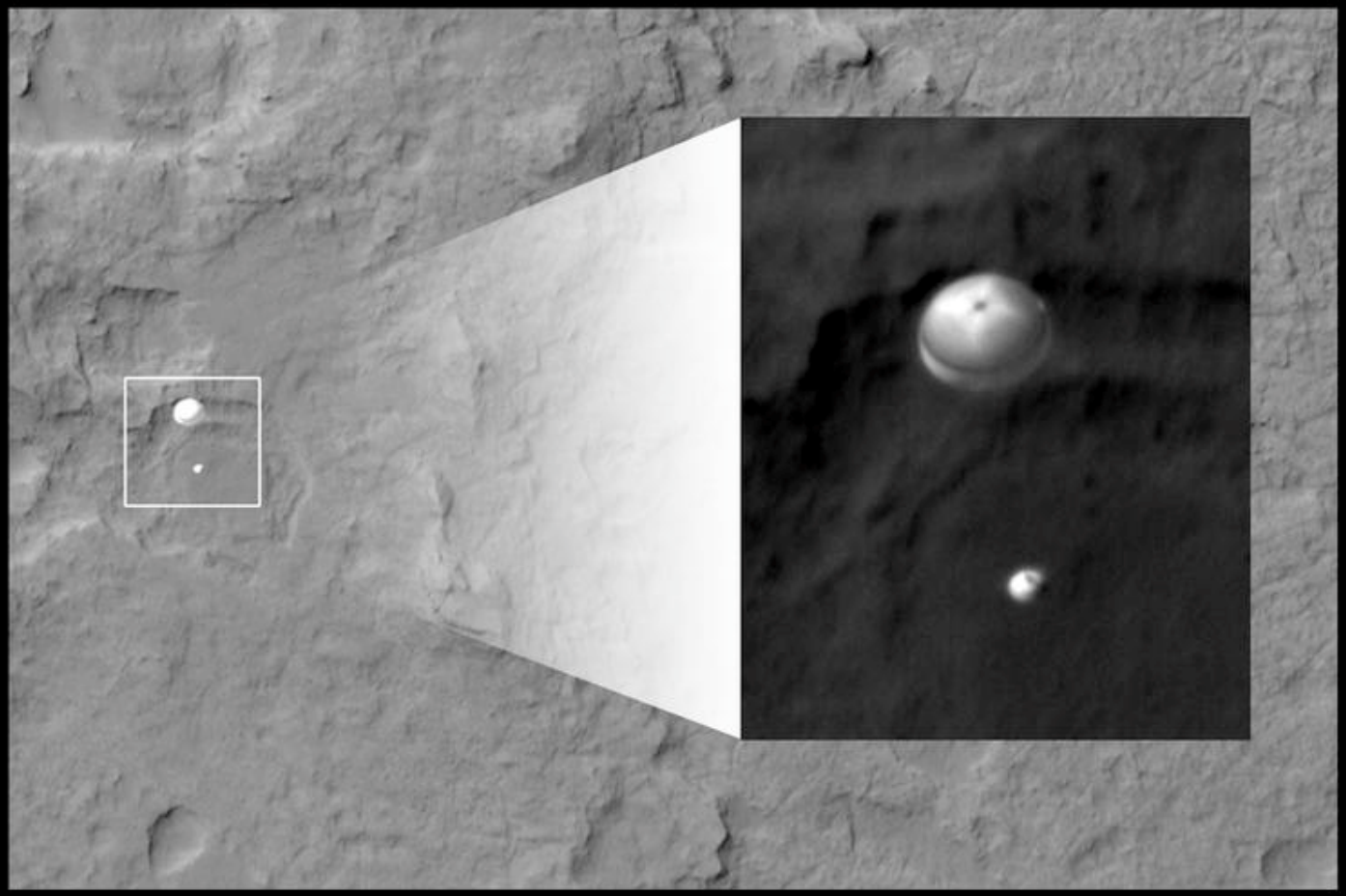
CURIOSITY

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

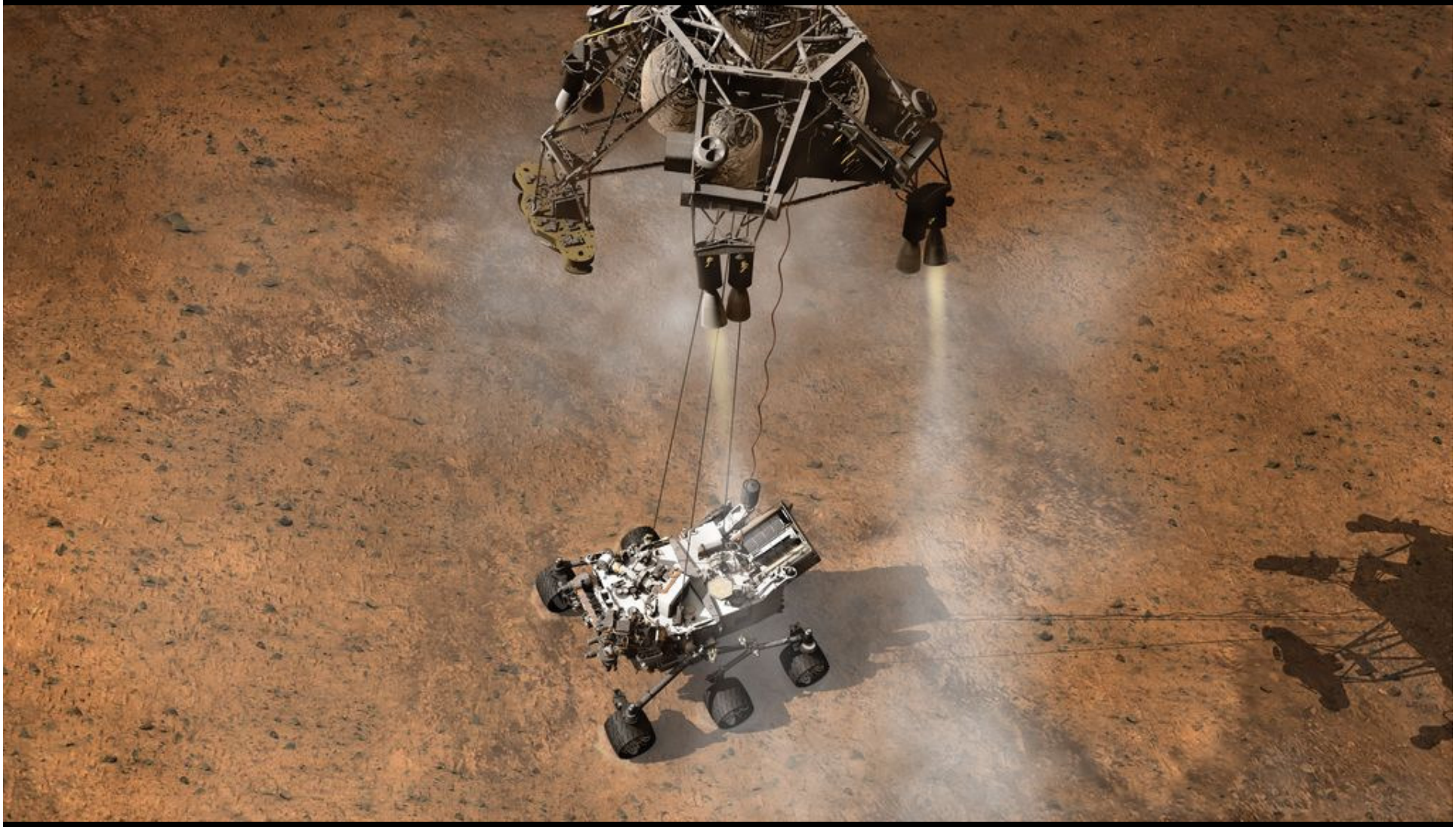
Noah Warner
Tactical Uplink Lead
Jet Propulsion Laboratory
California Institute of Technology
February 12, 2013

