

Presentation to the Canadian Space Agency

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8/24/17

Mars Exploration Program Science Goals



Life



Climate



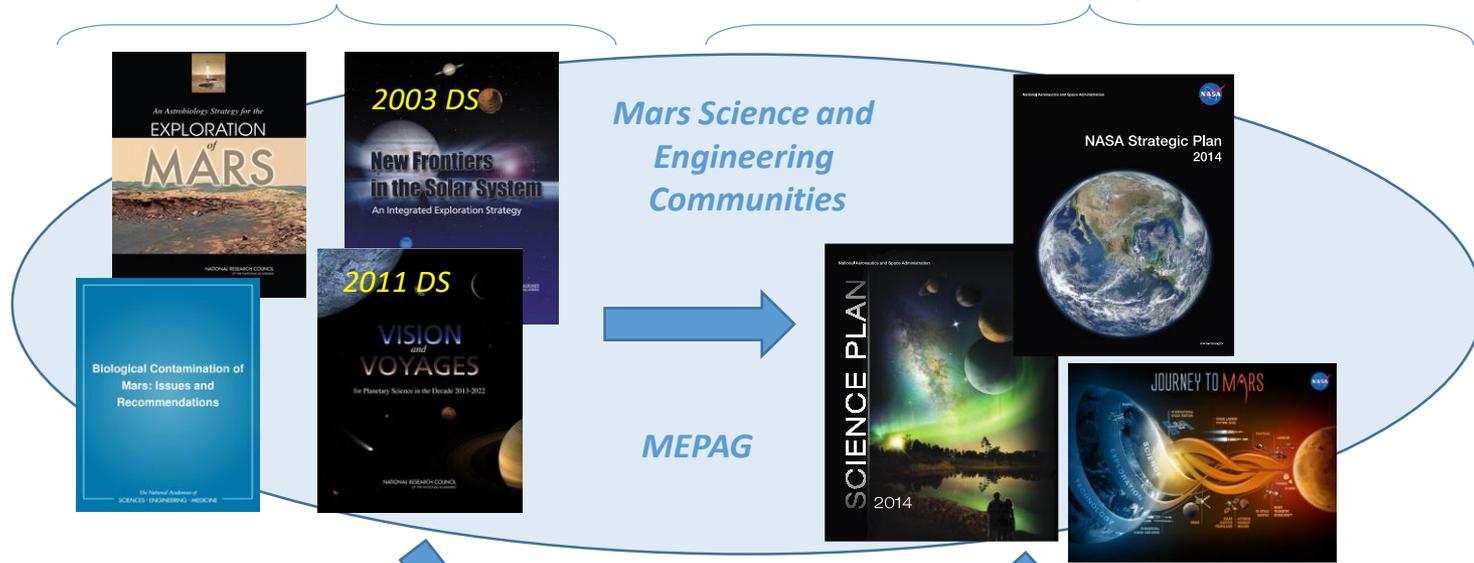
Geology & Geophysics



Prepare for Human Exploration

High-level science strategic directions

U.S. National Academy of Science National Aeronautics and Space Administration



The Planetary Decadal Survey is the principal guiding document for NASA SMD

**MARS Exploration Program
Science Goals**

MEPAG engages the scientific community to provide input to NASA directorates and MEP

