



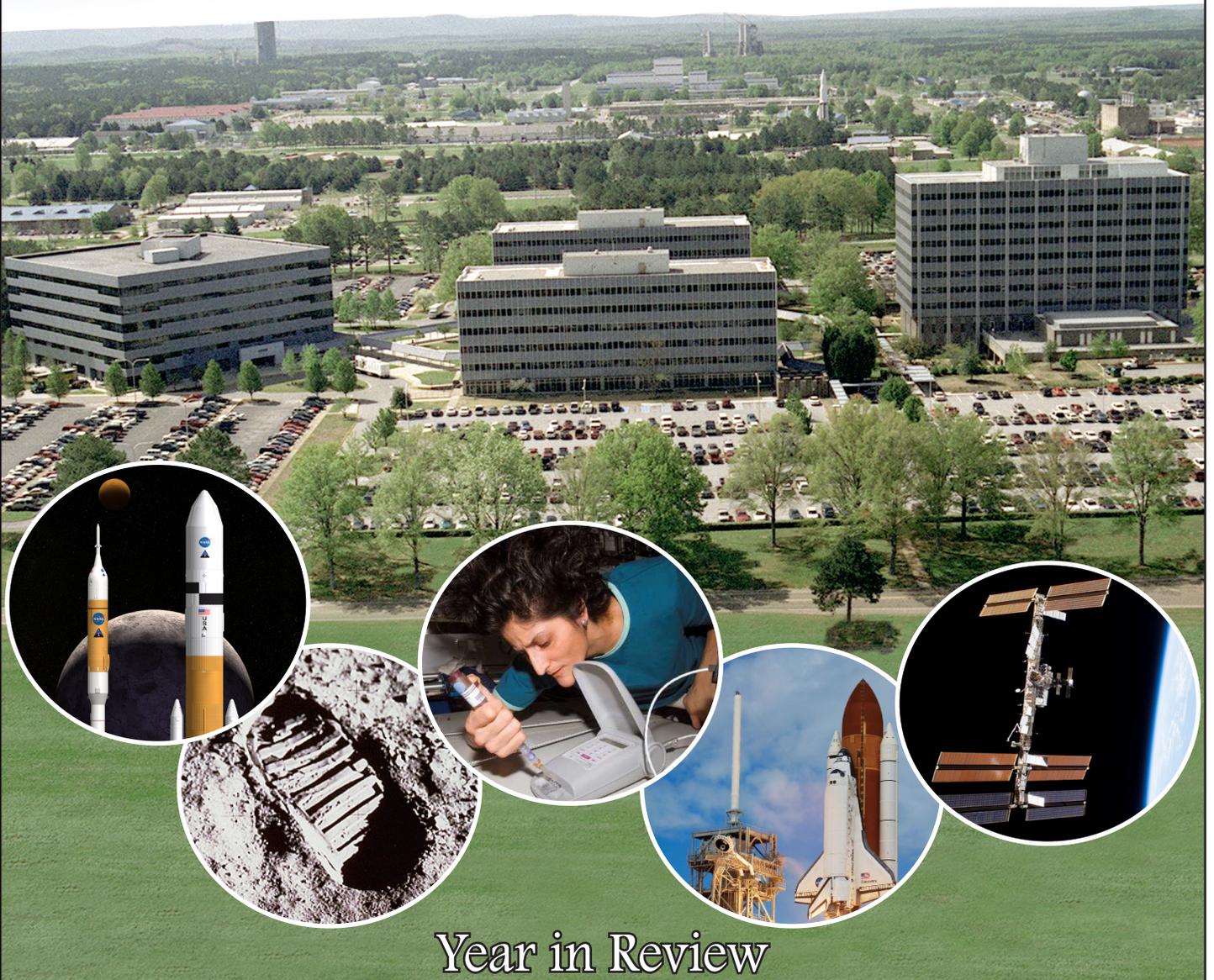
# MARSHALL STAR

Serving the Marshall Space Flight Center Community

Jan. 10, 2008

## THE MARSHALL CENTER

# 2007



Year in Review

# Selected highlights of Marshall's 2007 year of great accomplishments



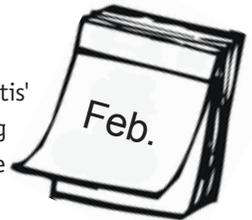
## NASA completes review milestone for Ares I launch

NASA completed the Ares I crew launch vehicle system requirements review — the first such milestone for a U.S. human-rated launch vehicle system in more than 30 years. This review brings the agency one step closer to developing a new mode of space transportation for astronauts on missions to explore the moon, Mars and other destinations.



