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MARSHALL STAR

In This Week's Star ⊟ (Click to Expand)

NASA Launches Most Capable and Robust Rover to Explore Mars

NASA News Release

NASA began a historic voyage to Mars with the Nov. 26 launch of the Mars Science Laboratory, which carries a car-sized rover named Curiosity. Liftoff from Cape Canaveral Air Force Station, Fla., was aboard an Atlas V rocket.

Image right: Technicians at the Jet Propulsion Laboratory look over Curiosity. (NASA)

"We are very excited about sending the world's most advanced scientific laboratory to Mars," NASA Administrator Charles Bolden said. "MSL will tell us critical things we need to know about Mars, and while it advances science, we'll be working on the capabilities for a human mission to the Red Planet and to other destinations where we've never been."

The mission will pioneer precision landing technology and a sky-crane touchdown to place Curiosity near the foot of a mountain inside Gale Crater on Aug. 6, 2012. During a nearly two-year prime mission after landing, the rover will investigate whether the region has ever offered conditions favorable for microbial life, including the chemical ingredients for life.

"The launch vehicle has given us a great injection into our trajectory, and we're on our way to Mars," said MSL Project Manager Peter Theisinger of NASA's Jet Propulsion Laboratory in Pasadena, Calif. "The spacecraft is in communication,

thermally stable and power positive."

The Atlas V initially lofted the spacecraft into Earth orbit and then, with a second burst from the vehicle's upper stage, pushed it out of Earth orbit into a 352-million-mile journey to Mars.

"Our first trajectory correction maneuver will be in about two weeks," Theisinger said. "We'll do instrument checkouts in the next several weeks and continue with thorough preparations for the landing on Mars and operations on the surface."

Curiosity's ambitious science goals are among the mission's many differences from earlier Mars rovers. It will use a drill and scoop at the end of its robotic arm to gather soil and powdered samples of rock interiors, then sieve and parcel out these samples into analytical laboratory instruments inside the rover. Curiosity carries 10 science instruments with a total mass 15 times as large as the science-instrument payloads on the Mars rovers Spirit and Opportunity. Some of the tools are the first of their kind on Mars, such as a laser-firing instrument for checking rocks' elemental composition from a distance, and an X-ray diffraction instrument for definitive identification of minerals in powdered samples.

To haul and wield its science payload, Curiosity is twice as long and five times as heavy as Spirit or Opportunity. Because of its one-ton mass, Curiosity is too heavy to employ airbags to cushion its landing as previous Mars rovers could. Part of the MSL spacecraft is a rocket-powered descent stage that will lower the rover on tethers as the rocket engines control the speed of descent.

Image left: The Mars Science Laboratory, bolted inside the payload fairing of an Atlas V rocket, is hoisted into place on the launch pad. (NASA)

The mission's landing site offers Curiosity access for driving to layers of the mountain inside Gale Crater. Observations from orbit have identified clay and sulfate minerals in the lower layers, indicating a wet history.

Precision landing maneuvers as the spacecraft flies through the Martian atmosphere before opening its parachute make Gale a safe target for the first time. This innovation shrinks the target area to less than one-fourth the size of earlier Mars landing targets. Without it, rough terrain at the edges of Curiosity's target would make the site unacceptably hazardous.

The innovations for landing a heavier spacecraft with greater precision are steps in technology development for human Mars missions. In addition, Curiosity carries an instrument for monitoring the natural radiation environment on Mars, important information for designing human Mars missions that protect astronauts' health.

The mission is managed by JPL for NASA's Science Mission Directorate in Washington. The rover was designed, developed and assembled at JPL. NASA's Launch Services Program at the Kennedy Space Center managed the launch. NASA's Space Network provided space communication services for the launch vehicle. NASA's Deep Space Network will provide spacecraft acquisition and mission communication.

For more information about the mission, visit http://www.nasa.gov/msl.

For more information about the Deep Space Network, visit http://deepspace.jpl.nasa.gov/dsn.

