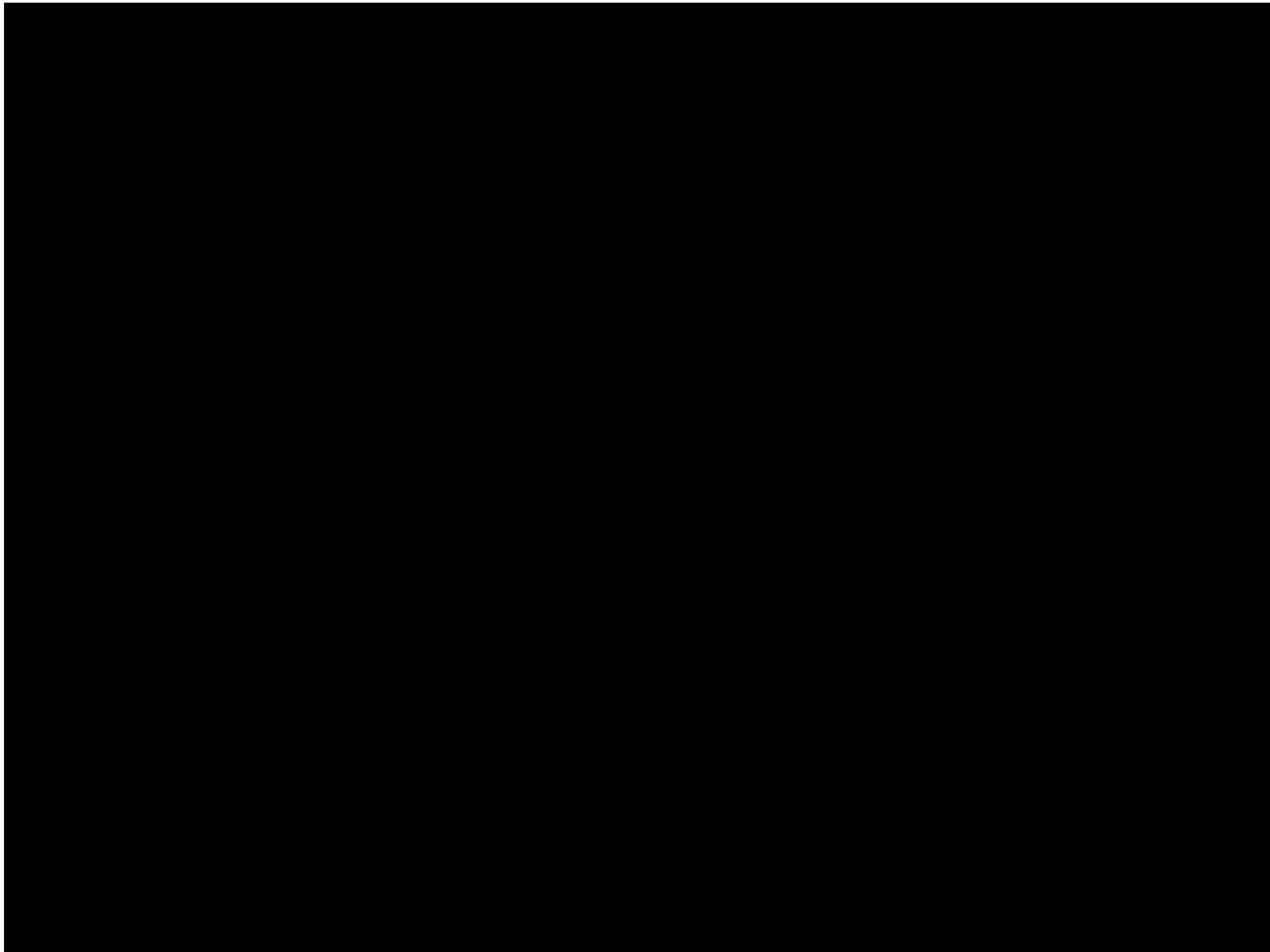




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SCIENCE<sup>ET</sup> MÉDIAS**



# Science Media Centre of Canada Webinar

## Mars Curiosity Mission: The Canadian Contribution

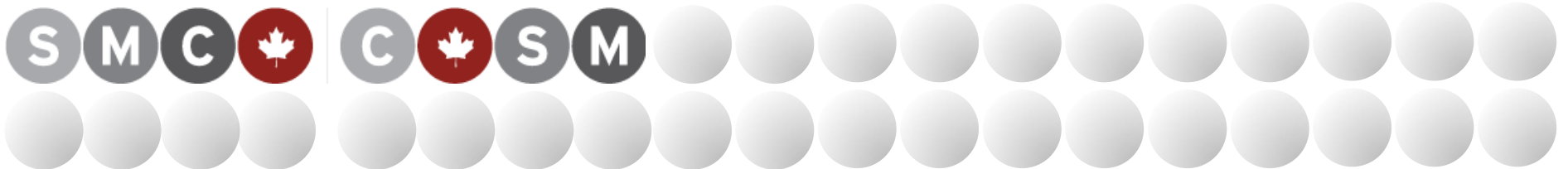
Tuesday July 31st, 2012 11:00 AM EDT

**Richard Léveillé**, Planetary Scientist, Canadian Space Agency;  
Member of the Science Team, Mars Science Laboratory

**Ralf Gellert**, Assistant Professor, Dept. of Physics, University of Guelph;  
APXS Principal Investigator, Mars Science Laboratory

**John Spray**, Director, Planetary and Space Science Centre,  
University of New Brunswick; APXS Co-Investigator, Mars Science Laboratory

**Stéphane Desjardins**, Director, Space Exploration Projects,  
Canadian Space Agency



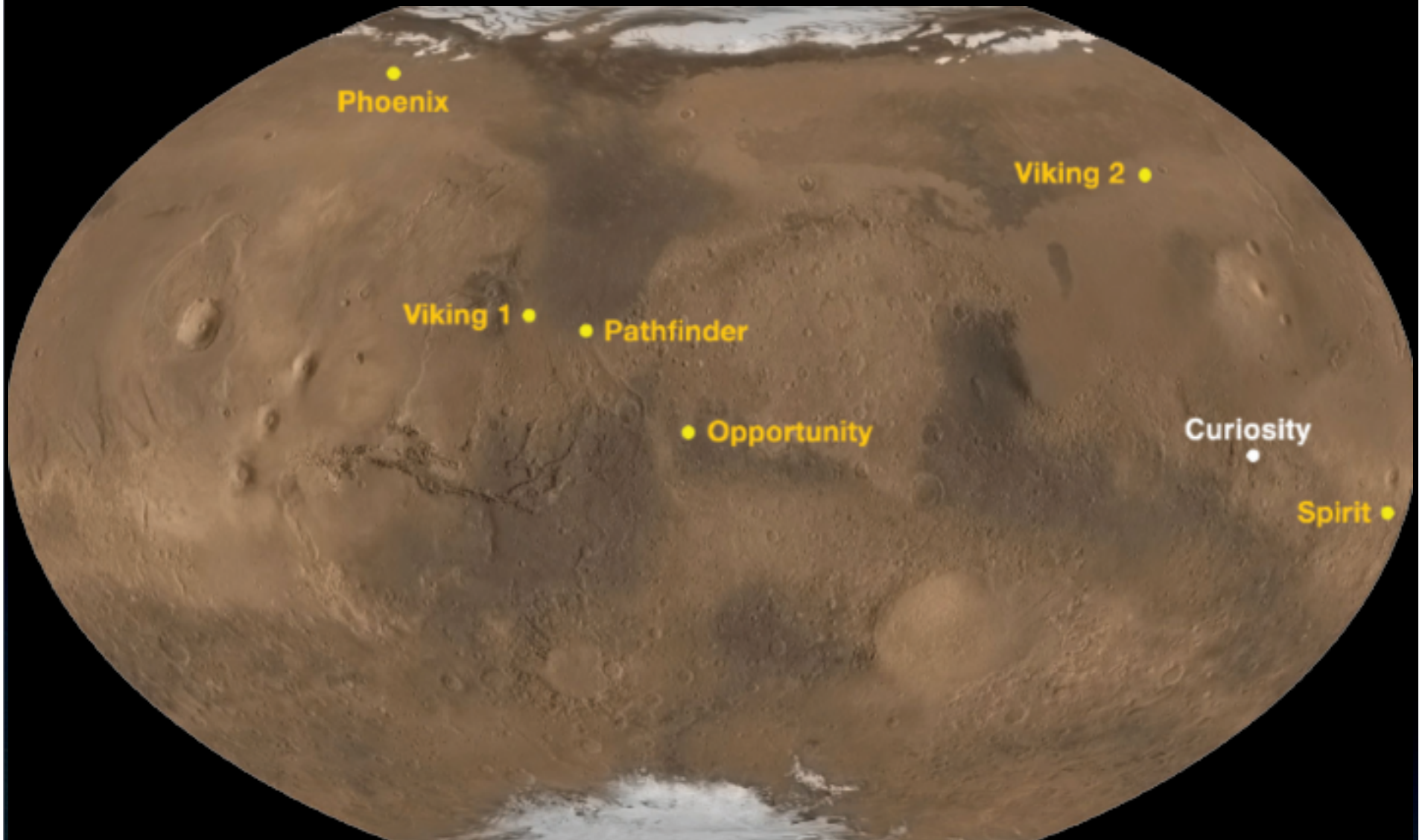


**Richard Léveillé**  
Canadian Space Agency





# Mars Rovers and Landers





# MSL Science Goals

**MSL's primary scientific goal is to explore Gale Crater as a potential habitat for life, and assess its potential for preservation of biosignatures.**

Objectives include:

- Assessing the **biological potential** of the site by investigating organic compounds, other relevant elements, and biomarkers
- Characterizing **geology and geochemistry**, including chemical, mineralogical, and isotopic composition, and geological processes
- Investigating the **role of water**, atmospheric evolution, and modern weather/climate
- Characterizing the spectrum of **surface radiation**



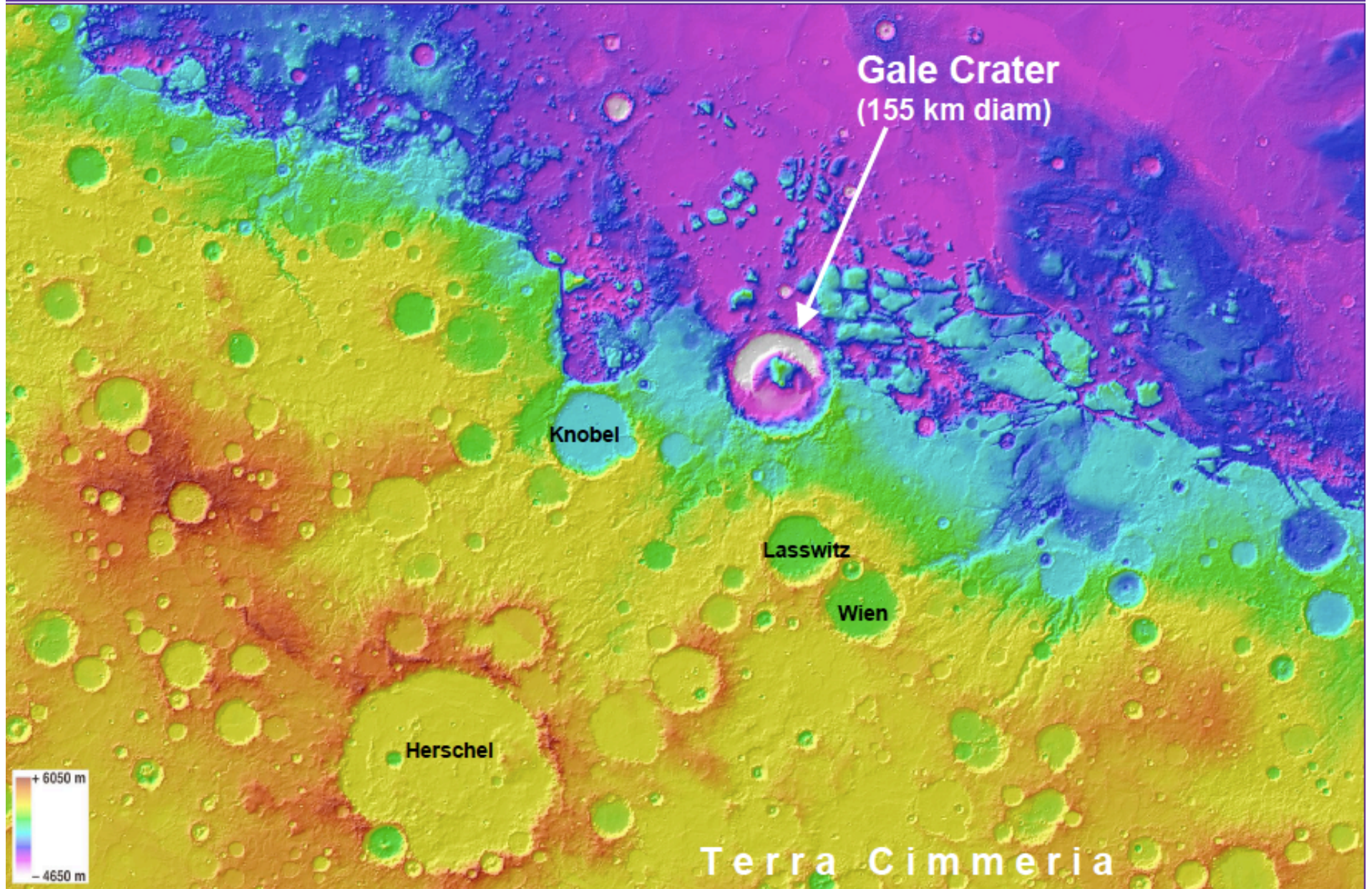
# Mars Science Laboratory

Landing Site:  
Gale crater

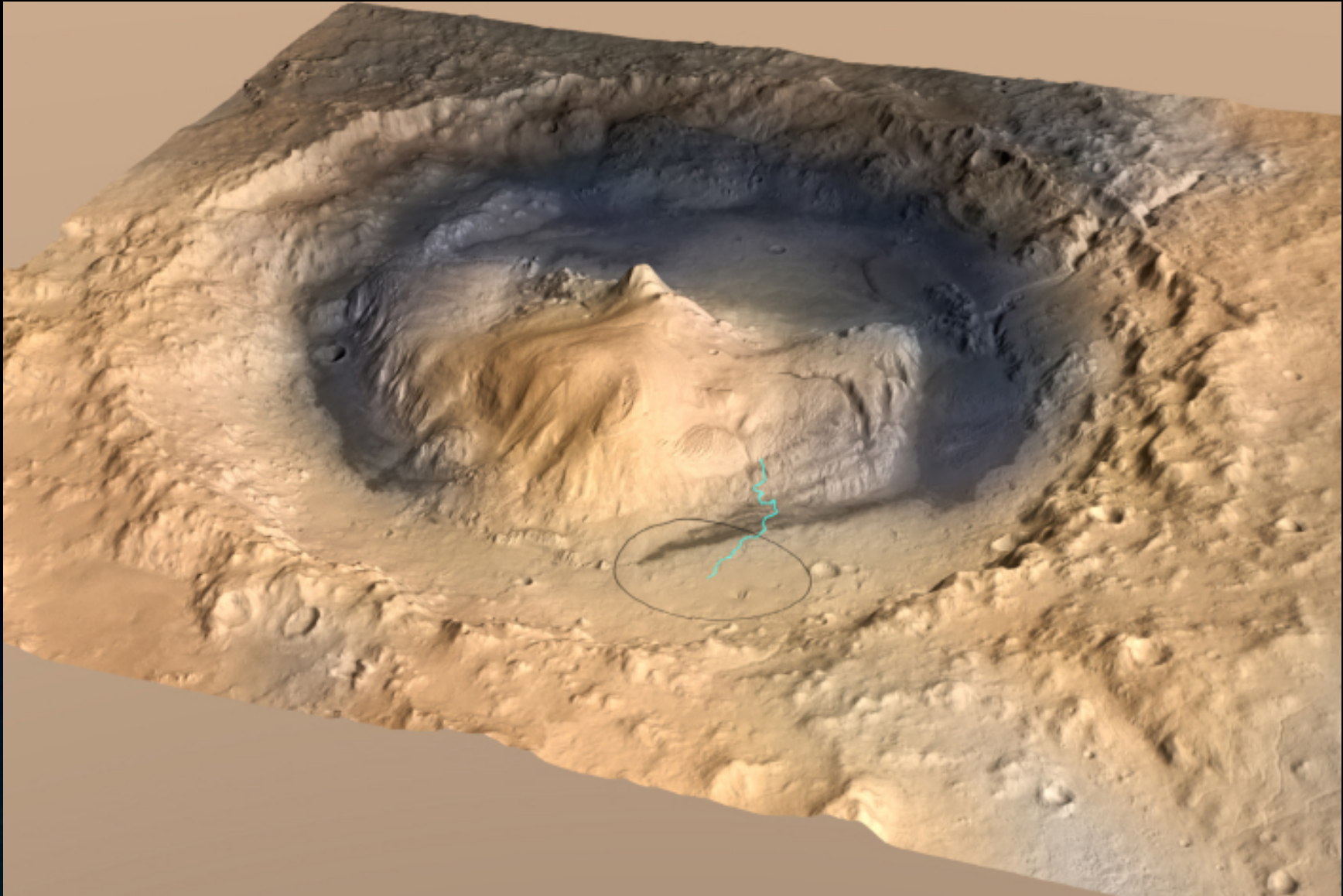




