

# **Velocity Leadership: Leadership, People, and Innovation**

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**Brian Muirhead, Mars Sample Return Campaign**

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## *High Velocity Leadership*

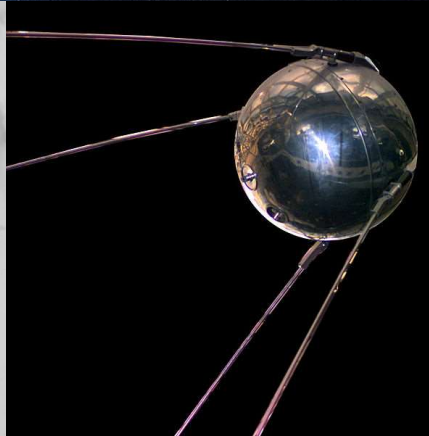
**The Power of Leadership,  
Teamwork and Innovation**

Brian K. Muirhead, JPL Fellow



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## Beginnings of the Space Age



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## Beginnings of the Space Race



"We do these things not because they are easy, but because they are hard."

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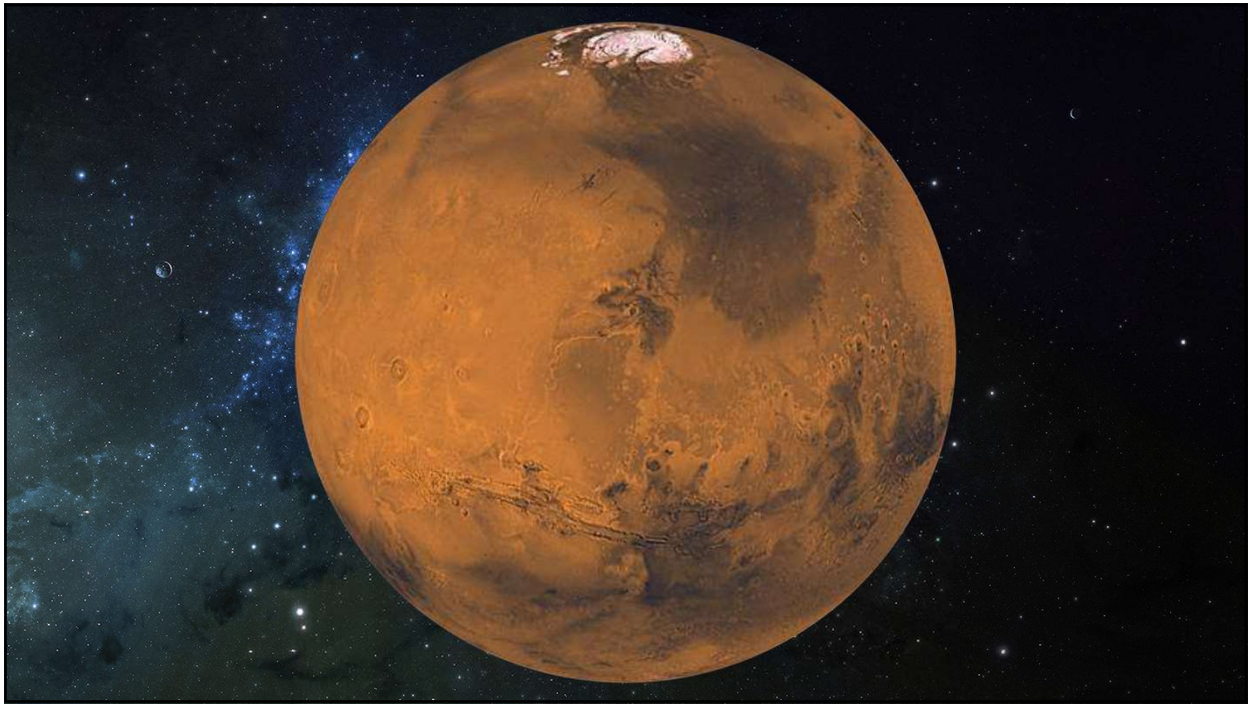
Looked impossible...



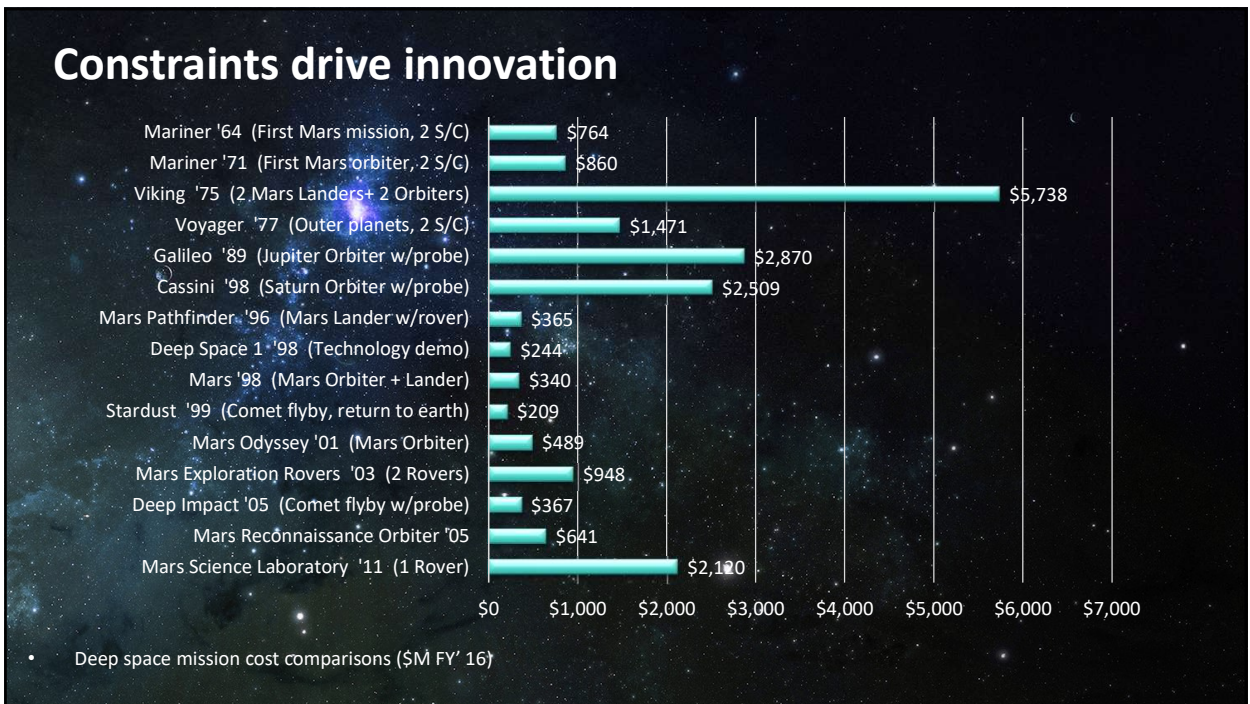
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## Know what your customer wants

- Demonstrate a simple, reliable and low cost system for placing science payloads on the surface of Mars
- Demonstrate NASA's commitment to low cost planetary exploration
- Demonstrate the mobility and usefulness of a microrover on the surface of Mars
- Assess the structure of the Martian atmosphere, determine elemental composition of rocks and soil, investigate surface geology and mineralogy of rocks and acquire meteorology data at the surface