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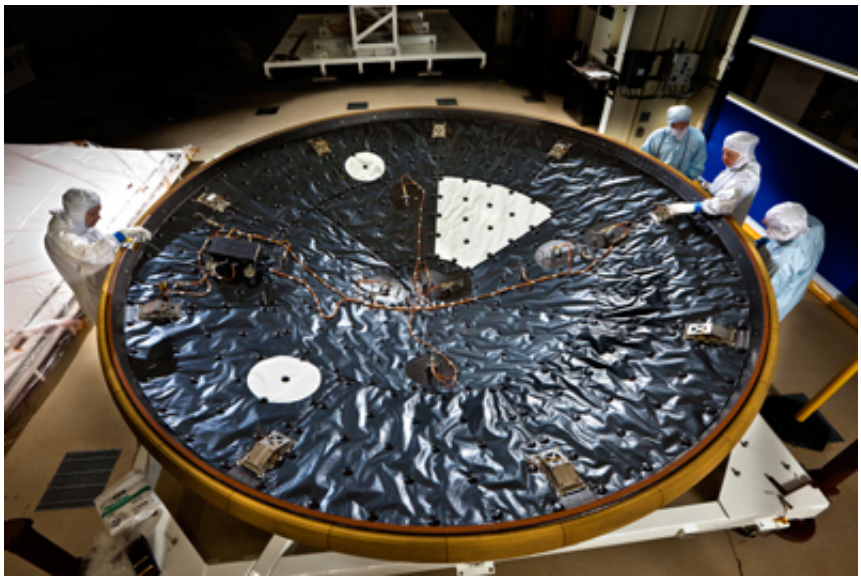
Marshall's First Technology Demonstration Mission Launched on Mars Science Laboratory on Nov. 26
By Sanda Martel



When NASA's Mars Science Laboratory launched Nov. 26 from Cape Canaveral Air Force Station, Fla., to deliver the advanced new science rover Curiosity to Mars, also aboard was a complex instrumentation payload with the potential to transform the way we live and work in space.

Image right: A set of sensors embedded in the heat shield will record heat and atmospheric pressure during the spacecraft's entry into the Martian atmosphere. (NASA)

The Mars Science Laboratory Entry Descent, & Landing Instrument, or MEDLI, is a set of engineering sensors to measure atmospheric conditions and performance of the entry vehicle heat shield during the laboratory's atmospheric entry and descent to the Red Planet. Results could have significant long-term effects on how we send future robotic and human missions to Mars.

MEDLI is one of nine Technology Demonstration Mission, or TDM, projects the Marshall Space Flight Center is overseeing through its Technology Development Missions Program Office.

"We are extremely pleased that MEDLI is the first flight demonstration in the TDM Program and look forward to the results from this mission," said John McDougal, manager of the program. The Technology Demonstration Missions Program is part of Marshall's Flight Programs and Partnership Office.

"The newly formed TDM Program is vital to NASA's technology maturation pipeline," he added. "The program provides a means for advancing new technologies, developed in a lab or on a test range, by demonstrating the concept in its relevant operating environment, usually in space, before incorporation into a NASA or other government mission."

The instrument suite's innovative Mars Entry Atmospheric Data System, or MEADS, pressure sensors will gather information about the aerothermal and aerodynamic characteristics of the entry vehicle as it descends and studies the Martian atmosphere itself. The MEDLI Integrated Sensor Plugs, or MISP, comprised of thermocouples and recession sensors, will analyze the performance of the Mars Science Laboratory's thermal protection system.

Close analysis of the mission is vital to NASA's future exploration of the Red Planet. The Mars Science Laboratory spacecraft will enter the Martian atmosphere traveling more than 3.5 miles per second -- the second fastest NASA entry to Mars to date, after the Pathfinder mission in 1997. The vehicle's aeroshell also is much larger than Pathfinder's, the craft itself is much heavier and its entry will include the first-ever guided lifting trajectory attempted there -- all conditions expected to result in the highest heat flux and shear stress ever faced by a vehicle's heat shield at Mars. The laboratory is scheduled to land on Mars in August 2012.

Because the Martian atmosphere is primarily composed of carbon dioxide, design and testing of the entry system to withstand such environments relies primarily on simulation tools. It is very difficult to conduct experiments on Earth that simulate all aspects of a Mars entry. As a consequence, the spacecraft had to be designed with large safety margins -- which come at the cost of payload mass. The results of the MEDLI experiment will help NASA dramatically reduce these margins on future missions, enabling more robust robotic studies and, in time, human journeys of discovery on Mars.

While not part of the core scientific payload of the Mars Science Laboratory, MEDLI will provide important engineering data for the design of entry systems for future planetary missions.

The instrument suite was designed and developed by Langley Research Center in partnership with Ames Research Center, Moffett Field, Calif. The mission is managed by the Jet Propulsion Laboratory in Pasadena, Calif., for NASA's Science Mission Directorate in Washington.

For more information about MEDLI and the Mars Science Laboratory, visit http://www.nasa.gov/mission_pages/tdm/medli/medli_overview.html.

For more information about Technology Demonstration missions, visit http://www.nasa.gov/mission_pages/tdm/main/tdm_overview.html.

Martel, an AI Signal Research Inc., employee, supports the Office of Strategic Analysis and Communications.