NASA derives its strategic science goals from the scientific community

Mars Exploration Program Missions

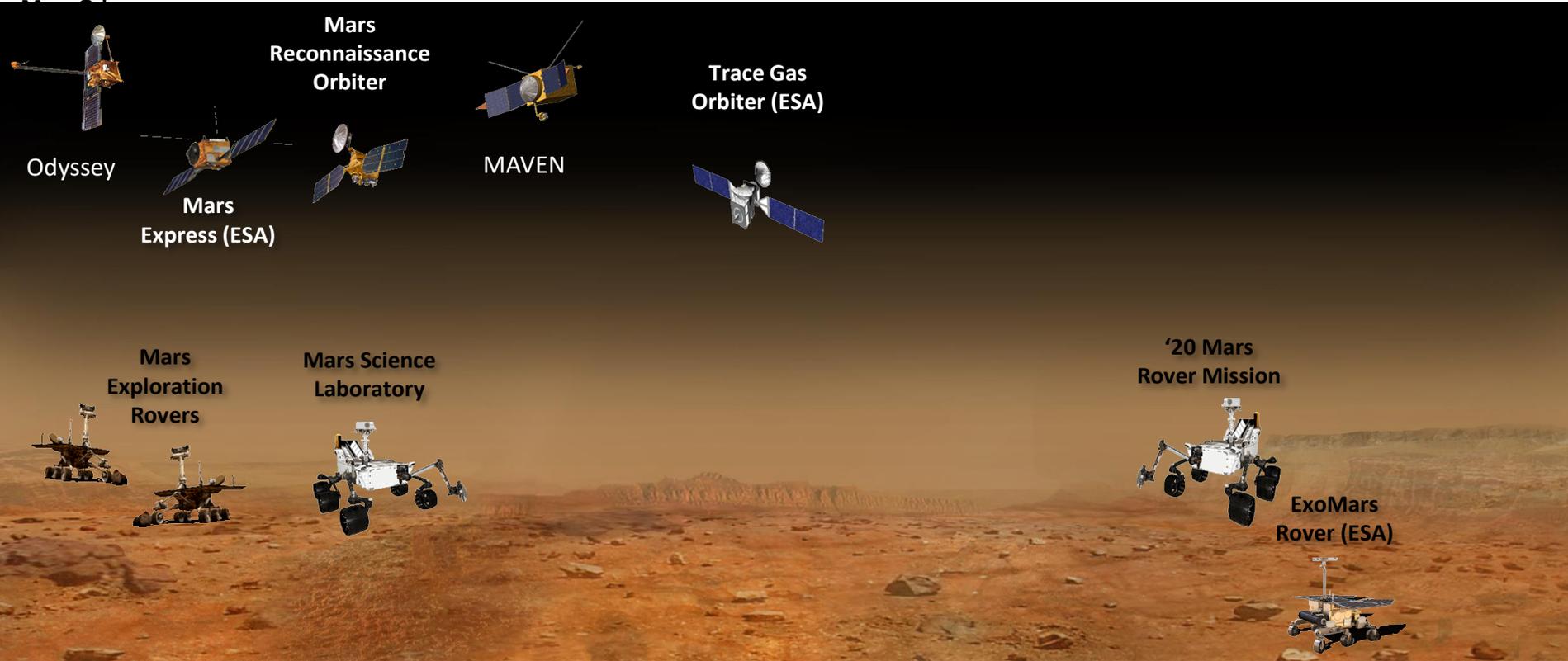
2001 - 2015

2016

2018

2020

Future Mars Missions



Mars Exploration Program Highlights

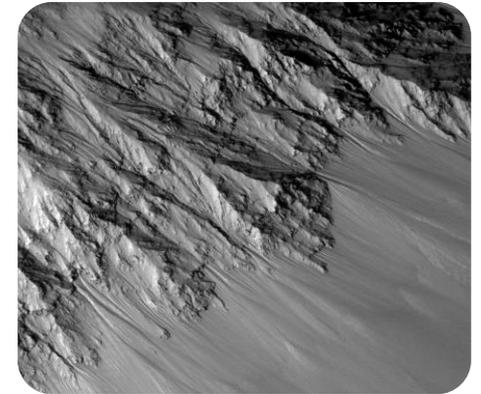
Opportunity: Journey to
Perseverance Valley



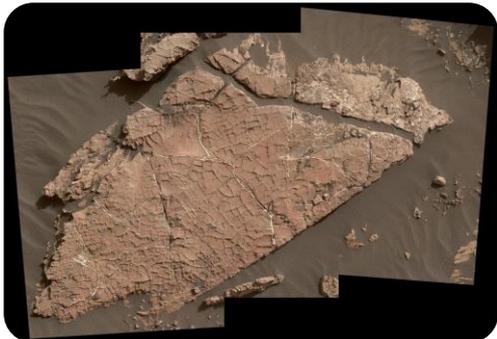
MRO: >50,000 orbits
Completed Global 6m
Resolution Imagery



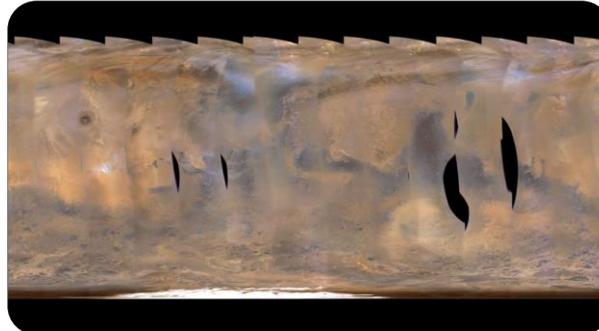
MRO: Continuing Observations
of Recurring Slope Lineae



