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Bill Ingalls / NASA

TOUCHDOWN!

Mars Science Laboratory hits the spot in Gale Crater

By Mark Whalen

Above left: The Mars Science Laboratory team in the mission support area reacts after learning the Curiosity rover has landed safely.

Above right: This image taken by Curiosity shows the rover's main science target, Mount Sharp, at a height of about 3.4 miles. The rover's shadow can be seen in the foreground, and the dark bands beyond are dunes.

You don't have to go to London to be an Olympic champion. JPL's Mars Science Laboratory has come through with a gold-medal performance in hitting its landing site to begin an unprecedented mission of exploration.

Culminating an eight-month journey of more than 350 million miles, Mars Science Laboratory's elaborate entry, descent and landing scheme that included a novel skycrane drop to the surface worked to perfection as the Curiosity rover was delivered to the team's intended landing ellipse at Gale Crater on Sunday, Aug. 5 at 10:32 p.m. Pacific time.

Confirmation of Curiosity's successful landing came in communications relayed by JPL's Mars Odyssey orbiter and received by the Canberra, Australia, antenna station of NASA's Deep Space Network. And when the voice of operations and flight dynamics lead Al Chen broke the silence in the 230 mission control room with "touchdown confirmed," it set off a raucous exultation of joy, celebration and relief.

JPL Director Charles Elachi said he walked outside mission control about an hour and a half before landing and stared up at Mars. "You are going to have a visitor," Elachi said he whispered. "And the planet smiled," Elachi said.

Elachi said Curiosity's landing has been inspiration to the young people of the world. "We hope that the tens of millions of people who have been sharing this adventure with us are the people who are going to be carrying the torch for continuing our exploration of the solar system."

Curiosity landed inside Gale Crater near the foot of Mt. Sharp, a 96-mile-high mountain named for late Caltech geologist Robert Sharp. After initial checkout of the rover's systems and science instruments, Curiosity will begin its two-year search for whether the region ever offered conditions favorable for microbial life.

"As incredible as our achievement was tonight, we just succeeded one more time in raising the bar even higher," said NASA Administrator Charles Bolden at a post-landing press briefing in von Kármán Auditorium.

"This mission has been an unprecedented technological tour de force," added White House science adviser John Holdren. "There is a one-ton, automobile-sized piece of American ingenuity sitting on the surface of Mars."

In a statement, President Obama congratulated the team for "the unprecedented feat of technology that will stand as a point of national pride far into the future. It proves that even the longest of odds are no match for our unique blend of ingenuity and determination."

There is a one-ton, automobile-sized piece of American ingenuity sitting on the surface of Mars.

White House science adviser John Holdren

"The administration is committed," added Holdren, "to a vibrant and coordinated strategy of Mars exploration and planetary exploration more generally, and continuing America's leadership here on Earth and throughout the solar system.

The celebratory mood continued in the post-landing briefing as panelists greeted members of the entry, descent and landing team, who had invaded von Karman, with high-fives.

"I think you can tell the team is ecstatic with tonight's results," deadpanned Mars Science Lab Project Manager Pete Theisinger, who drew cheers when recalling the successful landings of the Mars Exploration Rovers. "Eight years ago I sat on this stage after the landing of Spirit and three weeks later the landing of Opportunity. And I never thought I would say this, but this (Mars Science Lab) landing is better than that."

Theisinger thanked the families of team members for their understanding of the long and sometimes-unusual hours dedicated to the task of getting Curiosity on the ground at Mars. "This work is very hard and demanding, and without the support of the home front it can't be done successfully."

"That rocks, seriously!" said Deputy Project Manager Richard Cook. "I've been lucky enough to have done this four times, and it never gets old," referring to his leadership roles with JPL's three previous Mars rovers—Pathfinder (1997), Spirit and Opportunity.

Adam Steltzner, who led the entry, descent and landing team, was overwhelmed by the events. "I am and will be forever satisfied if this is the greatest thing I am ever given. To work with such a talented group of people, not just EDL but the entire team, it's a tremendous honor and humbling experience."

