LOCKHEED MARTIN MICHOUD SPACE SYSTEMS

MISSION SUCCESS® BULLETIN

November 29, 1999

X-33 Liquid Hydrogen Tank damaged in test

A team from Michoud Space Systems continues working with Lockheed Martin Skunk Works in the wake of damage to the X-33 composite liquid hydrogen tank.

The damage was discovered on November 3, following completion of the fifth in a series of test cycles on the composite tank at the Marshall Space Flight Center.

Earlier that day, the tank had passed a pressure test with a full load of liquid hydrogen, as well as a structural test simulating the force of the fully-loaded, Michoud-built X-33 liquid oxygen tank sitting atop the hydrogen tank.

After the tests were completed and the tank drained, an engineer viewing television monitors of the tank observed exposed core material on one lobe skin along the longeron – a structural element of the tank to which the lobe skins are bonded.

Bob Goetz, senior advisor and former vice president of engineering at the Skunk Works and **Bob Ryan**, retired deputy director of the Marshall Structures and Dynamics Laboratory, will lead the investigative team to analyze test data and determine the probable cause. Findings are expected in four to six weeks.

Alliant TechSystems and the Skunk Works fabricated components for the composite liquid hydrogen tank. A joint Lockheed Martin-Alliant team working in Sunnyvale, CA completed the assembly.

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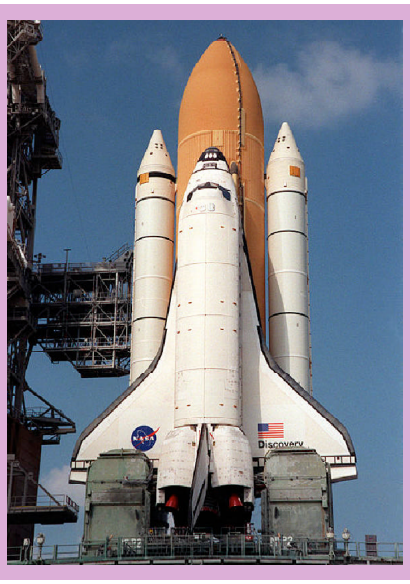
Michoud's push for ISO 9001 Certification succeeds

Dennis Deel, (left), President, Michoud Space Systems, joins Feltus Kennedy, ISO senior management representative, in showing off the company's new ISO 9001 Certificate of Registration. Deel congratulated all employees for their part in achieving ISO certification. "It's an outstanding accomplishment, which reflects our employees' commitment to Mission Success in everything we do." Michoud received the ISO certification after undergoing a four-day audit by the British Standards Institution.



STS-103

Target launch date: **December 9**

(Note: Launch date is under review at press time.)

Target launch time: **1:10 a.m. EST**

External Tank: **ET-101**
Orbiter: **Discovery**

Mission numbers: **Shuttle flight number 96; 1999 mission number 3; Discovery flight number 27**

Primary payload/mission: **Hubble Space Telescope Servicing Mission**

DuPont experts assess MAF safety program

Two representatives of DuPont Safety Resources, a safety consulting company, carried out an in-depth assessment of Michoud Space Systems' safety program during a week-long visit to Michoud Assembly Facility in early November.

"Recent audits of our safety programs had good things to say about our safety program," said **Steve Turner**, Michoud's Safety Manager. "The audits concluded that we have an outstanding program, clearly one of the best, if not the best, in NASA.

"The success of MAF's safety program is directly attributable to our employees," he said. "Their contributions are the backbone of the safety program.

"However, we need to keep pushing for improvement in our safety performance," Turner asserted. "DuPont Safety Resources is a well-respected safety consulting firm that has been used by a number of NASA centers. We hope that they will provide us with a fresh look at our overall program — what we are doing right, but most importantly, what we need to do better or differently."

The two DuPont representatives, **Evelyn Williams** and **Ben Waide,** have extensive experience in the safety management of large-scale industrial facilities. Their basic activities at MAF were to evaluate Michoud's current capabilities and resources for safety management, perform one-on-one interviews with approximately 10 percent of the workforce and provide guidance on opportunities for improvement.