Curiosity: >5 years
since landing



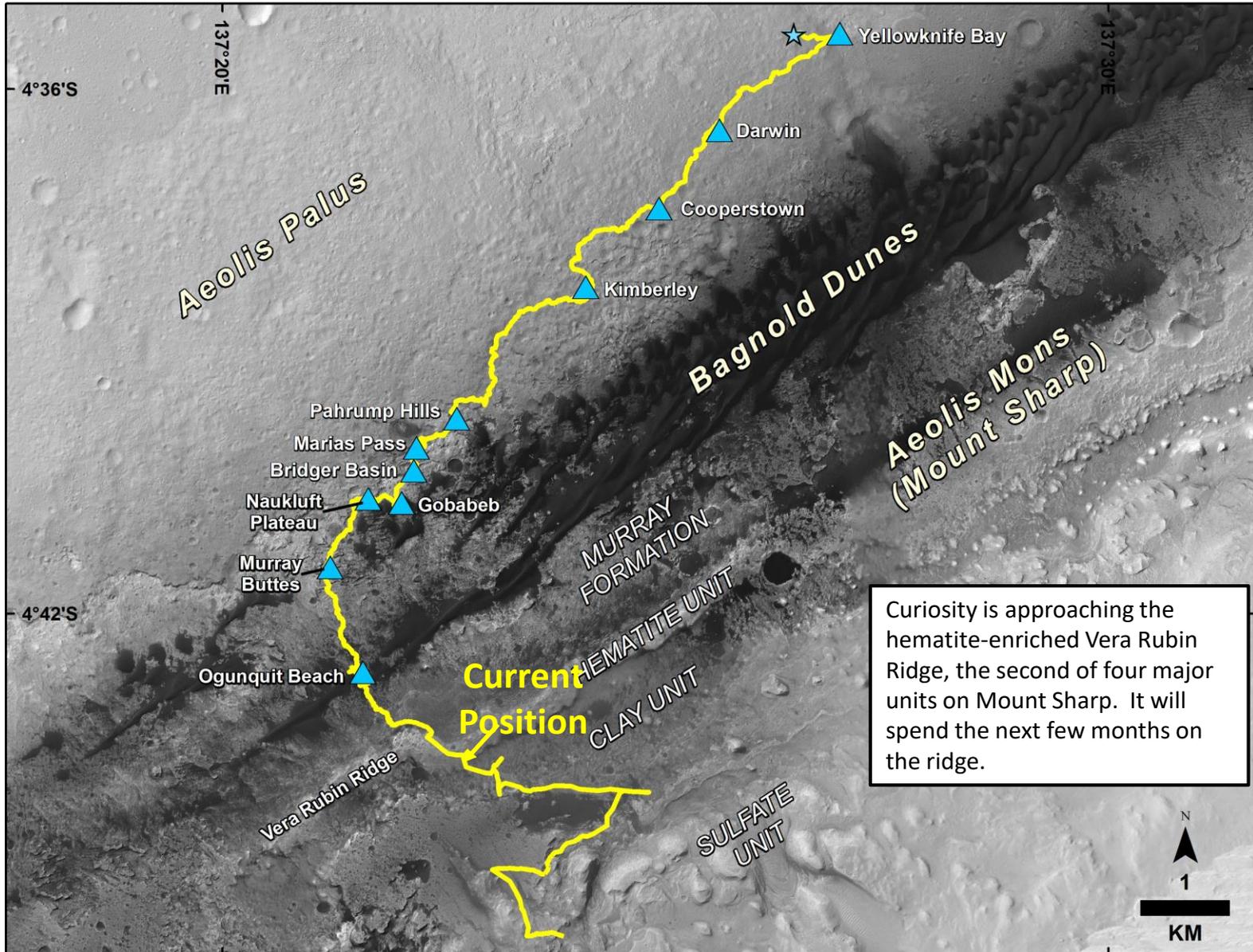
MAVEN Tracks Back-to-back
Regional Storms



Mars 2020 Landing Site
Finalists



Curiosity Traverse



A Guide to Gale Crater



Mars 2020: Mission Overview



LAUNCH

- Atlas V 541 vehicle
- Launch Readiness Date: July 2020
- Launch window: July/August 2020

CRUISE/APPROACH

- ~7 month cruise
- Arrive Feb 2021

ENTRY, DESCENT & LANDING

- MSL EDL system (+ [Range Trigger and Terrain Relative Navigation](#)): guided entry and powered descent/Sky Crane
- 16 x 14 km landing ellipse (range trigger baselined)
- Access to landing sites $\pm 30^\circ$ latitude, ≤ -0.5 km elevation
- Curiosity-class Rover

