

ET-122 on track for early delivery

Tank endures through Columbia investigation and Katrina damage

John DesForges remembers the first day he returned to work, three weeks after Hurricane Katrina. With no power to run the elevator, he climbed the stairs to the Intertank level in Cell A of the Vertical Assembly Building to inspect External Tank-122. Concrete roofing panels with mesh and rebar sticking out still lodged against the tank after falling when Katrina ripped up the roof.



Katrina's debris lodged against ET-122 in Cell A.

“My first thought was, ‘Will this tank ever fly?’ And I wondered how badly damaged was the structure

of the tank because we could see only foam damage.” Once the concrete was removed, ET-122 was lifted from Cell A and rolled out of the VAB so repairs could be made to the building. DesForges started on a tank damage assessment and then a repair plan.

“We also had to decide in what configuration to deliver ET-122. A tank with all the Return to Flight modifications? A tank with the producibility enhancements? A tank with the debris risk mitigation changes? In the end, NASA decided on a tank with all the RTF mods and many of the producibility enhancements and debris risk mitigation changes. We got the official turn-on from NASA to restore the tank to flight condition in November 2008.”

Originally delivered to NASA in November 2002, ET-122 did not ship to Kennedy Space Center initially because KSC's tank storage capacity was full. So NASA decided to ship the tank to KSC shortly after Space Shuttle *Columbia* was scheduled to land in early 2003. However, after the accident, everything was put on hold.

“Today, the tank has taken on a whole new appearance,” DesForges says. “It now looks like an RTF tank with a few extra modifications and repairs.”



Employees work on ET-122 in Building 420 earlier this month.

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DesForges who is the tank's missile mother describes the most obvious changes as being the removal of the Protruberance Air Loads (PAL) ramps from the Liquid Oxygen (LO2) and Liquid Hydrogen Tanks. The Ice Frost Ramp extensions are also sprayed, and the bipod areas closed out with new configuration foam.

The most obvious signs of Katrina repairs can be seen on the LO2 tank where concrete impacts were concentrated in the -Y to -Z quadrant and the Intertank, where technicians replaced a four-foot-wide section of foam that runs the entire 22.5-foot length of the Intertank in the same quadrant.

"This is the largest salvage operation in NASA history of a man-rated flight vehicle; to be able to deliver it in a safe flight configuration is really an honor," DesForges said. "We really feel good about the tank's restoration. The Michoud team has accomplished so much."

Lockheed Martin is on schedule to deliver the tank on September 17 – 13 days ahead of the September 30th delivery date. ET-122 is slated to be the launch-on-need tank for the STS-134/ET-138 mission in February, but a NASA change request is under consideration to fly ET-122 as the primary tank for the STS-134 mission.



TPS mechanic Theresa Rivera works final closeout on the +Y vertical strut, which is part of the aft interface hardware.

ET-122's insignia depicts the power of restoration

Several months ago ET-122 Missile Mother **John DesForges** started thinking about a symbol representing ET-122's Katrina history as a kind of motivation for employees. He sketched several concepts and presented his best to graphic artist **Jon Irving**. The resulting artwork shows a restored ET-122 in flight with a shuttle on its back flying out of the eye of the hurricane.

The art includes Lockheed Martin and NASA logos, symbolic of the teamwork involved in the restoration. NASA Space Shuttle Manager **John Shannon** was so impressed with the logo that he requested it be painted on the Intertank access door, and Irving did that several weeks ago.

Today, ET-122 is being resurrected from the damage caused by Hurricane Katrina, just as many Michoud employees have restored their lives after Katrina.



Pictured next to ET-122 in the horizontal position are Cleveland Thomas (front left), Dana Dreyfus, Jon Irving and James Riley. Thomas, Dreyfus and Riley are electrical/mechanical technicians who installed the Intertank access door in Building 420. Irving is the graphic artist who painted the insignia on the door.

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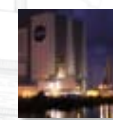
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Orion performs under pressure

The Lockheed Martin *Orion* team performed well under pressure as the first *Orion* spacecraft successfully passed a structural proof pressure test at Michoud on Aug. 30, paving the way for future tests prior to space flight. This *Orion* spacecraft will be used for ground and flight test operations to correlate test data with analytical models to validate *Orion's* flight design engineering.

Built to spaceflight specifications, the vehicle completed an important series of leak and proof pressure tests that confirmed *Orion's* structural design can withstand long-duration missions. The test incrementally pressurized the spacecraft with breathing air up to 15.55 pounds per square inch – or 1.05 atmospheres – which is the equivalent pressure a scuba diver's gauge would read at a 35-foot depth.