## Florida hailstorm delays first shuttle mission of 2007

A February 26 hailstorm at the Kennedy Space Center, Fla., damaged space shuttle Atlantis' external tank, ET-124. Marshall's External Tank Project Office was in charge of developing a plan to repair the 4,000 damage sites on the tank and the repair work was done on the launch pad at the Kennedy Center.



## Payload Operations Center marks 6th anniversary

March 19 marked the sixth anniversary of round-the-clock operations of NASA's Payload Operations Center at Marshall, supporting NASA research on board the International Space Station.



## Marshall's Payload Operations Center conducts first simulation with Japan Aerospace Exploration Agency



NASA's Payload Operations Center team at the Marshall Center participated in the first simulation of International Space Station science activities with a team from the Japan Aerospace Exploration Agency (JAXA). The teams conducted the long-distance training exercise on March 8 from control rooms in the Huntsville Operations Support Center and the Tsukuba Space Center in Tsukuba, Japan. NASA and JAXA are working together in preparation for the arrival of the Japanese Experiment Module, or Kibo, at the station in 2008.

## Marshall's George Hopson named one of the first 12 NASA technical fellows for propulsion for NASA Engineering and Safety Center

The Marshall Center's George Hopson, a member of the NASA Engineering and Safety Center, was named one of the first 12 NASA technical fellows. The NASA Technical Fellows Program was established to recognize technical excellence and provide agency-wide leadership of their respective engineering disciplines as members of the engineering and safety center supporting the Office of the Chief Engineer.

## 14th annual Great Moonbuggy Race



Forty-seven high school and college/university student teams competed April 14 in the 14th edition of the internationally renowned NASA Great Moonbuggy Race at the U.S. Space & Rocket Center. The event, planned and hosted each year by the Marshall Center with the support of several Huntsville aerospace industry partners, commemorates the Apollo-era lunar rover missions planned and managed by the Marshall Center. In 2007, students from the Huntsville Center for Technology won the high school division,

while the Rochester Institute of Technology in Rochester, N.Y., took home the college title. Both winning teams received a cash prize from Northrop Grumman and a trophy depicting NASA's original lunar roving vehicle.



## Student rocketeers fly high in Student Launch Initiative

The annual Student Launch Initiative and University Student Launch Initiative rocketry challenges, hosted by the Marshall Center's Academic Affairs Office, culminated in April and May when high school and college/university teams from around the nation gathered in Huntsville to launch their homemade rockets. High-schoolers showed off their rockets in the lobby of Bldg. 4200 before sending them aloft April 25-28. College and university students gathered to fly their rockets May 15.



## LOCAD-PTS tested on International Space Station

The LOCAD-PTS, Lab-on-a-Chip Application Development Portable Test System, developed by the Marshall Center and its partners was successfully tested in May on board the International Space Station by astronaut Suni Williams. The portable test system will help spacefaring crews avoid bacterial growth in their spacecraft, and could provide a handy research tool for science missions to other worlds.



## Marshall team assists with investigation of train derailment carrying reusable solid rocket motor segments

Officials from the Marshall Center and ATK Launch Systems of Brigham City, Utah, assisted the Federal Railroad Administration in its investigation of the May 2 train derailment near Linden, Ala., about 35 miles south of Demopolis. The train was transporting space shuttle reusable solid rocket motor segments from the ATK's manufacturing site in Brigham City to NASA's Kennedy Space Center, Fla. A team from Marshall's Reusable Solid Rocket Booster Project Office, Engineering Directorate, Safety and Mission Assurance Directorate and the Office of Strategic Analysis and Communications' Public and Employee Communications Office traveled to the scene within hours of the mishap to assist in the safe recovery and initial evaluation of the solid rocket motor segments and to assist the investigation teams.



## Successful rocket motor test in Utah helps shuttle, Ares I

NASA's Space Shuttle Program successfully fired a reusable solid rocket motor May 24 at a Utah facility. The flight support motor, or FSM-14, burned for approximately 123 seconds, the same time each reusable solid rocket motor burns during an actual space shuttle launch. The static test provided important information for continued shuttle launches and for development of the rocket that will carry the next human spacecraft to the moon.

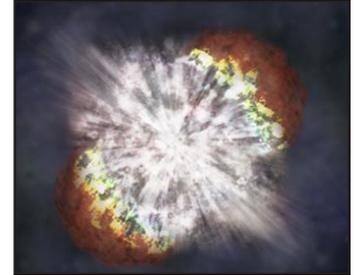


## NASA successfully completes engine hardware tests

At the Marshall Center's East Test Stand, NASA engineers successfully completed testing of subscale main injector hardware. The test results support the development of the J-2X engine that will power the upper stages of the Ares I crew launch vehicle and the Ares V cargo launch vehicle, along with the RS-68 engine that will power the core stage of the Ares V.

