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## Chapman to retire as NASA's ET manager

### Praises ET-135 performance on STS-131 launch

John Chapman will step down as NASA's ET project manager on April 30. The Mission Success Bulletin interviewed him recently about his tenure as ET boss.

**MSB:** After *Discovery* landed last week at Kennedy Space Center ending the STS-131 mission, Shuttle Launch Integration Manager **Mike Moses** said *Discovery's* preliminary inspection showed miniscule damage – that's a testament to the fact that the External Tank has become a very clean vehicle. Agree?

**Chapman:** Absolutely. ET-135 was one of the best tank performances we've seen. The amount of debris shed, the foam losses – all very low. And what debris did come off, we understand why. It's consistent with the physics. Our recommendation will be no IFAs (In-Flight Anomalies) with the understanding that what little foam did come off was well within the limits. I'm extremely happy with the performance of the tank.



**MSB:** What's the status of ETs still in production?

**Chapman:** I anticipate ET-137 will be finished up on Friday, April 30 or Saturday, May 1. We have three tanks to go: ET-137; ET-138, the final production tank; and ET-122, the hurricane-damaged tank. I'm confident in our team's ability. We are now producing tanks that are better and better, the attention to detail is better and better, and the NCDs (Non Conformance Documents) are decreasing. The thing you worry about – people getting complacent – isn't happening. If anything, we're looking at things harder than we've ever looked before. Everyone here understands what it takes to build a superior tank. I'm extremely proud of this team.

**MSB:** You took the job as ET project manager shortly after Katrina and not long after the first Return to Flight mission in 2005. How challenging was that time period?

**Chapman:** My first day as ET project manager was October 31, 2005. Clearly, I had followed all the events of Hurricane Katrina. On one hand, it was an incredibly daunting task. We were under pressure to get ready for the second RTF flight. We had to make changes to the tank in the aftermath of Katrina. But on the positive side, the resiliency of the ET team was amazing. Watching folks who had endured their own personal disaster keep their eye on their jobs – the dedication, just amazing. And then later, particularly to watch RTF 2, that first flight after Katrina in July 2006.



ET-122 laydown

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Truly inspiring, tears in your eyes. All systems performed as they should. We understood the physics. An incredible experience.

**MSB:** You led the program to overcome other hurdles too like ET-124, the tank that sustained hail damage on February 26, 2007.

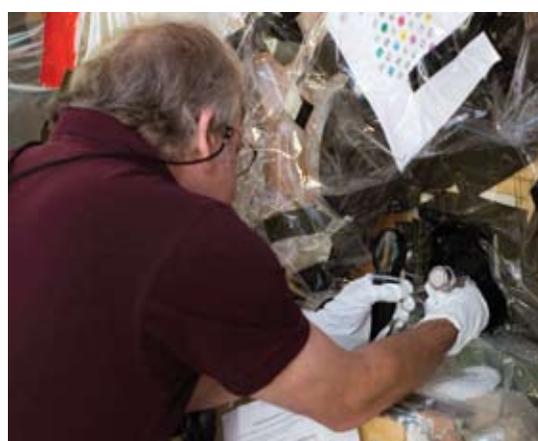
**Chapman:** For a while there, I thought the ET project had a target on its back. I was on my way down to KSC when the hail storm hit. When I got there, the ground was just covered with sizeable hail stones. The tank took more than 4,000 hits. We pretty much knew we were in uncharted territory. But once again, we had a superb team that didn't shy away from a challenge. We broke it down into parts, and then worked together to solve the problem. We had superior analytical tools. We understood exactly what everyone was doing. We got real data from our test programs. Lockheed Martin came up with that pencil sharpener tool to smooth over the foam repairs. We developed a good relationship with the USA (United Space Alliance) people, and the Lockheed employees at Kennedy helped tremendously. We took a bad situation and made it good. And some of the work that we did on the hail-damaged tank and the lessons learned – we used those on ET-122, which let us proceed with that work.