The successful tests demonstrated a leak-free structure fabricated using self-reacting friction stir welding techniques, a technology that produces stronger and higher quality joints when compared with conventional welding. The pressurization test demonstrated weld strength capability, and advanced aluminum-lithium alloy structural performance at maximum flight operating pressures, making this structure survivable in the harshest environments of space. Test engineers monitored and collected data from 600 channels of instrumentation to support margin assessments and confirm design accuracy.

Successful test completion allows the hardware to advance to subsystem assembly and integration. Following additional testing this year, the assembled crew module will be mated to the launch abort system to undergo ground tests in flight-like environments in 2011.



Lockheed Martin's Orion Crew Module Ground Test Article recently underwent a successful structural proof pressure test at Michoud.

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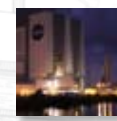
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Mission Success Bulletin delivers the news one last time

This is the last edition of our *Mission Success Bulletin*. The newsletter began 29 years ago in 1982 and has reported on company, program, employee, community outreach and awards & recognition news these many years. The newsletter stepped away from printed copies by shifting to a totally on-line format in January of this year.

Thank you for reading the *Mission Success Bulletin* through the years. A special thanks goes to those of you who suggested stories, provided information, reviewed copy, took photographs, and occasionally wrote an article or two. And a big shout-out to graphic artist **Jon Irving** for his attractive design of the Bulletin.

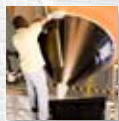
To see Human Space Flight and Space Systems news in the future, please go to @SpaceSystems, our company Intranet that's updated each day.

Use LM VPN to access the links to get there. The link to @SpaceSystems is <http://news.ssc.lmco.com> Or go to the Michoud Operations Web Portal at <http://policy.global.lmco.com/manned/michoud/index.html> and then click "Space Systems" at upper right to get to @SpaceSystems.

Also, Space Bytes comes out every Wednesday and provides useful information from Space Systems. To get there, go to <http://news.ssc.lmco.com/spacebytes/2010SSC/sb100908.html>



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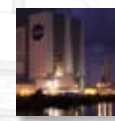
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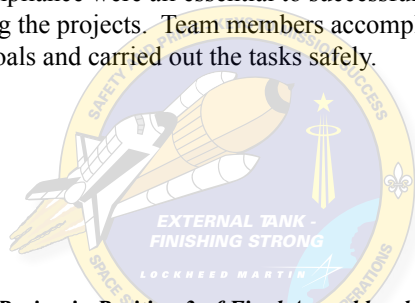


Doing It Safely team is monthly winner

The Doing It Safely program's monthly winner is a team of employees representing Production, Quality Control, and Transportation who worked together in Final Assembly on several projects.

First, the team cleaned up and reorganized Position 4 for ET-94 activities. After completing this major task, team members cleaned and reorganized Position 3 to make space for a new Material Review Board (MRB) holding crib. Finally, the team prepared Position 1 to receive ET-94.

FOD compliance, environmental compliance, and safety compliance were all essential to successfully completing the projects. Team members accomplished all their goals and carried out the tasks safely.



Posing in Position 3 of Final Assembly where they completed one of their projects is the Doing It Safely winning team. Front row: Danny Winn (from left), Brenda Williams, Peter Finger and Joseph Stephenson. Back row: Ed Ramsey, John Singelmann, Jeff Hall, Tim Harper, Stanley Ebert, Conrad Carriere and Ron Eisinger. Not pictured are Tim Bordelon, Clifton James, Randy McCullen, and Booker Watson.



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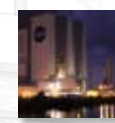
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On August 13, astronauts **Jim Dutton** and **Ricky Arnold** presented six Silver Snoopy Awards and a NASA Leadership Award to deserving Lockheed Martin employees. The Snoopy recipients are as follows:

- **Mike Gray** – for his efforts as an inspector supporting the External Tank Program, specifically for his contribution in resolving the manhole cover seal issue



Astronauts Jim Dutton (left) and Ricky Arnold presented six Snoopy awards to Mike Gray (from left), Jason Holbrook, Tom Kilroy, Ben Ferrell, Donna Hutson and Judy Thorne.

- **Jason Holbrook** – for superior performance in Thermal Protection Systems (TPS) applications and Return to Flight activities, and for being an excellent role model and mentor for new technicians
- **Tom Kilroy** – through his direct efforts and involvement in Structured Improvement Activities, critical path processing times in the Final Assembly/Building 420 collaborative work cell were significantly improved
- **Ben Ferrell** – for outstanding performance as a key member of the ET Return to Flight Team and for his leadership of the Launch Integration Team
- **Donna Hutson** – for outstanding performance as a subcontract administrator on the ET Program to supply raw material and TPS components, areas in which she is a subject matter expert
- **Judy Thorne** – for the initiative to deal with the SAP charging requirements, and the sustained dedication and outstanding follow-on performance

In addition, Dutton and Arnold also presented the NASA Leadership Award for technical expertise to ET Chief Engineer **Jeff Pilet**. NASA cited Pilet for developing robust plans; marshaling and deploying expert resources; and providing tireless, innovative, and skilled leadership in successfully addressing an array of challenges that collectively contributed to improvements in safety performance of the Space Shuttle vehicle.

