

MISSION SUCCESS[®]

BULLETIN

March 23, 1999

Shuttle upgrade study continues and expands

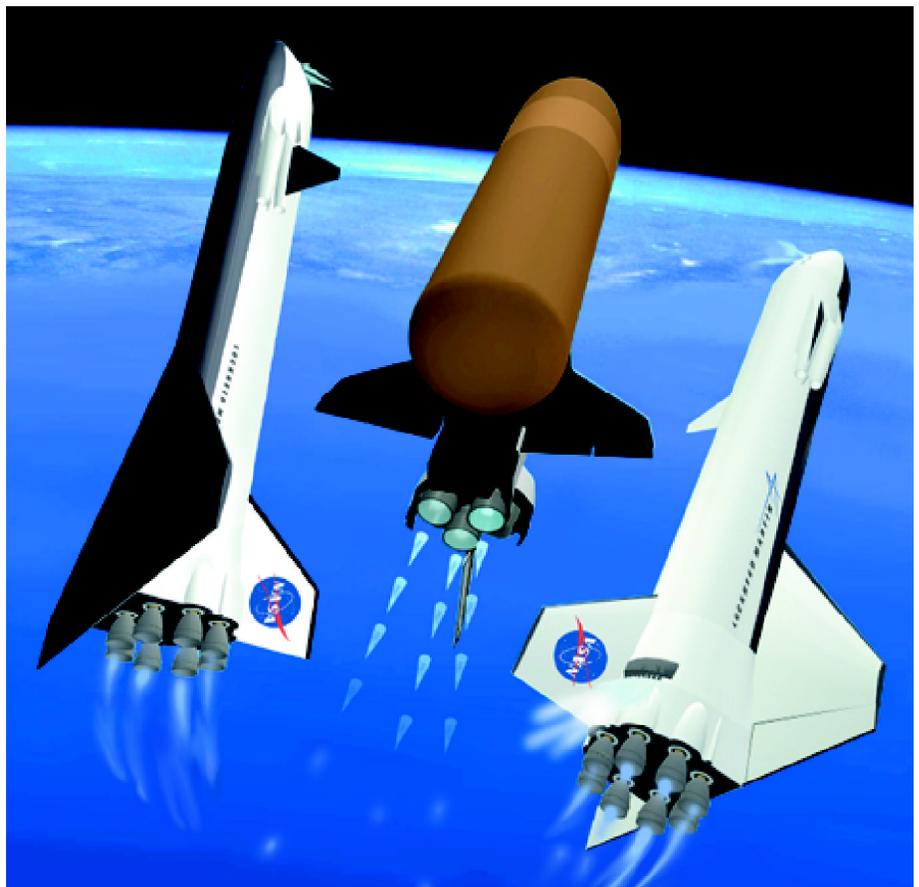
Michoud Space Systems is proceeding with a new phase of a NASA study on Space Shuttle upgrades meant to decrease the expense of operations and lower the cost of access to space. The focus of this large-scale study is the Reusable First Stage (RFS), formerly termed "Liquid Flyback Booster."

"The company is receiving a total of \$2.15 million from NASA to continue the study during the current fiscal year," said Michoud RFS study team lead **Patti Jones**. So far, Michoud has received \$1 million of this year's allocation.

Reusable First Stage was initially proposed as a replacement for the currently-used solid rocket boosters. RFS was conceived as a liquid rocket booster using liquid hydrogen and liquid oxygen with improved safety and performance factors. After being jettisoned from the Shuttle, the replacement boosters would fly back under their own jet power to a landing at Kennedy Space Center, reducing booster processing costs.

The more powerful booster would also significantly increase Shuttle cargo capabilities to Space Station orbit (from around 25,500 pounds with a Lightweight ET to approximately 40,000 pounds), and improve system safety by allowing the Shuttle to continue with a mission despite an engine out on a booster.

Michoud began its participation in the RFS study in May 1997. Other prime team participants in the study



A conceptual rendition of the proposed Reusable First Stage boosters at separation during a Space Shuttle launch.

are Boeing and NASA's Marshall Space Flight Center, Kennedy Space Center, and Johnson Space Center.