Curiosity landed on Mars August 5, 2012 (PDT)



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

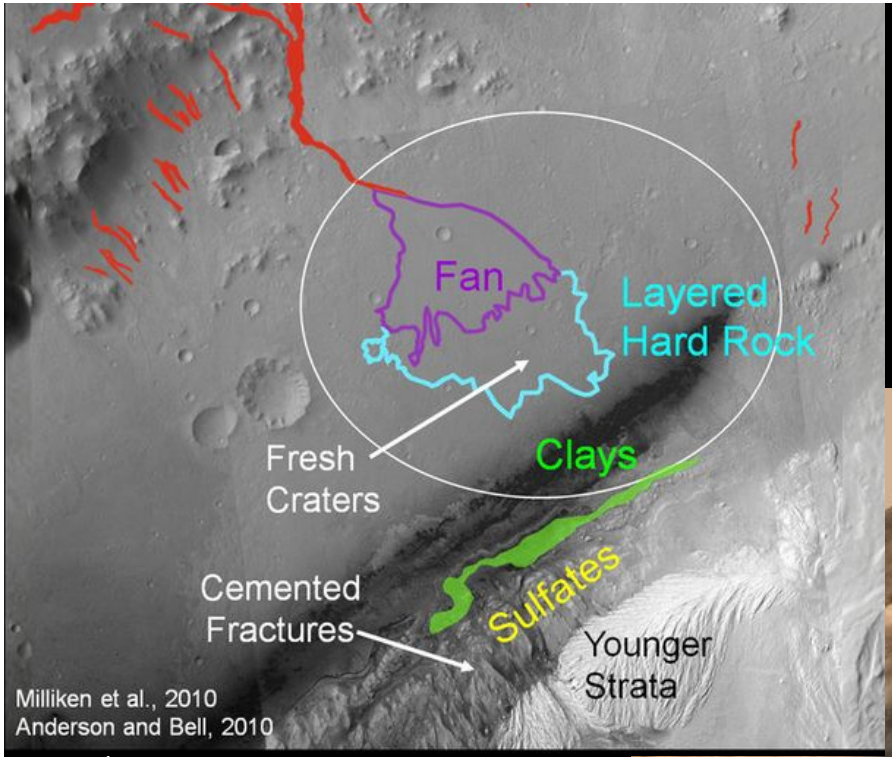


Curiosity's primary scientific goal is to explore and quantitatively assess a local region on Mars' surface as a potential habitat for life, past or present

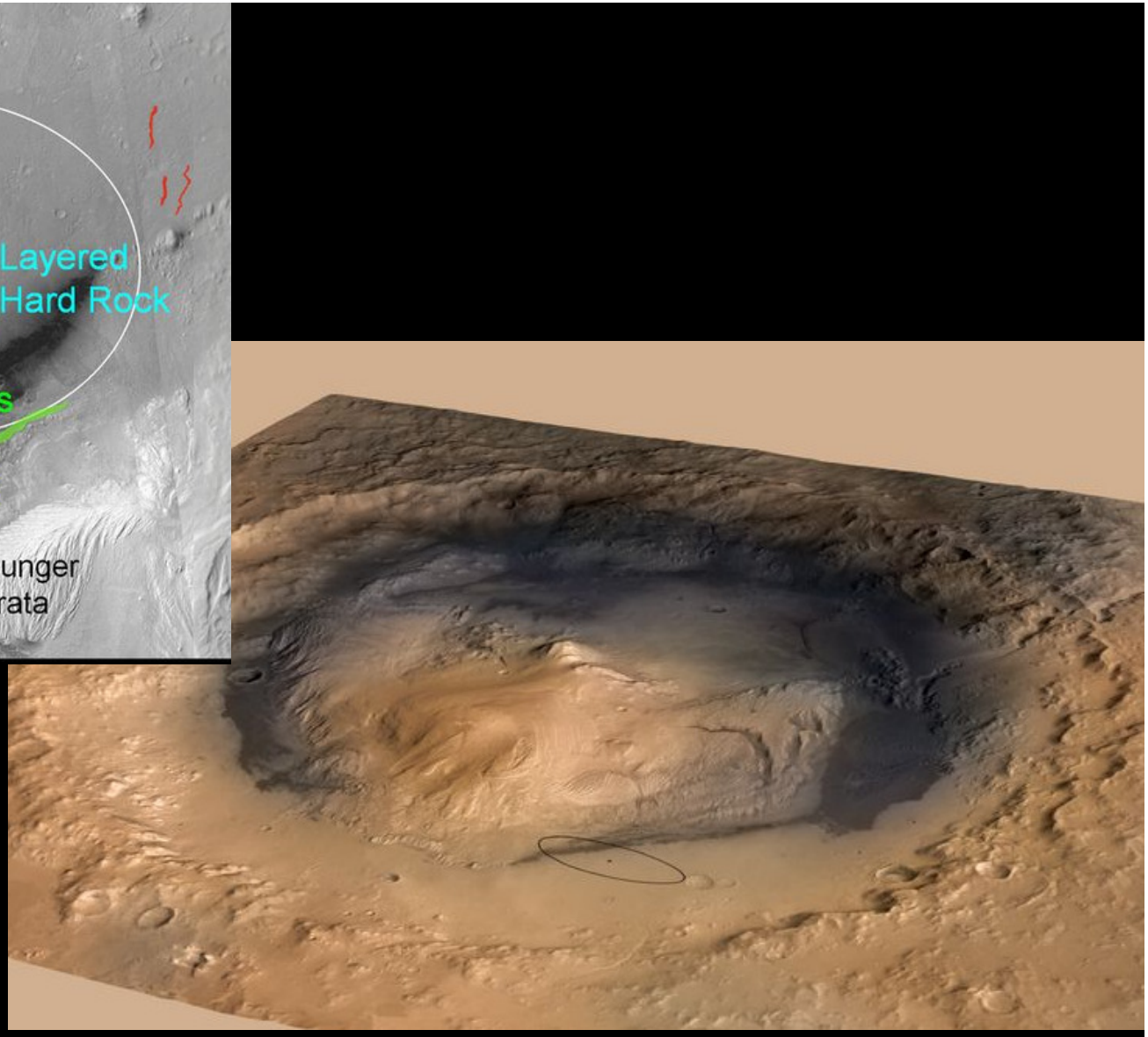
- Biological potential
- Geology and geochemistry
- Role of water
- Surface radiation