# Gale Crater is on the Dichotomy Boundary



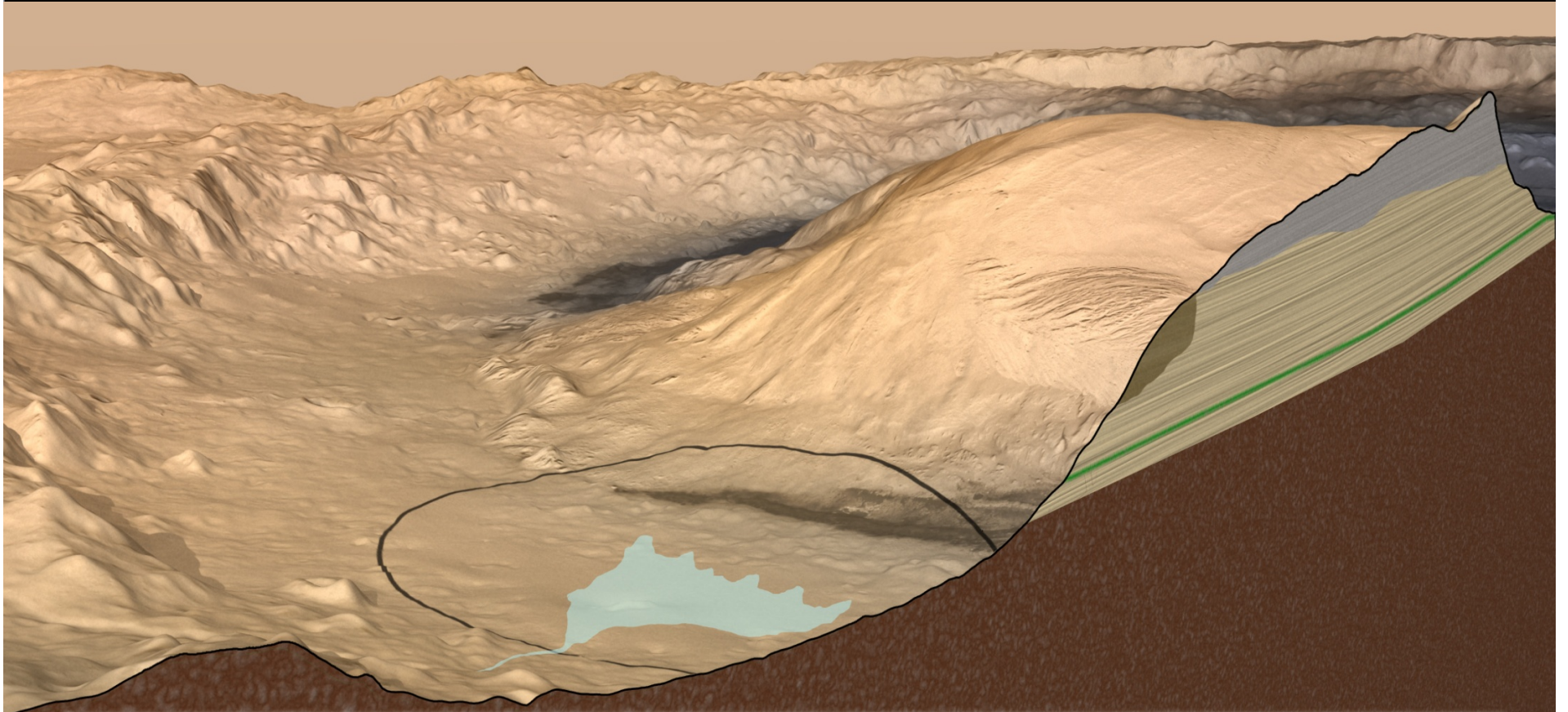








# The Strata of Gale Mountain

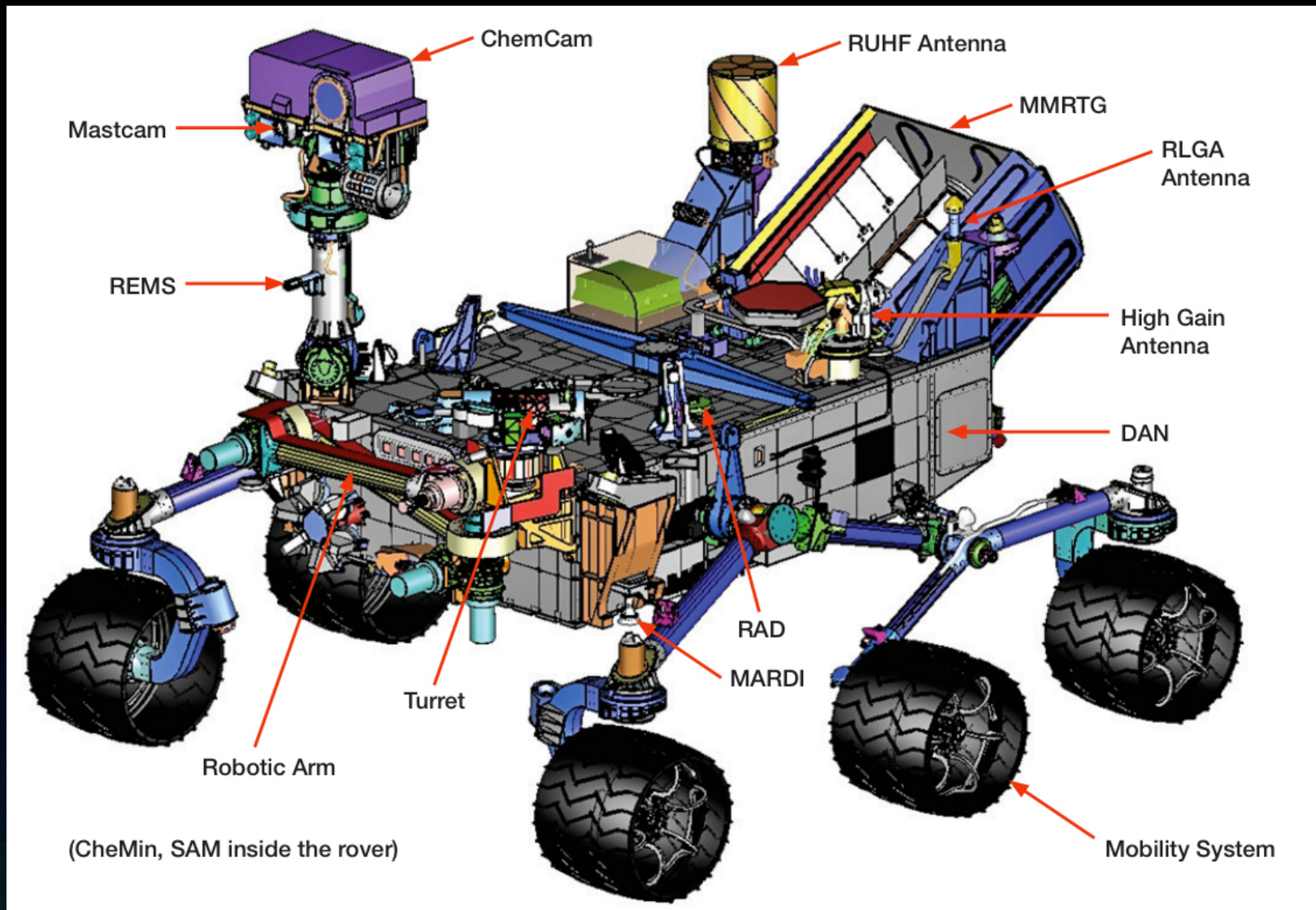


Gale Crater contains a 5-km high mound of stratified rock.

Strata in the lower section of the mound vary in mineralogy and texture, suggesting that they may have recorded environmental changes over time.

Curiosity can investigate this record for clues about habitability, and the ability of Mars to preserve evidence about habitability or life.







