

National Aeronautics and
Space Administration



Moonshot for the Next Generation

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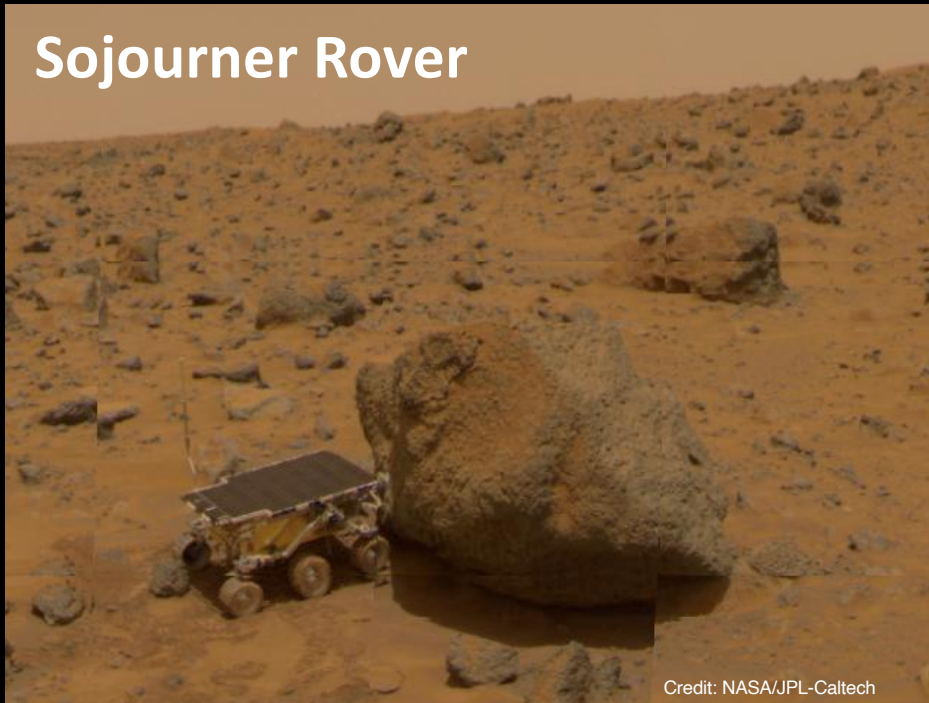