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Steltzner and wife Trisha are expecting their second child in a few weeks, and he confirmed that the girl would not be named Curiosity.

Theisinger said the team is in no hurry to start driving "this priceless national asset. We're going to take the time to understand how to operate in this challenging environment. Be patient with us, please."

For its first full day on Mars (Sol 1) on Aug. 6, Curiosity raised its high-gain antenna, which will increase the data rate at which the rover can communicate directly with Earth. The mission will use relays to orbiters as the primary method for sending data home, because that method is much more energy-efficient for the rover.

On Sol 2, plans call for additional checkout of science instruments and engineering systems, as well as obtaining the first images from the navigation camera on the mast. Sol 3 is planned for the first color images from the mast camera. Images of the surrounding terrain will be used for initial science assessment and planning.

Bill Ingalls / NASA

The Mars Science Lab team has been moving one marble a day since launch from jar to jar.

Curiosity carries 10 science instruments with a total mass 15 times as large as the science payloads on the Spirit and Opportunity rovers. Some of the tools are the first of their kind on Mars, such as a laser-firing instrument for checking elemental composition of rocks from a distance. The rover will use a drill and scoop at the end of its robotic arm to gather soil and samples of rock interiors, then sieve and move the samples into analytical laboratory instruments inside the rover.

Project Scientist John Grotzinger leads a seven-country team that includes nine principal investigators controlling 10 science instruments to attain Mars Science Lab's four main science goals: determine whether Mars has offered conditions favorable for life; characterize the planet's climate and geology; and prepare for human exploration.

Grotzinger took the opportunity to note the importance of the successful landing for younger space fans. "There is no greater inspiration for middle-school children who are going into math, science and engineering than a mission to Mars. The number of hits on the website is unparalleled. The emphasis on the excitement that this generates is what we bestow upon our children."

It's by another measure, Grotzinger added, that he considers the mission invaluable.

"The money, $2.5 billion—we don't put in the rover and send it to Mars; it's spent here on Earth. This whole enterprise, if you divide the cost by every woman, man and child in this country, comes out to the cost of a movie, and on behalf of all my colleagues in science, that's a movie I want to see."

For more information on the mission, visit *http://www.nasa.gov/mars* and *http://marsprogram.jpl.nasa.gov/msl*.

August 5, 2012 – 10:32 p.m. PDT

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2.

"Touchdown confirmed."

Operations and flight dynamics lead Al Chen

3.

1. Ann Deveraux, deputy lead for entry, decent and landing.
Photo: Thom Wynne / JPL Photo Lab

2. Richard Cook, deputy project manager.
Photo: Thom Wynne / JPL Photo Lab

3. Entry, descent and landing lead Adam Steltzner celebrates the landing.
Photo: Bill Ingalls / NASA

4. Reacting to Curiosity's successful touchdown are, from left, Fuk Li, Pete Theisinger, Charles Elachi, John Grunsfeld, Leslie Livesay.
Photo: Thom Wynne / JPL Photo Lab

9.

"We hope that the tens of millions of people who have been sharing this adventure with us are the people who are going to be carrying the torch for continuing our exploration of the solar system."

JPL Director Charles Elachi

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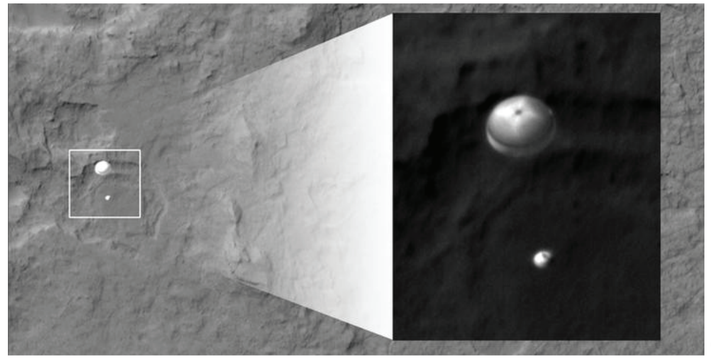


7.