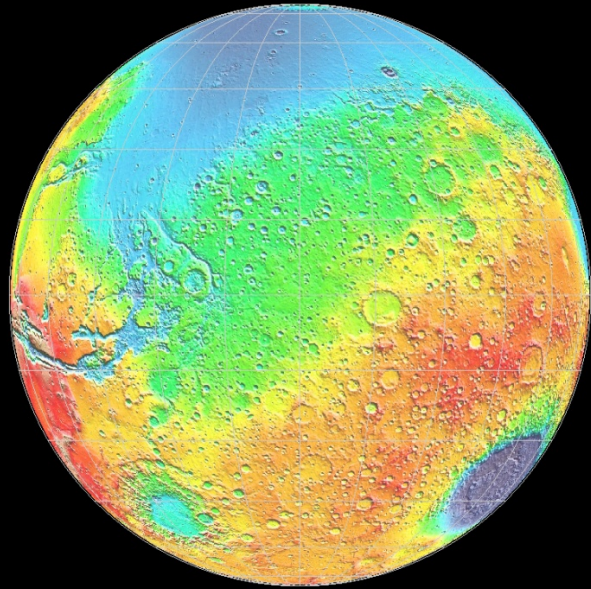
## **John Spray**

Director, Planetary and Space  
Science Centre, University of  
New Brunswick

APXS Co-Investigator, Mars  
Science Laboratory



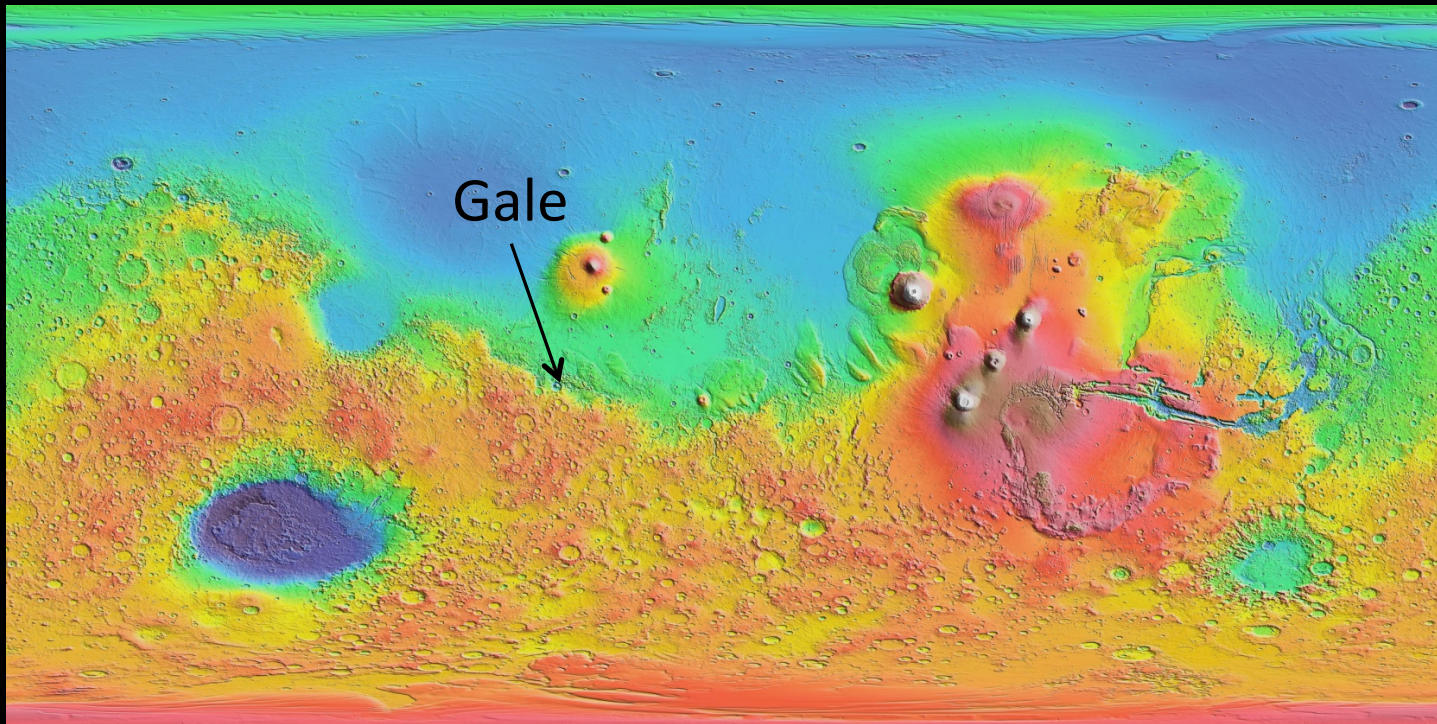
# Topographic maps of Mars



Blue = low    Red and white = high

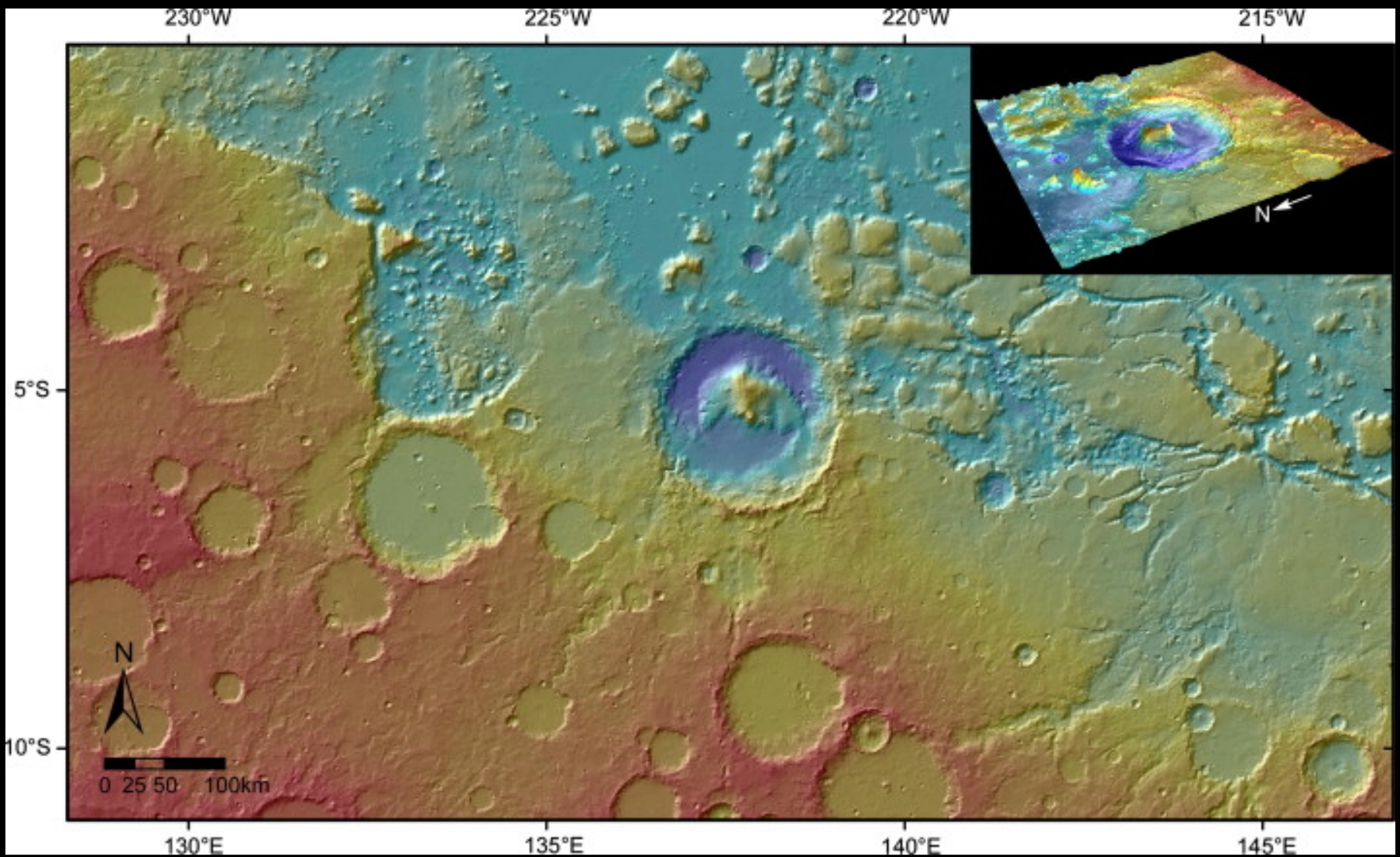
The **Northern Lowlands** (blue) are smoother and show few craters

The **Southern Highlands** are higher elevation and show high cratering signature.





# Gale impact crater (centre) straddles the crustal dichotomy



# MSL rover landing ellipses for Gale crater







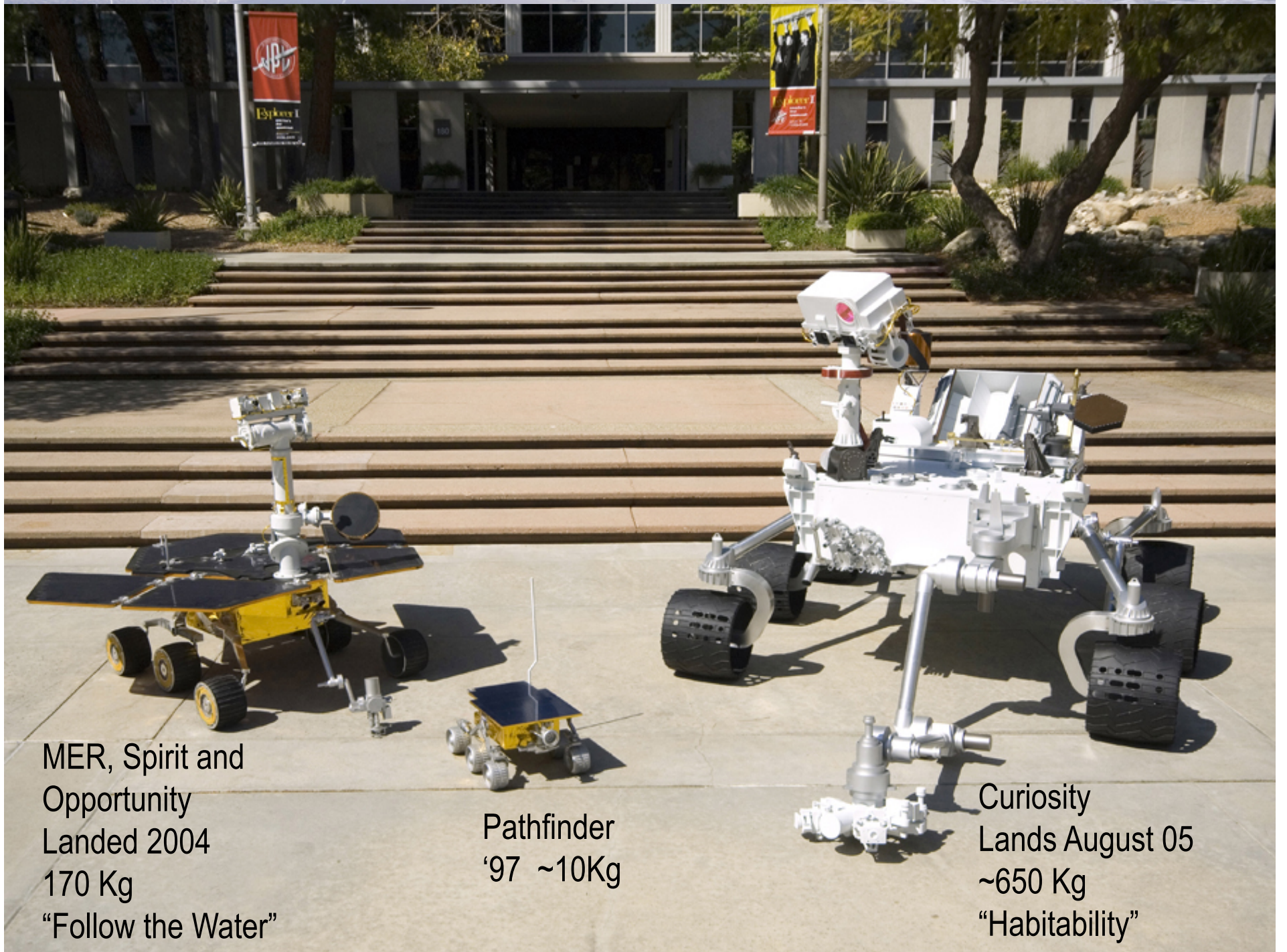




# Ralf Gellert

APXS Principal Investigator  
Mars Science Laboratory

Assistant Professor  
Dept. of Physics, University of  
Guelph



MER, Spirit and  
Opportunity  
Landed 2004  
170 Kg  
“Follow the Water”

Pathfinder  
'97 ~10Kg

Curiosity  
Lands August 05  
~650 Kg  
“Habitability”