www.nasa.gov





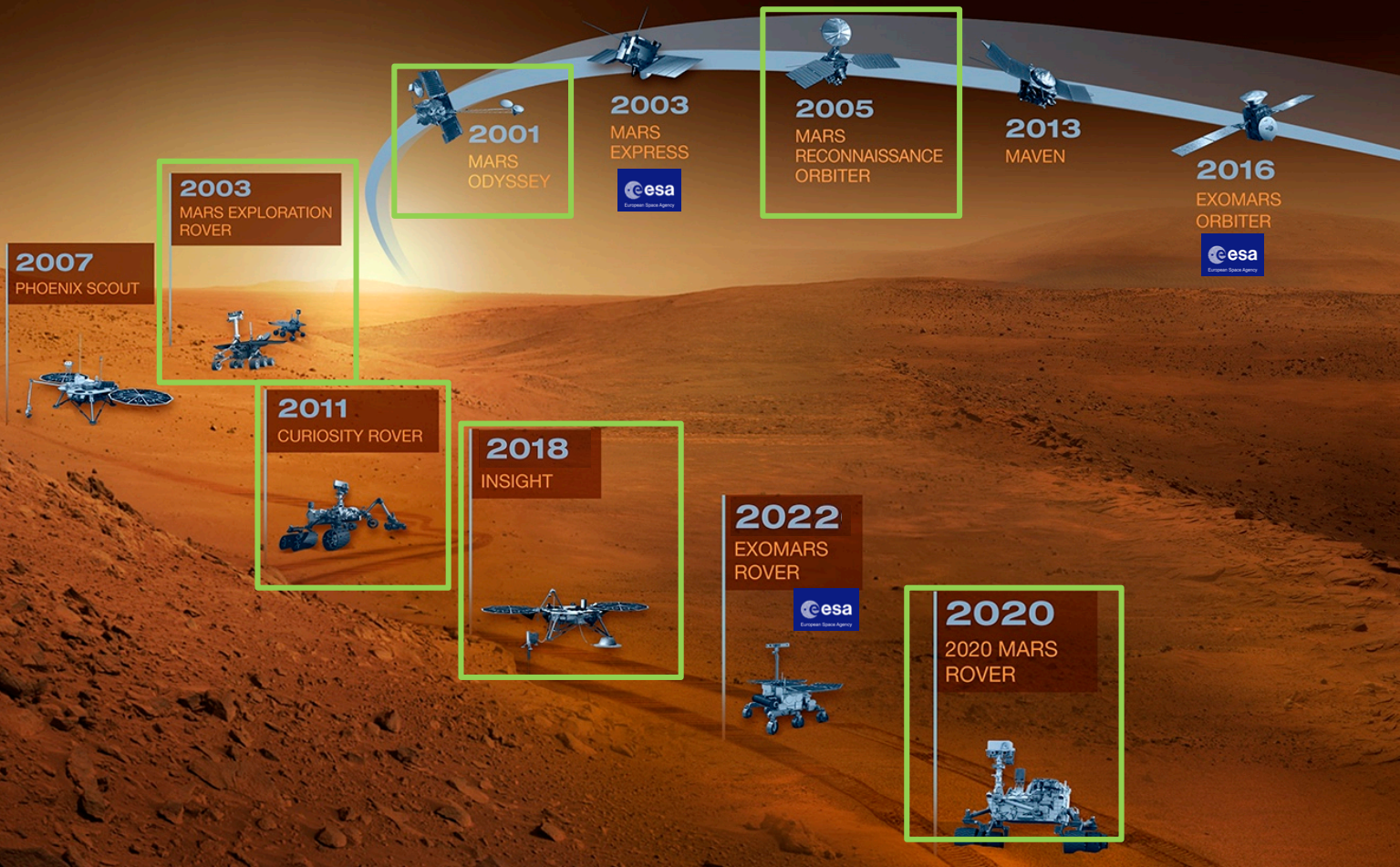
Sojourner Rover



Endeavor



Mars Exploration In the Past 20 Years



Mars Science Laboratory Mission

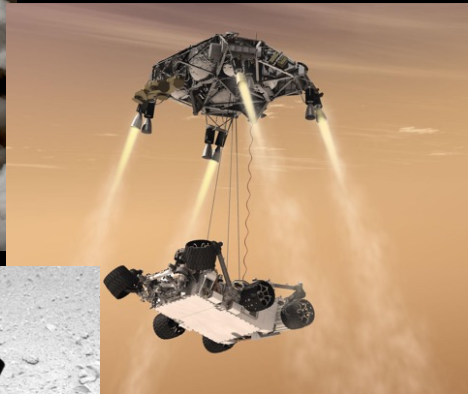
Design & Assembly
(3-5 years)

Launch
(2 hours)

Cruise
(8.5 months)

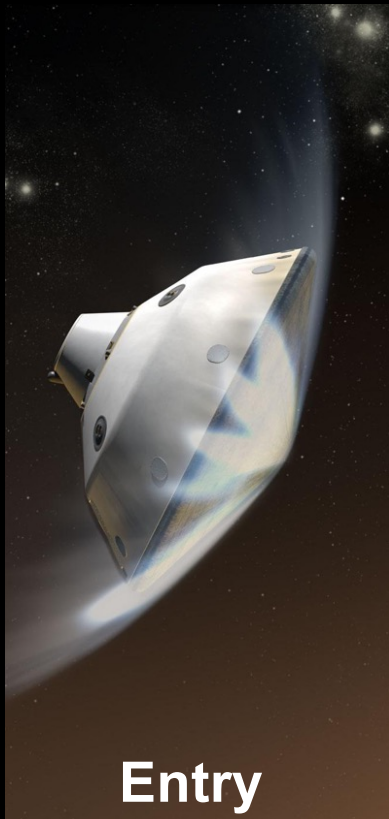
Entry, Descent, and Landing
(7 minutes)

Surface Operations (8+ years)