### Mars Pathfinder Mission Objectives

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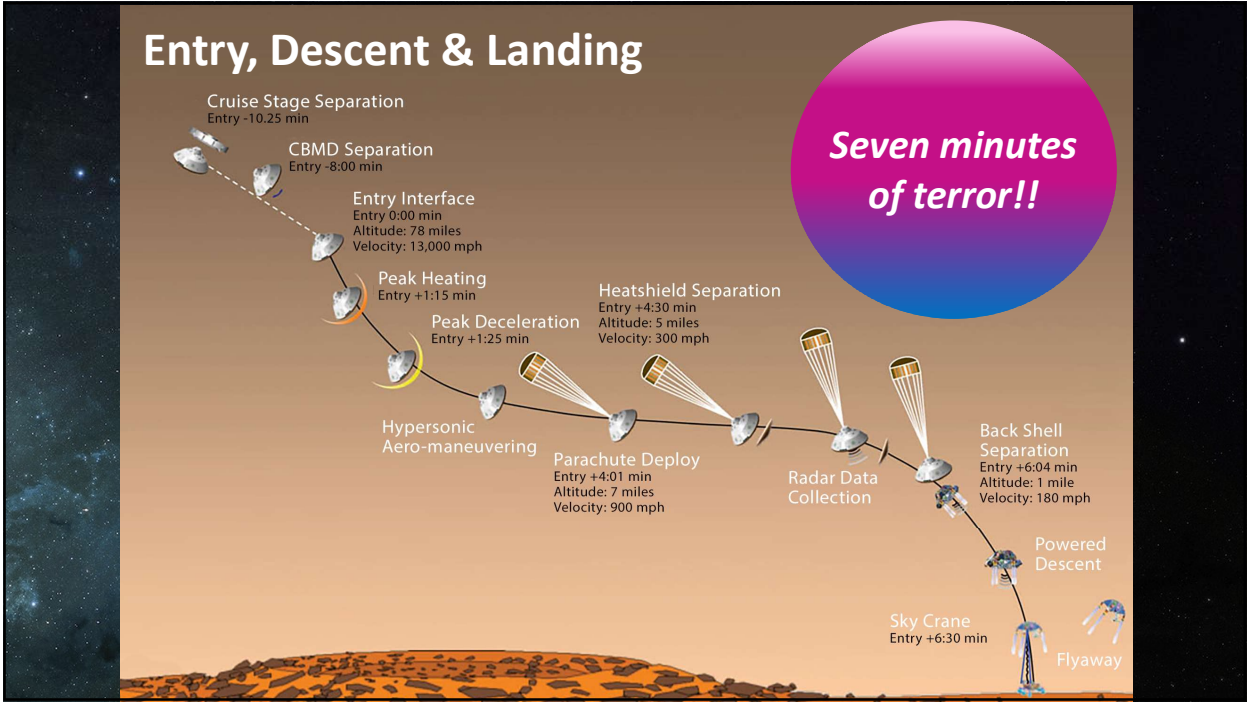
Mars is hard...



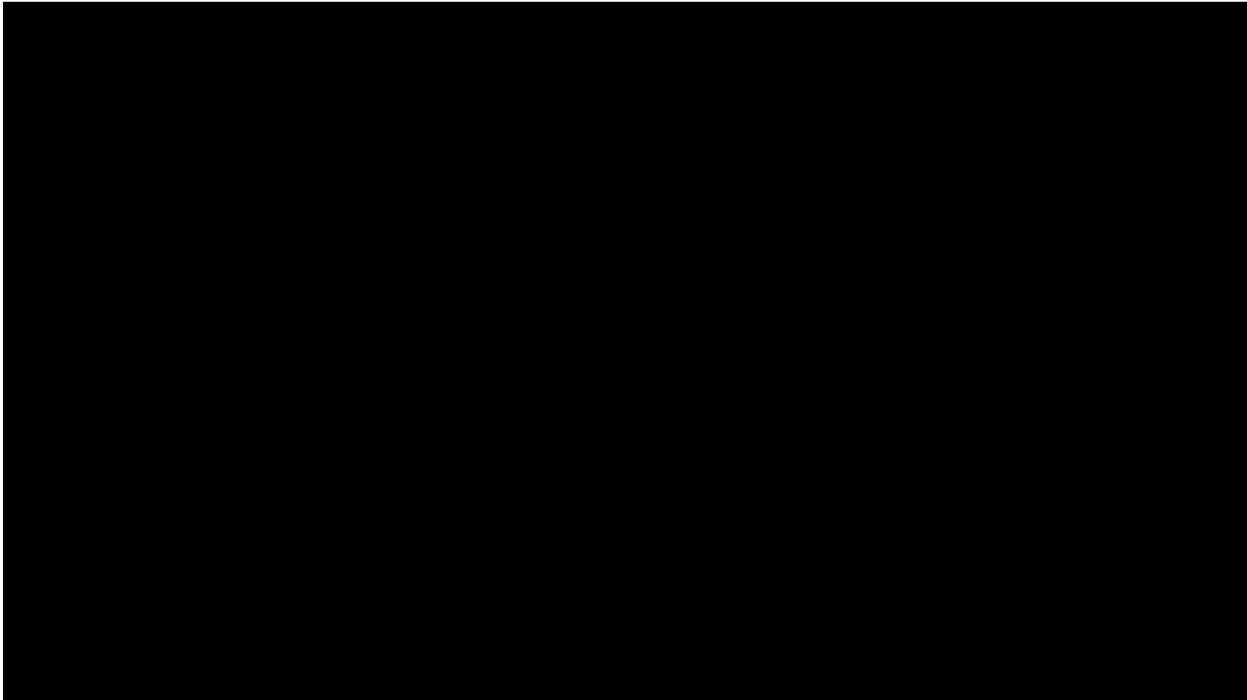
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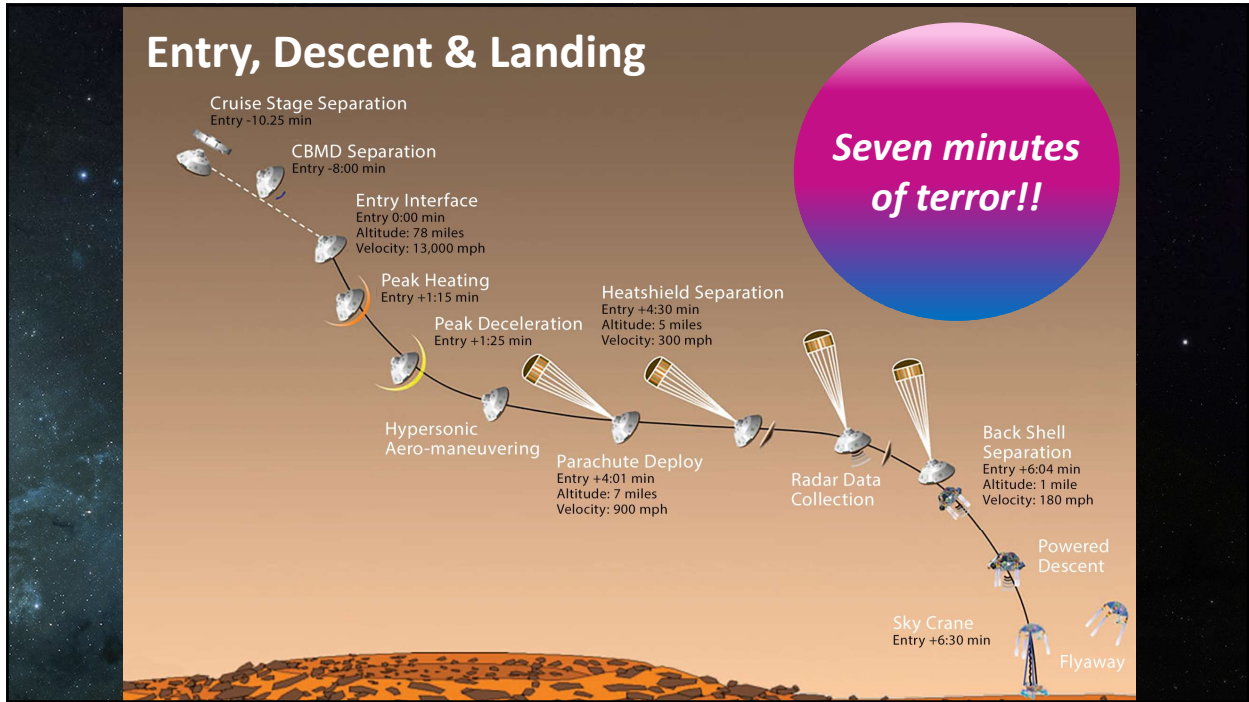