NASA/JPL-Caltech

Curiosity's Science Objectives



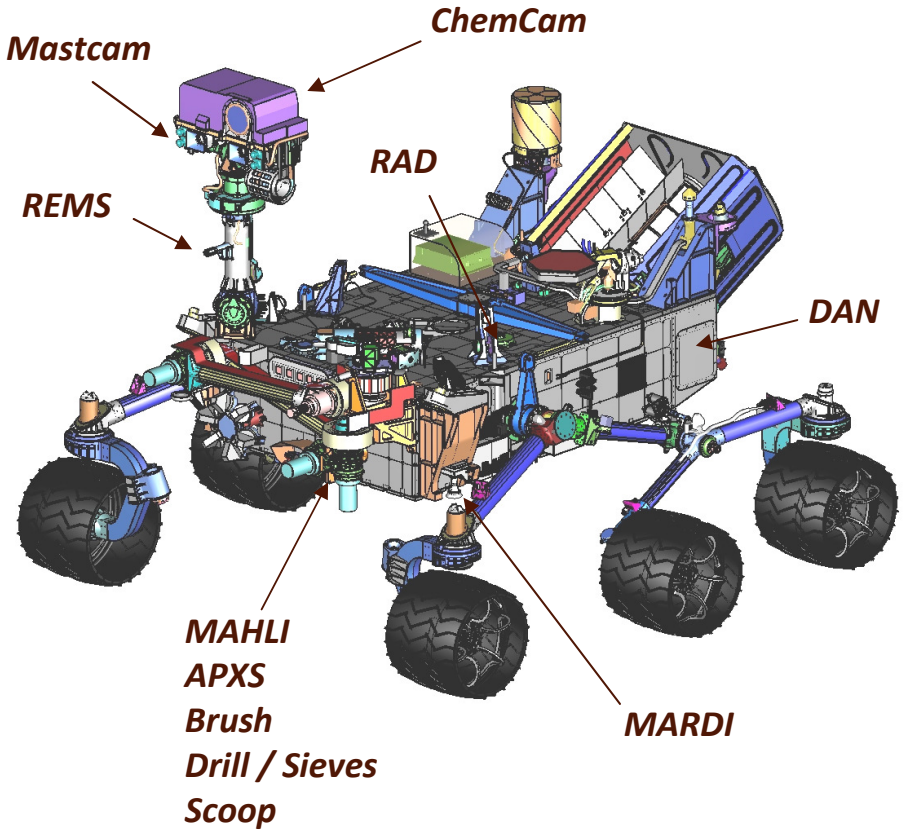
NASA/JPL-Caltech



NASA/JPL-Caltech/ESA/DLR/FU Berlin/MSSS

CURIOSITY

Target: Gale Crater and Mount Sharp



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**

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

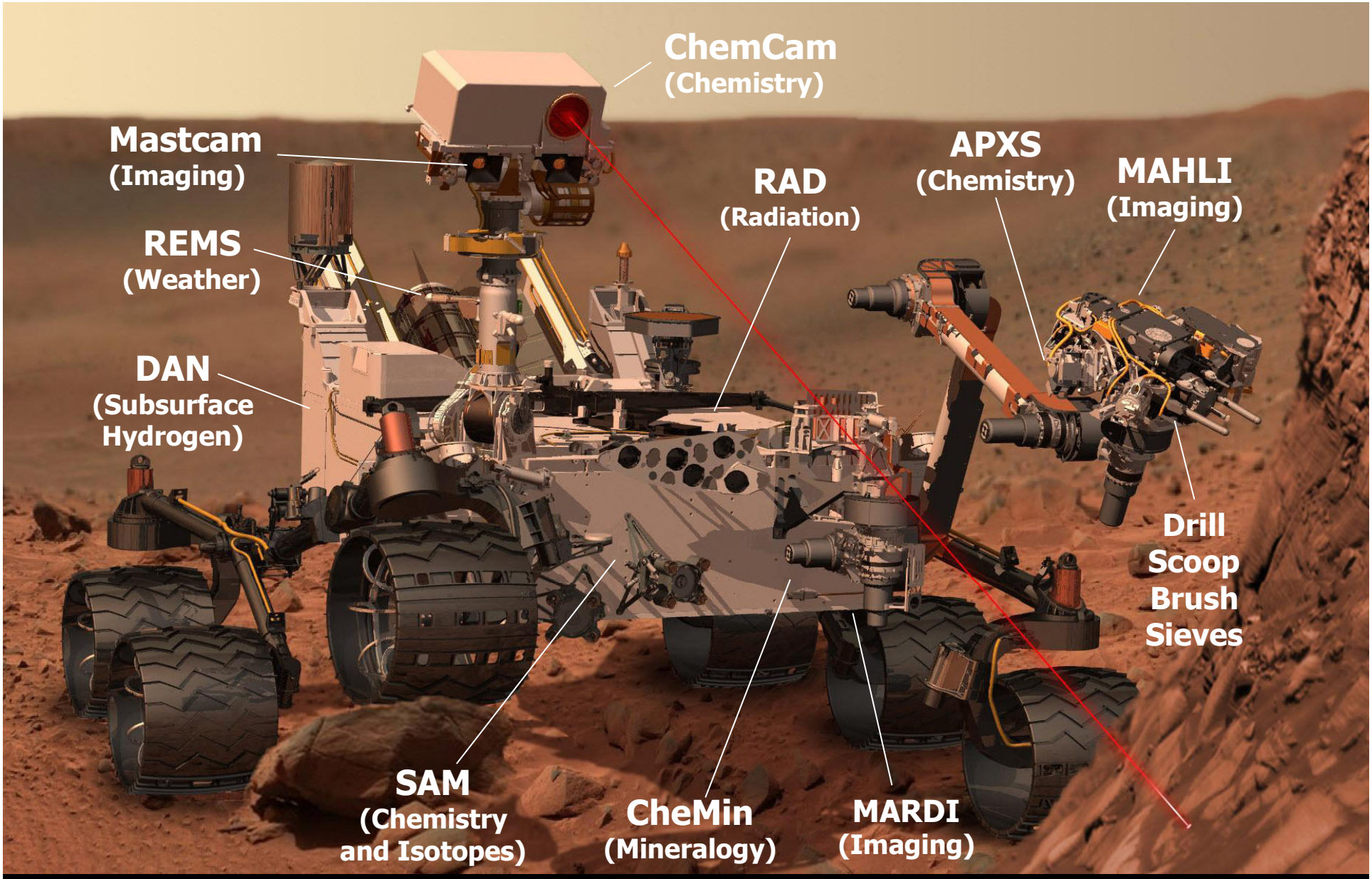
REMS (J. Gómez-Elvira, CAB, Spain) - Meteorology / UV