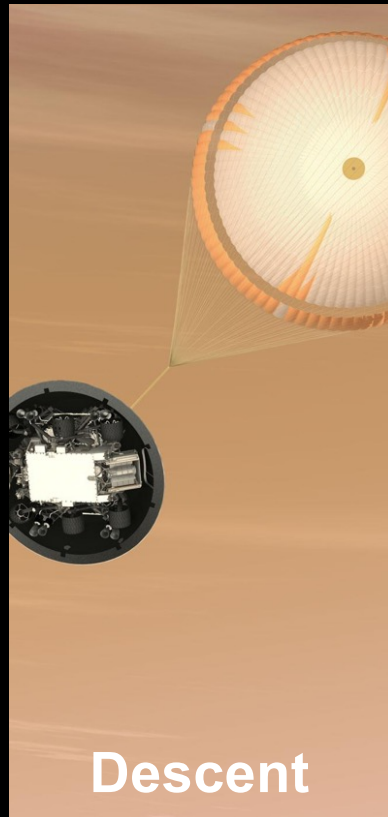


Images: NASA/JPL-Caltech/Scott Andrews/Canon

Landing on Mars



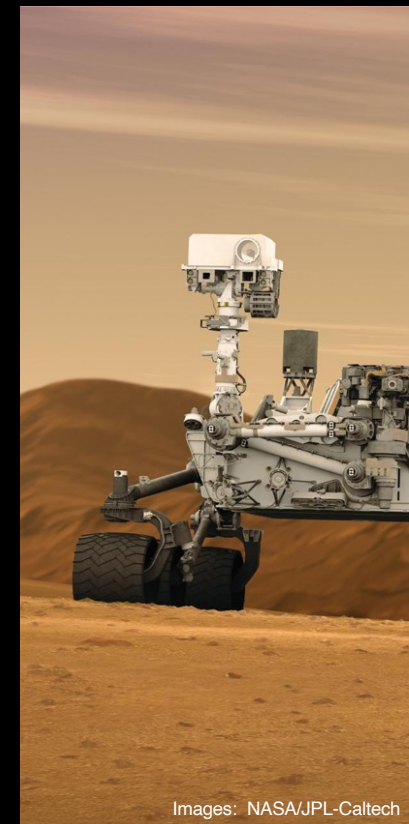
Entry



Descent

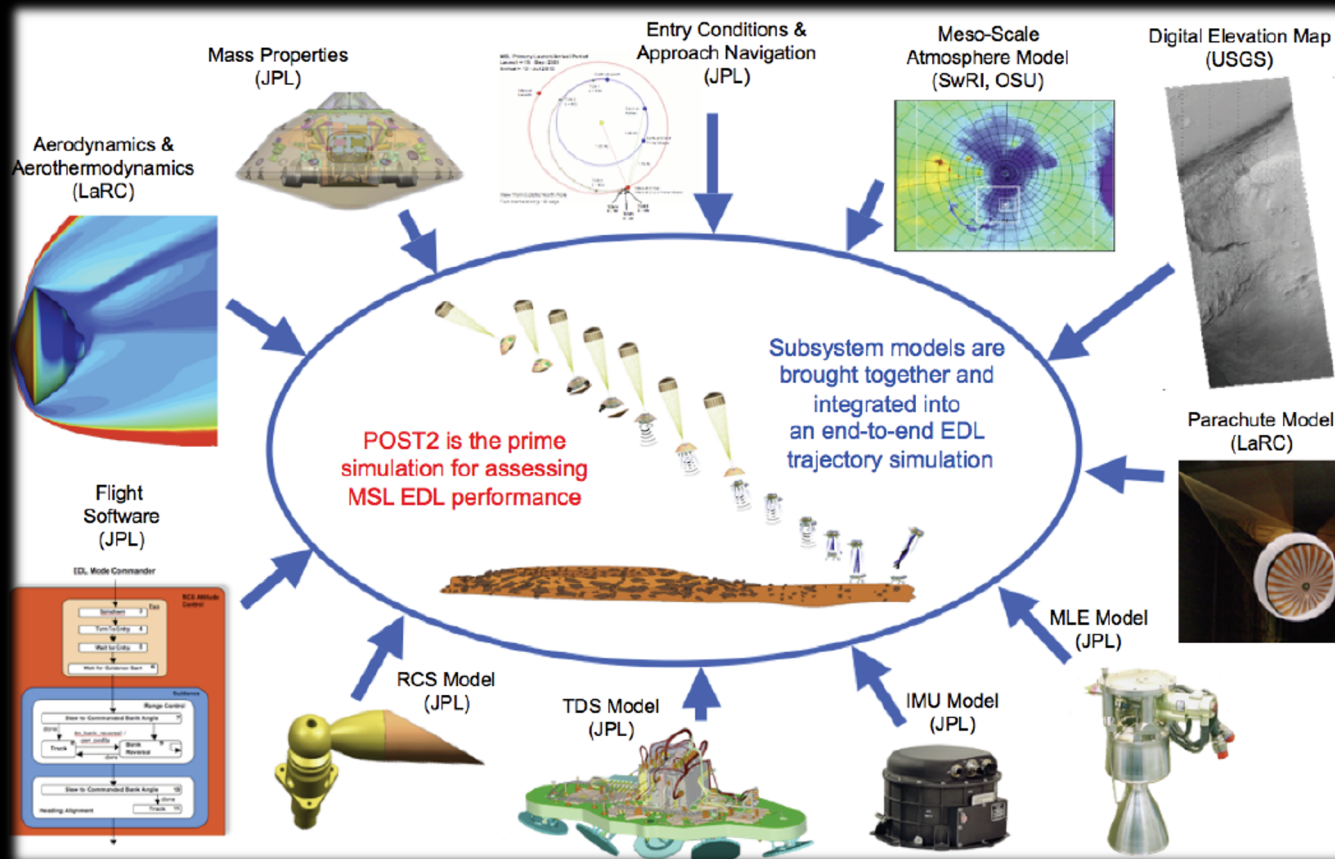


Landing



Images: NASA/JPL-Caltech

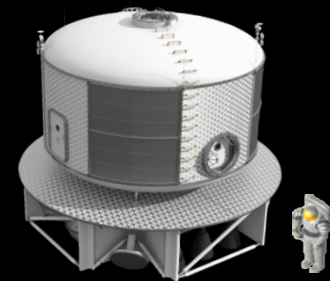