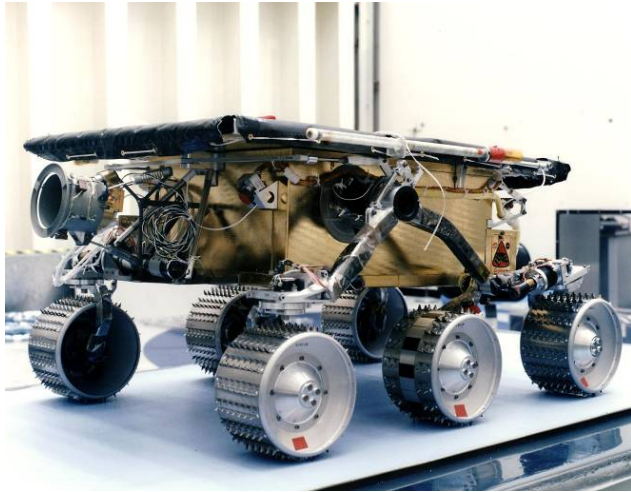


# 3 Generations of APXS

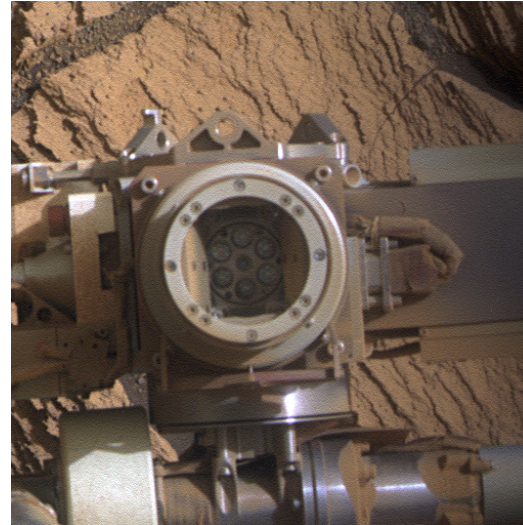
Alpha-Particle-X-ray Spectrometer



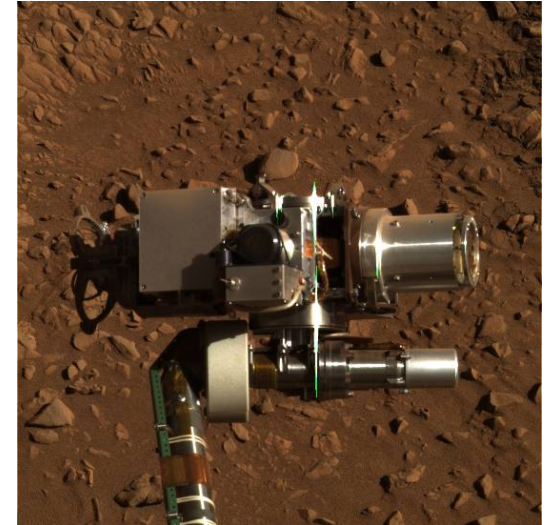
Sojourner, 1997



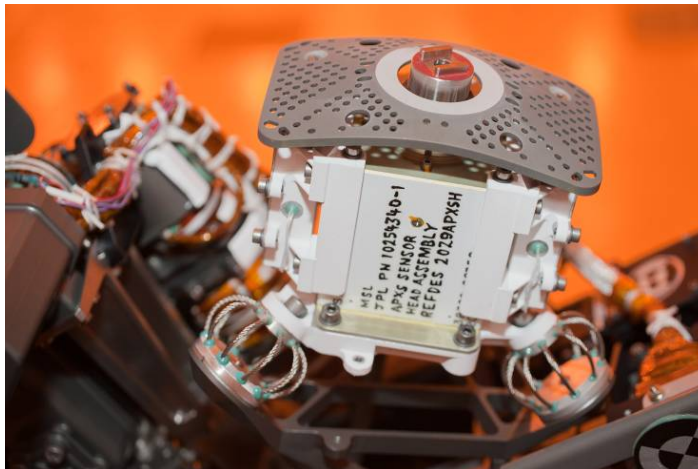
Opportunity 2003-now



Spirit, 2003-2010



MSL (Curiosity), lands August 5th



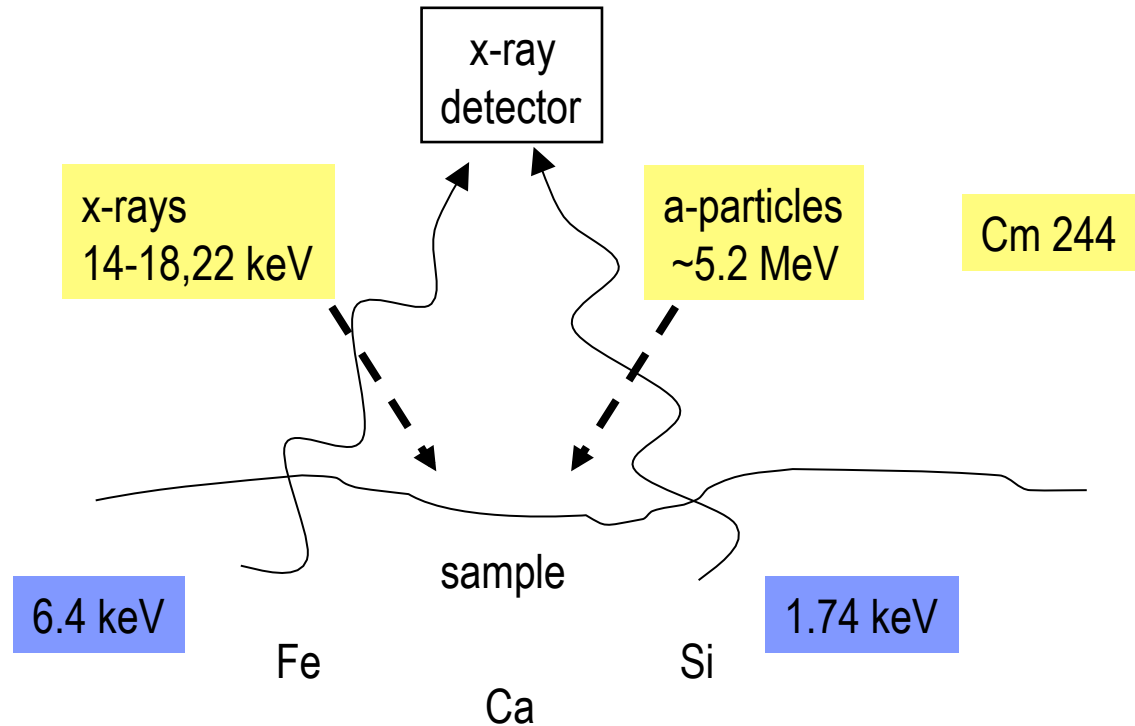
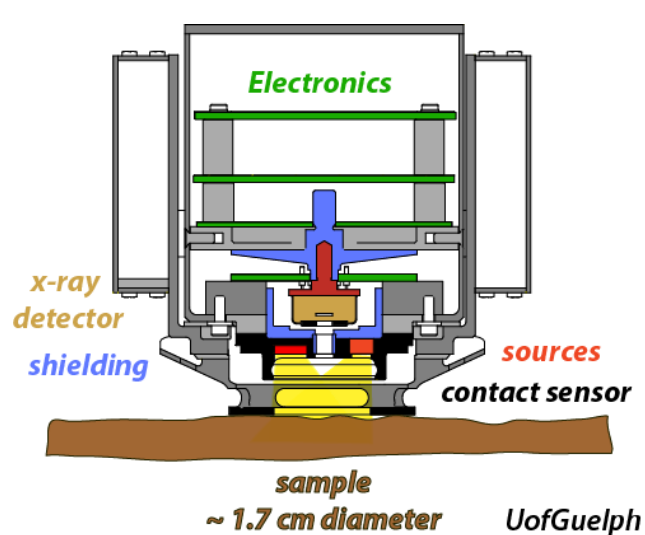
# APXS X-ray Spectroscopy

