



MARSHALL STAR

Serving the Marshall Space Flight Center Community

Sept. 18, 2008

Hurricane Ike hits Johnson; center closed this week

Marshall becomes temporary control site for space station operations; Michoud escapes damage from Ike

By Lori Meggs and Sanda Martel

As Hurricane Ike approached the Texas coast Sept. 11, two flight control teams from the Johnson Space Center relocated to temporary control sites at the Marshall Space Flight Center and in Austin, Texas, to continue operating the International Space Station 210 miles above Earth.

One of the Johnson teams moved its activities to the Backup Control Center at Marshall, in a room adjacent to the Payload Operations Center in Building 4663, where daily science activities on the space station are coordinated. The other team relocated to Austin, and began controlling the station Sept. 11 — two days before Hurricane Ike hit the Texas coast.

On Sept. 14, the Austin team shut down its remote control center, transferring it to the Johnson flight team at Marshall — a first for Marshall, and only a month since it was certified as a Backup

Control Center for the space station. Marshall's capabilities allow the flight control team to perform the same functions for the space station as if they were in Houston.

The 35 members of the Johnson flight control team are not commanding directly from Marshall because communication and command links are still sent through systems online using generators at the Johnson Center. But telemetry, or data from the space station, is being downlinked directly to Marshall.

Employees in the Mission Operations Laboratory are making the Johnson Center employees feel at home. "Not only have we reconfigured networks and systems to accommodate, but we've also prepared meals and lent a helping hand to our friends and colleagues," said Angela Marsh, chief of the Ground Systems Branch of the Mission Operations Lab at Marshall. "They have enough stress on them right now — leaving their families and not knowing what's left back home. If we can help alleviate some of that, then hopefully we've given them what they need — plus a little more to help get their jobs done."

While the Johnson flight control team members are at Marshall, they are scheduled to handle the docking of Progress, a Russian

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Ares I rocket passes review to reach critical milestone

By Craig Dunn

NASA has taken a major step toward building the nation's next generation launch vehicle with a Sept. 10 successful completion of the Ares I rocket preliminary design review.

Starting in 2015, the Ares I rocket will launch the Orion crew exploration vehicle, its crew of four to six astronauts, and small cargo payloads to the International Space Station. The rocket also will be used for missions to explore the moon and beyond in the coming decades.

The preliminary design review is the first such milestone in more than 35 years for a U.S. rocket that will carry astronauts

into space. The review was conducted at the Marshall Space Flight Center. It examined the current design for the Ares I launch vehicle to assess that the planned technical approach will meet NASA's requirements for the fully integrated vehicle.

"This is a critical step for development of the Ares I rocket," said Rick Gilbrech, associate administrator of the Exploration Systems Mission Directorate in Washington.

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To read about Ares I motor test, please see page 2.

Marshall conducts first test on new motor for the Ares I rocket

By Craig Dunn

Engineers at the Marshall Space Flight Center completed the first-round testing of a critical motor for NASA's new Ares I rocket on Sept. 11. The Ares I is a two-stage rocket that will launch astronauts aboard the Orion crew exploration vehicle on missions to the International Space Station and to the moon by 2020.

The ullage settling motor is a small, solid rocket motor that serves two key roles during the launch of the Ares I rocket. During first stage separation, which occurs 125.8 seconds into flight, the motor will fire for four seconds, producing the forward thrust needed to push the second, or upper, stage away from the first stage. This forward thrust also ensures the rocket's liquid fuel is properly pushed to the bottom of the upper stage fuel tank prior to ignition of the J-2X engine that powers the upper stage.

The successful hot-fire test of this new development motor was the first test in this series. All test objectives were achieved, bringing NASA one step closer to developing America's new space transportation system. This first series of early development testing will consist of four motors. It is scheduled to run through 2009. The second test series is planned for February 2009.