Contributing to the study are Pratt & Whitney, Rocketdyne and Aerojet for the rocket motors, and Pratt & Whitney and General Electric for the air-breathing jet engines.

Tom Mobley, acting vice president of Technical Operations, is Michoud Space Systems' RFS Program manager.

Michoud's main objectives in the second phase of the RFS study, according to Jones, are to "continue

configuration definition work to enhance the baseline RFS concept we developed during the first phase, place more emphasis on alternative applications for RFS and continue with a series of technology advancement tasks.

"We are looking at several possible applications for RFS in addition to its use as a replacement booster for the Space Shuttle," said Jones. "We are considering it as the first stage of a fully reusable two-stage-to-orbit vehicle, and as a component in a reusable, heavy-lift "Magnum" vehicle for human

Continued on last page



Rich Dunn

Dunn named Contracts director

Michoud Space Systems has named **Richard A. Dunn** as director of Contracts and Estimating, effective March 8.

His responsibilities include overseeing the Contracts Administration & Negotiation, Configuration Data & Change Management and Estimating departments.

Previously, Dunn served as director of Contracts and Procurement for Lockheed Martin Advanced Environmental Systems in Albuquerque, New Mexico. While in Albuquerque, he also managed Program Contracts for Lockheed Martin Postal Systems and managed Contracts for Sandia National Laboratories when Lockheed Martin was awarded the management and operations contract there.

He has also held supervisory positions for Lockheed Martin in San Diego, California and Orlando, Florida. Altogether, he has 15 years of experience with Lockheed Martin in all phases of contract management and related functions.

Dunn, a native of New York City, holds a bachelor's degree in Flight Technology and master's degrees in Procurement and Contract Management and Business Administration from Florida Institute of Technology.

X-33/RLV Team captures award

Several Lockheed Martin Michoud Space Systems employees were among those recently recognized by NASA for their work as members of the X-33/VentureStar™ Propellant Densification Team.

Miranda Anthony, Bob Bauman (now retired), **William Greene**, and **Tim Knowles** served on the team, which was named a Turning Goals into Reality award winner in the Affordable Access to Space category.

By using densified propellants, the team found that more fuel

could be put into smaller tanks, which reduces overall vehicle size and weight.

This technology will be used to build a single-stage-to-orbit vehicle capable of delivering payloads to low-Earth orbit at much lower costs than existing launch vehicles.

The team, which started work in October 1997, consists of representatives from three NASA centers and six companies.

The award was presented at the John H. Glenn Research Center (formerly Lewis Research Center) at Lewis Field in Cleveland, Ohio.

External Tank Progress Report

Selected Highlights as of March 15, 1999

HARDWARE	STATUS
ET-102	
Tank	Staged in Building 420. Completed DD250 on 2/1.
ET-92 (LWT)	
Tank	In Final Assembly. External shakedown and Intertank closure are in work. Plan to move to Building 420 for Test & Checkout.
ET-103	
Tank	In Final Assembly. Ice Frost Ramp applications, TPS closeouts under way. Pressline installations continue.
ET-104	
Tank	In Final Assembly. Ice Frost Ramp applications continue. LO2 Mast installation in work. LH2 Feedline installation and alignment is under way.
ET-105	
LO2/Intertank	Cell H. Completed acreage SOFI spray. Flange trims and closeouts are underway.
LH2 Tank	Cell P. Completed external wash and acreage primer spray. Touchups and Keensert rework are under way.
ET-106	
LO2 Tank	On 7023 tool. Completed Clip Lug welds. X-ray and dye penetrant are in work.
LH2 Tank	On 7077 tool. Completed proof test. Post-proof test X-rays continue. Several indications being assessed by Engineering.
ET-107	
LO2 Tank	On 5018 tool. Dome is loaded. Preps for O-5 weld are under way.
LH2 Tank	On 5068 tool. Working X-ray and repair activities in preparation for the first part of mechanical installation.

Safety - Ingrained in new product environment

Editor's Note: Continuing the Mission Success Bulletin's series on Safety in this issue is Reusable Launch Systems Vice President **Randy Tassin**.



