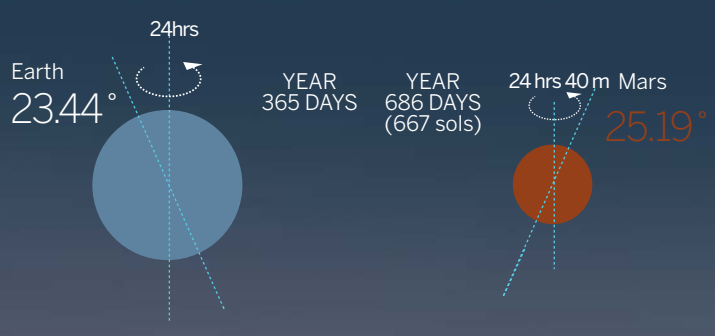
MARS ROVER CURIOSITY MAKES SAFE LANDING ON RED PLANET

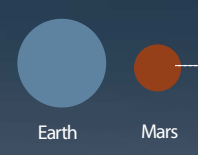
NASA scientists celebrated on Sunday as the space probe overcame the first hurdle in its search for signals of life.

WHY MARS?

First of all, there is evidence of water. And scientists are eager to know if some kind of organisms lived there a long time ago, or still do in very primitive forms. Among all the planets in our solar system, Mars is the closest to our world but there are not many similarities. And being able to live there without the help of technology would be impossible for us.



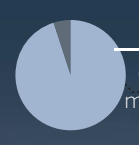
LET'S PUT EARTH AND MARS HEAD-TO-HEAD



53% Smaller than the Earth

10% The mass of the Earth

38% The gravity of Earth. You will be very light there.



95% Of its atmosphere is made out of poisonous Carbon Dioxide.

By STEVE GORMAN and **IRENE KLOTZ**
in Pasadena, California
Reuters

NASA's Mars science rover Curiosity landed safely late on Sunday after hurtling through the pink Martian skies at the start of a two-year quest for signs the Red Planet once hosted key ingredients for life.

Mission controllers burst into applause and cheered in relief as they received signals confirming that the rover had survived its perilous descent and arrived within its target zone at the bottom of a vast, ancient crater.

The robotic lab sailed through space for more than eight months, covering 566 million km, before piercing Mars' atmosphere at 20,921 km per hour — 17 times the speed of sound — before starting its descent.

Moments after landing, Curiosity beamed back its first three images from the Martian surface, one of them showing a wheel of the vehicle and the rover's shadow cast on the rocky terrain.

"I can't believe this. This is unbelievable," enthused Allen Chen, the deputy lead of the rover's entry, descent and landing team at the Jet Propulsion Laboratory near Los Angeles.

The craft's descent through Mars' thin atmosphere, a feat called the most elaborate and risky achievement in the annals of robotic spaceflight, turned out to be short-lived cliffhanger, much to NASA's relief.

Touch down

Curiosity, encased in a protective capsule-like shell, utilized a first of its kind automated flight entry system to sharply reduce its speed before landing.

Then it rode a giant supersonic parachute, a jet-powered backpack and a never before used "sky crane" to touch down inside a vast impact basin called Gale Crater, located near the planet's equator in its southern hemisphere.

NASA put the official landing time of Curiosity, the first full fledged mobile science laboratory sent to a distant world, at 10:32 pm on Sunday local time.

Curiosity will spend two years exploring Gale Crater and an unusual 5 km high mountain consisting of what appears to be sediments rising from the crater's floor.

The purpose of the $2.5 billion mission is to look for evidence that Mars — the planet most similar to Earth — may have once harboured the basic building blocks necessary for microbial life to evolve. It represents NASA's first astrobiology mission since the 1970s-era Viking probes.

The landing marks a major milestone for a US space agency beset by budget cuts and the recent loss of its 30-year-old space shuttle program.

"It's an enormous step forward in planetary exploration. Nobody has ever done anything like this," said John Holdren, the top science advisor to US President Barack Obama, who was visiting JPL for the event. "It was an incredible performance."

The exact condition of the rover upon arrival was not immediately clear. NASA plans to put the rover and its laboratory gear through several weeks of engineering checks before starting its two-year surface mission in earnest.

The rover, launched on Nov 26 from Cape Canaveral, Florida, comes equipped with an array of sophisticated instruments capable of analyzing samples of soil, rocks and atmosphere on the spot and beaming results back to Earth.

One is a laser gun that can zap a rock from 7 meters away to create a spark whose spectral image is analyzed by a special telescope to discern the mineral's chemical composition.

HOW BIG IS IT?

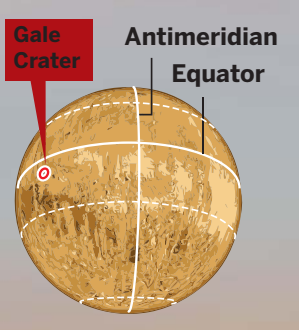
The Mini Cooper-sized rover is much bigger than its rover predecessors, Spirit, Opportunity and Sojourner. Curiosity is twice as long (about 2.8 meters, or 9 feet) and five times as heavy as Spirit and Opportunity, which landed in 2004. Sojourner, about the size of a microwave oven, landed in 1997 as part of the Mars Pathfinder mission.

Mars Pathfinder

Mars Exploration Rover (2007-2010)

Rover Curiosity

LANDING SITE



Crater named after Walter Frederick Gale, an amateur astronomer in the late 19th century

LANDING – WHERE AND HOW?

Curiosity will land near the foot of a mountain near the middle of Gale Crater. The landing system is similar to a sky crane heavy-lift helicopter. After a parachute slows the rover's descent toward Mars, a rocket-powered backpack will lower the rover on a tether during the final moments before landing. This method allows landing of a very large, heavy rover on Mars (instead of the airbag landing systems of previous Mars rovers). Other innovations enable a landing within a smaller target area than previous Mars missions.

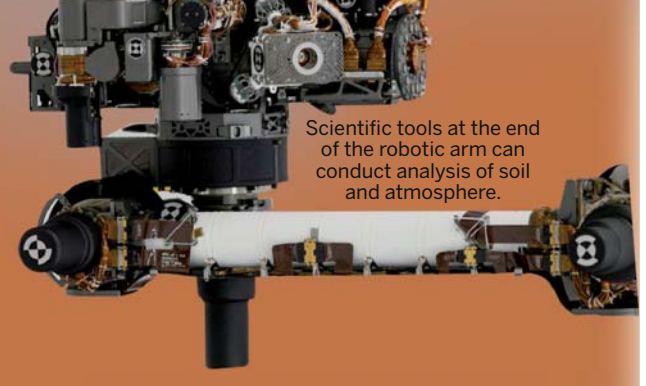
NASA'S MARS ROVER CURIOSITY LANDED INSIDE A GIANT CRATER ON MARS EARLY ON MONDAY. THE MISSION WILL STUDY WHETHER THE RED PLANET HAS EVIDENCE OF PAST AND PRESENT HABITABLE ENVIRONMENTS.

HOW DID CURIOSITY GET ITS NAME?

In 2008, NASA held a naming contest open to students and selected Curiosity, proposed by a sixth-grader from Kansas.

$2.5b

MISSION COST
Two and a half billion US dollars. One billion over its original budget.



FIRST IMAGE
Curiosity takes an image of its own shadow

WHEN WILL WE SEND ASTRONAUTS TO MARS?

US President Barack Obama has set a goal for astronauts to orbit Mars by the mid-2030s, to be followed by a landing. Before that can happen, the plan is to send astronauts to an asteroid first.