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

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

CURIOSITY

Curiosity's Investigation Teams



CURIOSITY

Curiosity's Science Payload

First Observations at Bradbury Landing

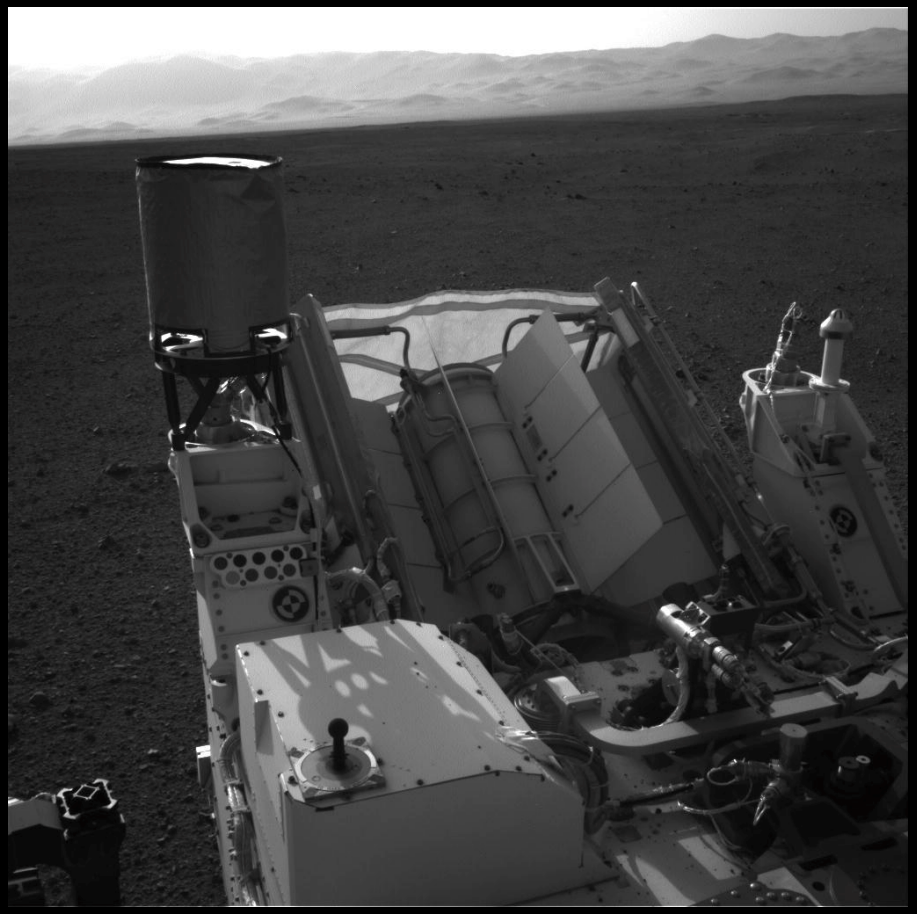
NASA/JPL-Caltech/MSSS

CURIOSITY

Mastcam-34 mosaic of Mount Sharp, descent rocket scours, and rover shadow

CURIOSITY

Navigation camera panorama of Bradbury Landing

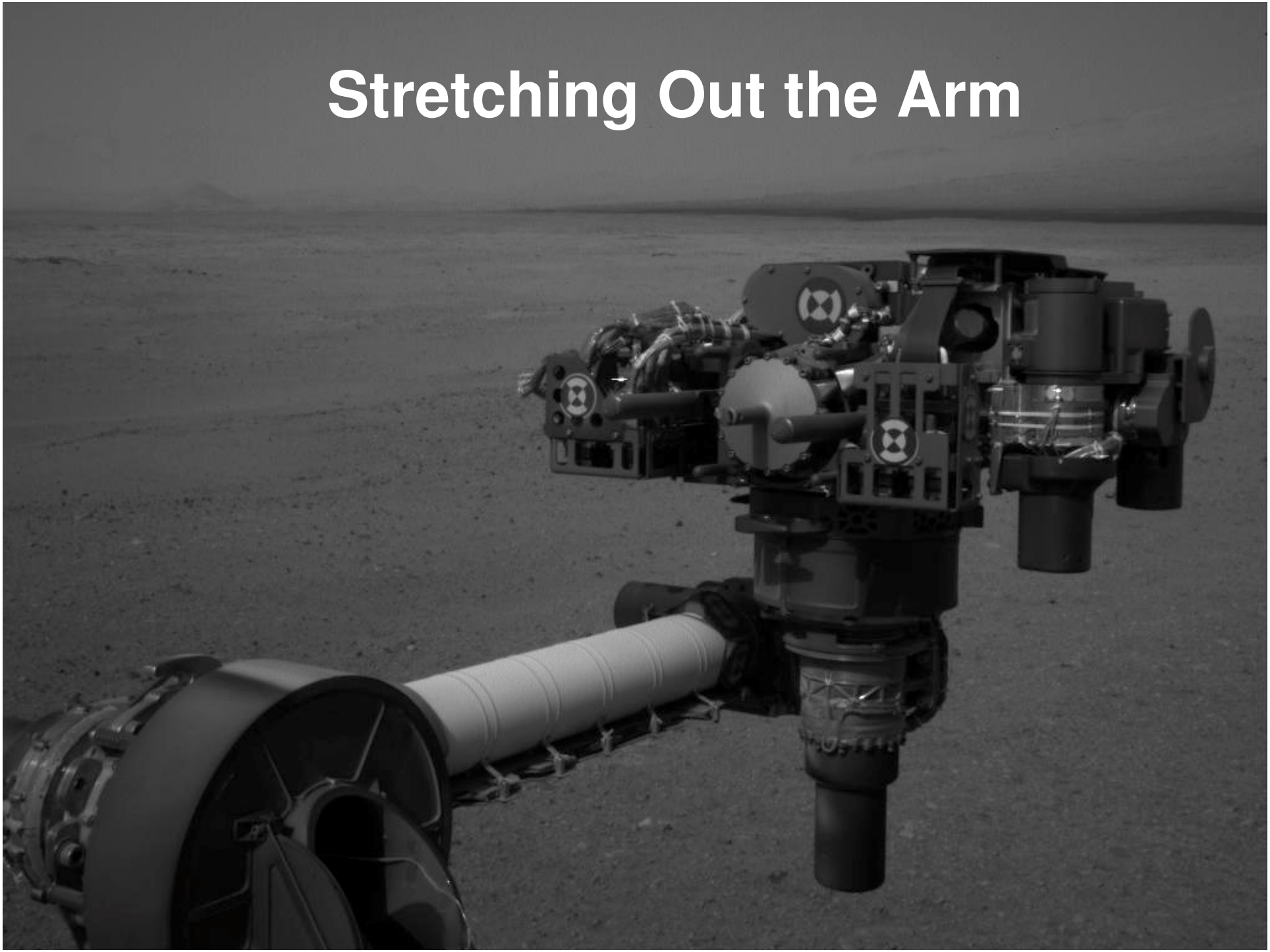


The Multi-Mission Radioisotope Thermoelectric Generator (MMRTG) on Curiosity was selected to:

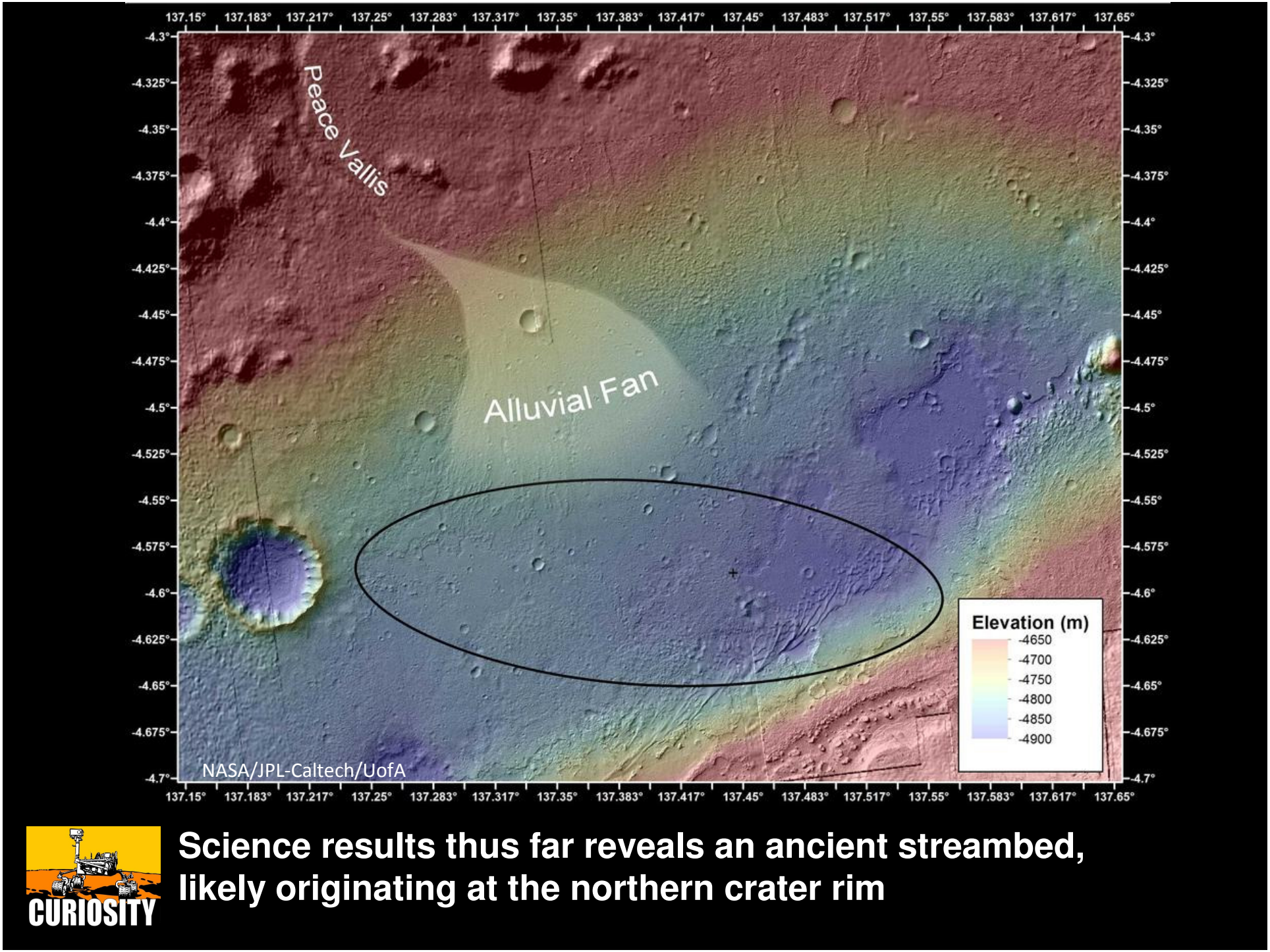
- maintain rover electronics and science instruments within their specific thermal limits
  - The MMRTG waste heat is used by the rover's thermal subsystem
- allow operations of the rover at any latitude, enabling the consideration of the largest set of landing sites possible
- enables the greatest number of science samples from all possible landing sites 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)

Stretching Out the Arm



Driving!