Randy Tassin

Faster, Better, Cheaper! We're hearing more and more of this phrase these days. Reusable Launch Systems (RLS) has been challenged with development of a new product

line for Michoud Space Systems. For the RLS Team, this isn't just a catchy phrase but reality. Our existence depends on it. To be successful, especially in commercial competition, we must change the way we do business.

This often means streamlining processes, pushing ourselves a little harder, taking some calculated risks. But there are two areas, our core values, which we cannot and will not compromise. These are Mission Success™ and the safety of our people!

We have a rich heritage at Michoud in Mission Success, a perfect record, and that isn't by "accident." Our safety performance, although good, can and should improve.

Individual Responsibility

The RLS focus is "fast track" with a philosophy that retains the idea of "Safety First" for the person, the product, and the facility. RLS operates in an Integrated Process Team (IPT) environment. This environment places a lot of responsibility and accountability on individual team members.

Our teams cross departmental lines and include all functional personnel necessary to achieve our goals. Each person is expected to contribute from the development of planning through to the delivery of products, and to be proactive in

maintaining a safe and professional work environment.

Working Offsite

Our experienced RLS employees working onsite at MAF, where we are trained and familiar with working safely with known people, processes and systems, are often called upon to work offsite.

Teams travel regularly to other sites — Palmdale, Sunnyvale, MSFC or supplier sites where we must integrate our operations with others in unfamiliar environments. When we do so, it's "Safety First." We conduct site visits, we plan our integrated roles, we learn the peculiarities of the individual sites and we do our best to prepare our people for the job that lies ahead.

New Vehicle Assembly Challenge

Another challenge lies ahead as we proceed with the assembly of the Kistler two stage K-1 launch vehicle here at MAF. This effort will be led by Michoud Space Systems and performed at Michoud by a team of industry partners, all with a variety of safety cultures and differing degrees of experience. We will be challenged to plan and manage the integrated activities of these teammates in an efficient, safe manner consistent with our own safety standards.

Share Your Experience

Michoud has had an enviable safety record over the past 25 years. However, as new employees come to Michoud Space Systems, we are challenged with maintaining that level of safety excellence. New employees do not have the benefit of our rich safety heritage. It is incumbent on our more experienced employees to be safety mentors, imparting their knowledge and experience to our newer employees.

Likewise, these new employees may provide us with new insight, ideas for safety improvements and a "fresh set of eyes" with which to evaluate our work environment.

"360 Degree" Employees

I have always been impressed with friends and acquaintances from certain safety leaders in the oil and petrochemical industries. These individuals' safety culture stood out in their safety approaches to outside jobs and recreational pursuits. My vision is that all Michoud Space Systems employees will also have safety habits ingrained to an extent that will be evident in their personal lives and in their pursuit of outside activities. We must have a 360° approach to safety at work, at home and at play.

Safety performance on RLS projects has been excellent, but there is always room for improvement. We must continue our efforts to instill a work ethic that is Faster, Better, Cheaper and Safer.



Left to right: Hody Childress, James Newman, Burl Dunlap

Astronauts honor MSFC Operations employees

Marshall Space Flight Center Operations employees **Hody Childress** and **Burl Dunlap** each received the coveted Silver Snoopy award last month from astronaut **James Newman**.

Astronauts choose the award's recipients as an appreciation for their "professionalism, dedication and outstanding support that greatly enhanced flight safety and mission success...."

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

Y2K Team wrapping up compliance drive

The Year 2000 Project Team at Michoud Space Systems is closing fast on its objective to achieve Y2K compliance for all computer systems and software.

NASA and other federal government agencies are required to be Y2K compliant before the next millennium arrives and this includes their prime contractors. Michoud Space Systems, prime contractor for the External Tank Project, is no exception and is obligated to be compliant by March 31.

"Michoud Space Systems has been working on the Y2K problem since mid-1997," said **Wayne Williams**, Management Information Systems.

"If any department...reports a particular computer system or software package after the March deadline as not being Y2K compliant, the directions we have received from the Leadership Team are to deactivate and dispose of it."