*Technician uses pencil sharpener tool on ET-124*

**MSB:** How about the nagging ECO (engine cut-off) sensor problem that sporadically bothered us for several years?

**Chapman:** The ECO sensors were an excellent example of teamwork between Marshall's office of Engineering and the Engineering departments at Michoud and KSC. We looked at conductivity and circuit instability, the environmental conditions that the conductors were subjected to. We removed the external part of the ECO system connector and sent it to Marshall for testing. We focused on the pin and socket arrangement and cryogenic conditions. We also capitalized on others' experience. Once we figured all that out, we soldered the connector pins to the socket to reduce motion that could cause electrical failure. It was a matter of teamwork from ULA (United Launch Alliance) to NASA to Lockheed Martin. As a result, we got bullet-proof performance. Once again, it's just a matter of breaking down a daunting problem and taking it piece by piece.



*Together, Lockheed Martin, NASA and United Launch Alliance solved the ECO sensor problem*

**MSB:** What would you say to Lockheed Martin employees at Michoud, Huntsville and the Cape?

**Chapman:** First as ET manager, it's been an incredible opportunity and thrill for me to work with you. The passion, the attention to detail, the pride of the ET team is fantastic. I would encourage the entire team to remain focused on these last three tanks to make them the best that we can deliver. We all hate to see the shuttle program end. Nevertheless, we want to see it end positively. Keep your eyes on the ball, think about things you haven't had to think about before because we're smaller now in manpower, and make sure we've done everything to make these tanks the best they can be.

**MSB:** What are your plans?

**Chapman:** I'm going to work on my house, which has survived 20 years of brutal neglect. I'm setting up my workshop. I'm going to work on my yard and my deck. The bass are beginning to bite. I'm a model airplane enthusiast so I'll pursue that, along with the ham radio, computers, reading and cooking. My wife still works at Marshall. I'll be a house-husband and happy.





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## STS-132 crew ready to fly



The third Space Shuttle mission of the year is on schedule to launch at 1:20 p.m. Central Time on Friday, May 14. To say this is a quick turnaround is an understatement. STS-131's *Discovery* landed just last week, and two days later STS-132's *Atlantis*, riding on the shoulders of ET-136, rolled up to the launch pad.

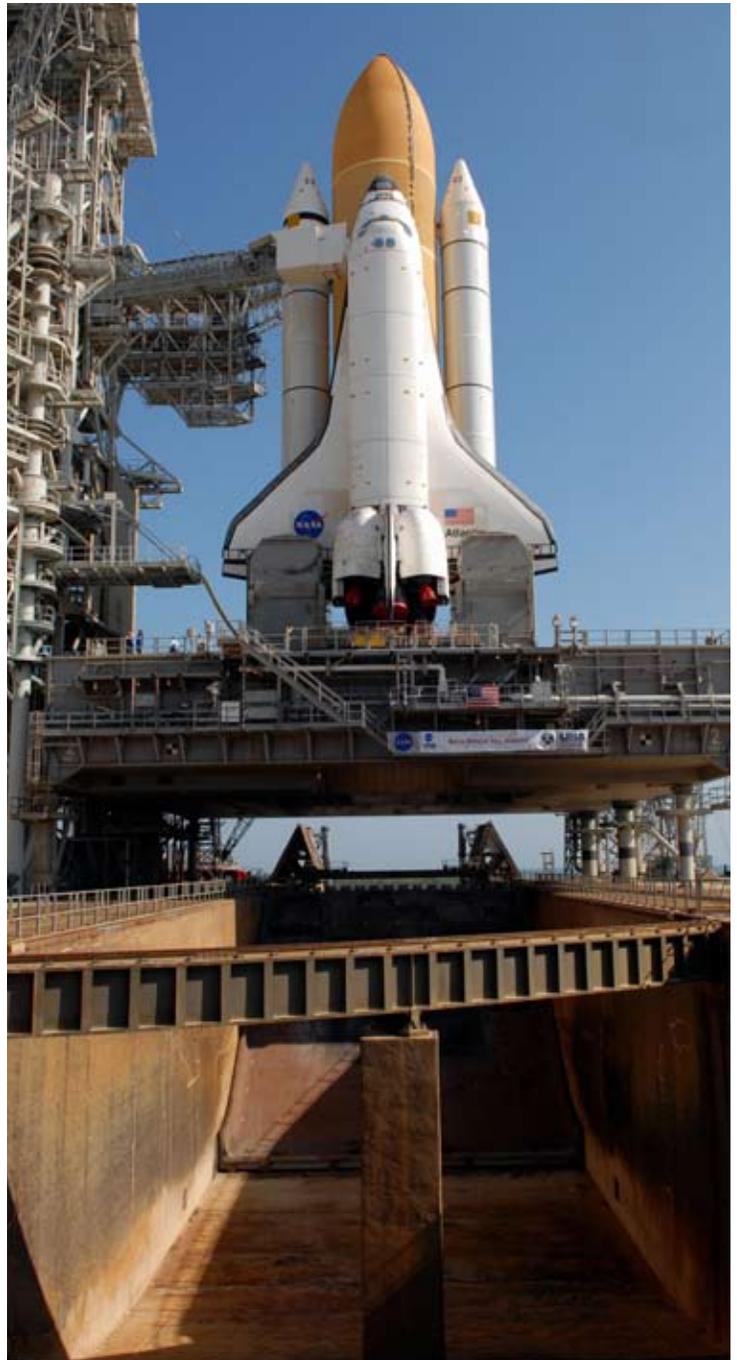
So in two weeks, a six-man American crew headed by **Ken Hamm** (2nd flight) will be on their way to the International Space Station. The 12-day mission features three spacewalks and will deliver an integrated cargo carrier and a Russian-built Mini Research Module to station.