Beatrice St. Amant, Production Operations (right). explains procedures she uses in assembling Intertank ring frames to DuPont representatives Ben Waide and Evelyn Williams.

During the week, Williams and Waide interviewed NASA Michoud Manager **John White**; conducted field audit training sessions; attended the Facilities Safety Monitor meeting; conducted many hours of field audits on two shifts speaking with and/or observing hundreds of employees at work; evaluated the MAF Safety Plan and command media on safety; evaluated a number of accident and incident files; and reviewed randomly selected supervisor checklists, safety training packages and safety inspection reports.

At the end of the week the two briefed executive management on their findings. The DuPont consultants agreed with the earlier safety audit results, and felt that the strong emphasis on safety training, organizations and communication were among Michoud's strengths.

"The key idea that DuPont left us with is that for MAF to improve in our performance, we have to develop an attitude that says we won't accept any injury or accident," said Turner. "We have to 'walk our talk.' No policy or program changes — simply follow the program. Use the safety department expertise and communicate that zero injuries and incidents are the only acceptable results."

DuPont Safety Resources plans to send a written report to Michoud Space Systems detailing its findings and recommendations in early December.

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X-33 Tank

Michoud Space Systems employees are working with Skunk Works employees in Palmdale, CA to develop recovery plans for the X-33, including the possibility of building metal liquid hydrogen tanks to replace the two composite tanks.

Impact of the damage to the X-33 program is unknown at this time.

The composite LH2 tank, one of two twin-lobed LH2 tanks for the X-33, is shown during installation in the test fixture at MSFC prior to testing.

The many booths at Fall Fest were a big hit with the kids and adults, too.

Volunteer efforts benefit Children's Hospital

Around 300 Michoud Space Systems employee volunteers staffed 21 game booths at the 1999 Fall Fest at Fontainebleau State Park. They succeeded in raising $7,890, funds that were earmarked for Children's Hospital, the object of many fundraising events by Michoud in the past.

A a recent ceremony, **Marion LaNasa**, Director of Public Affairs, presented a check for $10,000 to Roger Gorman, Director of Development for the hospital.

Marion LaNasa (left) presents Roger Gorman with a "big check" for Children's Hospital.

LaNasa commended employees for their hard work in raising the donation for the hospital.

Michoud wins GNOBR award

The Greater New Orleans Business Roundtable has cited Michoud Space Systems for its cost effectiveness and safe implementation during a year-long construction project in Cell E of the Vertical Assembly Building.

Specifically, Michoud and contractor Pala-Interstate dug 50 feet below Cell E to install a new 35-foot tall sump. The $1.8 million project also involved replacing common solution pumps in the cell.

"Michoud won the award because the project never once delayed External Tank assembly," said **Rick Ray**, chief of Facilities Maintenance Engineering. "That was so amazing."

Ray credited the close working relationship with Production Operations as being integral to the project. The inside and outside of liquid oxygen tanks and the inside of liquid hydrogen tanks are cleaned in Cell E.

The Greater New Orleans Business Roundtable is a group of industries and contractors who gives the annual award to a company that best demonstrates pre-project planning, value engineering, schedule compression, constructability and safety.

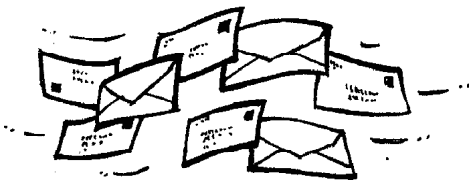
Holiday E-mail greetings may cause network outages

While many people enjoy exchanging greetings with friends and associates during the holiday season, digital greetings — those sent over Lockheed Martin's e-mail system — are strongly discouraged because of their potential impact to the Corporation's network.

"Many holiday e-mails contain special features such as sound or animated graphics that make the message extremely large," said Lockheed Martin Enterprise Information Systems (EIS) President **Joe Cleveland**. "Too many of these large files being sent via LM-Xpress could disrupt the regular delivery of electronic mail — both incoming and outgoing — and create other performance problems."

Cleveland added that there is also the potential for a greeting to be hiding a virus which could severely impact desktop computers and/or the Corporation's e-mail system.