SURFACE MISSION

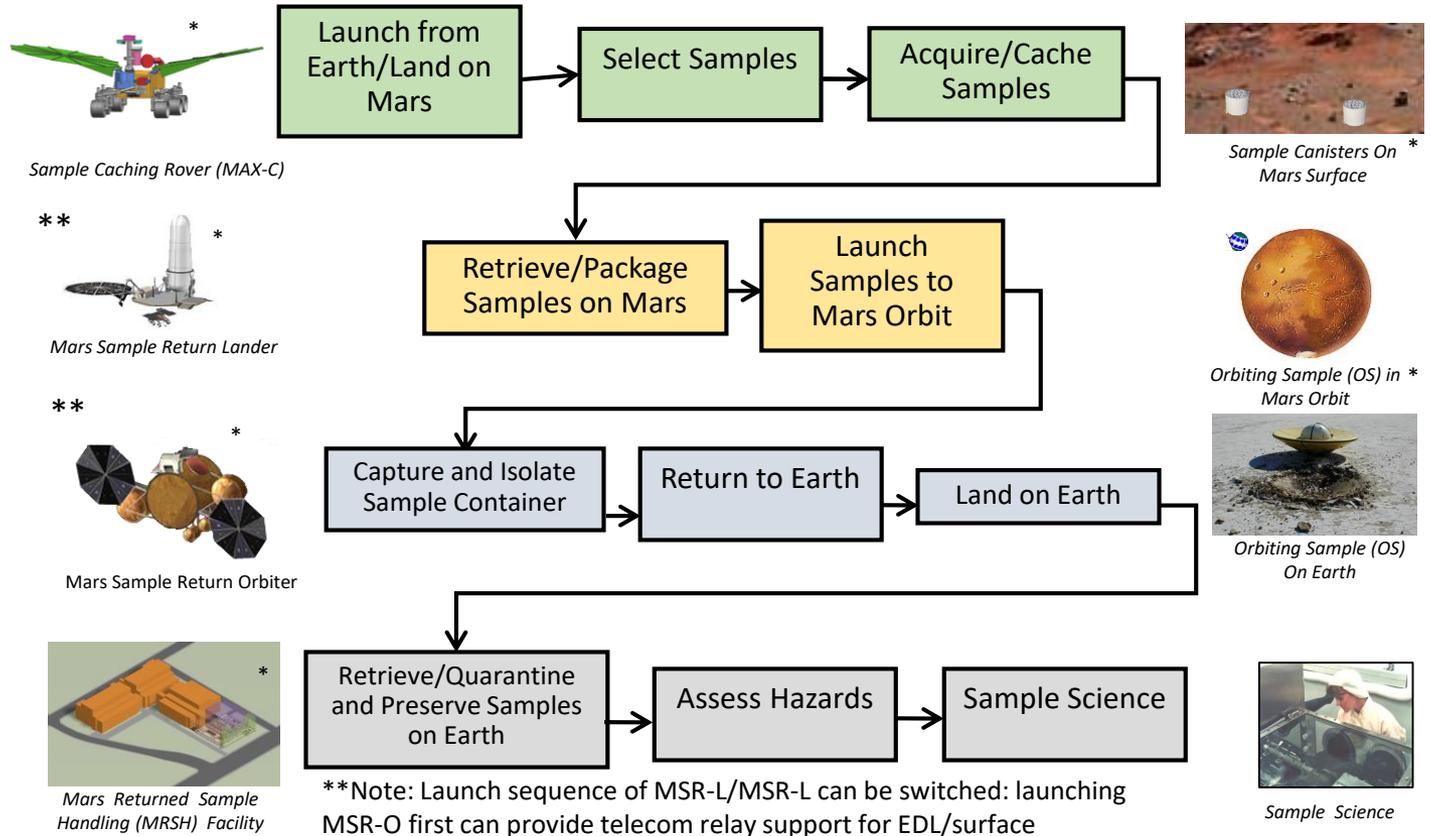
- 20 km traverse distance capability
- [Enhanced surface productivity](#)
- [Qualified to 1.5 Martian year lifetime](#)
- Seeking signs of past life
- Returnable cache of samples
- Prepare for human exploration of Mars

Mars 2020 Mission Objectives

- A. Characterize the... geologic record... of an astrobiologically-relevant ancient environment.
- B. Perform... astrobiologically-relevant investigations.
- C. Assemble rigorously documented and returnable cache...
- D. Contribute to the preparation for human exploration of Mars...

The Mars 2020 mission fully responds to the high priority Planetary Decadal Survey recommendation for a Mars science rover to perform in situ science and collect and cache a set of scientifically documented martian samples for potential future return to Earth

Functional Steps Required to Return a Scientifically Selected Sample to Earth As presented to the Decadal Survey of 2012



**Note: Launch sequence of MSR-L/MSR-L can be switched: launching MSR-O first can provide telecom relay support for EDL/surface operation/MAV launch