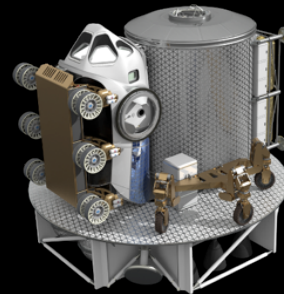
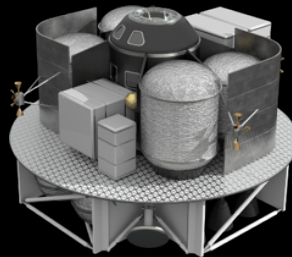
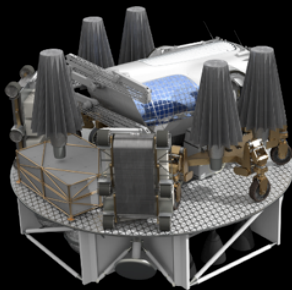
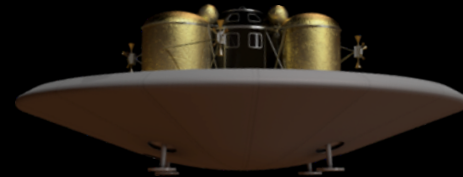
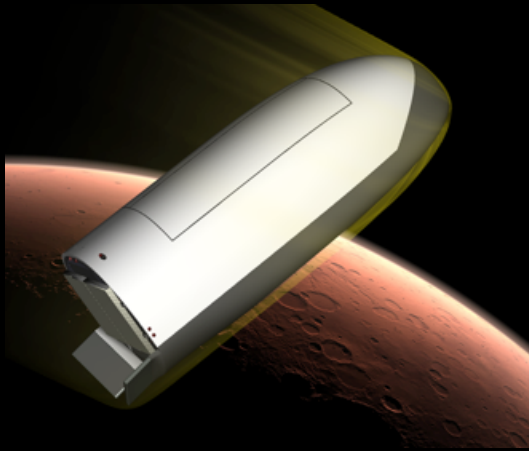
We cannot test the whole system at Mars...