CURIOSITY

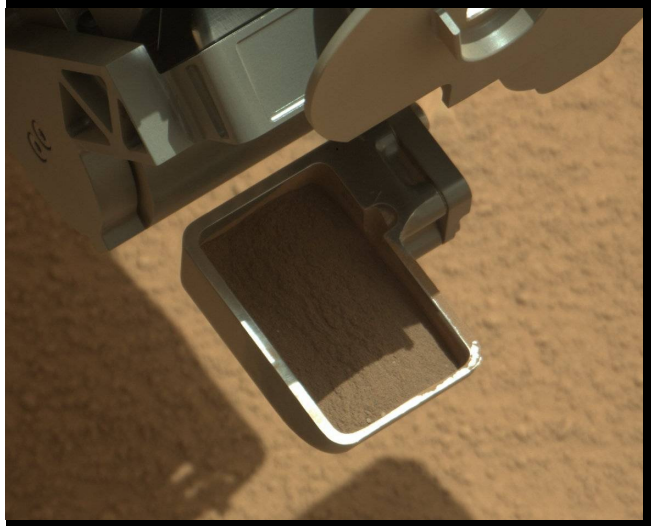
Science results thus far reveals an ancient streambed, likely originating at the northern crater rim

Rocknest Scooping Campaign

Wheel scuff to prepare for safe scooping

NASA/JPL-Caltech

CURIOSITY



NASA/JPL-Caltech/MSSS

CURIOSITY

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

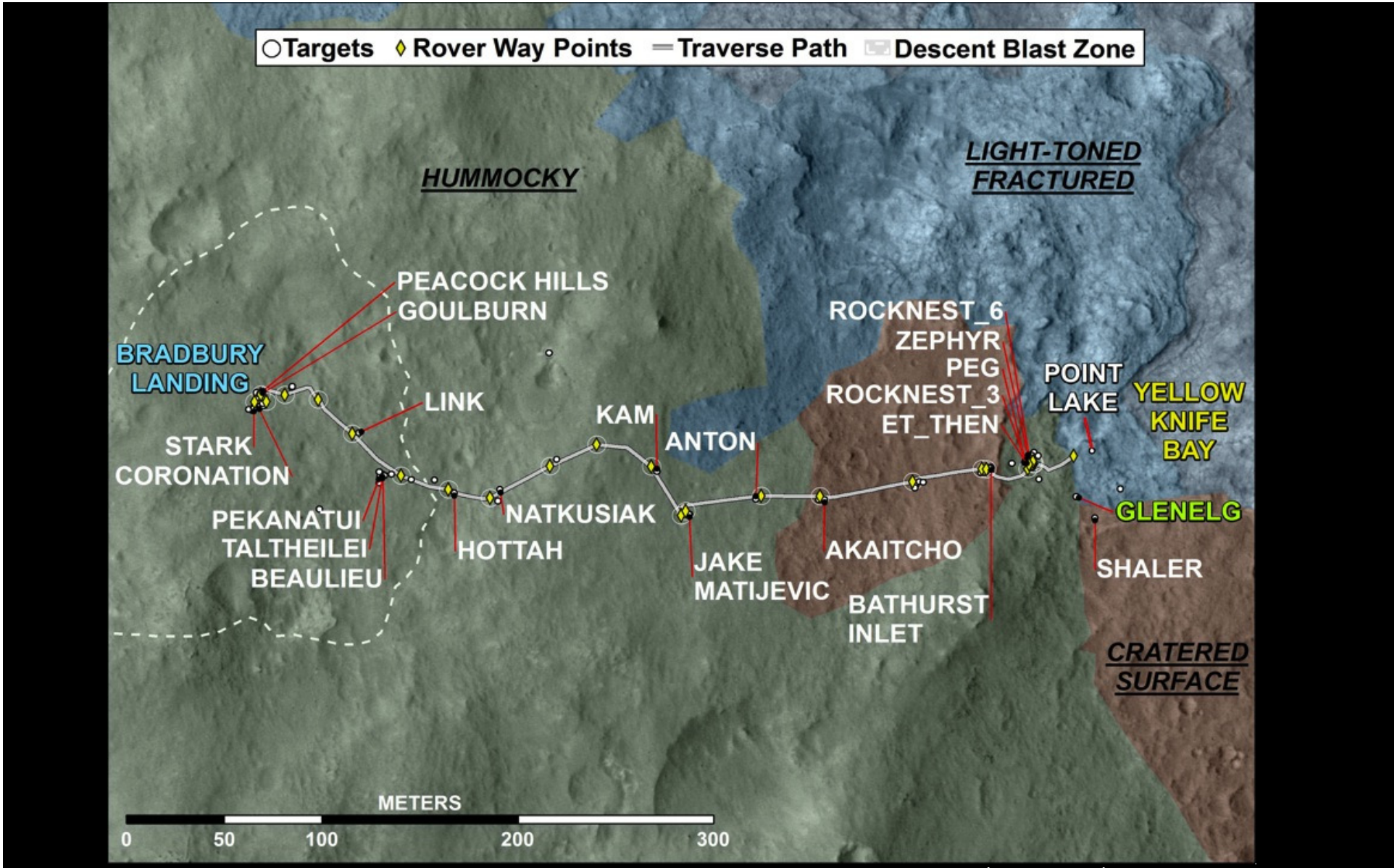
Assembled from 55 MAHLI images

Shows four scoop trenches and wheel scuff

CURIOSITY

NASA/JPL-Caltech/MSSS

The Glenelg Region and Yellowknife Bay



NASA/JPL-Caltech/Univ. of Arizona

CURIOSITY

Curiosity is currently exploring Yellowknife Bay, a basin within the Glenelg region

NASA/JPL-Caltech/MSSS

Postcards from Yellowknife Bay showing a diversity of rock types, fractures, and veins