~ 1Kg  
10 W power

XRF  
X-ray  
Fluorescence

+

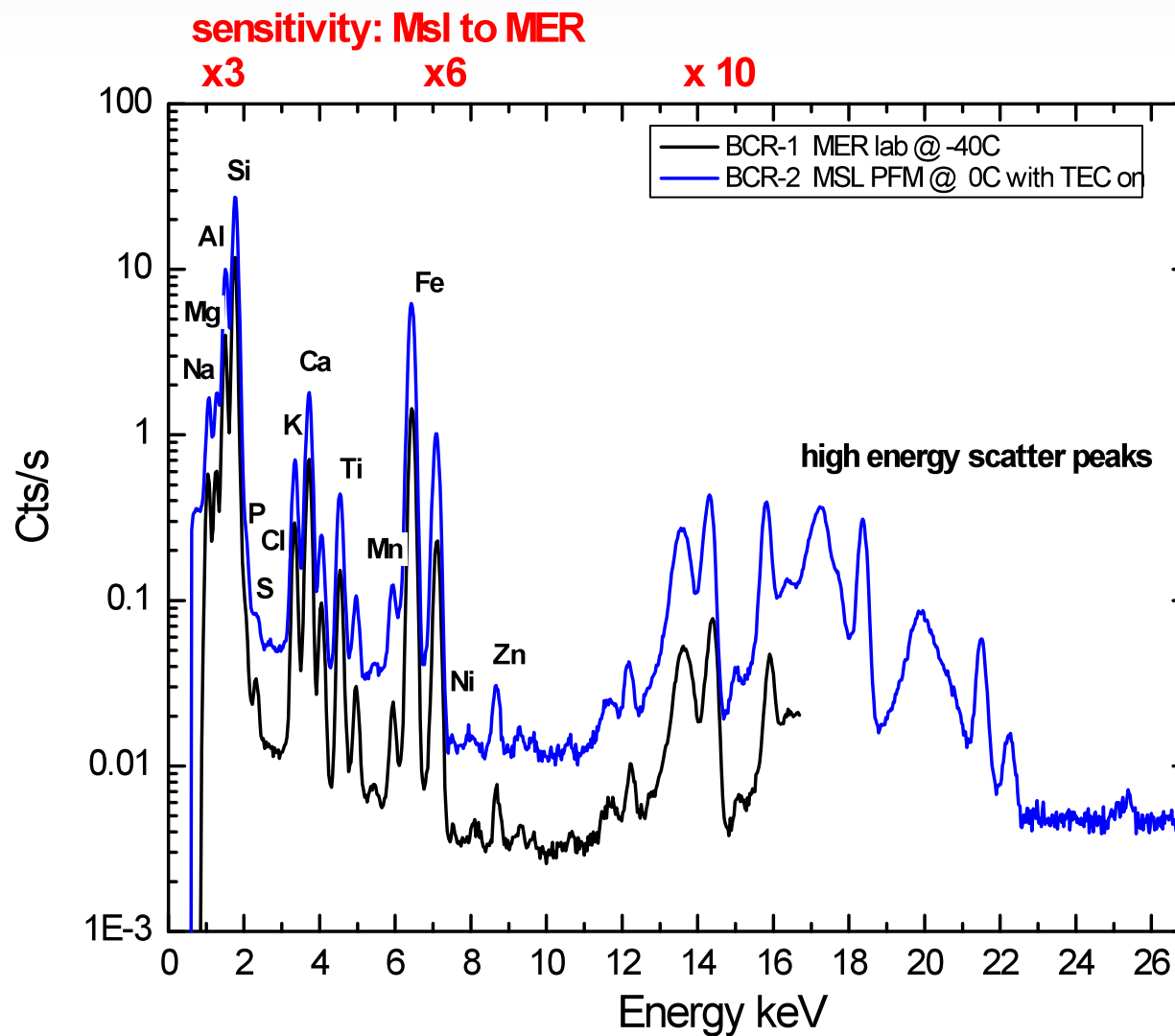
PIXE  
Particle induced  
x-ray emission



MER : measurement took ~ 5 hours during night < -40C

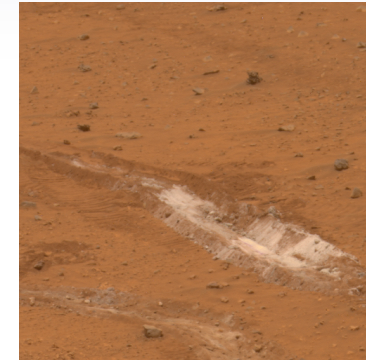
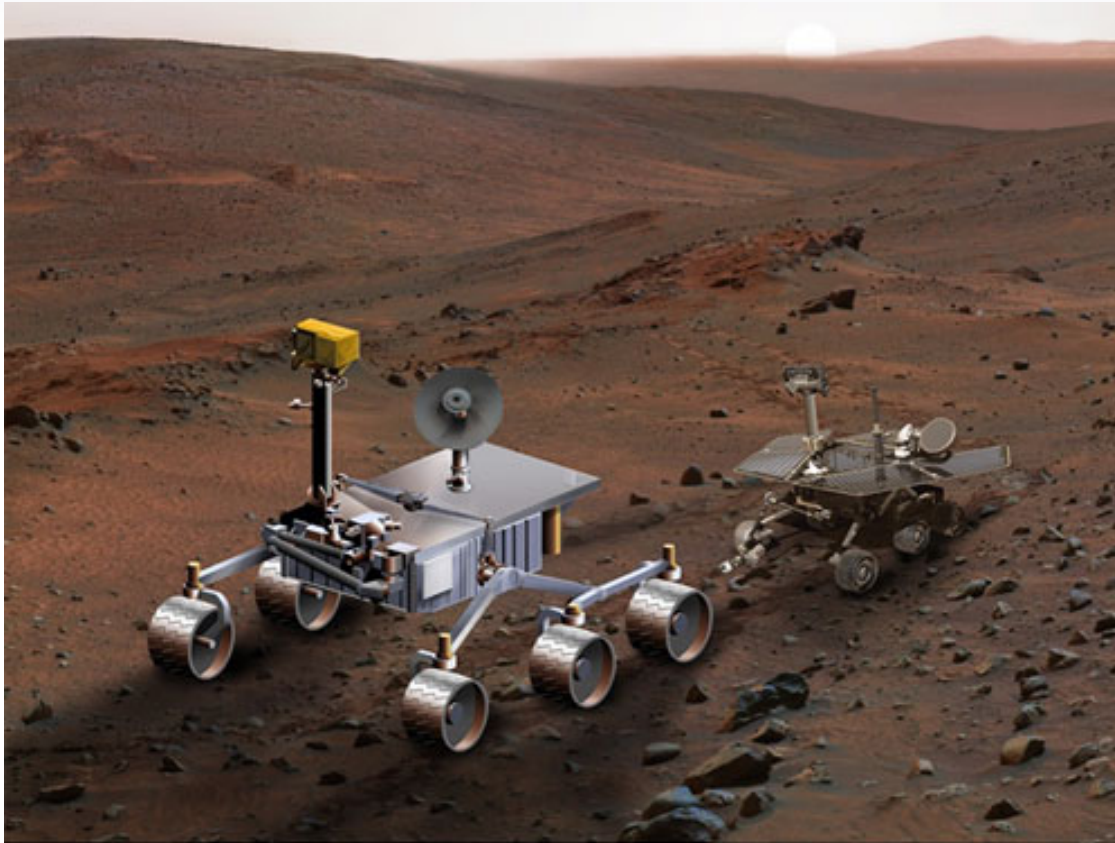
MSL : ~ 2 hours day or night, up to ~-10C