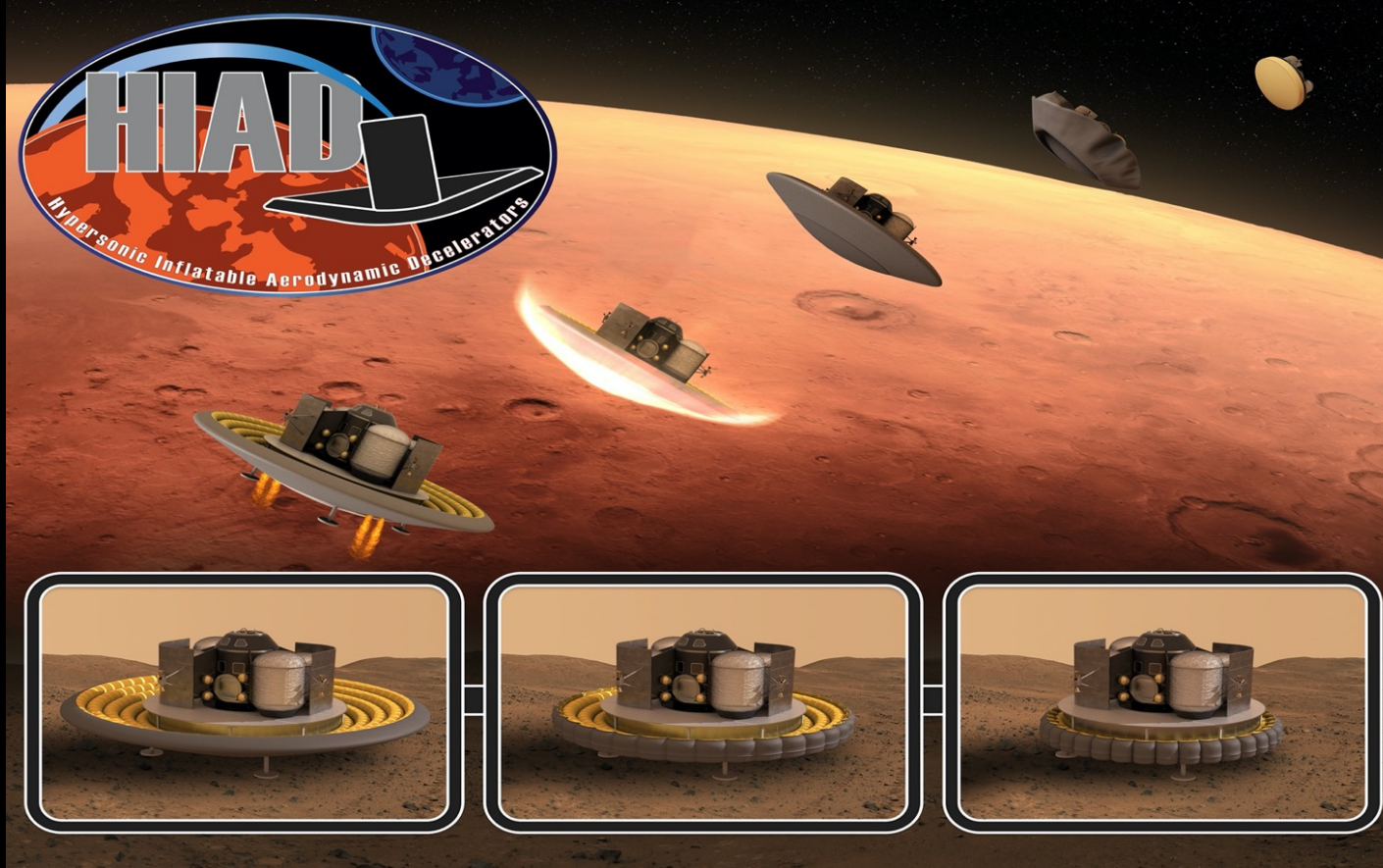
so we use computer simulations.