CURIOSITY

NASA/JPL-Caltech

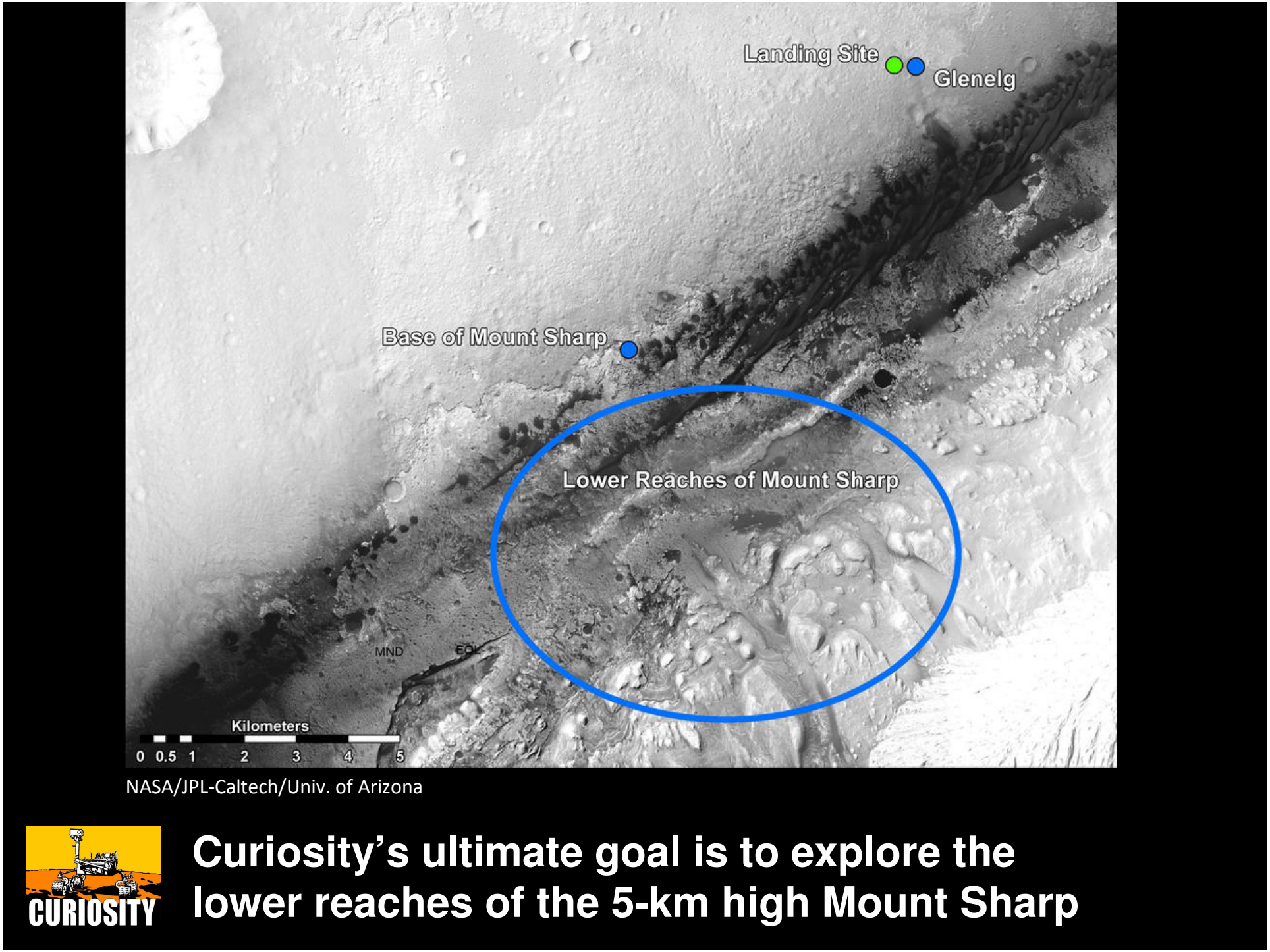
CURIOSITY

Curiosity's first surface contact with the drill on Mars was in Yellowknife Bay

CURIOSITY

Curiosity then went on to make her first drill holes on Mars!