Lockheed Martin favorite **Tony Antonelli** (2nd flight) will pilot *Atlantis*. Mission specialists include **Steve Bowen** (2nd), **Mike Good** (2nd), **Garrett Reisman** (2nd & 3 months on station) and **Piers Sellers** (3rd).

Waiting for them on station will be Commander **Oleg Kotov** (Russia), **Tracy Caldwell** and **T.J. Creamer** (USA), **Mikhail Kornienko** (Russia), **Soichi Noguchi** (Japan) and **Alexander Skvortsov** (Russia).

Lockheed Martin delivered ET-136 to NASA on February 24, the 132nd flight tank, and employees hope its performance will match that of the previous mission's tank, ET-135, which flew an almost flawless ascent, shedding very little foam on its way to orbit.

STS-132 is scheduled to be *Atlantis*' 32nd and final flight. After this mission, only two shuttle trips remain – STS-134 and STS-133. STS-134, set for July 29 has now moved to mid-November because of a change to the Alpha Magnetic Spectrometer payload. For now, STS-133 is still scheduled to launch September 16.



*STS-132 awaits its May 14<sup>th</sup> launch date.*





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## Orion program ready for Pad Abort-1 Test

Pad Abort-1, a flight test to validate the *Orion* crew exploration vehicle's Launch Abort System (LAS), is scheduled at White Sands Missile Range in New Mexico on May 6. The LAS passed a Flight Test Readiness Review on April 22.

Although *Orion* is a component of NASA's Constellation program, the future of which is under Congressional review, the complex test will be conducted as part of an ongoing mission to develop a safe escape for all human spaceflight applications during an emergency. This is a test, and no crew will be aboard the launch abort vehicle. The LAS is positioned atop the crew module (CM) mock-up and designed to activate within milliseconds to pull the vehicle to safety and position the module for a safe landing.

Three solid rocket motors – an abort motor, an attitude control motor and a jettison motor – are designed to fire. The abort motor will ignite nearly 500,000 pounds of thrust to propel the CM away from the pad, reaching 445 mph in three seconds and an altitude of one mile. The attitude control motor exerts up to 7,000 pounds of steering force to maintain stability and reorient the vehicle as needed. The jettison motor is designed to pull the LAS away from the CM and make way for three sets of parachutes to slow the module for landing. If everything goes perfectly in this first test, the CM would land approximately one mile down-range from the launch pad after 100 seconds.



*The Orion Launch Abort System sits on the pad for May 6<sup>th</sup> launch.*





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# NASA unveils innovative tank developed by Lockheed Martin and partners

NASA unveiled a Lockheed Martin-developed prototype tank dome March 30, demonstrating a new production technology that could lead to stronger, lighter, and lower-cost liquid propellant tanks for spaceflight. NASA and Lockheed Martin formed a strategic international partnership with MT Aerospace in Augsburg, Germany, to develop the prototype dome.