- Deborah Brown

The Michoud Space Systems Y2K Team identified three broad categories to address the Y2K problem: software, hardware and facilities. All computer systems and software used by the company were then placed into these categories.

These included financial operations, manufacturing operations, technical operations, materiel procurements, product assurance and numerous other activities performed by the company.

"Our approach was to examine every area and treat each one equally in terms of their importance to the company's operations," said Williams. "Our obligation to NASA and ourselves is to be 100 percent compliant and not just compliant for those items that may be considered more essential to our business."

After a thorough assessment, the process of repairing, replacing or retiring the non-compliant systems went forward. As of mid-March, the Team had almost reached its final objective.

"Software is 99 percent complete, we are 96 percent through with our hardware upgrades and are only three items away from being through with our Facilities requirements," said Williams. "I feel confident that we will meet our External Tank contractual obligation by the deadline of March 31."

"If any department within Michoud Space Systems reports a particular computer system or software package after the March deadline as not being Y2K compliant, the directions we have received from the Leadership Team are to deactivate and dispose of it," said current Y2K Team Coordinator, **Deborah Brown**, Management Information Systems.

"We have outlined some further responsibilities after the deadline is past," said Williams. "We will be required to retain all the documentation on what we have done to achieve compliance until the year 2010. And we are now formulating contingency plans in the event that any system, for some reason, happens to fail when the Year 2000 actually occurs."

For more than a year, procurement contracts have contained

clauses requiring suppliers to guarantee their delivered products are Y2K compliant. This will remain a focus of the company's follow-on activities, according to Williams.

"We will continue monitoring our suppliers of both flight and non-flight hardware through the remainder of the year to assure that their products are Y2K compliant," he said.

The Y2K Project Team has representatives from each department within the company. They are: **Stuart Stine**, Business Operations; **John Chapman**, Executive Offices and Planning and Control; **Joe Garrard**, Human Resources; **Malcolm Wood**, Facilities and Environmental Operations; **Deborah Brown**, Management Information Systems; **Emory Hodges**, Production Operations; **John Welborn**, Product Assurance; **Mark Bryant**, Material Sourcing; **Dave Lewis**, Technical Operations and **Dewey Crosby**, Reusable Launch Systems.

If employees have a Y2K question or a concern about a particular computer or item they are using, they should contact the appropriate team representative.



"Penguins" prepare for future flights

The 1998 Astronaut Candidate Class (the "Penguins") poses in front of a liquid hydrogen tank during its recent tour of Michoud Assembly Facility.

Two in Business Operations receive honors



Marie Cousin

Marie Cousin, property specialist in Business Operations, has been recognized for her work in handling the property management records

administration for over \$200 million of special tooling and test equipment. Cousin received a Corporate property management achievement award from **Peter**

DeMayo, Corporate Vice President of Contract Policy, at a recent Property Management Council meeting.



Marshall Benham

In addition, **Marshall**

Benham, Manager, Property Management, has been selected to chair the corporatewide Property Management Council. The council is responsible for overall policy, administrative processes, review of common issues and operations of the Corporate Property Resource System for all property management administrative functions within Lockheed Martin.

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.



Black History Month a hit with employees

Several hundred Michoud Space Systems employees attended the Black History event last month in the Building 102 special event room. Headlining the event were the Lockheed Martin Choir and a series of presentations about African American notables in science and civil rights. The crowd also enjoyed an exhibition of employee paintings.

Report “near misses” to head off trouble

What’s a near miss? Most people would recognize one if they saw it. Near misses take us by surprise — they are unplanned and unwanted events that could have but didn’t cause damage or an injury.

The best way to keep accidents from happening is to eliminate or control hazards before they result in injury, illnesses or damage. When near misses occur, it’s a sign that an unsafe situation exists that needs to be addressed.

Near misses raise an immediate warning flag. To stop them from happening again and to head off real injury or damage, anyone involved in or seeing a near miss should immediately notify their supervisor and the Safety department (7-4125).

Deel chairing Savings Bonds campaign

Dennis R. Deel, Michoud Space Systems President, has been named Chairman of the 1999 Greater New Orleans U.S. Savings Bonds campaign.