EIS advises all Lockheed Martin employees not to accept or send these electronic greetings. Furthermore, employees should ask their associates both inside and outside the Corporation not to send any e-mail greetings with large attachments.



For further guidance on the proper use of Lockheed Martin assets, including the Lockheed Martin Intranet and e-mail system, please refer to Lockheed Martin Policy CPS-007 at:

http://policy.global.lmco.com/p3/lockmart/index.html#gen

"We ask for your cooperation in keeping the Lockheed Martin e-mail system operational to support our business critical operations," Cleveland said.

“Intra”-preneurial communications -- Lockheed Martin style

So many meetings—so little time. In today's business environment of faster better, cheaper, it seems that the numer of meetings increases along with the workload. How often is an employee required to attend two meetings at once— hundreds of miles apart? Does it seem an impossible task to accomplish?

There's a solution available that lets employees regain time *and* lets them “be in two places at once” — videoconferencing.

Facilities everywhere

With over 1,000 company, NASA, private and public videoconferencing rooms available around the world, you can conduct meetings just about anywhere and everywhere, at any time. And the costs incurred by videoconferencing are much less than would be generated by travel. Anyone on the facility can utilize this excellent resource. There are few limitations to its use.

Expanded capabilities

New developments in the field increase videoconference capabilities. A recent addition, called continuous presence, enables all participants to view multiple locations at the same time. Through integrated computer systems, users may also present and view electronic data real time.

Many departments are already using videoconferencing effectively. For example, Advanced Programs used videoconferencing when the department designed and built a composite aeroshell panel for the X-38 vehicle, conferring frequently with Johnson Space Center (JSC) and Maine University's Mechanical Engineering department.

Schedule assistance

“Due to the tight schedule, both JSC and Michoud could not spend a lot of time sending people to travel between locations,” noted **John Fong**, stress analysis engineer. “It would have been costly and time consuming to send representatives off-site.

The WSA 3 team confers with suppliers during design of the new mandrel.

> ***“Videoconferencing puts a contemporary twist on the old adage ‘a picture is worth a thousand words’.”***
>
> **- John Fong**

“With a videoconference we were able to choose a time and have all the contributors on hand to ask and answer questions,” said Fong. “Having everyone see the data at once and point to it on the video screen got everyone on the same page. Videoconferencing puts a contemporary twist on the old adage ‘a picture is worth a thousand words’.”

Videoconferencing helped **Bill Jones**, WSA 3 team lead, design a new mandrel for the External Tank. “We were able to conduct our 30, 60 and 90 percent design reviews using videoconferencing, saving us thousands of dollars in travel and schedule time. Union practitioners participated in the design review, and their contributions were invaluable to the final design.”

Significant savings

Terry Hibbard, Vice President, External Tank project, acknowledges the savings in time and travel. “Corporate has asked us to cut travel expenses by 20 percent. Videoconferencing is one of the key technologies and capabilities to do that. I have found through my own usage that more than half the time it's as effective as traveling.”

Other employees also say videoconferencing avoids the headaches associated with traveling, and time away from job and family. Many employes are using videoconferencing to take charge of their schedules again.

For more information on videoconferencing or to schedule a conference, please contact **Toni McCormick**, 257-5211.

Layoff volunteer numbers announced

The Michoud Space Systems Human Resources Department has announced that 125 employees have volunteered for layoff.

"The option to volunteer for layoff was made available to qualified salaried employees on November 1 when the company announced the need for a work force reduction," said **Cheryl Alexander**, Manager, Human Resources.

The reduction will affect approximately 300 personnel, and will take effect on January 1, 2000.

"At the time the reduction was announced, a deadline of November 15 was set for employees who would like to volunteer for layoff," said Alexander, "We offered a series of counseling sessions for salaried employees in the NASA Auditorium to explain the various benefits options. Many employees attended them and decided to take advantage of the offered severance package."

Information about the work force reduction, including questions from employees and answers, can be found on the Michoud Space Systems Work Force Reduction intranet site at: http://gumbo/admin/layoff/layoff.htm

Beware Y2K travel problems

With the approach of Y2K, the Corporate Travel organization has provided some helpful hints for travel during the first days of the new year.