"We are extremely excited about the success of this test that proves we are headed down the correct development path for this program," said Danny Davis, upper stage manager for Ares Projects at the Marshall Center. "We have the right team in place, and we are working a design that will secure America's future in space."

The word "ullage" is taken from the French term "ouillage," which

is used in winemaking to describe the space between wine and the top of a storage container, such as a barrel or bottle. In this case, it refers to the space at the top of the first stage fuel tank and the need to push the fuel, or settle it, to the bottom of the tank.



Dennis Olive/NSFC

The successful hot-fire test Sept. 11 of the ullage settling motor was the first test in this series.

The ullage motor, 9 inches in diameter and 47 inches in length, is similar in design to the booster separation motor used on the space shuttle's reusable solid rocket motor. Eight ullage motors will be arranged in four pairs on the Ares I upper stage aft skirt, which also houses the reaction control system. The aft skirt is located between the upper stage core, which contains the liquid hydrogen and oxygen fuel tanks, and the interstage, which houses the rocket's roll control system.

"We are very excited about this opportunity for our team

to practice the basic principles of solid rocket motor design for the Ares I," said Steve Harvison, ullage settling motor design lead at the Marshall Center. "It has been especially beneficial to newer team members who are fresh out of college and eager for this challenge. We are working every engineering aspect of these motors, from technical analysis, modeling and simulations to propellant tailoring work and hands-on developmental testing."

The first Ares I test flight, called Ares I-X, is scheduled for 2009.

NASA's Johnson Space Center in Houston manages the Constellation Program, which includes the Ares I rocket, the Ares V heavy cargo launch vehicle, the Orion crew exploration vehicle and the Altair lunar lander. Marshall manages the Ares Projects.

Dunn, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

Moving toward NASA's 50th anniversary ...

When NASA opened Oct. 1, 1958, American leadership transferred certain space-related work from the Department of Defense to NASA. Some of the work involved United States participation in the 1957-1958 International Geophysical Year, or IGY, an international effort to collect geophysical data from around the world.

On Oct. 1, 1958, President Dwight D. Eisenhower issued an executive order that transferred Department of Defense responsibilities for a remaining U.S.-International Geophysical Year satellite to NASA. NASA also received assignments for four lunar probes, three remaining International Geophysical Year satellite projects and a number of rocket engine development research programs.



Design review

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"Completing the preliminary design review of the integrated vehicle demonstrates our engineering design and development are on sound footing, and the Ares I design work is taking us another step closer to building America's next mode of space transportation."

The preliminary design review included more than 1,100 reviewers from seven NASA field centers and multiple industry partners. The review is the final step of this design process. Teams representing each major part of the Ares I rocket — the upper stage engine, first stage and upper stage — all have conducted similar reviews during the past year.

The preliminary design review is one of a series of reviews that occurs before actual flight hardware can be built. As the review process progresses, more detailed parts of the vehicle design are assessed to ensure the overall system can meet all NASA requirements for safe and reliable flight. This process also identifies technical and management challenges and addresses ways to reduce potential risks as the project goes forward.

"Risk assessment is a very important part of the process," said Steve Cook, Ares Projects manager. "It allows us to identify issues that might impact the Ares I rocket.

For example, we identified thrust oscillation — vibration in the first stage — as a risk. In response to this issue, we formed an engineering team. The team conducted detailed analyses and reviewed previous test data, and then recommended options to correct the problem."

"We intend to hold a limited follow-up review next summer to fully incorporate the thrust oscillation recommendations into the stacked vehicle design," Cook added. "Identifying risks that can impact the project and resolving them is a necessary and vital part of the development process."

With the completion of this review, each element of the Ares I rocket will move to the detailed design phase. A critical design review will mark the completion of the detailed design phase and allows for a more thorough review of each system element to ensure the vehicle design can achieve

requirements of the Ares program.

This week, the J-2X engine will be the first Ares I element to kick off the critical design review process. The engine will power the Ares I upper stage to orbit after separation from the first stage.