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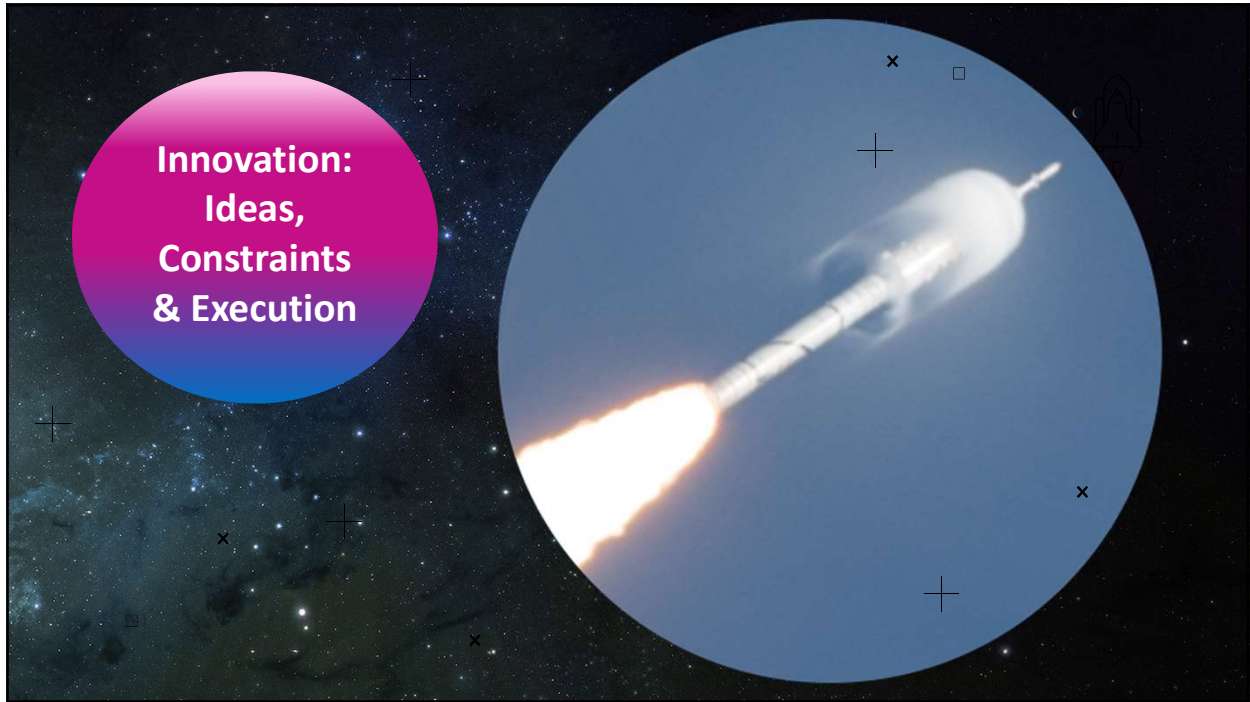


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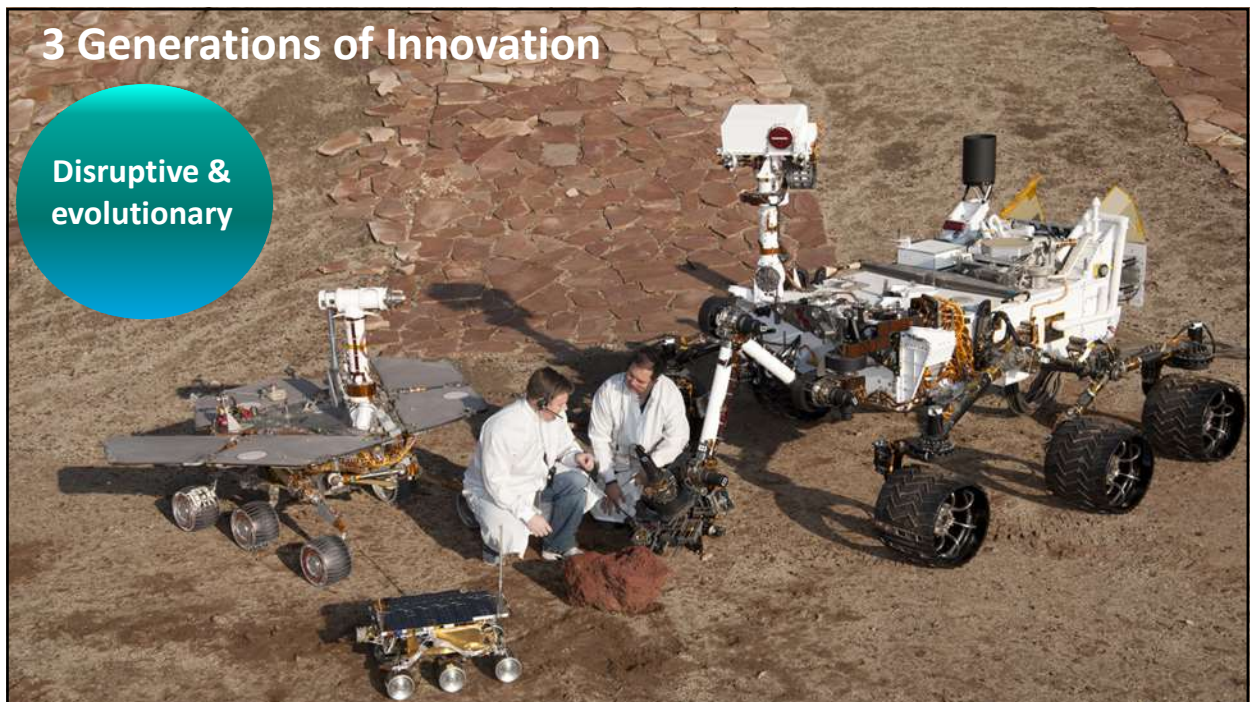


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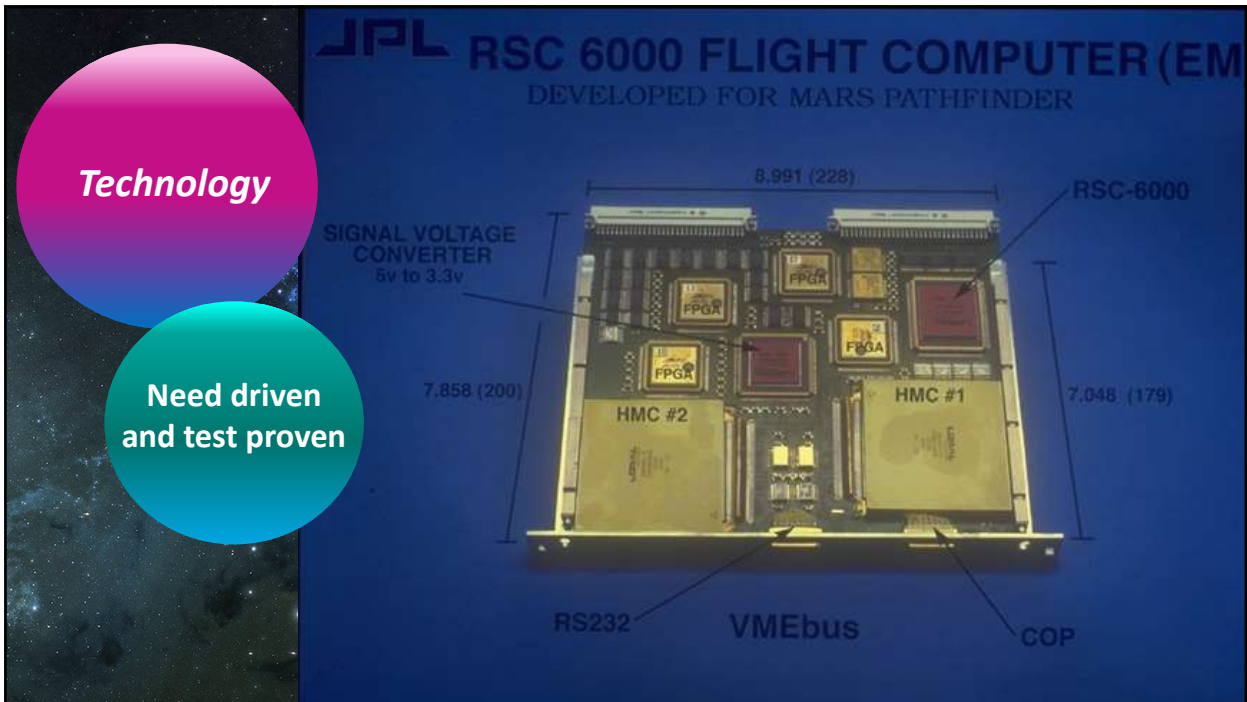