Q: How many days in advance of December 31 should I make my reservations for travel in January 2000?

A: If you plan to travel in January, make arrangements as far in advance as possible.

To the greatest extent possible make reservations for January travel no later than Monday, December 20.

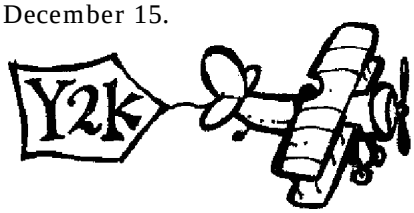
Lockheed Martin's travel offices will make every effort to provide hard-copy tickets and itineraries no later than Friday, December 24, the last day before the holiday break. However, holiday schedules may vary by business location.

Q: Can I use E-tickets?

A: Electronic tickets will not be issued for travel from December 31, 1999 through January 7, 2000.

Q: When should I get my international travel documentation?

A: We strongly recommend obtaining all travel documentation (passports, visas, etc.) no later than December 15.



Q: Other than air travel, should I have Y2K related travel concerns?

A: Yes, the infrastructure of foreign locations could be impacted. Water, electricity, traffic control and rail transportation are a few of the services that could be affected. Third-world countries are the most likely to experience problems.

For more information contact your local Lockheed Martin travel manager or Corporate Travel at 301-897-6508.

Additional information is available at the Corporate Security Intranet site at http://security.corp.lmco.com/ or at the U.S. State Department's Travel Warnings site at http://216.200.80.33/travel_warnings.html

Tom Fierke

Navy Public Service Award goes to Michoud executive

Thomas G. Fierke, general counsel for Lockheed Martin Michoud Space Systems and a colonel in the U.S. Army Reserve, was recently honored with a Department of the Navy Superior Public Service Award.

The award, presented at the Marine Forces Reserve Headquarters in New Orleans, recognized Fierke for his support of the U.S. Marine Corps through the committee for Employer Support of the Guard and Reserve (ESGR).

Fierke was described as "an active and key coordinator between employers and reservists, [functioning] as the state ESGR Ombudsman, actively working to link reservists, legal services and employers to resolve and prevent conflicts."

Major General **David M. Mize**, Commander, Marine Forces Reserve, presented the award.

Emergency Information

To find out the status of work at MAF, call 257-1MAF or 1-800-611-3116; check the EWS; listen to WWL-870 radio or WWL-TV; or access the MAF Site Status web site at www.mafstatus.com

Employees advised not to participate in Web-based program

The Corporate Information Protection (CIP) office reports that approximately 150 employees are participating in inappropriate web-based activity involving the "Search for Extra-Terrestrial Intelligence" or SETI project.

The employees responded to a request from the University of California at Berkeley asking participants to use "idle time" on their desktop or server computing system to process information related to the project.

By complying with this request, employees are utilizing the Corporation's computing resources in an unacceptable manner and violating company policy *CPS-007: Personal Use of Lockheed Martin Assets.* The project also raises serious information protection concerns, CIP reports.

Employees who are participating in this project are asked to withdraw their participation immediately, and all employees are asked not to participate in this or similar projects without prior approval from their management.

MILESTONES

Employees celebrating milestone anniversaries with Lockheed Martin in November include:

25 years
Richard Gartley
Sylvia Harrison
Cynthia Miller

20 years
Donald Dawes
James Dillon
Robert Eagan
Thomas Lowry
Ashok Prabhakar

15 years
Deette Geraci
Mary Morgan
Thomas Wood

10 years
Mark Knoblach
Jeffery Pilet
Melanie Powell
Linda Williams

5 years
Ernest Dawkins
Lavenia Emerson
John Golman
Joseph Greulich
Kristen Haley
Danny Howard
Richard Manicke
Louis McCoy
Steven Reeves
Don Saling
Monte Smith
Rosalind Thomas
Charles Ziegler
Laurence Zurek

Questions on Ethics?

To obtain clarification on ethical matters or to report possible wrongdoing, contact the Michoud Space Systems ethics officer, Stuart Stine, at 7-3842, or call the Corporate Office of Ethics and Business Conduct, 1-800-563-8442.

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