"We're excited about getting into full system engine tests with the new J-2X engine," Cook said. "This will be one of the safest, most affordable and highest performing rocket engines ever built, and testing is critical as we begin preparation for future flights."

Marshall manages the Ares projects and is responsible for design and development of the Ares I rocket and Ares V heavy cargo launch vehicle. NASA's Johnson Space Center in Houston manages the Constellation Program, which includes the Ares I rocket, the Ares V vehicle, the Orion crew capsule and the Altair lunar lander. NASA's Kennedy Space Center in Florida is responsible for ground and launch operations. The program also includes multiple project element teams at NASA centers and contract organizations around the United States.

For more information about the Ares rockets, visit <http://www.nasa.gov/ares>. For more information about NASA's Constellation Program, visit <http://www.nasa.gov/constellation>.

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David Higginbotham/MSCF

Under clear, blue skies, the Ares Projects team celebrated the successful completion of its preliminary design review with a picnic Sept. 12 at the Carroll D. Hudson Recreation Center on Redstone Arsenal. Project managers on hand to recognize key team members, were, from left, Garry Lyles, associate director for Technical Management for Marshall's Engineering Directorate; Dan Dumbacher, director of the Engineering Directorate; Herb Shivers, deputy director of the Safety & Mission Assurance Directorate; Roy Malone, director of the Safety & Mission Assurance Directorate; Teresa Vanhooser, deputy manager of Ares Projects; and Steve Cook, manager of Ares Projects. Among those recognized were 43 individuals who received a "Made It Happen" award. In addition, more than 500 team members were recognized with four group awards for their contributions to the Ares Projects.

It takes a nation to build a rocket

More than 200 companies nationwide helping build, test, fly Ares I

By Rick Smith

As NASA celebrates last week's successful completion of the Ares I rocket's preliminary design review, thousands of American workers all over the country are already hard at work to build, test and fly the next-generation flagship launch vehicle.

Today, more than 200 companies in 32 states and Puerto Rico are supporting one or more critical Ares projects: the rocket's first stage, upper stage or upper stage engine.

"These contributing companies and organizations across the nation are providing critical engineering expertise, hardware and materials fabrication and testing, and a wide spectrum of support services," said Steve Cook, Ares Projects manager at the Marshall Space Flight Center.

"Their work ensures that NASA will, in the next decade, successfully fly the Ares I rocket to orbit to support the International Space Station and send Americans back to the moon, preparing the way for rewarding new journeys of discovery throughout the solar system," Cook said.

Twenty-seven Alabama companies are on the job, supporting Ares I development.

The Boeing Co. of Huntsville leads NASA's Ares I Upper Stage Project, which is supported in Alabama by United Launch Alliance of Trinity, and six Huntsville-based firms: Global Majic Software Inc.; Millennium Engineering & Integration Co.; Moseley Technical Services; Northrop Grumman Systems Corp.; Orion Propulsion; and Summa Technology Inc.

Supporting NASA's Ares I Upper Stage Engine Project are Analytix LLC; Dynamic Concepts Inc.; GE Fanuc Embedded Systems; General Standards Corp.; Miltec Corp.; Mock Electronics Inc.; and the University of Alabama in Huntsville.

Dynamic Concepts Inc. and 12 other Huntsville companies also support Ares I vehicle integration activities at the Marshall Center, which manages Ares Projects for NASA. Those contractors include BD Systems Inc.; Colsa Corp.; Digital Fusion; Draper Laboratories; Gray Research Inc.; Integrated Concepts & Research Corp.; Jack Lee & Associates; Jacobs Sverdrup; Qualis Corp.; Teledyne Brown Engineering Inc.; Total Solutions Inc.; and UNITEs/SAIC.

The 165-foot-long Ares I first stage is a five-segment solid rocket booster derived from the space shuttle's twin boosters, reconfigured to produce greater thrust. Burning more than 1.3 million pounds of propellant in just 125.8 seconds, the first stage will propel the rocket to an altitude of roughly 36 miles before being jettisoned. As the Ares I upper stage engine ignites, the first stage will deploy parachutes and gently drop into the sea for recovery, analysis and reuse.