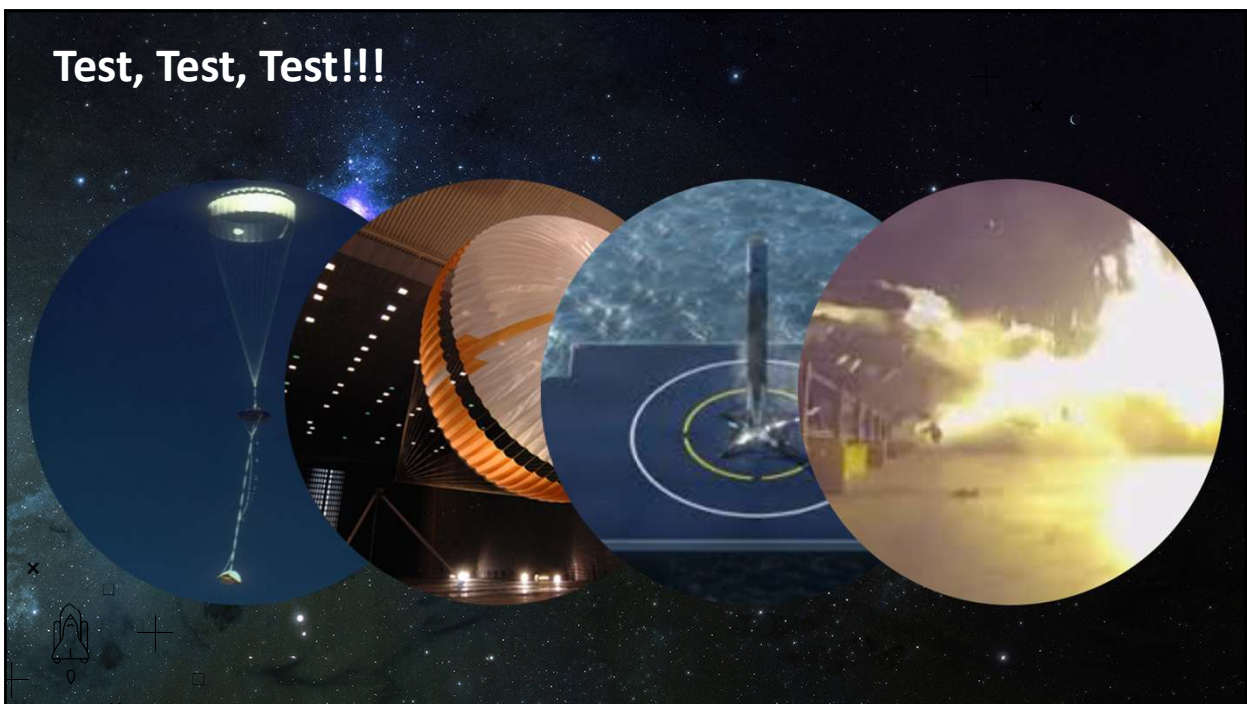
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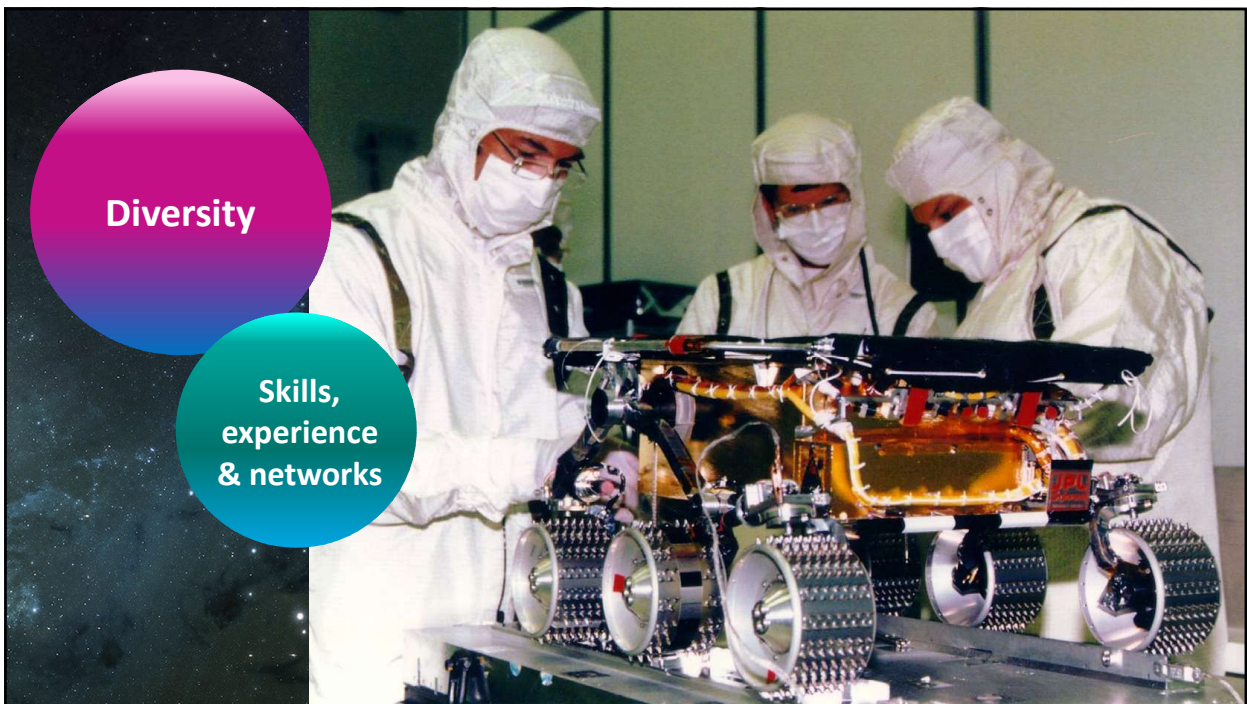