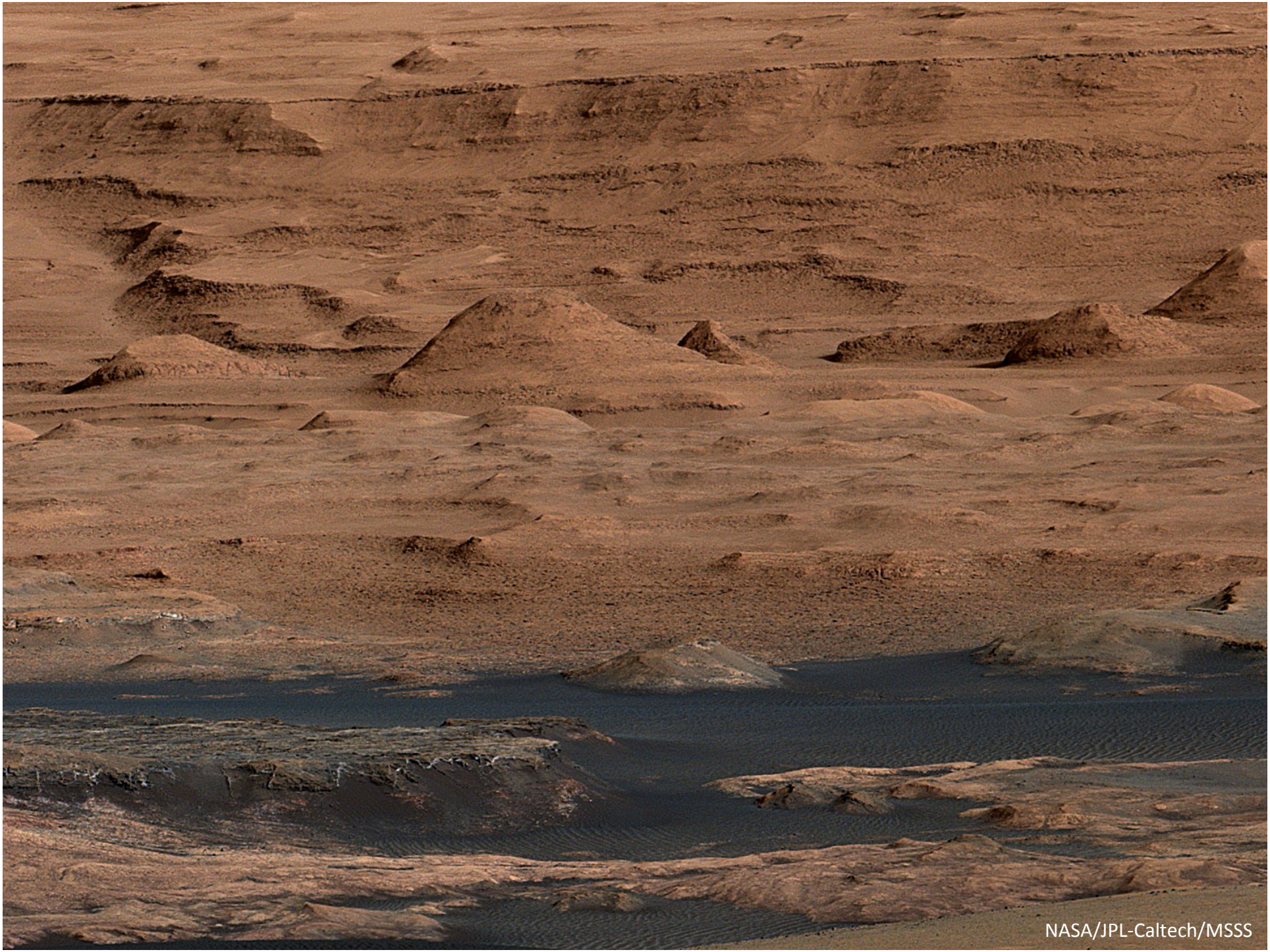
Mount Sharp,
The Ultimate Destination



NASA/JPL-Caltech/Univ. of Arizona

CURIOSITY

Curiosity's ultimate goal is to explore the lower reaches of the 5-km high Mount Sharp


NASA/JPL-Caltech/MSSS


NASA/JPL-Caltech/MSSS

NASA/JPL-Caltech/MSSS

CURIOSITY

Layers, Canyons, and Buttes of Mount Sharp

Follow Curiosity as She Explores Gale Crater

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

Twitter: @MarsCuriosity
Facebook: MarsCuriosity

Be A Martian!
beamartian.jpl.nasa.gov

www.nasa.gov/msl

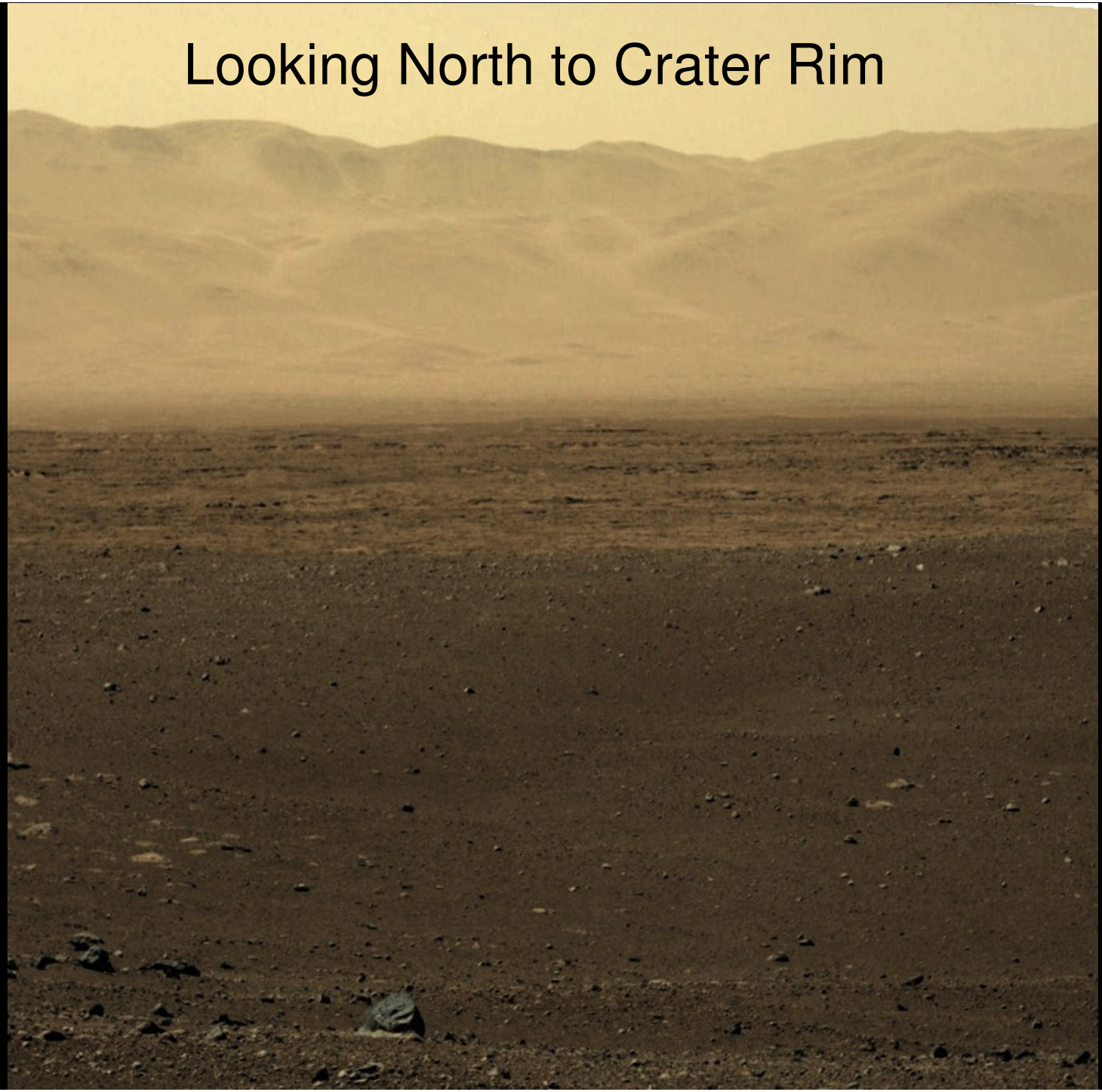
Backup Slides

NASA/JPL-Caltech

CURIOSITY

“Touchdown confirmed.”
“Let’s see where Curiosity will take us.”

Looking North to Crater Rim



Cheers break out in mission control!

NASA/JPL-Caltech

CURIOSITY

First use of dust-removing brush

CURIOSITY

The first drill contact was a divot test using our percussive capabilities