"Lockheed Martin is proud to be associated with a project that represents an affordable, innovative solution to a complex technical challenge," said **Dr. Ray Johnson**, LM Chief Technology Officer, who attended the unveiling at Marshall Space Flight Center. "Innovation is vital to our economy and to future space activities. International collaboration on this project reinforces the fact that good ideas come from everywhere, and helps us think differently, which is the cornerstone of innovation. As we focus on affordability, innovations like these will help reduce manufacturing costs while delivering a superior product, with improved reliability and performance."



The team created the 18-foot diameter tank dome from high-strength 2195 aluminum-lithium using two separate manufacturing processes: Friction Stir Welding, which softens, but does not melt metals in the joining process, and Spin Forming, a metal-working process that produces a strong, seamless surface. The traditional gore manufacturing method involved welding together pie-shaped sections of a heavier, lower-strength aluminum alloy. The new process is estimated to produce tanks that are 25 percent lighter than current designs, which translates to a more reliable system with lower lifecycle costs.

**Jeb Brewster** is the Lockheed Martin project manager on the dome, which was the first full-scale production effort using the new process. MT Aerospace holds the patent for the manufacturing process.

During the ribbon-cutting ceremony, both **Gene Goldman**, new deputy center director at Marshall, and **Lesia Roe**, director at NASA's Langley Research Center praised the project as a model of government, industry, and international cooperation.

MSFC managed the prime contract and conducted key material testing of the dome and dome weld. Lockheed Martin collaborated with MT Aerospace on the development and subcontracted the company to perform the manufacturing. Langley provided program oversight, and Alcoa provided the 2195 alloy.





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## STS-131 Honorees tour Kennedy Space Center



*Selected for their outstanding performance, these Launch Honorees spent Easter weekend at KSC and saw the April 5th early morning launch on Space Shuttle Discovery's first attempt. Standing before ET-135 and the shuttle stack are from left: Moin Masoodi, Terri Ryan, Randy Champagne, Sandy Sollberger, Brian Sollberger, Dawn Diecidue-Conners, Fred Ogden, Carlos Yingst, Jerome Douglas, Andy Buell and Charlie Coultas.*



*"Doing It Safely" winners*



*Pre-dawn launch picture perfect for 51 employees*

## "Doing It Safely" winners



Safety has recognized Production employees **Danny Winn** (from left), **George Bruder** and **John White** as the "Doing It Safely" winners for March. The three are commended for their exceptional performance during the installation of the aft interface truss on ET-138, the final flight tank.

Prior to the operation, the crew held an error prevention huddle so that everyone understood the critical nature of the work to be performed. During the truss installation process, they ensured that safe distances were maintained to prevent any inadvertent contact and damage to other areas of ET-138. Because of their commitment to doing the job safely, the crew completed the installation without incident.



*Two Lockheed Martin FIRST Robotics teams go national*



*LM recognizes employees during National Volunteer Week*



*LM donates House Busters truck & trailer to St. Bernard Project*



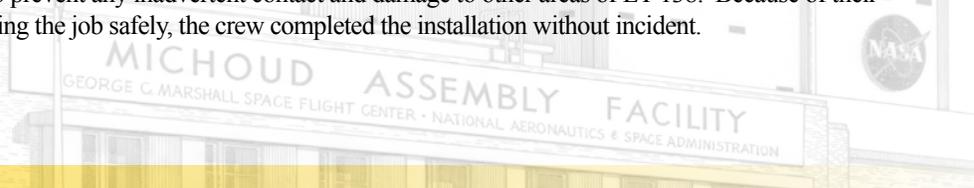
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## Pre-dawn launch picture perfect for 51 employees

Dave Anderson  
Nelda Bellinger  
Jeannette Bilich  
Harold Blouin  
Brandon Brown  
Roger Brown  
Belinda Chaplain  
Paul Cheramie  
Ronnie Clark  
Craig Coleman  
Mack Cuenca  
Simon Davis  
Noel Debose  
Wil Dudley  
Aida Elsayed  
Terrence Ester  
Emile Evans  
Arnold Fazande  
Johnny Fox  
Al Gaines  
Carlos Garcia  
Adam Gates  
Joe Gildhouse  
Charles Goins  
Matt Hall  
Jerry Hart  
Holly Hebert  
Daren Hubbard  
Gary Jackson  
Katrina Jarreau  
Brian Jeansonne  
Dom Kiper  
Kevin Kolb  
Jim Little  
Kiana McCants  
Colleen McGehee  
Sean McLane  
Phil McNeill  
Troy Miller  
Amanda Nguyen  
Deborah Ong  
Wayne Revere  
Kevin Ring  
Rob Roberts  
Max Roche  
Mike Ryals  
Bonnie Townley  
Ronnie Troxclair  
Don Wallen  
John White  
Randy Wiggins