# APXS Spectra MER vs MSL





# Major MER Findings



Silica



Hydrated  
Sulphates

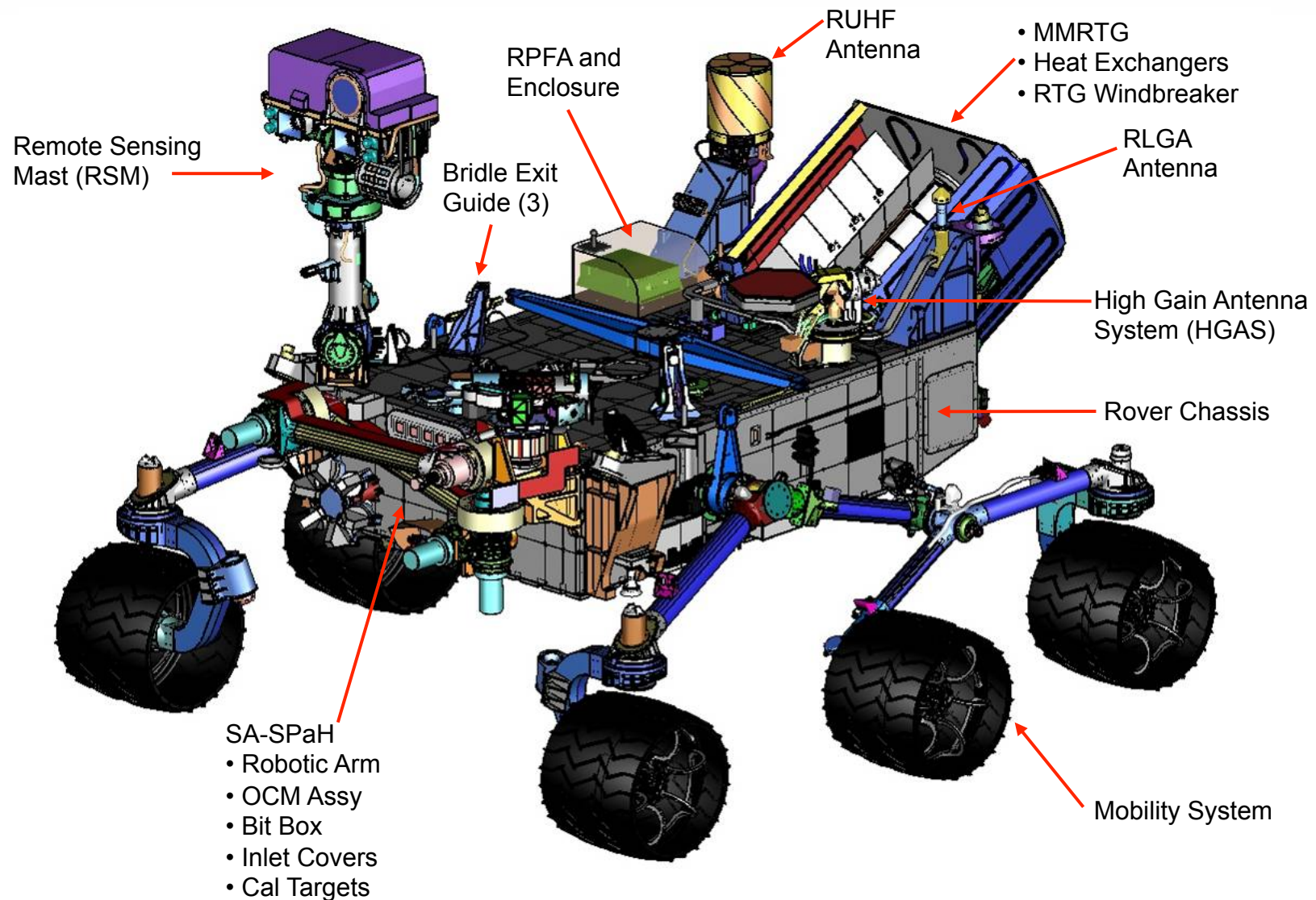


Calcium-  
Sulphate

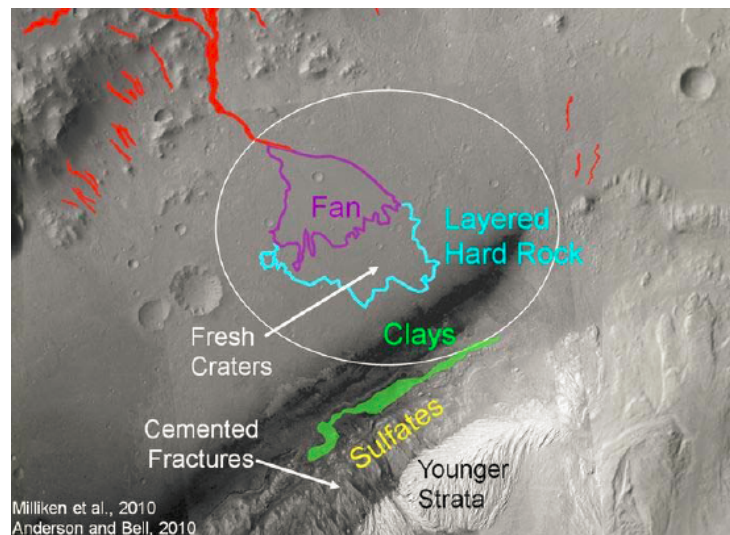
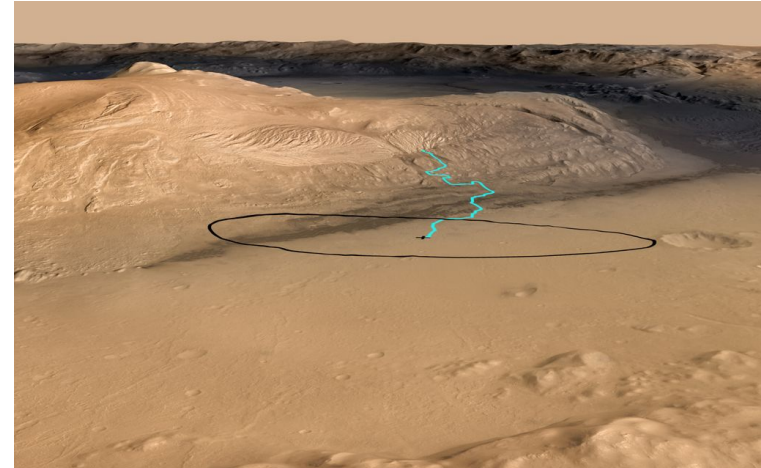
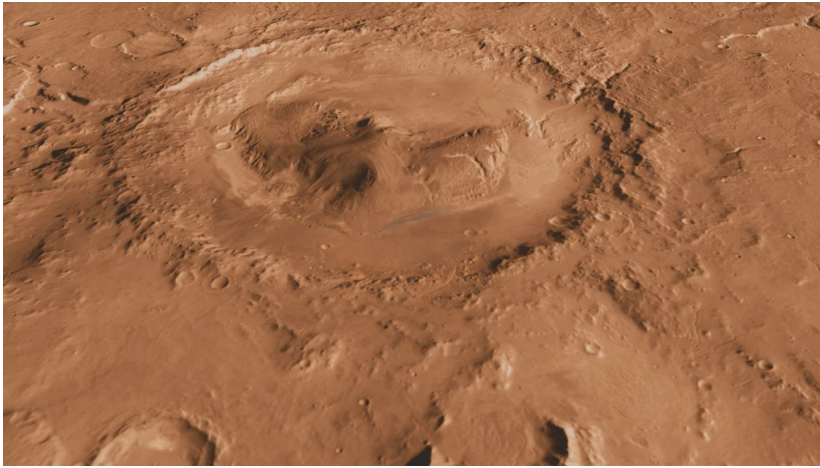


# MSL Rover and Science Payload

MSL is advanced MER rover plus analytical lab inside rover belly



# Gale Crater





Canadian Space  
Agency

Agence spatiale  
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# Stéphane Desjardins, Director, Space Exploration Projects, Canadian Space Agency

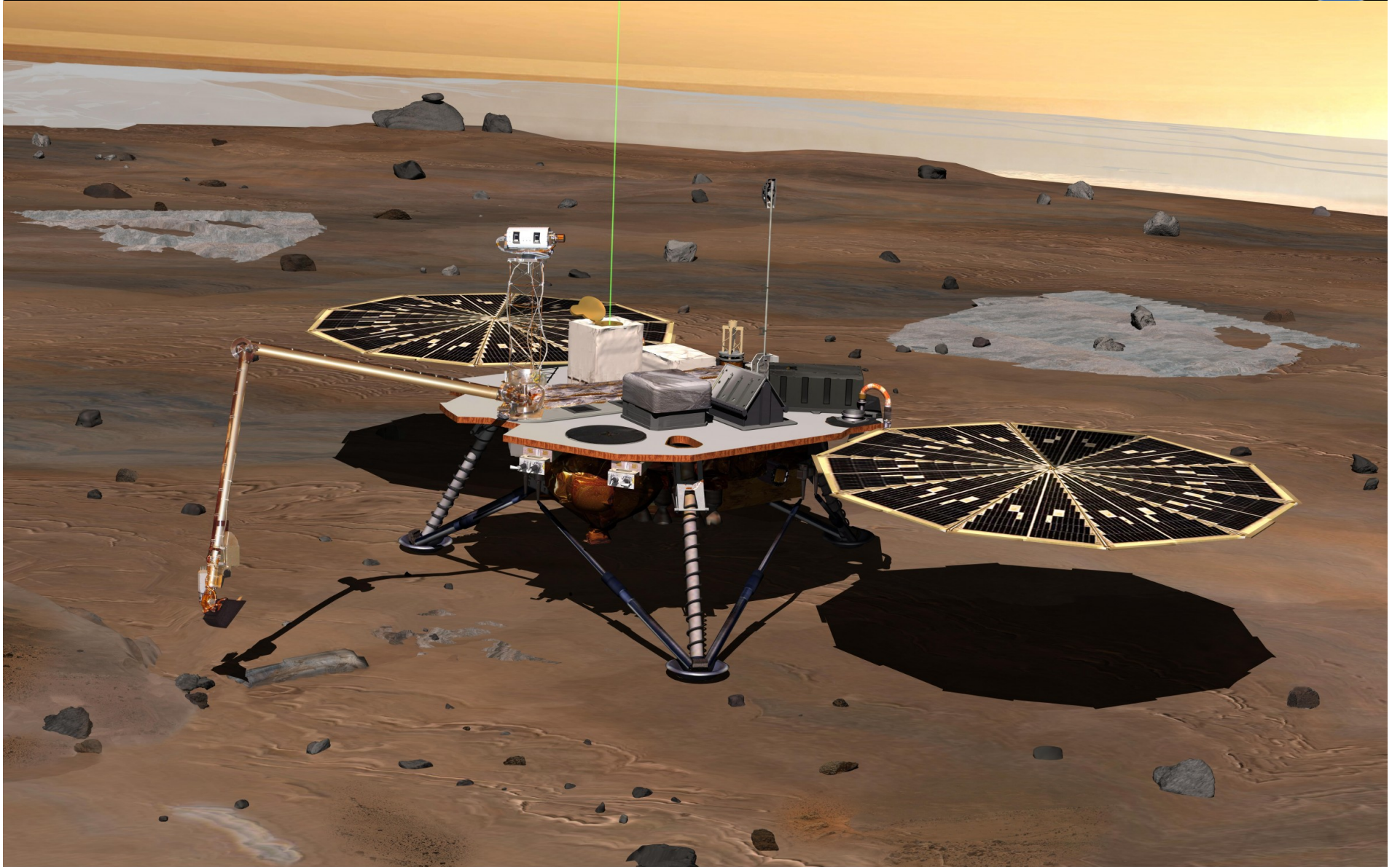
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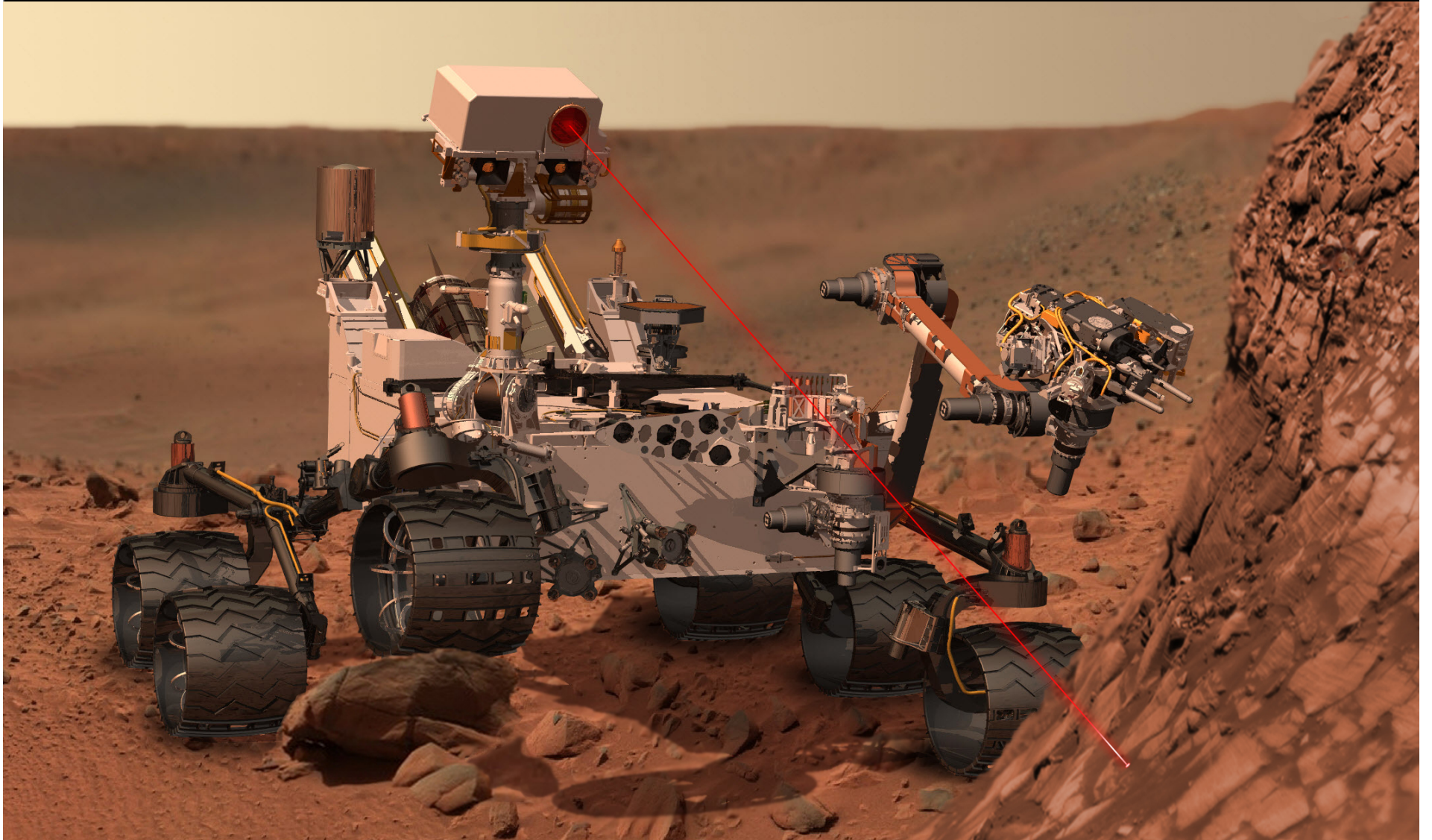