The Savings Bonds campaign runs through July 2 in Orleans, Jefferson, St. Bernard, Plaquemines and St. Tammany parishes. The theme of this year’s campaign is “Reach for New Heights.”

“U.S. Savings Bonds are a great way to get in the saving habit,” said Deel. “Other investment options may bring greater returns, but bonds can be an outstanding complement to any savings program. They also represent a positive, meaningful way each of us can participate in the affairs of our government.”

MILESTONES

Employees celebrating milestone anniversaries with Lockheed Martin in **February** include:

40 years

Gale Copeland

25 years

Rey Abadie
James Garnett
William LeBlanc

20 years

D. Andrea Bass
Robert Bierhorst
Elizabeth Blouin
John Clark
Gerald Craft
Barklay Emmons
Edwin Gornor
Stanley Jones
James Little
Lawrence Nichols
Chris Pembo
Bruce Roberts
John Smith
Donna White
Jimmy Williams
Samuel Ziegler

15 years

Michael Fabacher
Deborah Fauver
James Feeley
Jeffery Ginn
Allen Gusman
Gregory Landry

George McCarlie
Mark McCloskey
Dina Michel
Robert Morrison
Carl Mundell
Kevin Pierce
Keith Tassin

10 years

Marianne Dann
Kevin Dubose
Joel Pigott

5 years

Laurie Percy
Bernie White

Sign up for Jazz Fest volunteer jobs, Classic tent

Now that Carnival is over, **Jazz Fest '99** is right around the corner and plenty of people will be needed to put on the show. To volunteer, call EVO coordinator **Gordon Dyer**, 7-2102, or **Betty Jane Schlater** at 7-4419. Retired UAW members are also urged to volunteer by calling **Sal Scariano** at 254-0154.

Employees running in the upcoming **Crescent City Classic** (April 17) can sign up to participate in the Lockheed Martin tent. Sign-up tables will be staffed at 11 a.m. until noon from March 29 through April 12 in the 351 and 102 cafeterias.

The Michoud Recreation Association sponsors the Lockheed Martin tent. Any questions can be directed to event coordinator **John Fisher**, 7-1171.

Traffic cops to patrol Old Gentilly

The New Orleans Police traffic enforcement division is increasing its presence in the vicinity of Michoud Assembly Facility. Employees are reminded that a left turn on red while exiting the facility is unsafe and illegal, and such action can lead to drivers being issued tickets.

Reusable First Stage

Continued from Page 1

exploration of Mars.

"In addition, the RFS study team is pursuing technology advancement tasks that could mitigate costs and risks to the RFS project," Jones said. "Principal among these are development of rocket engine integrated health monitoring, being spearheaded by Lockheed Martin at Denver; a rocket engine reusability analysis being carried out by Lockheed Martin personnel at Huntsville; and the design and development of a subscale composite rocket propellant tank here at Michoud."

NASA is scheduled to hold an interim review with study team members in April. A final review of study results will take place in the August time frame.

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Editor/Writer: Arthur Nead

Graphics, Photography: NASA,
Larry Songy, Hugh Webb

Contributors: Randy Tassin,
Steve Stefancik, Betty Jane Schlater,
Harry Wadsworth

**Lockheed Martin
Michoud Space Systems**

Telephone: (504) 257-1308

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The road to ISO 9001 registration

ISO 9001 is an internationally recognized set of quality standards that can aid companies in consistently producing a quality product. Becoming ISO certified is important in 1999 because Michoud Space Systems would join a growing list of ISO-certified companies.

These days more and more companies are going through the ISO certification process because they want to show their customers they are serious about consistently manufacturing quality products. Some customers, like NASA, are now requiring ISO certification.

"There are three steps to ISO 9001

success," said **Feltus Kennedy**, head of the ISO implementation team. First, "Say What We Do" in our work procedures. Second, "Do What We Say" by following those procedures. Finally, "Prove That We Do It" by maintaining accurate records.

"Right now we say we produce a good quality product and we do," Kennedy said. "But with ISO 9001 certification, we can back it up by showing our customers that we meet their requirements and that we've been audited and certified by an independent third party."

Michoud wants to achieve ISO certification by September 30.