## Star Power: Chandra sees the brightest supernova ever

The brightest stellar explosion ever recorded was seen by NASA's Chandra X-ray Observatory and ground-based optical telescopes. The discovery indicates that violent explosions of extremely massive stars were relatively common in the early universe and a similar explosion could be ready to go off in our own galaxy. This new supernova may offer a rare glimpse of how the first stars died. It is unprecedented to find such a massive star and witness its death. The discovery of the supernova, known as SN 2006gy, provided evidence that the deaths of such massive stars are fundamentally different from theoretical predictions.

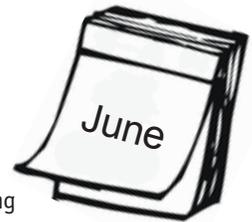


## NASA awards contract for developmental first stage roll control engines for Ares I

NASA selected Aerojet-General Corp. of Redmond, Wash., to provide developmental engines for the Ares I crew launch vehicle first stage roll control system. These engines are the first in a series of steps to develop the roll control system to manage the amount of rotation by the first stage solid rocket from liftoff to its separation from the second stage, ensuring that Ares I stays on the designated trajectory for the first two minutes of flight.

## Nearly 240 receive honors and awards

Nearly 240 Marshall Center personnel were honored by the president, the center or by NASA in June for exceptional achievements. Among the achievements: Three Marshall Center employees — Robert Lightfoot, deputy director of the Marshall Center; Robin Henderson, associate director of the center; and Teresa Vanhooser, deputy director of Marshall's Exploration Launch Office — received Presidential Rank Awards. Jim Snoddy, technical assistant in Marshall's Engineering Directorate, received a NASA Distinguished Service Medal for leadership of the team designing and developing the Ares I crew launch vehicle and the Ares V cargo launch vehicle. Alan M. Title, principal scientist at the Lockheed Martin Advanced Technology Center in Palo Alto, Calif., received NASA's Exceptional Scientific Achievement Medal for his leading role in a series of Marshall-led solar physics missions that have revolutionized scientific understanding of the dynamic sun.



## STS-117 debuted Marshall-developed shuttle main engine improvement

Atlantis launched June 8 on its first mission of 2007, STS-117, to the International Space Station. The mission marked the debut of the Marshall-developed Advanced Health Management System, a space shuttle main engine safety improvement, which flew in monitor-mode. AHMS, an on-engine computer that collects and processes turbopump vibration, would shut down an engine if anomalies are detected. The mission also saw the installation of the Marshall-managed oxygen generation system, which was delivered to the space station during the STS-121 mission in July 2006.

## NASA authorizes contract for Ares I materials

NASA authorizes a contract with a maximum value of \$16.7 million with Alcoa North American Rolled Products of Bettendorf, Iowa, to supply aluminum lithium plates and metal ingots for early development of the Ares I crew launch vehicles upper stage. The firm fixed-price contract has a period of performance through Aug. 5, 2008.

## UNIC named Marshall's Software of the Year winner

The Marshall Center's 2007 winner of the Software of the Year Award was a design and analysis tool that describes the thermal and flow environments of the components and sub-components of launch vehicles. This software is called "UNIC - A Multidimensional, Multiphysics Computational Heat Transfer Analysis Software." UNIC, short for Unstructured-grid Navier-Stokes Internal-external flow Computational heat transfer methodology, was developed by Dr. Ten-See Wang in Marshall's Engineering Directorate and Dr. Yen-Sen Chen of Engineering Sciences Inc. in Huntsville.

## Space station breathes easier thanks to new Oxygen Generation System

Thanks to a new Marshall designed oxygen generator, the International Space Station will now have enough oxygen to support a larger crew. The hardware is part of the station's environmental control and life support system and will be used to augment the Russian oxygen generator. The installation and activation of this critical life support system is the result of a long process of hard work and collaboration from a very dedicated team of NASA employees from across the agency and contractors and suppliers from around the country. Once fully operational, the new system will generate about 12 pounds of oxygen per day, enough for six people. However, it can provide as much as 20 pounds of oxygen per day, enough for as many as 11 people.