Three... two... one... zero... booster ignition and lift off of *Discovery*, and with that 51 Lockheed Martin employees from Michoud experienced their first launch of the Space Shuttle "live" and in color at Kennedy Space Center. "It was a great 24-hour trip," said quality inspector **Joe Gildhouse**. "We left Easter Sunday, got to the Orlando hotel in time to eat, and then it was off early to bed because we had to board the bus taking us to KSC at 3 a.m. To see the launch light up the night sky, hear the roar of the engines and the crackle as it went up was quite an experience."

Performance Enhancement Manager **Russell Arthur** said the program to send employees to launches began November 2008 with funds allocated from Award Fee set aside for motivation and morale. Over 200 employees have had the good fortune of seeing the shuttle lift off. Others who have traveled to KSC but didn't get to see a launch because of weather or a technical glitch still say the experience was gratifying, Arthur added.

"It was my first launch," said **Ron Troxclair**, mechanical & electrical systems test, "Seeing it go up before my time here at Michoud expires was great, and I really appreciate the company sending me."

About ten minutes prior to the 6:21 a.m. launch, the Lockheed Martin group and hundreds of other spectators on the NASA Causeway were treated to the added bonus of a flyover of the International Space Station, clearly visible to all.

"We're standing there and we could see the shuttle all lit up, and on the horizon dawn was just beginning to break, and then this tiny light – the space station – flew across the sky," said **Nelda Bellinger**, executive administrative assistant. "It was all just breathtaking."

*Discovery's* liftoff was NASA's second pre-dawn launch this year and had all the qualities of a nighttime launch, explained safety engineer **Holly Hebert**. When dawn finally broke, the sun lit up the vapor trail with colors of pink, yellow and red. "It was amazing."

For **Jeannette Bilich**, a financial and operational auditor for 24 years, the trip was much more than just seeing the launch. "It was being with everyone you worked with and meeting some who worked at Michoud for years and years that you had just met. It's the pride of knowing that we all had a hand in building the ET and seeing it fly."

*Discovery* returned safely to KSC on April 20 to wrap up its 15-day, six million-mile journey at the space station.





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## Two Lockheed Martin FIRST Robotics teams go national

Mandeville High School's FIRST Robotics team ("Prometheus"), along with Northshore High School's ("Team Combustion") participated in the FIRST Robotics Championship in Atlanta on April 16-17. Both teams performed well and finished high in the standings. Team Prometheus finished 12th and Team Combustion 27th in their 85-team division.

Nearly 350 FIRST Robotics teams including teams from Brazil, Israel and Canada competed in this year's soccer-inspired game. Team Prometheus advanced to the championship by winning the Bayou Regional while Team Combustion earned admission to the national competition by winning the coveted



Bayou Regional Chairman's Award.

These were the only two teams from Louisiana to earn Atlanta bids. Both teams are sponsored in part by Lockheed Martin. **Keith Joiner** and **Darren Kearney** mentor Team Prometheus, and **Glynn Adams** mentors Team Combustion. To see more photos from the championship, go to



*Team Prometheus competes at FIRST Robotics Championships.*



*Mandeville High's Team Prometheus*





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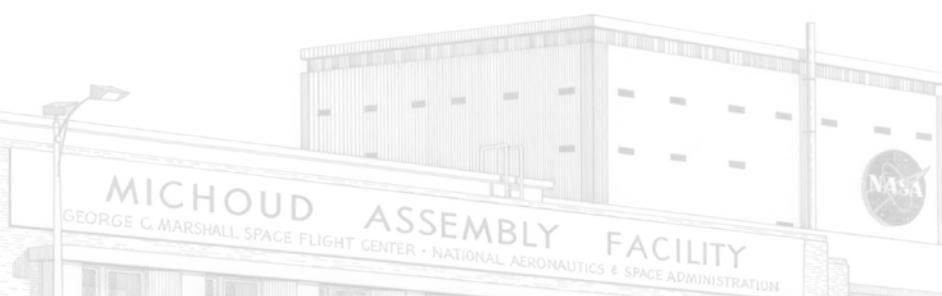