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Getting Closer to the Goal

The Marshall Space Flight Center's 2011 Combined Federal Campaign runs through Dec. 16. To date, Marshall's work force has contributed $476,305 toward the center's $700,000 goal.

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Samuel A. Ortega Selected to Manage Centennial Challenges Program at Marshall

By Rick Smith

Sam Ortega has been named as manager of the Centennial Challenges Program at the Marshall Space Flight Center. He was named to the post in September. Ortega leads day-to-day oversight and management of the Centennial Challenges, NASA's series of technology prize competitions founded in 2005 to stimulate innovation in technologies of interest to NASA and the nation. Centennial Challenges engage independent inventors -- small businesses, student groups and individuals -- to develop and demonstrate prize-winning solutions that may have a dramatic impact on industry, exploration and everyday life. NASA's Centennial Challenges are managed for the agency by the Marshall Center.


Sam Ortega (NASA/MSFC)

From 2001 to 2011, Ortega held a series of increasingly vital management and leadership positions in the Reusable Solid Rocket Booster Project Office, part of the Marshall Center's Space Shuttle Propulsion Office. From 2008-2011, he led the Reusable Solid Rocket Booster Motor Business Office, where he managed the operations budget for the project. Ortega also led the Reusable Solid Rocket Booster and Ares Ballistics and Motor Performance Teams from 2005-2011, ensuring the solid rocket motors performed safely and as predicted by Marshall engineers. He also led teams tasked with designing, testing and analyzing the shuttle's twin solid rocket boosters -- used during the first two minutes of shuttle launch to deliver more than 70 percent of the vehicle's liftoff thrust.

Ortega was a microgravity systems test engineer in Marshall's Engineering Directorate from 1996 to 2001, where he tested, integrated, provided flight support for and refurbished experiments and test facilities used aboard the space shuttle and the International Space Station. These included NASA's Microgravity Science Glovebox, which in September 2011 passed 10,000 hours of operation since it was delivered to the space station in 2002.

He joined NASA in 1987 as a structural stress analyst, completing stress and fracture analysis reports to flight certify experiments, hardware, satellites and other payloads scheduled to fly to space aboard the shuttle.

A native of Edinburg, Texas, Ortega earned a bachelor’s degree in civil engineering in 1989 from Texas A&M University in College Station. He has received numerous honors for his contributions and dedication to the nation’s space program, including a Silver Snoopy award, presented by NASA's Astronaut Corps in 2010 for his leadership of the Ballistics and Motor Performance Team; and a Space Flight Honoree Award in 2009 for his exceptional service to and support of the Reusable Solid Rocket Booster Project.

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Marshall Team to Ring in Holiday Cheer at Events Dec. 1, Dec. 6

The Marshall Space Flight Center team will see what fun it is to enjoy the holiday season at two celebrations in December.

The center will host a rocket-lighting ceremony from 4:45-5:15 p.m. Dec. 1 at Marshall's Rocket Park, near the intersection of Rideout and Mercury roads. Thousands of colored lights will twinkle all the way down the Saturn I -- the tallest of the park's historic rockets. The lights will be officially lit by Marshall Center Deputy Director Gene Goldman and a special guest from the North Pole. Guests will enjoy hot cocoa and cookies, and music by children from the Marshall Child Development Center. In case of rain, the event will be held on the 10th floor of Building 4200.

The Marshall Center will hold its annual holiday reception from 1-3 p.m. Dec. 6 at Activities Building 4316. Hors d'oeuvres and desserts will be provided by Kathleen's Catering & Chocolate Gallery of Huntsville. Marshall Center team members Shane Adkins, Lawrence Jones and Raul Mejia from the Marshall Exchange Music Club will offer live music throughout the reception. Guests also can get their picture made with Santa.

Both events are sponsored by the Marshall Exchange. Watch ExplorNet for more information.

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NASA Awards New Protective Services Contract

NASA news release

NASA has awarded Excalibur Associates Inc. of Alexandria, Va., a contract to provide protective services at the Marshall Space Flight Center and the Michoud Assembly Facility.

The firm-fixed-price contract begins Jan. 1, 2012, with a nine-month base period, followed by four one-year options and a one three-month option, which may be exercised at NASA's discretion. The performance period, including all options, has a total mission services price of $43.1 million and an additional maximum indefinite-delivery, indefinite-quantity value.

Under the contract, Excalibur will be responsible for providing support for physical and personnel security, technology protection and emergency management and training.

For more information about NASA and agency programs, visit http://www.nasa.gov.

Find this article at:

http://www.nasa.gov/centers/marshall/about/star/index.html