The 84-foot-long Ares I upper stage is propelled by a J-2X main engine fueled with liquid oxygen and liquid hydrogen. The J-2X will operate for approximately 465 seconds, burning more than 302,200 pounds of propellant, and shut down when Ares I reaches an altitude of roughly 83 miles. The Orion crew exploration vehicle then will separate from the upper stage, and its own engine will fire to insert the spacecraft into low Earth orbit.

NASA's Constellation Program fleet — now more than four years into development — includes the Ares I, the Ares V heavy cargo launch vehicle, the Orion spacecraft and the Altair lunar lander. The Ares V will serve as NASA's primary vessel for safe, reliable delivery of large-scale hardware to space, including the Altair lunar lander, also in development, and supplies needed



Artist rendering of Ares I on launch pad

to establish a sustained human presence on the moon. The Orion will ferry a crew of four to six astronauts to a variety of destinations in space.

The first Ares I test flight, called Ares I-X, is scheduled for 2009. The first crewed launch of the Ares I rocket is planned for no later than 2015, and NASA plans to send the first missions back to the moon around 2020.

"We're proud to help continue the nation's tradition of leadership in space," Cook said. "Since NASA's creation 50 years ago, our endeavors have yielded or inspired technology innovations that enrich nearly every commercial industry and benefit Americans and people around the world in countless ways. Our team effort on Ares I will continue that legacy, and also help to stimulate our economy and reignite the country's passion to journey to worlds beyond our own.

The Marshall Center manages Ares Projects for NASA's Exploration Systems Mission Directorate in Washington. The Constellation Program Office at NASA's Johnson Space Center in Houston leads the next-generation launch vehicle development program.

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Build

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Three prime contractors lead NASA's Ares I effort for industry. NASA awarded the contract to lead the Ares I First Stage Project, valued at approximately \$1.8 billion, to Alliant Techsystems of Minneapolis in August 2007. The Boeing

Co. was awarded Ares I contracts valued at approximately \$2 billion — \$1.2 billion for the upper stage production contract, awarded in September 2007, and \$800 million for the Ares I upper stage avionics unit, awarded in December 2007. The contract for the Ares I Upper Stage Engine Project, valued at approximately \$1.2

billion, was awarded to Pratt & Whitney Rocketdyne Inc., of Canoga Park, Calif., in June 2006.

For more information about Ares I, visit www.nasa.gov/ares.

Smith, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Marshall Star Ad Form." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue, Sept. 25, is 4:30 p.m. Thursday, Sept. 18.

Miscellaneous

Twin headboards, \$25 each, \$40 both; exercise bicycle, \$50; horse saddles, \$150 each, \$250 pair. 684-6308

Viking Emerald Model 183 sewing machine, \$300. 837-4409

Legacy by Childcraft three-drawer dresser/changing table, cherry finish, \$40. 895-6640

Lenox Eternal china, service for 12, two vegetable bowls, two platters. 883-8257

Nordic Track CX1000 Space Saver, \$300; Roper washer, dryer, \$200 obo. 585-0303

Kenmore Series 90 washer/dryer, \$250 both; two curio cabinets, \$250 for both. 859-6916

Gas pressure washer, 5HP, \$150 obo. 679-0340

Peavey 410 TX, 210 TX bass cabinets, Peavey Mark VIII bass amp head, \$600. 636-2978

Nintendo Wii Fit, \$139. 457-7476

13-inch Magnavox TV/VCR combination, \$50. 656-6464

This End Up twin trundle bed; Chinese paintings, original, framed; TV stand, DVD cabinet. 895-9219

Side-by-side refrigerator, water, ice dispenser, white, \$400; four walnut faux plantation blinds, \$20 each. 457-3114