9. Scores of space fans crowded New York City's Times Square to watch the landing activities live on huge-screen TV.
Photo: Used with permission, Navid Baraty / Navid Baraty Photography

8. Clara Ma, 15, who named the rover in a student contest three years ago, addresses a NASA social media event at JPL.
Photo: Bill Ingalls / NASA

7. Curiosity and its parachute were spotted by JPL's Mars Reconnaissance Orbiter as the rover descended to the surface on Aug. 5.

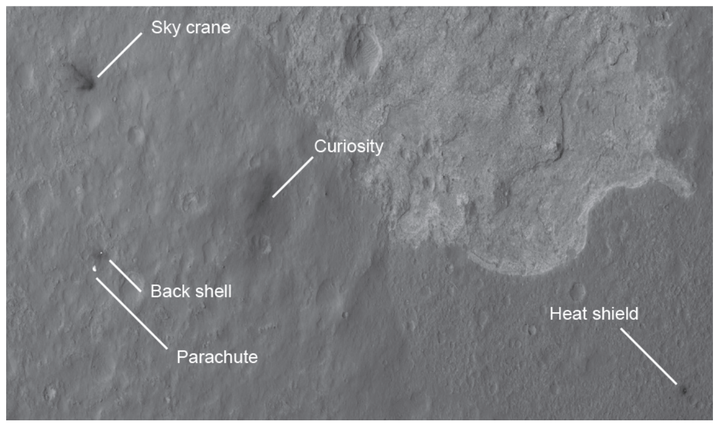
5.

Curiosity is an "unprecedented feat of technology that will stand as a point of national pride far into the future. It proves that even the longest of odds are no match for our unique blend of ingenuity and determination."

President Obama

5. The Mars Science Lab team meets prior to the landing.
Photo: Bill Ingalls / NASA

6. The four main pieces of hardware that arrived on Mars with Curiosity were spotted by the High-Resolution Imaging Science Experiment on JPL's Mars Reconnaissance Orbiter about 24 hours after landing.



6.

News Briefs

JPLer earns presidential award

Ian Clark of the Entry, Descent and Landing Systems and Advanced Technologies Group has been named a recipient of the 2011 Presidential Early Career Award for Scientists and Engineers.

Clark, one of six NASA employees to be honored, joined 90 other federal researchers who received their awards in a ceremony in July in Washington, DC.

Clark was recognized for exceptional leadership and achievement in the pursuit of advanced entry, descent and landing technologies and techniques for space exploration missions.

The awards represent the highest honor bestowed by the U.S. government on scientists and engineers beginning their independent careers. They recognize recipients' exceptional potential for leadership at the frontiers of scientific knowledge, and their commitment to community service as demonstrated through professional leadership, education or community outreach.

Ian Clark

JPLers (right side of the rope) compete in tug-of-war the Aerospace Summer Games.

Lab athletes compete in Aerospace Summer Games

More than 160 JPLers participated in the Aerospace Summer Games, held July 14-15 at Dockweiler Beach. It was by far the largest turnout at the annual friendly competition between Southern California aerospace organizations for JPL, which came in seventh out of 15 teams.

"This was an amazing year to attend with the beautiful weather and the high energy and enthusiasm of all the members on the JPL team," said Lauren Halatek, a robotics mechanical engineer in the Measurement Systems and Instrumentation Group who served as JPL's Aerospace Games coordinator.

Engineering and Science Director Leslie Livesay and Deputy Director Rene Fradet showed their support by greeting members of the JPL team, and demonstrated their golf skills during the new Executive Masters event. Other events were volleyball, horseshoes, balloon toss, human pyramid, relay race, tug-of-war and dodgeball.

To view the final results, go to *https://sites.google.com/site/aerospacesummergames/2012-results.*

Passings

Charles Hicks, 67, a pricing analyst in the Program Business Management Division, died June 30.

Hicks had been with JPL since 2002. Most of his years at the Lab were as business manager for missions of the Astronomy, Physics and Space Technology Directorate. He later served in a staff support position in Division 250.