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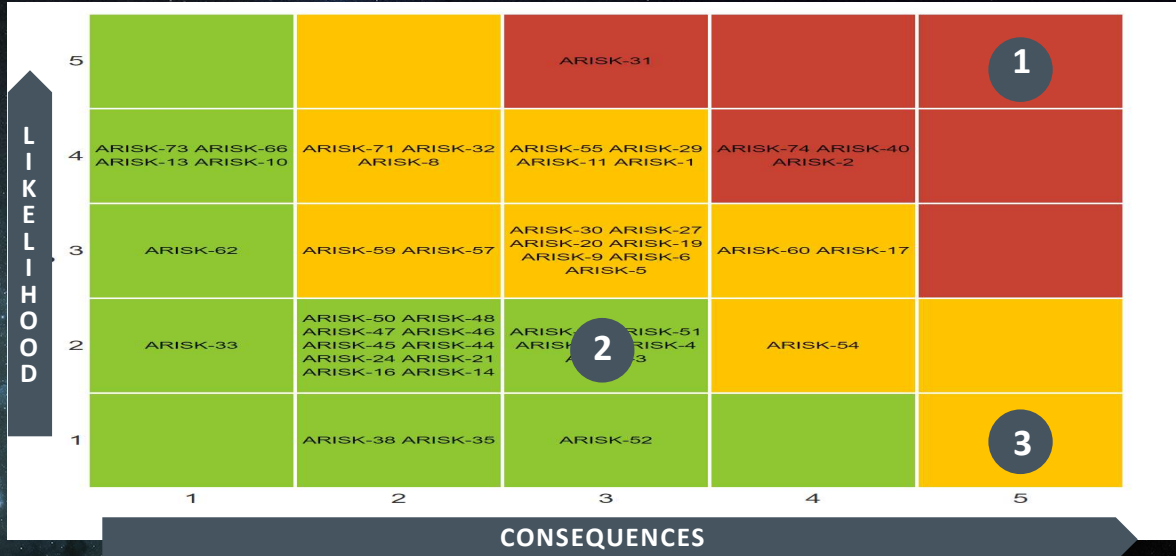
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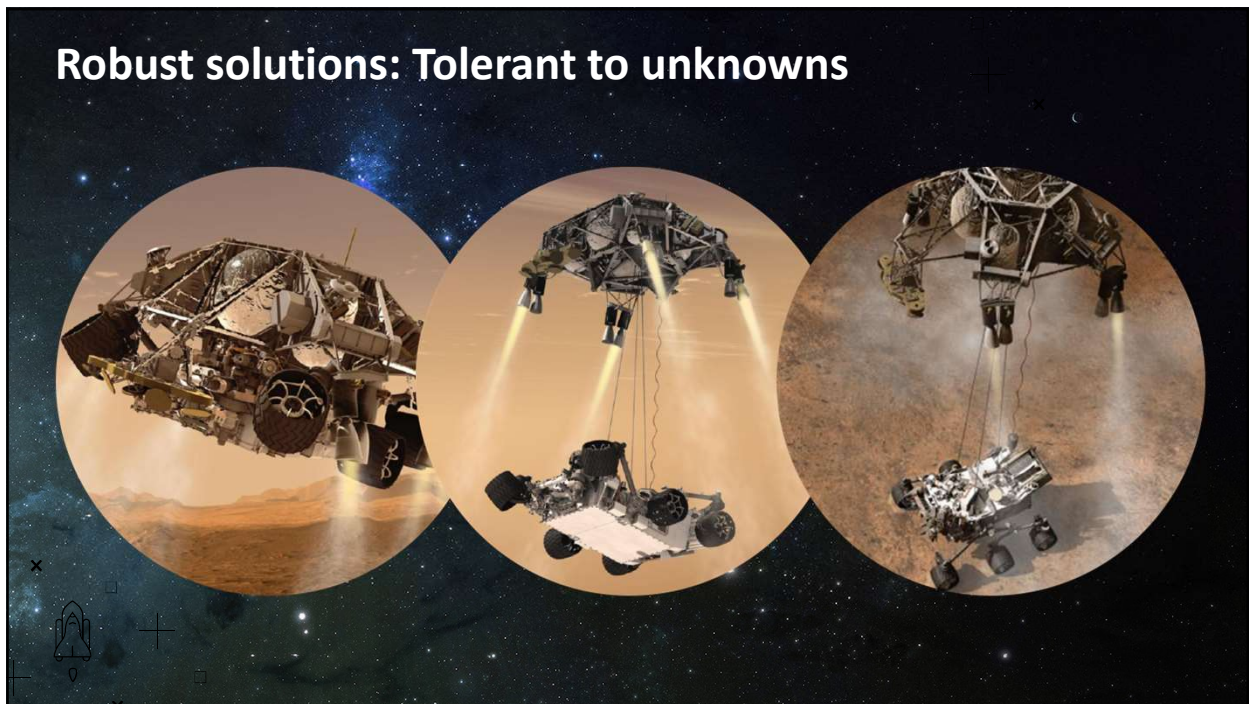


# Identify, Understand, Communicate & Mitigate Risks



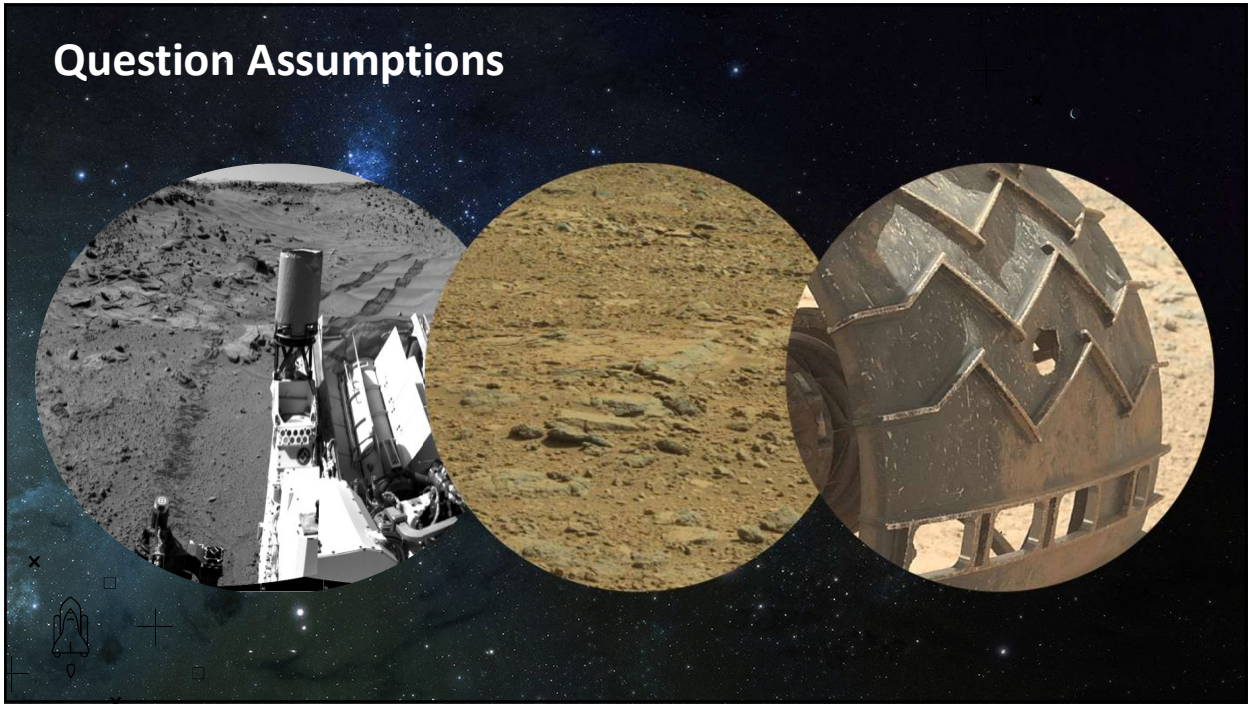
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# Robust solutions: Tolerant to unknowns