Yard vacuum, 4HP, 4-inch joiner; 1/2-inch table top drill press; gas grill. 881-5897

Garbage compactor, residential, brown, \$300 obo. 852-5595

Lift Chair, blue fabric. 882-7274

Milk glass pitcher, grape design, \$25 obo. 509-2536

Maytag washer/dryer set, white, warranty. 256-1523

Brad Paisley tickets, Oct. 3. 338-9840

Dog pen, 7.5x7.5x4, cover, \$200. 683-7007

Pack n' Play, bassinet, sheets, \$50; Graco stroller, net cover, \$45; upright piano, \$250. 880-2285

Kelty "Trek" backpack child carrier, \$50. 895-6640

Six antique oak dining chairs, upholstered seats, \$300. 479-5982

Baby crib, mattress, pink linens, \$75; baby swing, \$45. 682-7165

Hot tub equipment, two 4BHP motor/pumps, 220V heater/controller, new flow switch, price negotiable. 828-1234

Solid oak entertainment center, one glass side, shelves, photos, \$150. 882-0461

Springfield Armory loaded M1A, 3rd Generation 4x14 scope, 10 20Rd magazines, \$2,500. 509-2536

Vehicles

2008 Maxima, loaded, warranty, 11k miles, \$24,500 obo; 1999 Mercury Mystique, 83k miles, \$2,995 obo. 520-2802

2008 Saturn Outlook XR, red jewel tint coat, navigation system, leather, 12,150 miles, \$31,000. 679-0340

2006 BMW 325i, white/tan, loaded, 37k miles, \$23,900. 883-6894 or 468-6894

2006 Honda CRF230F dirt bike, \$1,950 obo. 776-4741

2005 Ford Taurus, AWD, leather, moon roof, pueblo gold, 44k miles, \$15,000. 975-1667

2005 Sidekick four-horse trailer, mid-tack, stud wall, rear storage, a/c, \$15,000. 426-2006

2004 Potomac travel trailer, two slides, new tires, awning, mattress, ladder, extras. 773-0194

2004 Chevrolet Colorado Z71, fully equipped, 12k miles, \$12,000. 890-0499

2003 Chevrolet Trailblazer, pewter, luggage rack, 52k miles, \$10,250. 776-9165

2002 Fleetwood Expedition motor home, track vision, slide outs, three TVs, take up payments. 431-9898

2002 Suzuki XL-7, seats seven, \$6,900 obo. 783-6278

2002 Dodge Grand Caravan SE minivan, DVD, leather, chrome wheels, electric sliding doors, \$5,595. 852-6952

2001 Nissan Altima, special edition, beige, automatic, 142k miles, \$4,700. 773-5639

2001 Kawasaki Bayou 300 4x4 four wheeler, less than 50

hours, \$2,700 obo. 828-9798

2001 Toyota Tacoma, four speed, 78,500 miles, \$7,500 obo; 1993 Honda delSol, 125,500 miles, \$4,000 obo. 778-8893

2001 Tahoe LS, black, gray/tan interior, MP3 player, cargo cover, AC, 107,845 miles, \$9,000. 881-4880

2001 Suzuki Katana, custom paint, chrome accessories, low miles, many extras, \$3,800. 874-4974

2000 Toyota Solara, white, two door, automatic, 146k miles, \$6,500. 205-990-4615

2000 Lincoln Town Car Signature Series, all options, 48k miles, \$10,000. 461-7411

1999 Toyota 4-Runner Limited Edition, white, brown interior, sunroof, CD, A/C, \$7,000. 694-1260

1999 Suzuki Intruder 800 motorcycle, helmets, leather, 10k miles, \$4,000. 837-6776

1995 Ford Taurus, \$750; 1997 Grand Am, two door, \$1,200. 221-0444

1993 Geo Prizm, 1.6L, auto, blue, AC, 206k miles, \$1,100. 520-5014

1984 Toyota Cressida, four door, five-speed, shop manual, needs minor work. 233-0705

35HP tractor, 6-foot bucket, box blade, three-cylinder diesel, hi/low gears, \$6,200. 683-8409