## NASA awards upper stage engine contract for Ares rockets

NASA signs a \$1.2 billion contract with Pratt and Whitney Rocketdyne Inc., of Canoga Park, Calif., for design, development, testing and evaluation of the J-2X engine that will power the upper stages of the Ares I and Ares V launch vehicles. The contract includes ground and test flight engines. It continues work that began on June 2, 2006, under a preliminary letter contract with Pratt and Whitney Rocketdyne.



## SERVIR arms Hurricane Dean responders with just-in-time images

The day before Hurricane Dean was predicted to make landfall in Central America, the government of Belize, directly in the path of the storm, requested assistance and information from NASA's SERVIR project. Marshall manages an experimentation and development facility for SERVIR at the National Space Science and Technology Center. The SERVIR team dug in and worked together, long-distance, and delivered information and imagery into the hands of the disaster response teams.

## STS-118 led to decision to redesign external tank ramps, brackets

STS-118 marked the first launch of shuttle Endeavour in more than four years, after the orbiter went through extensive modifications, including the addition of safety upgrades already added to Discovery and Atlantis. The 119th shuttle mission launched on Aug. 8 from the Kennedy Space Center, Fla., and continued International Space Station construction by delivering a third starboard truss segment. STS-118 marked the first full operation of the Advanced Health Management System, which actively operated on all three shuttle main engines and performed well. Liquid oxygen tank feedline bracket foam liberated from ET-117 during Endeavour's ascent led to a decision to modify the brackets on the tank for the next mission, ET-120 for STS-120.



## Marshall Center reclaims old Saturn test tunnel for new capability in East Test Area; 'RATT' roams tunnel to test laser technology

A new "RATT" began roaming one of the old tunnels under the Marshall Center's East Test Area. The "RATT," or Remote Automated Target Transporter, is a robot that moves targets up and down this 300-meter tunnel where engineers are testing sensors that could be used for automated docking to the International Space Station — or even landing on the moon. Built in 1957, the tunnel held miles and miles of cables and wiring used to transmit data during engine testing until the tunnel was cleaned out in 2006. Now, more information

than those cables could ever hold runs the length of the tunnel on one piece of fiber optic cable, no bigger than the size of an index finger.



### NASA awards first stage contract for Ares rockets

NASA signs a \$1.8 billion contract with Alliant Techsystems, known as ATK, located near Brigham City, Utah, for the design, development, testing and evaluation of the first stage of the Ares I and Ares V launch vehicles.



### NASA selects Ares I upper stage production contractor

NASA selects The Boeing Co., Huntsville, Ala., as the contractor to provide manufacturing support for design and construction of the upper stage of the Ares I rocket. Ares I will launch astronauts to the International Space Station and eventually help return humans to the moon.



### 15 years of successful discovery missions

NASA's Discovery Program celebrated its 15th anniversary with a science conference that brought together experts who lead Discovery's scientifically rich, lower cost missions. In 15 years, 10 missions endeavored to answer questions about how our solar system came to be and how we on Earth fit in. A two-day event hosted in Huntsville commemorated the successes of the completed Discovery missions: Mars Pathfinder, NEAR, Lunar Prospector, Genesis, Deep Impact and Stardust and also looked forward to the successes anticipated from those missions not yet complete: MESSENGER, Dawn and Kepler.

### J-2X powerpack test article installed on test stand

Core components of the J-2X engine are installed on the A-1 Test Stand at NASA's Stennis Space Center. Tests of the components, known as Powerpack 1A, will be conducted from November 2007 through February 2008. Marshall manages the J-2X upper stage engine for NASA's Constellation Program.



### NASA conducts first test of main parachute for Ares I rocket

NASA and industry engineers successfully completed the first drop test of the main parachute that will help recover the first stage of the Ares I crew launch vehicle. Ares I will carry the NASA's Orion crew exploration vehicle to space. The test, conducted on September 25 at the U.S. Army's Yuma Proving Ground near Yuma, Ariz., is part of an ongoing series of tests to support the design and development of the Ares I parachute recovery system, which is derived from the system NASA uses to recover the space shuttle's solid rocket boosters after launch.

### Annual Combined Federal Campaign kicks off

The 2007 Combined Federal Campaign effort at the Marshall Center began in October with its most ambitious goal yet — \$600,000 to be raised between Oct. 8 and Dec. 7. This year's effort was highlighted by several events, including a kickoff barbecue Sept. 25 featuring music, food and an inspirational message from Ralph Malone, president and chief executive officer of Triana Industries in Madison, Ala. Marshall also hosted a high-energy team rally Oct. 25, featuring speaker Amy George, director of special projects for the Huntsville Hospital Foundation, and challenging employees and contractors to put Marshall Center Director David King to work, "sweating for a day" at one of Huntsville's charitable organizations. By the close of the campaign, Marshall team members had raised more than \$684,139.63.