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## Question Assumptions

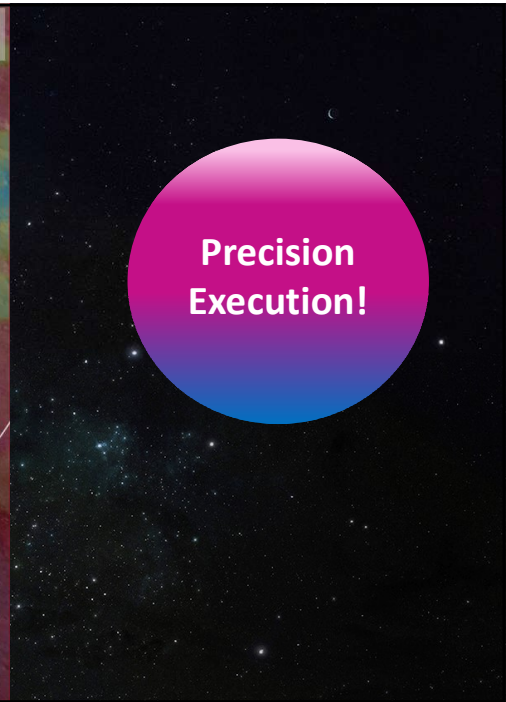
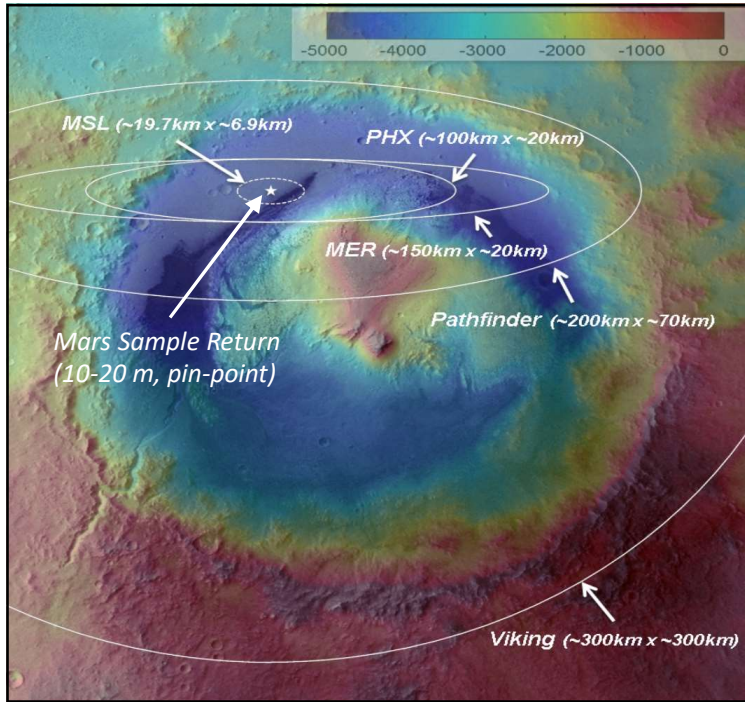


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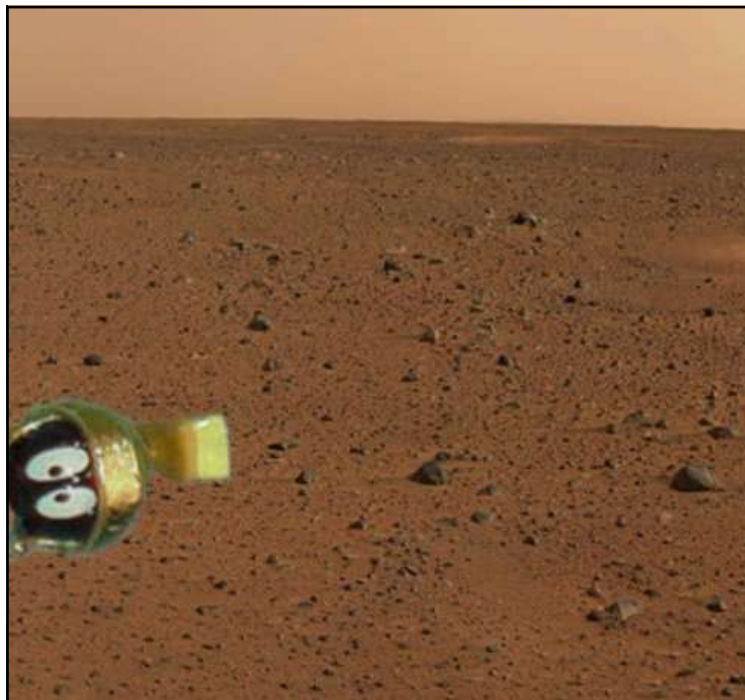


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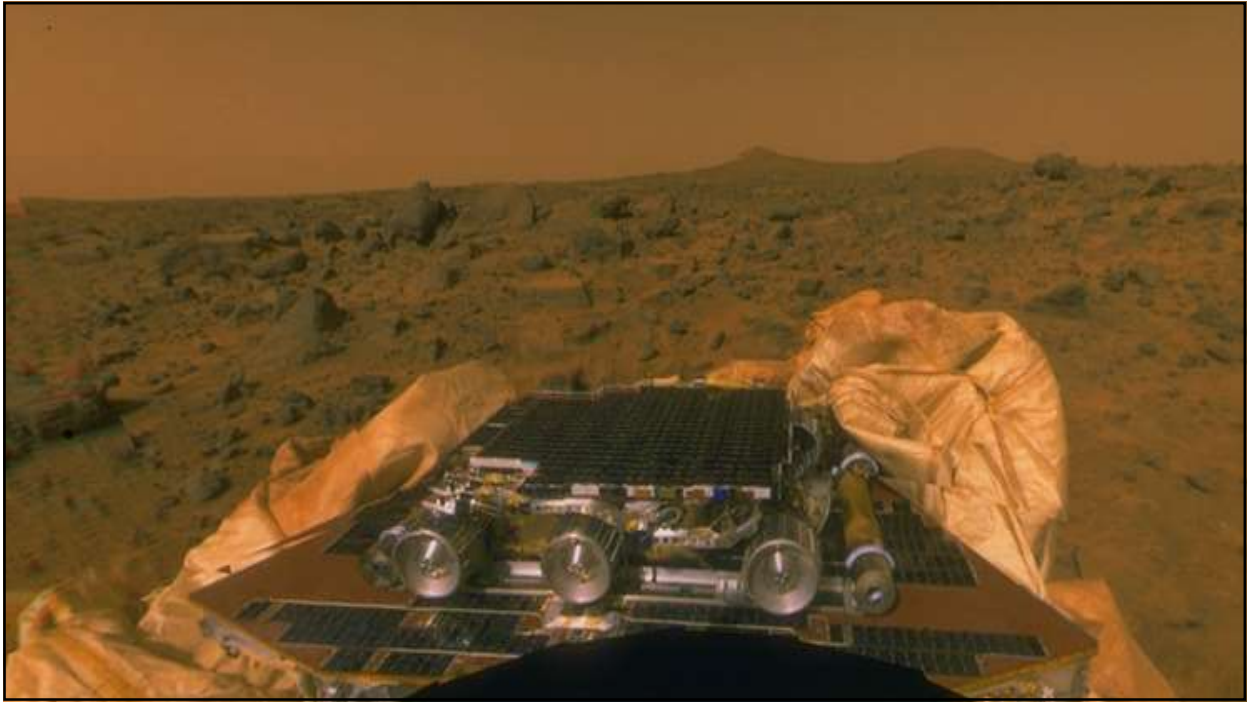