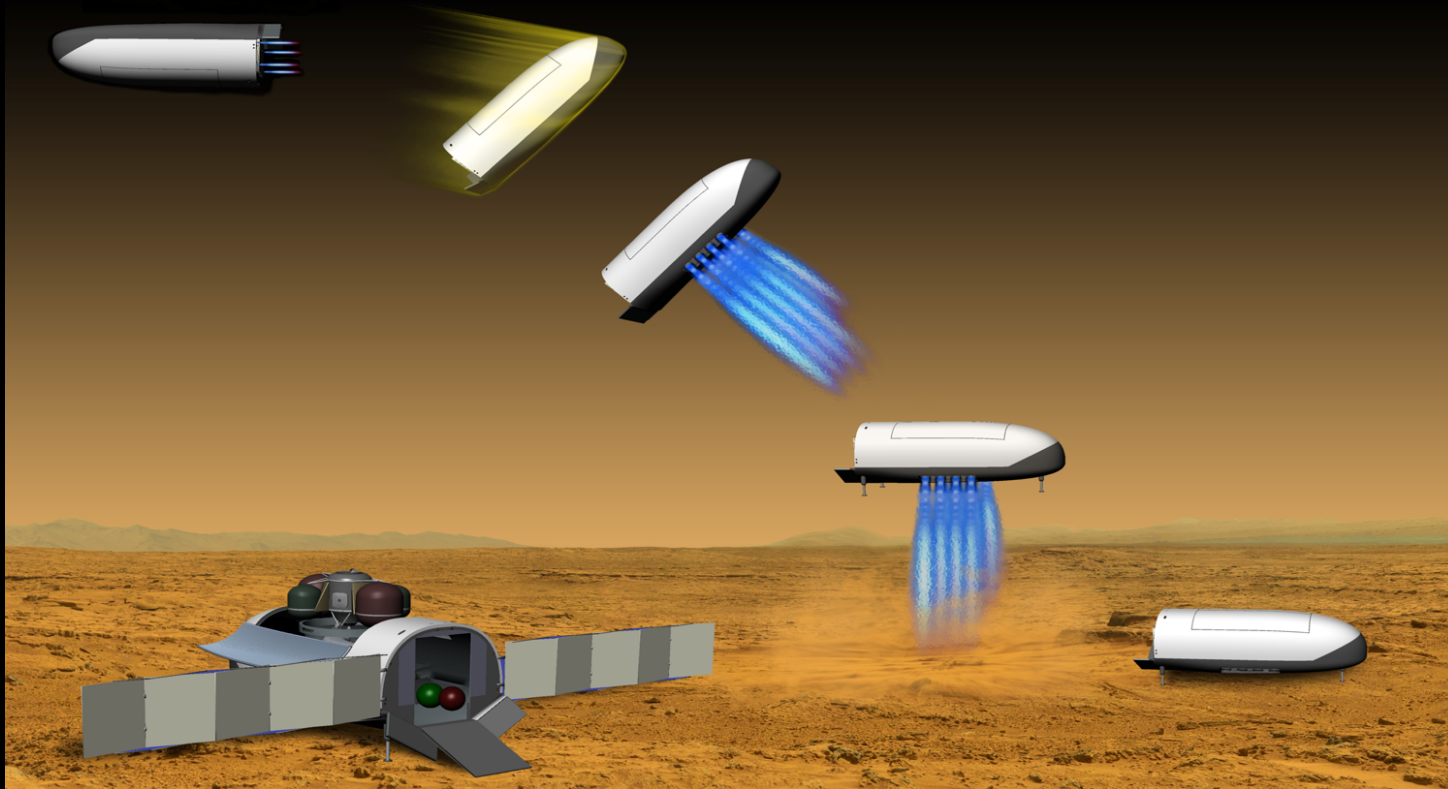


**Sending humans to Mars will
require landing multiple landers
carrying 20,000 to 40,000 kg
payloads.**



Potential Entry Configurations







SPACE POLICY DIRECTIVE – 1

Reinvigorating America's Human Space Exploration Program



“Lead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities.

Beginning with missions beyond low-Earth orbit, the United States will **lead the return of humans to the Moon for long-term exploration and utilization**, followed by human missions to Mars and other destinations.”

NASA is charged with landing the first woman and the first person of color on the Moon with the Artemis program.





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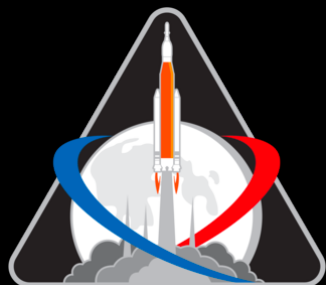
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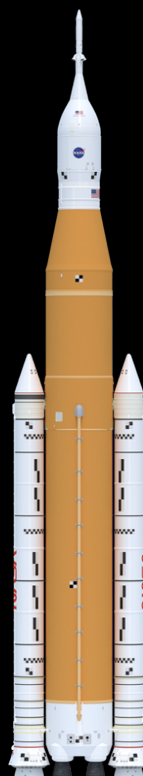




STATUE OF LIBERTY
305 ft.



