand new space station. That mission was so important. A Soyuz just can not do what the shuttle can." ■

Return to Flight Expo Scrapbook

August 6, 2005

Michael Holt, Program Management & Technical Operations (PM&TO), explains how the Fiber Placement Machine works in the National Center for Advanced Manufacturing.

Dennis Silbernagel, Production Operations, shows his family how the ET production line is laid out in the Model Room.

The Return to Flight Expo on Saturday, August 6 was a wonderful time to show Michoud's families about the efforts and achievements behind returning the Space Shuttle to safe flight.

As it happened, *Discovery* and her crew undocked from the International Space Station and started preparing for their trip back to Earth on the day of the Expo.

Approximately 5,000 employees and family members attended the Expo. ■

Rebecca Gambino, PM&TO, lifts 2-yr.-old Melanie up to see the moon rock.

Jessica Jacques, Production Operations, discusses her role as a foam technician at the Thermal Protection Systems Spray Equipment and Demo booth.

Scott Morales, PM&TO, shows off a foam sample to his curious audience. Morales was assisted by Frank Duncan (left of Morales), Safety & Product Assurance, who discussed cryogenic materials, and Chuck Williams (far right), who demonstrated how foam works.

United Way

Michoud Operations' Campaign

August 29 – September 16, 2005

It takes more than good intentions to build a better community.

Among other things, it takes strong, committed families; it takes children prepared to succeed in school; it takes healthy lifestyle choices for young and old; and it takes a reliable safety net for families or individuals faced with the unexpected - or the unimaginable.

Building a greater New Orleans takes many things; the United Way contributes to most of them.

The United Way is a community-based, community-run organization that provides local solutions to local problems by assisting people and non-profit agencies in our area. In the past year alone, United Way for the Greater New Orleans Area has distributed almost $11 million to 61 nonprofit agencies, impacting 700,000 people - or about one-half the population in Orleans, Jefferson, St. Bernard and St. Tammany parishes.

By contributing to the 2005 Michoud Operations United Way campaign, you will help the United Way fund over 133 programs that impact local families every day. Whether the need is for shelter following fire or floods; pre-school programs for our youngest citizens; or basic assistance for the physically-challenged, United Way-funded programs help build a better New Orleans.

Do your share to build a greater New Orleans. Donate generously during the 2005 Michoud Operations campaign, from August 29 through September 16. ■

Lockheed Martin employees may have lost the Tug of War at the special night for volunteers at Zephyrs stadium, but they always win by pulling together for United Way. Pictured from left are Pat Shea, Tom Davis, Hal Simoneaux, Marshall Byrd, Nahlon Vogt and Cory Schnard.

United Way Campaign Incentives

Incentive Awards	Qualifications
(10) $500 Cash Prizes (before taxes) *To be awarded August 2006*	2005-06 Sustaining Michoud UW contributor, $4/week minimum; VPs/Directors not eligible
Minimum Three-night Cruise for Two Departing N.O. *To be awarded August 2006*	2005-06 Sustaining Michoud UW contributor, $500 or more annual contribution
2005 Honda *(Courtesy Royal Honda)*	2005-06 Supportive Level contributors in the Greater New Orleans area
$500 in Gasoline *(Courtesy Spur Gasoline / Murphy Oil USA)*	2005-06 Supportive Level contributors in the Greater New Orleans area
Five-day Penthouse Cruise for Two on the Carnival Fun Ship *(Courtesy Carnival Cruise Lines)*	2005-06 UW contributors of $1,000 or more in the Greater New Orleans area
Two-night Stay/Oasis Spa and Resort/ Grand Casino, Gulfport, MS.	2005-06 Supportive Level contributors in the Greater New Orleans area

Hartley named S&PA director

Paula Hartley, a senior manager in Program Management & Technical Operations, has been named director, Safety & Product Assurance. She succeeds **Richard Harris** who was named Crew Exploration Vehicle deputy program manager.

Hartley

Hartley has also been appointed the Lockheed Martin independent lead to the Integration Management Team that is overseeing the five teams that are investigating foam loss from STS-114.

She joined Lockheed Martin in 1985 as a metallurgist supporting the ET program and then served as principal investigator on several advanced metallic materials and processes research programs.

In addition to the Super Lightweight Tank program, she has supported Advanced Launch System and Next Generation Launch Technology programs. Most recently, she assumed the role of Risk Reduction Test Manager for the Falcon Small Launch Vehicle program.

Hartley is widely published and holds two patents on solid state joining technologies. She holds a Metallurgical Engineering and Materials Science degree from the University of Notre Dame and a master's in business administration from Tulane University. ■

NASA moves forward on CEV

Program crucial to Michoud future

When NASA advanced the timetable for a Crew Exploration Vehicle (CEV) from 2014 to 2011 to fill the gap following the end of the Space Shuttle program, Lockheed Martin was ready.

The CEV team had already included such a plan in its initial bid to build the vehicle earlier this year.

As the next human space flight program beyond the shuttle, the CEV pits two rivals, the Lockheed Martin team versus the Northrop Grumman-Boeing team. The program timeline shows both teams currently under contract as part of Phase 1. This fall NASA will release a Call for Improvements with a list of vehicle requirements. The teams will use the requirements to submit their design proposals in mid-December. Then NASA will announce the winning CEV team in March/April 2006. Phase 2 will begin at that time and run through 2011.