These challenges include, but are not limited to, the repair of hail-damaged ET-124, the redesign of the Engine Cut-Off (ECO) sensor feed-through connector, the assessment of flow control valve



Ricky Arnold (left) and Jim Dutton also presented the NASA Leadership Award to Jeff Pilet.

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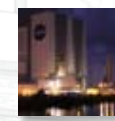
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debris on ET hardware, the design and implementation of design and process changes that improved the delivery and flight performance of ETs, and the implementation of titanium feedline yokes that minimized the potential for foam and ice debris.

On August 23, astronaut **Butch Wilmore** presented Silver Snoopy awards to four Lockheed Martin employees.



Astronaut Butch Wilmore poses with John Ellis, Kevin Aldrich, Richard Smith and Tim Livingston after presenting each with a Snoopy award.

- **John Ellis** – for sustained outstanding performance, dedication and initiative as a Mechanical Systems test technician for the Detail Fabrication Support Shop
- **Kevin Aldrich** – for exceptional leadership of Material Management and successfully integrating Physical Distribution, Property Management and Inventory to provide exemplary service to the ET and Orion programs
- **Richard Smith** -- for exemplary leadership and sustained performance as senior manager of Design & Analysis in support of the shuttle program
- **Tim Livingston** – for playing an instrumental role in the effective utilization and deployment of LM21 process improvement initiatives on the ET program

And on September 8, astronaut Jim Dutton returned to Michoud to present one additional Silver Snoopy:

- **Francisco Gutierrez** – for exemplary support as Lead Quality Assurance Engineer and his extensive knowledge of the ET fabrication process



Jim Dutton pins a Silver Snoopy on Francisco Gutierrez.

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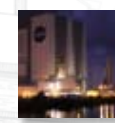
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1	4/25/08	Base Incentive
2	5/31/08	STS-124 launch/land 6/14/08
3	7/10/08	ET-127 delivery
4	8/6/08	ET-129 delivery
5	11/14/08	STS-126 launch/land 11/30/08
6	11/19/08	ET-130 delivery
7	2/14/09	ET-131 delivery
8	3/15/09	STS-119 launch/land 3/28/09
9	4/28/09	ET-132 delivery
10	5/11/09	STS-125 launch/land 5/24/09
11	7/15/09	STS-127 launch/land 7/31/09
12	7/29/09	ET-133 delivery
13	8/28/09	STS-128 launch/land 9/11/09
14	10/14/09	ET-134 delivery
15	11/16/09	STS-129 launch/land 11/27/09
16	12/20/09	ET-135 delivery
17	2/8/10	STS-130 launch/land 2/21/10
18	2/24/10	ET-136 delivery
19	4/5/10	STS-131 launch/land 4/20/10
20	4/30/10	ET-137 delivery
21	5/14/10	STS-132 launch/land 5/26/10
22	6/25/10	ET-138 delivery

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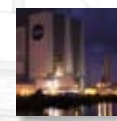
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Mission	Launch Date	Tank	Delivery Date
STS-133	November 1, 2010	ET-137	April 30, 2010
STS-134	February 26, 2011	ET-138	June 25, 2010
		ET-122*	September 17, 2010 (projected)

* *Launch-on-need tank for STS-134/ET-138. However, a recommendation is being considered for ET-122 to fly with STS-134 in February.*



Milestones

Employees celebrating anniversaries with Lockheed Martin in September 2010

30 Years

Julie Flower
Karen Gares
Mark Goerlitz
Ameen Sarkees
Lionel Smooth
Roy Thomas

Melanie Jennings
Susan Jones
Troy Ohlsen
Antonio Otero
Kim Owens
Paul Pareti
Karen Poy
Scott Sanfilippo

25 Years

Daniel Galbraith
Vern Greene

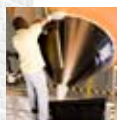
20 Years

Theresa Dowdy

Editor's Note:

In recognizing the Awards Night winners in the July *Mission Success Bulletin*, we neglected to include **Mark Ryan's** name as a member of the *Orion* Requirements Realignment #2 Proposal team. Congratulations to you too, Mark!

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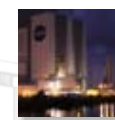
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