## Systems engineering at your fingertips; new guide for the Marshall Center goes live on the Web

With the click of a mouse, Marshall Center engineers have a guide to any systems engineering information they may need. The Systems Engineering Guide went live on the Web Oct. 1. The online tool is an overview, review and tutorial of how Marshall performs systems engineering — the coordination of all engineering efforts on a project.



## Marshall's Engineering Directorate realigns two departments

The Marshall Center's Engineering Directorate developed a plan to improve communications, operations and its commitments to customers. Its Spacecraft and Vehicle Systems Department and Space Systems Department realigned to become more product-focused departments to better serve the many programs and projects at Marshall.

## Marshall begins partnership with three new NASA Explorer Schools

Beginning in October, Marshall's Office of Academic Affairs held on-site kickoff celebrations honoring three new NASA Explorer Schools: Nodaway R-V School District in Ravenwood, Mo.; Harding Middle School in Des Moines, Iowa; and Church Point Middle School in Church Point, La. The three were among 25 new NASA Explorer Schools named in 2007 by NASA. Begun in 2003, the three-year partnership opportunities help teachers and schools motivate students to learn, and inspires them to pursue higher education and careers in math, science, engineering and technology fields.



## International Space Station achieves perfect "Harmony"

Harmony, the module formerly known as Node 2, was delivered to the International Space Station by the crew of space shuttle Discovery during the STS-120 mission, and was installed Oct. 26. Built by the Italian Space Agency and managed for NASA by the Marshall Center, Harmony will increase the living and working space inside the station to some 18,000 cubic feet, and will allow the addition of European and Japanese laboratories, dramatically expanding the station's science capabilities.

## Marshall's Engineering Directorate celebrates a NASA first

Ten years of work has paid off for the Marshall Center's Engineering Directorate. The flight software branches in its Space Systems Department and Spacecraft and Vehicle Systems Department are the first organizations among NASA centers to achieve a Software Engineering Institute Capability Maturity Model Integration (CMMI) level 3 rating. Capability Maturity Model Integration is a best practices model that provides organizations guidance and a common-sense approach to improve software processes.



## Former astronaut Eileen Collins visits Marshall to champion safety

Former shuttle commander Eileen Collins, the first woman to pilot an American spacecraft to orbit, was the guest speaker during the Marshall Center's "Safety & Mission Success Awareness Day," an outgrowth of NASA's annual Safety Day activities. In combination with the successful Safety & Health Expo held Oct. 30-31 at Marshall — featuring walking, running and biking challenges for team members — the Nov. 6 event was designed to promote and enhance safety consciousness in all areas of duty across the agency.

### Successful rocket motor test helps NASA's shuttle and Ares I



NASA's Space Shuttle Program successfully conducted a static firing of a four-segment reusable solid rocket motor Nov. 1 at a Utah facility. The two-minute test provided important information for continued launches of the shuttle and for development of the Ares I rocket, a key component of NASA's Constellation Program that will launch the Orion crew vehicle on missions to the moon. The test evaluation motor, or TEM-13, burned for approximately 123 seconds, the same time each reusable solid rocket motor burns during an actual space shuttle launch.



### Hinode reveals new insights about the origin of solar wind

New results from the Japanese satellite Hinode reveal that magnetic waves play a critical role in driving the solar wind into space at speeds of almost 1 million mph. Images from Hinode's sensitive X-ray telescope captured the cover of the December 7 issue of the journal Science. Marshall manages U.S. science operations and managed the development of scientific instrumentation provided by NASA, which partnered with the space agencies of Japan, the United Kingdom and Europe.



### Shuttle mission delayed; Marshall tests fuel sensor system

An electrical connection in the fuel sensor system in Atlantis' external tank prompted two postponements of the STS-122 mission to the International Space Station. Suspect electrical connections were removed from ET-125 on the launch pad at the Kennedy Space Center, Fla., and shipped to the Marshall Center where testing is underway. A replacement connector is being modified and the next launch date depends on test results. The next launch opportunity for STS-122 could come between Jan. 24 and the first week in February.

### NASA awards contract for Ares Instrument Unit Avionics.

NASA selects The Boeing Company as the prime contractor to produce, deliver and install avionics systems for the Ares I rocket. The avionics are the "brains" of the Ares I and will provide guidance, navigation and control for the rocket until it reaches orbit. The selection is the final major contract award for Ares I.

**Classified ads will return Jan. 17**  
The classified ads will resume in the Jan. 17 Marshall Star.

# MARSHALL STAR

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