*Milestones Employee anniversaries*

## Lockheed Martin recognizes employees during National Volunteer Week



*Lockheed Martin employees who give to their community by volunteering at least 100 hours a year receive the bronze President's Volunteer Service Award. For 250 hours of service, they receive a silver award and for 500 hours a gold award. Bottom row from left are Darren Kearney (silver), Hank Knighton, Linda Savage-Regan, Melissa Earhart, David Lander (silver) and Manny Zulueta. Top row includes Keith Joiner (silver), Jim Lasecki, Curtis Craig (silver), Cora Arcement-Buffone, Tom Fierke, Mark McCandless, Scot Marshal (gold), Marion LaNasa, Carlos Yingst and Barry Keegan (silver). Not pictured are bronze recipients Brian Dejan, Alfred Donaldson, Paul Irland, Eric Johnson, Harry Wadsworth and Dee Willick and silver awardees Christi Johnson, Scott Johnson, Philip Kopfinger (Huntsville Technical Operations) and Travis Smith.*





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## Lockheed Martin donates House Busters truck & trailer to St. Bernard Project

After Hurricane Katrina flooded or damaged hundreds of employee homes, the corporation and employees around the world generously gave to a special Katrina fund so Lockheed Martin was able to buy a truck with a trailer and fill it full of tools to gut employee homes to the studs. The employees who gutted the 51 employee homes called themselves the House Busters.

The trailer and the tools haven't been used much the past several years so on April 21 as part of National Volunteer Week, LM donated the recovery equipment to the St. Bernard Project, a non-profit rebuilding flooded houses for Katrina survivors.

"We wanted to donate the equipment to an agency that will keep the goodwill and spirit of the House Busters team alive – and the St. Bernard Project does just that," explained volunteer coordinator **Kevin Barré**.

The non-profit focuses on homes for senior citizens, people with disabilities and families with children who can't afford to have their homes rebuilt by contractors. With the assistance of 20,000 volunteers, the agency has completed over 275 homes with 50 currently under construction.

**Liz McCartney**, the co-founder of the St. Bernard Project and CNN's Hero of the Year in 2008, accepted the donation. "You guys get it. You roll up your sleeves and do it. It's solvable; it's fixable. Families can go home again. Kids can go to school. We can create a new generation of scientists and mathematicians. With Lockheed Martin's help, the good people of New Orleans who want to come home can do that."



The organization's website is at [http://www.stbernardproject.org/v158/index.php?option=com\\_content&view=article&id=3&Itemid=4](http://www.stbernardproject.org/v158/index.php?option=com_content&view=article&id=3&Itemid=4)





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## ET Incentive Plan milestones

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



## Space Shuttle schedule

Mission	Launch Date	Tank	Tank Delivery Date
STS-132	May 14, 2010	ET-136	February 24, 2010
STS-133	September 16, 2010	ET-138	June 29, 2010
STS-134	Mid-November 2010	ET-137	May 5, 2010 (plan to beat this date)
		ET-122*	September 30, 2010

*\* Launch-on-need tank for STS-134/ET-137*





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## Milestones

*Employees celebrating anniversaries with Lockheed Martin in May 2010*

### 35 Years

Morgan Ballard  
Lawrence Brignac  
Samuel Ducksworth

### 30 Years

Judy Atilano  
Tim Barkley  
Connie Bartholomew  
James Duke  
Tim Harper  
Brian Knipfing  
Andrea Labat-Henderson  
Hollis Monroe  
Mark Ryan  
Billy Thomas  
Kathleen Wakefield  
Walter Whitfield

### 25 Years

Jamie McKeough  
Dan Walkowski  
Doug Webb

### 20 Years

Kenneth Leveque  
John Stalder  
Richard Treat

### 15 Years

Gary Collins

### 10 Years

Sonya Johnson

### 5 Years

Eric Matherne