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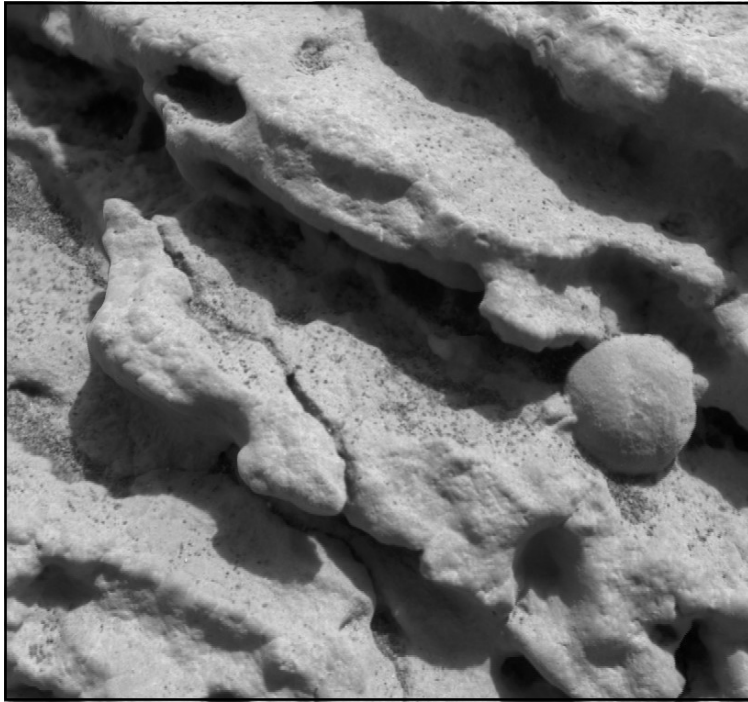


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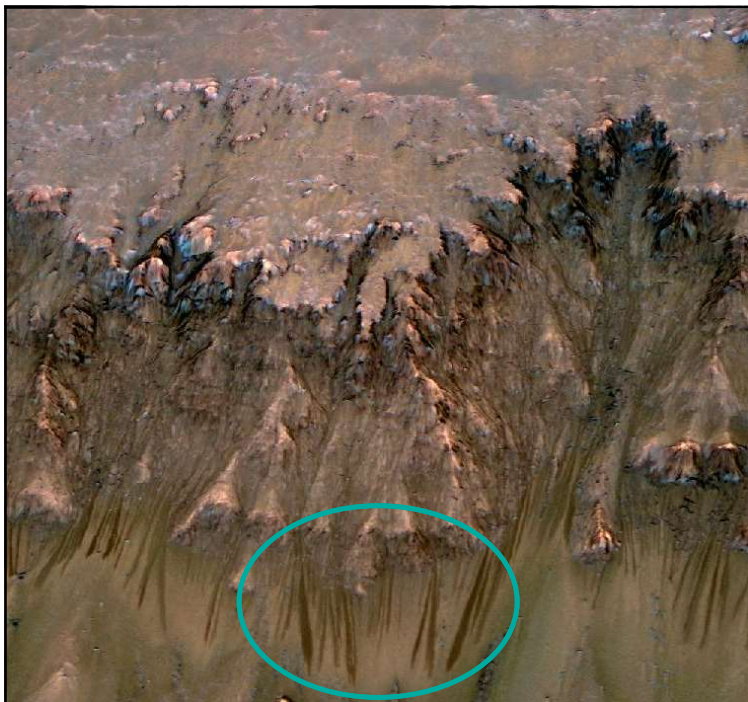
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Sedimentary  
Rock by Mars  
Exploration  
Rovers

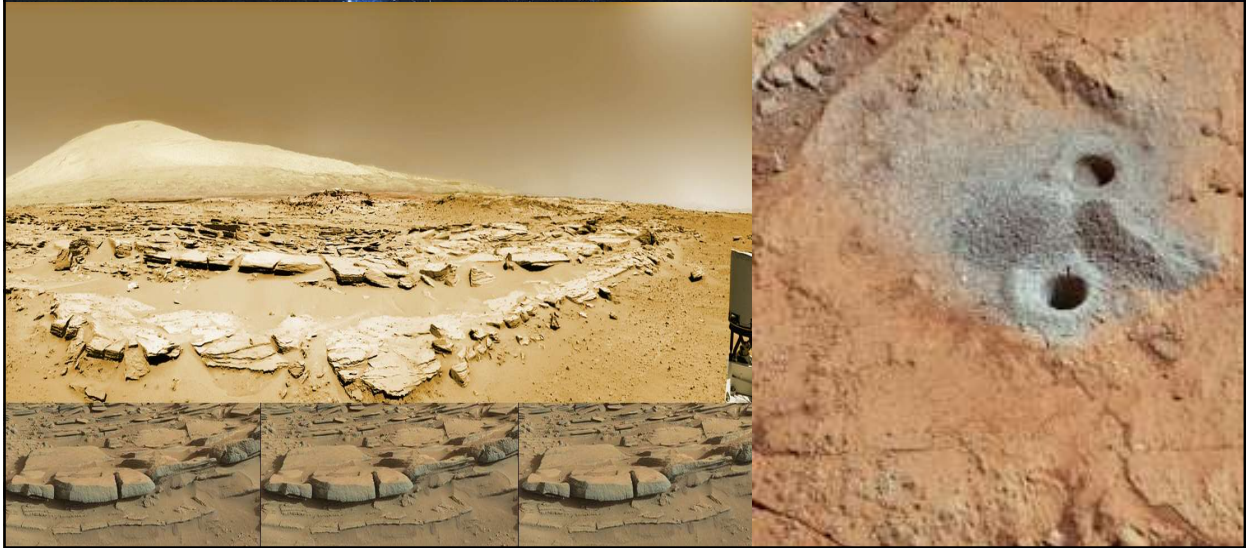
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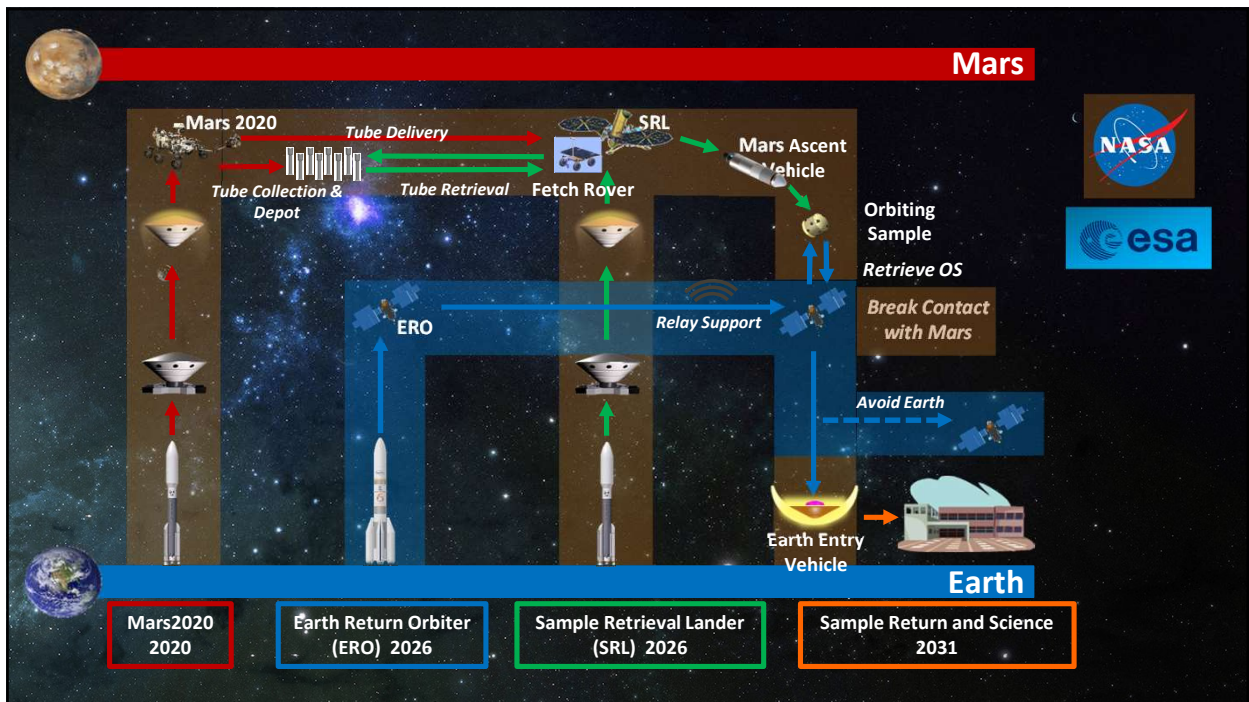
Active Features  
by Mars Global  
Surveyor