Four wheeler, \$3,500. 783-4326

Wanted

Four tickets, Auburn vs. Tennessee, Sept. 27. 726-0278
First/second generation iPhone, not 3G, good condition, no more than \$125. 679-5557

Houses/offices to clean, available evenings/weekends. 777-8595

White daybed, for girl's room. 759-3009

Apple iPhone, prefer relatively new, but not necessarily 3G. 797-7245

Two Auburn/LSU football game tickets. 880-6563

Wringer clothes washing machine, wringer does not have to work. 776-7248

Laptop, needs wireless capability, CD, disk drive, under \$100. 325-9264

Leaf vacuum. 759-3009

Found

Brown-rimmed sunglasses, Building 4200 basement. 544-4680



Emmett Given/MSFC

Ares goes to the classroom

Marshall Space Flight Center employees took space and science to the classroom Sept. 5, demonstrating the excitement of careers in science and engineering to about 100 sixth-graders at Davis Hills Middle School in Huntsville. Bob Armstrong, standing, outreach lead for Ares Projects, discusses the Ares rockets and NASA's plans to explore the moon and beyond. Marshall Center astrophysicist Mitzi Adams was also on hand to perform experiments and discuss astronomy and solar physics. Also participating in the Davis Hills event was Roger Reid, author of the new young adult novel, *Space*, and a Davis Hills alumnus. He spoke to students about growing up in Huntsville and his career path to becoming a writer.

Hurricane

Continued from page 1

re-supply ship, to the station. Progress was scheduled to deliver equipment and supplies to the station Sept. 17.

Houston and its surrounding area took a direct hit from Hurricane Ike, and the Johnson Center is not expected to re-open for normal operations until the week of Sept. 22. The Johnson flight control team at Marshall will operate from Building 4663 until Johnson re-opens.

Johnson's closing prompted Space Shuttle Program Manager John Shannon to postpone the STS-125 program-level Flight Readiness Review scheduled Sept. 11-12. It is too early to know what effect, if any, the hurricane will have on upcoming space shuttle launches, NASA officials said.

A 65-member team that stayed behind to ride out Hurricane Ike at Johnson has begun to transition to recovery operations, clean up debris and restore power to center facilities and infrastructure.

Johnson employees are encouraged to call the JSC Emergency Information Line at 281-483-3351, or remotely, toll-free, at 1-877-283-1947, for updated information, including when they should return to work.

NASA's Michoud Assembly Facility in New Orleans experienced high winds and water surge when Hurricane Ike whipped through the Gulf Coast Sept. 13, but there was no damage at the 43-acre manufacturing facility.

Michoud is a NASA-owned facility managed by the Marshall Center. The world-class manufacturing facility provides vital support to NASA exploration and discovery missions. Michoud manufactures and assembles critical hardware components for the space shuttle and exploration vehicles under development at Marshall and other NASA field centers.

Meggs and Martel, AI Signal Research Inc. employees, support the Office of Strategic Analysis & Communications.

MARSHALL STAR

Vol. 49/No. 2

Marshall Space Flight Center, Alabama 35812
(256) 544-0030
<http://www.nasa.gov/centers/marshall>

The Marshall Star is published every Thursday by the Public and Employee Communications Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Classified ads must be submitted by 4:30 p.m. Thursday, and other submissions no later than 5 p.m. Friday to the Marshall Public and Employee Communications Office (CS20), Building 4200, Room 102. Submissions should be written legibly and include the originator's name. Send e-mail submissions to: intercom@msfc.nasa.gov. The Star does not publish commercial advertising of any kind.

Manager of Public and Employee
Communications — Dom Amatore
Editor — Jessica Wallace



U.S. Government Printing Office 2008-723-022-20167

PSRST STD
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PERMIT NO. 298