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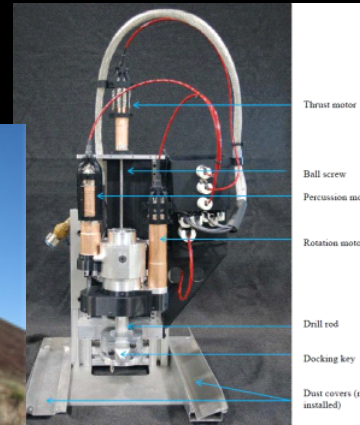


OSIRIS REx is a sample return mission that returns at least 60 g (and as much as 2 kg) of pristine carbonaceous regolith from asteroid 1999 RQ36



Canada

# Exploration Core



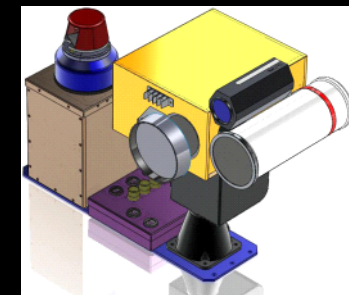
**Mini-corer**  
Norcat



**Microscope**  
MDA

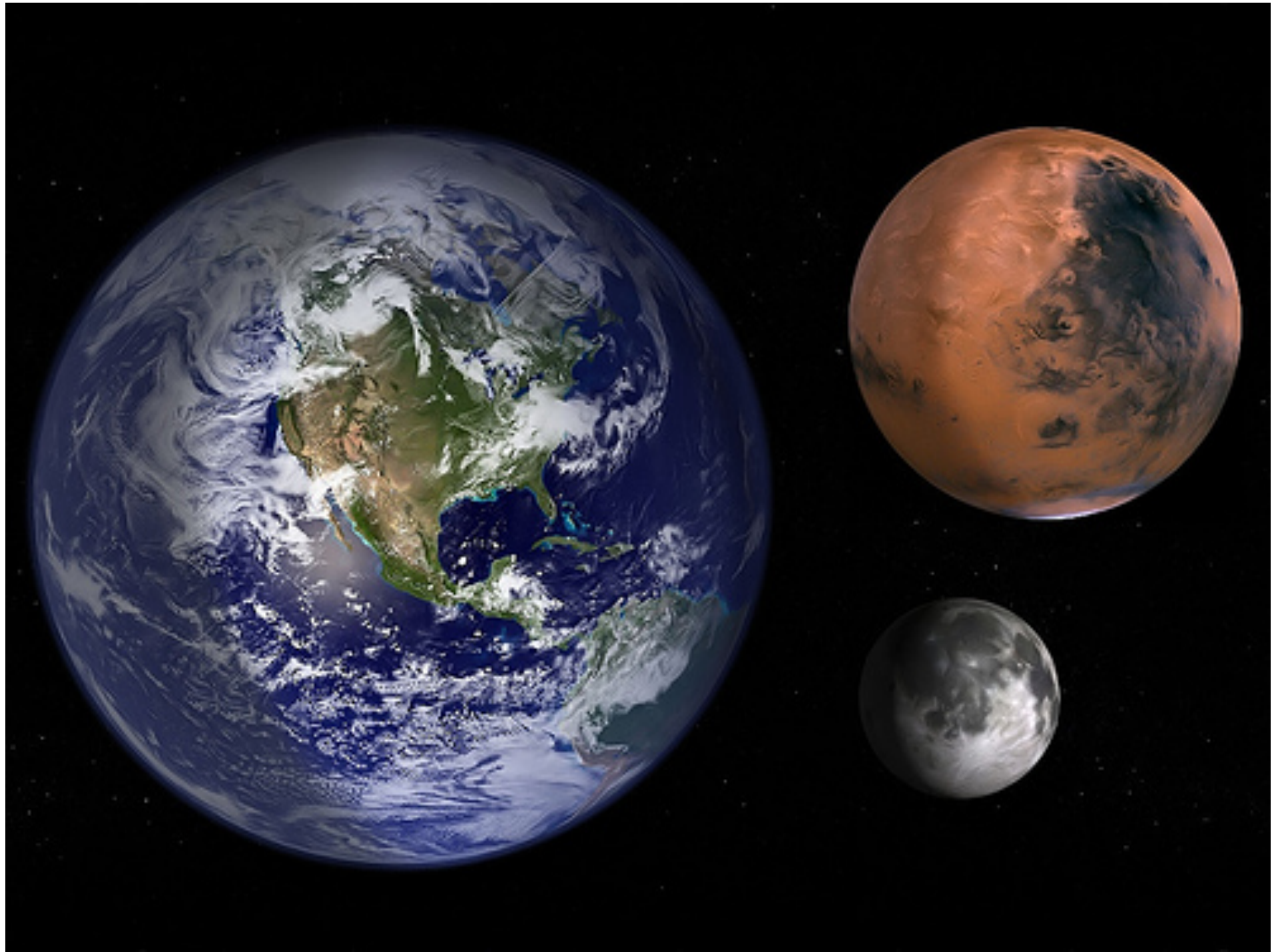


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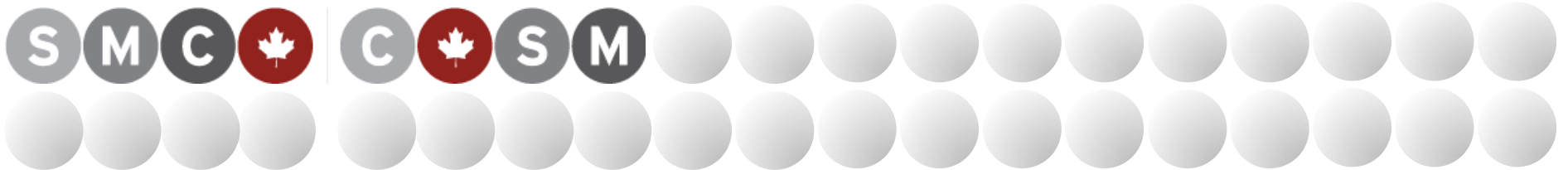


**Next Vision Syst. 1:**  
Neptec





# Questions?





# More information/ visuals/ interviews:

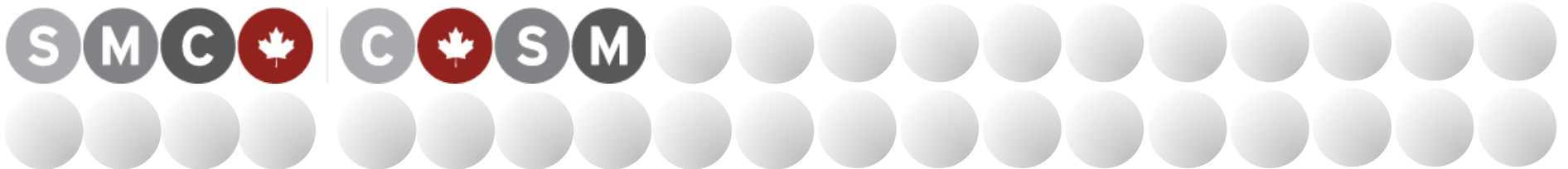
For more information, visuals, or to speak to any of the panelists individually, please contact:

Ami Kingdon, Media Officer  
**Science Media Centre of Canada**  
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Office: (613) 656-1295 Cell: (613) 878-8279

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