He is survived by his wife, Rosemary, stepson Mario and granddaughter Maeve. A memorial was held July 30 in New Jersey.

Walt Brown

JPL radar sciences pioneer **Walter E. Brown Jr.**, 87, died July 9.

Brown joined the Lab in 1957. In 1960 he joined the newly formed Space Sciences Division as supervisor of the Science Data Handling Group. At this time he pioneered the development of a digital data handling system (the first such system flown in space by NASA) for Ranger spacecraft scientific instruments, and initiated the formation of the Radio/Radar Science Group, which developed the Venus radiometer that flew on Magellan. He later supervised the Radiosciences Group, which developed radars for aircraft, Lunar Sounder, Seasat and the Shuttle Imaging Radars. He also led the Aircraft Radar Group, which rebuilt the Aircraft Radar System using new digital techniques; the radar system has served as research and development tool for many disciplines for many years.

Brown received the NASA Medal for Exceptional Engineering in 1984 for outstanding achievement in pioneering imaging radar development, and the NASA Group Achievement Award in 1990 for the development and operation of the Airborne Imaging Radar System. He retired in 1991.

Brown is survived by his children Gregory, Timothy and Judith, and his grandson, Nic. He is preceded in death by his wife Jennie and his son Daniel.

Frank Colella

Frank Colella, 91, retired manager of JPL's Public Affairs Office, died July 29.

Colella joined JPL in 1959 as a public relations representative. In 1976 he was named manager of the Public Information Office (now the Media Relations Office) and was later named to manage JPL's Public Affairs Office. He retired in 1988.

Colella was awarded the NASA Exceptional Service Medal in 1973. A veteran of the U.S. Air Force, Colella in 2005 was belatedly awarded the Distinguished Flying Cross and two air medals—honors he should have been given in 1944. He was also recognized for chronicling the nation's space program at Kennedy Space Center's news center.

Colella is survived by his wife, Sally; daughters Victoria, Frances and Christine; and grandchildren Jessica, Maeia, Daniel and Christine. Memorial services were held Aug. 7 at St. Bede the Venerable Catholic Church in La Cánáda.

Letters

My family and I would like to express our sincere gratitude to co-workers and friends at JPL for their support during the recent passing of my beloved husband, Nyle. Your condolences, kind thoughts, prayers, cards, gifts, flowers and the plant from ERC were so comforting during this difficult time. Thanks to all of you who attended the memorial service. It really meant so much to me to have you there. I am truly blessed to have all of you in my life. Once again, thank s a million from the bottom of my heart!

Hanh and the Milam family

Thank you to the ERC for the lovely plant you sent during the recent passing of my mother-in-law, Kay Calas. Also, a thank you to my facility co-workers for your kind expressions of sympathy and for the nice potted flowers. Sincerely,

Ronni Sunde

Thank you very much to my JPL co-workers for your kind words and the beautiful plant I received on the passing of my mother. Your support helped me cope during a difficult time.

Hari Nayar

My heartfelt thanks go out to all of my JPL friends and co-workers for your kindness and support when my mother, Mildred LaBau, passed away. You have been a pillar of strength for me and my family. Sincerely,

Joanne Kennedy and family

I would like to thank my family and friends here at JPL for your kind thoughts and prayers during my mother-in-law's short illness and ultimately passing away. Your support means so much during a difficult time such as this. I would also like to thank JPL for the beautiful plant. Sincerely,

Susan Fowler

Retirees

The following employees retired in July: **Susan Foster**, 41 years, Section 2745; **Walter Proniewicz**, 38 years, Section 3870; **Victoria Wang**, 38 years, Section 317H; **David Deats**, 34 years, Section 2747; **Robert Nelson**, 32 years, Section 3227; **Michael Hecht**, 30 years, Section 3820; **George Lewis**, 28 years, Section 343J; **Ahmed Salama**, 27 years, Section 343D; **Robert Korechoff**, 26 years, Section 383D; **Cynthia Cooper**, 19 years, Section 1122; **Thomas Spilker**, 19 years, Section 312A.

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