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# Curiosity Discoveries



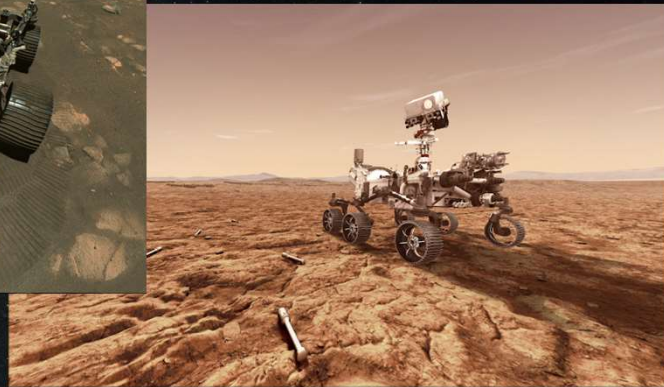
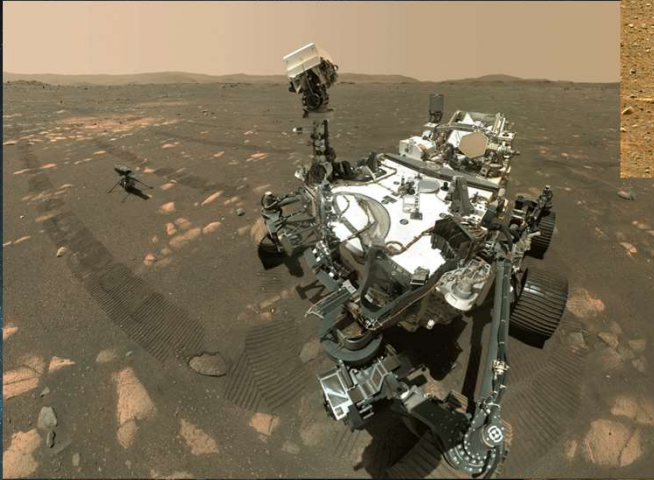
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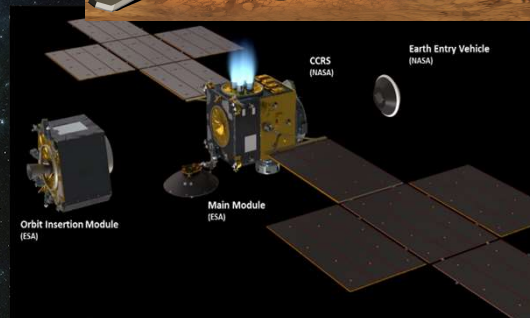
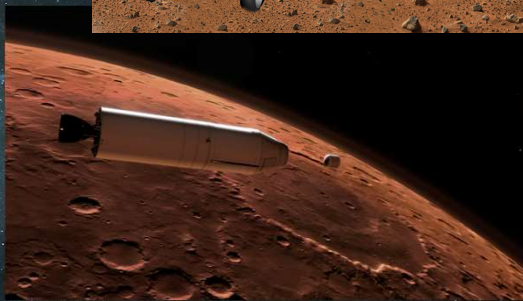
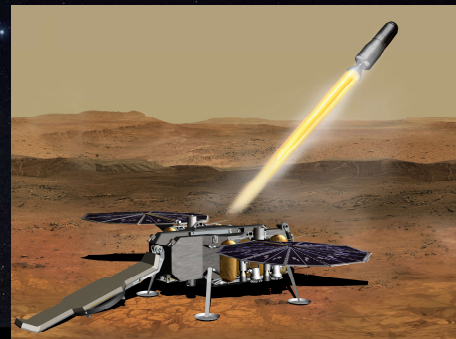
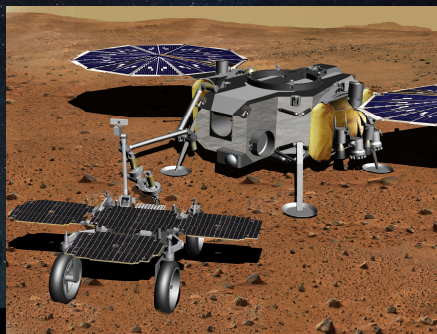


## Mars 2020



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## Mars Sample Return

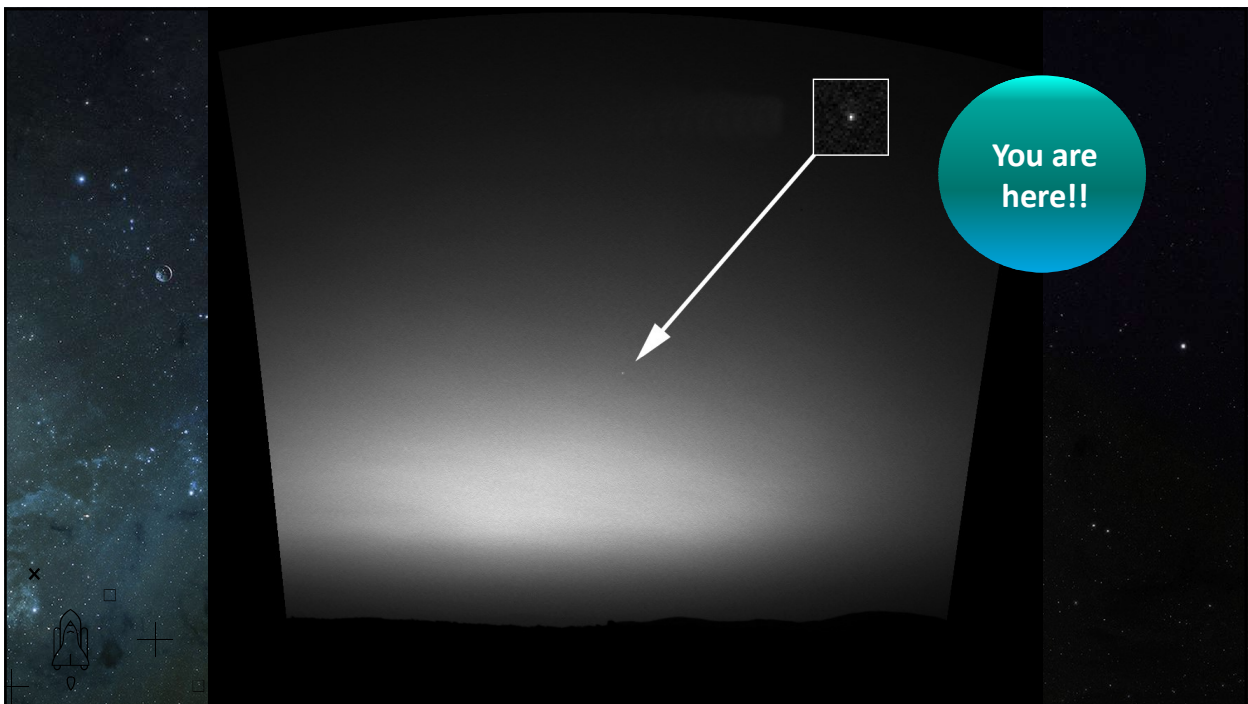


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# Evolution of the Journey to Mars



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