What are Lockheed Martin's chances of winning the CEV competition, valued between $3 and $5 billion?

"Excellent," says **Cleon Lacefield**, CEV program manager from Denver.

"This competition will determine for the next generation what crewed system is going to be in the U.S. inventory," says Lacefield. "And we can either be on that team or not.

"We have a long standing relationship with NASA; we want to enhance that relationship and show them that we are the team to work with for the next generation, because this vehicle will be around for a long time."

Initially, the CEV would fly as many as one-half dozen missions each year to the space station with a crew of four or six, Lacefield explains. After each trip, it will be necessary to refurbish the vehicle and reapply the Thermal Protection System. Each vehicle would fly six to eight missions so the program would be in continuous production.

> ***"We have a long standing relationship with NASA; we want to enhance that relationship and show them that we are the team to work with for the next generation, because this vehicle will be around for a long time."***
>
> *– Cleon Lacefield, CEV Program Manager*

If Lockheed Martin wins the CEV down-select next year, Michoud's role would be to build the CEV structure and sub-assembly.

"We must submit a compelling proposal with the right amount of risk and the right cost value," says **Richard Harris**, CEV program deputy. "Those who understand the requirements and propose to write solutions that are cost effective will come out ahead."

Lockheed Martin will use Lean 21 initiatives and strategies to reach the best cost solution, Harris says. He points to Michoud's status as a government-owned, company-operated (GOCO) facility and how that contributes to a low-cost program.

"It also helps to have a workforce that is used to dealing with NASA and human space flight," adds Lacefield.

NASA anticipates demonstration and certification flights by 2009-2010. A demo might be an on-pad abort exercise because the CEV is expected to have full-abort capability throughout the mission. Flights to the Moon and beyond will come later in the program.

"The CEV will be a more operative, affordable crew vehicle than shuttle," Harris says. One way to do that is to design a system with no landing gear and no need for runways and infrastructure. Harris says the CEV will use parachutes, drogue chutes and airbags for landing.

The CEV is part of a larger architectural study for space exploration. When NASA releases its requirements from the study, Lacefield believes it will show the CEV launching atop a Shuttle Derived Vehicle.

"NASA's preferences are to go with an existing NASA system or Shuttle Derived system because that's what they have the greatest confidence in," Lacefield says.

"We're excited to work through a transition of the existing workforce to this new project and for that to be the future of Lockheed Martin in human spaceflight." ■

For more information on NASA's Vision for Space Exploration, go to: *http://www.nasa.gov/missions/solarsystem/explore_main.html*

Diversity Maturity Survey in work

The second Diversity Maturity Survey is scheduled August 29 – September 16 and will canvass more than 50,000 Lockheed Martin employees at all sites. The survey helps indicate the corporation's level of diversity maturity

A random sample of employees will receive an e-mail inviting them to participate. Another group of employees who do not have e-mail access will receive instructions at their home about how to participate on-line.

The Diversity Maturity Model (DMM) tracks the progress Lockheed Martin is making in being more inclusive. The rating is based on a self-assessment performed by the business units, the survey and data that incorporate demographic information relating to diversity.

Last year the corporation as a whole received a DMM assessment of 2.0 or Enlightened on a scale of 1-5 that included 1) Foundational, 3) Embraced, 4) Integrated, and 5) Institutionalized Inclusion. The corporation identified three key areas: employee retention, customer focus and a productive and innovative work climate.

Lockheed Martin's goal this year is a 2.5 DMM rating. Participation is voluntary and responses confidential. ■

Milestones

Employees celebrating anniversaries with Lockheed Martin in September 2005

25 years.
Barney Brumfield
Ferdinand Delery
Paul Dillon
Jerry Dominick
Julie Flower
Karen Gares
Mark Goerlitz
Ameen Sarkees
Lionel Smooth
Roy Thomas
Gene Traylor

20 years
Andrew Booth
James Brooks
Chris Clutter
Daniel Galbraith
Glen Gilmore
Vern Greene
Melanie Jennings
Susan Jones
Troy Ohlsen
Antonio Otero
Kim Owens
Paul Pareti
Debra Pierce
Karen Poy
Gerard Roulé
Scott Sanfilippo
Richard Venable
Nathaniel Williams

15 years
Theresa Dowdy

5 years
John Dragash

Ethics Corner

Last fall, Ethics focus groups were formed at Michoud to discuss key issues that surfaced during the latest company-wide Ethics Survey. The issues discussed included 1) employee retaliation, 2) no action taken regarding unethical conduct and 3) breach of employee confidentiality.

These groups, derived from all disciplines across Michoud Operations, provided valuable insight as to why these issues persist, complete with recommendations for resolution. The results of these focus groups were compiled, and an action plan developed specific to those issues.

As part of the action plan, one of the focus groups recommended developing a training awareness curriculum for individuals who have access to confidential employee information.

This curriculum will touch on how to treat and handle confidential information, complete with corporate policy, and the consequences of mis-handling the information. The classes are scheduled over the next two weeks for employees who have access to employee information that would be considered confidential.

As a note, the biannual corporate-wide Ethics Survey will be conducted this fall. ■

Mission Success
Bulletin

Lockheed Martin Space Systems Company
Michoud Operations, Volume 24, Number 6
August 29, 2005

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Mission Success Bulletin is published by the Communications Department.

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