Curiosity's First Six Months on Mars:
from touchdown to drilling rocks

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Curiosity landed on Mars
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The HiRISE camera on the Mars Reconnaissance Orbiter took this action shot of Curiosity descending on the parachute!
Touchdown with the Sky Crane Landing System
“Touchdown confirmed.”
“Let’s see where Curiosity will take us.”
Cheers break out in mission control!
Curiosity’s primary scientific goal is to explore and quantitatively assess a local region on Mars’ surface as a potential habitat for life, past or present

• Biological potential
• Geology and geochemistry
• Role of water
• Surface radiation
Target: Gale Crater and Mount Sharp
Curiosity’s Investigation Teams

REMOTE SENSING

**Mastcam** (M. Malin, MSSS) - Color and telephoto imaging, video, atmospheric opacity

**ChemCam** (R. Wiens, LANL/CNES) – Chemical composition; remote micro-imaging

CONTACT INSTRUMENTS (ARM)

**MAHLI** (K. Edgett, MSSS) – Hand-lens color imaging

**APXS** (R. Gellert, U. Guelph, Canada) - Chemical composition

ANALYTICAL LABORATORY (ROVER BODY)

**SAM** (P. Mahaffy, GSFC/CNES/JPL-Caltech) - Chemical and isotopic composition, including organics

**CheMin** (D. Blake, ARC) - Mineralogy

ENVIRONMENTAL CHARACTERIZATION

**MARDI** (M. Malin, MSSS) - Descent imaging

**REMS** (J. Gómez-Elvira, CAB, Spain) - Meteorology / UV

**RAD** (D. Hassler, SwRI) - High-energy radiation

**DAN** (I. Mitrofanov, IKI, Russia) - Subsurface hydrogen

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**Wheel Base:** 2.8 m
**Height of Deck:** 1.1 m
**Ground Clearance:** 0.66 m
**Height of Mast:** 2.2 m
**Mass:** 900 kg
Curiosity’s Science Payload

- ChemCam (Chemistry)
- Mastcam (Imaging)
- REMS (Weather)
- DAN (Subsurface Hydrogen)
- SAM (Chemistry and Isotopes)
- CheMin (Mineralogy)
- APXS (Chemistry)
- RAD (Radiation)
- MAHLI (Imaging)
- MARDI (Imaging)
- Drill Scoop Brush Sieves

Drill Scoop Brush Sieves
First Observations at Bradbury Landing
Mastcam-34 mosaic of Mount Sharp, descent rocket scours, and rover shadow

NASA/JPL-Caltech/MSSS
Navigation camera panorama of Bradbury Landing
The Multi-Mission Radioisotope Thermoelectric Generator (MMRTG) on the MSL Rover was chosen for use to:

- maintain Rover electronics and science instruments within their specific thermal limits
  - The MMRTG waste heat is used by the MSL Rover’s thermal subsystem

- enable operations of the rover at any latitude, enabling the consideration of the largest set of landing sites possible

- allow for obtaining the greatest number of science samples from all possible landing sites being considered by the Mars Program

- enable operations during the day or night

- enable navigation through challenging terrain without (considering the view to the Sun)

- enable science operations throughout the Martian year

Curiosity on Mars with a Nuclear Power Source (NPS)
Looking North to Crater Rim
Stretching Out the Arm
Driving!
Science results thus far reveals an ancient streambed, likely originating at the northern crater rim.
MAHLI Portraits and Rocknest Scooping Campaign
Images of Curiosity’s turret centered on MAHLI (left) and APXS (right)
Curiosity images its undercarriage with its Mars Hand-Lens Imager
Wheel scuff to prepare for safe scooping
MAHLI view of coarse (0.5 to 1.5 mm) sand from the ripple’s surface, and fine (< 0.25 mm) sand on wall and floor of trench.
Curiosity self-portrait at Rocknest

Assembled from 55 MAHLI images

Shows four scoop trenches and wheel scuff
The Glenelg Region and Yellowknife Bay
Curiosity is currently exploring Yellowknife Bay, a basin within the Glenelg region.
Postcards from Yellowknife Bay showing a diversity of rock types, fractures, and veins
First use of dust-removing brush
PRELIMINARY
(3 FRAMES
IN THIS PART OF
THE MOSAIC
ARE STILL TO
BE RETURNED FROM MARS)
Curiosity’s first surface contact with the drill on Mars was in Yellowknife Bay
The first drill contact was a divot test using our percussive capabilities.
Curiosity then went on to make her first drill hole on Mars!
Mount Sharp,
The Ultimate Destination
Curiosity’s ultimate goal is to explore the lower reaches of the 5-km high Mount Sharp.
Layers, Canyons, and Buttes of Mount Sharp

This boulder is the size of Curiosity

NASA/JPL-Caltech/MSSS
Follow Curiosity as She Explores Gale Crater

Mission Website: mars.jpl.nasa.gov/msl

Twitter: @MarsCuriosity
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www.nasa.gov/msl