SPACE SHUTTLE
184 ft.



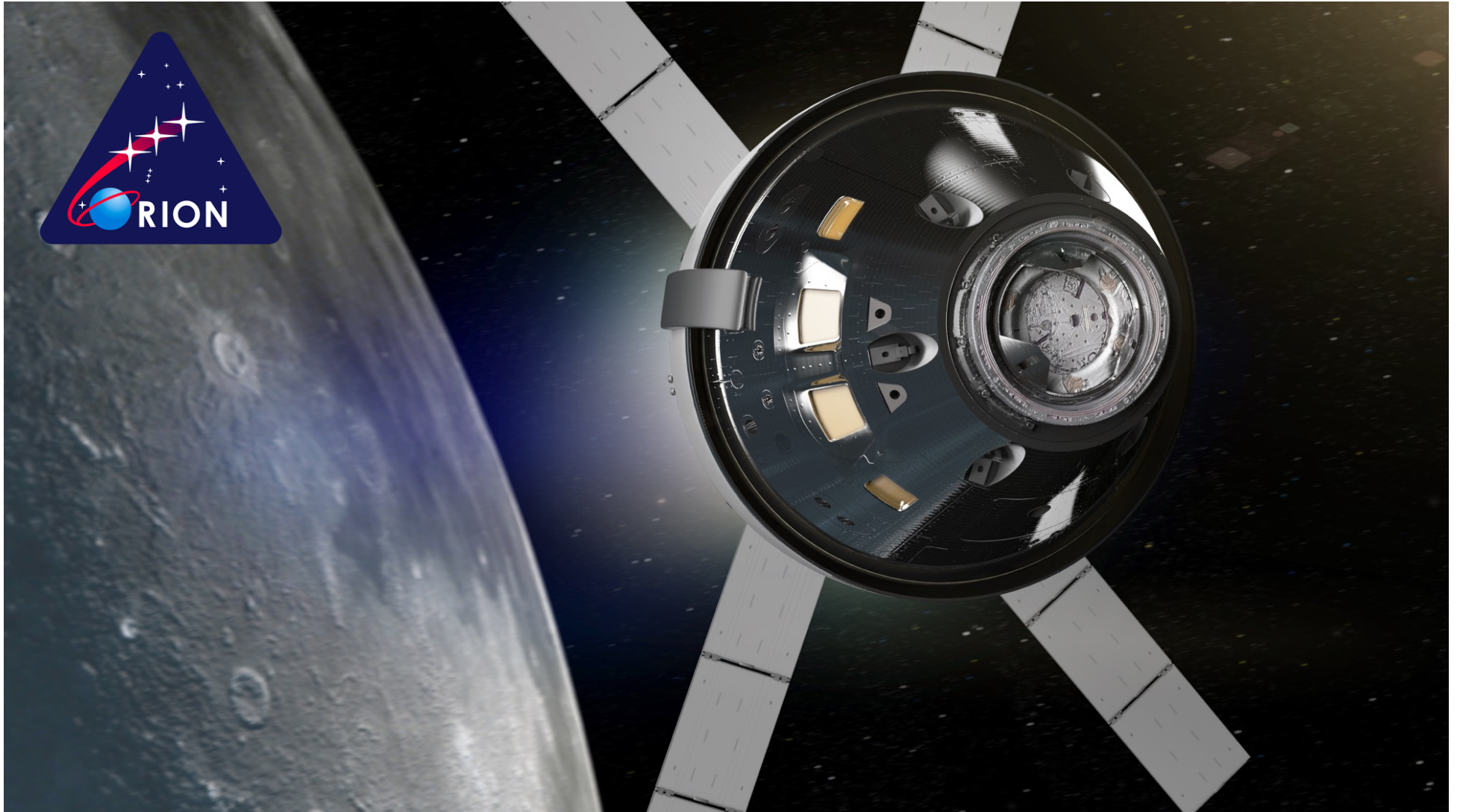
SLS / ORION Block I
322 ft.



SLS / ORION Block II
364 ft.



SATURN 5
363 ft.





Spacecraft
Adapter
Jettison
Panels

Spacecraft Adapter

Service Module (SM)
Includes the European Service Module and
the NASA Crew Module Adapter

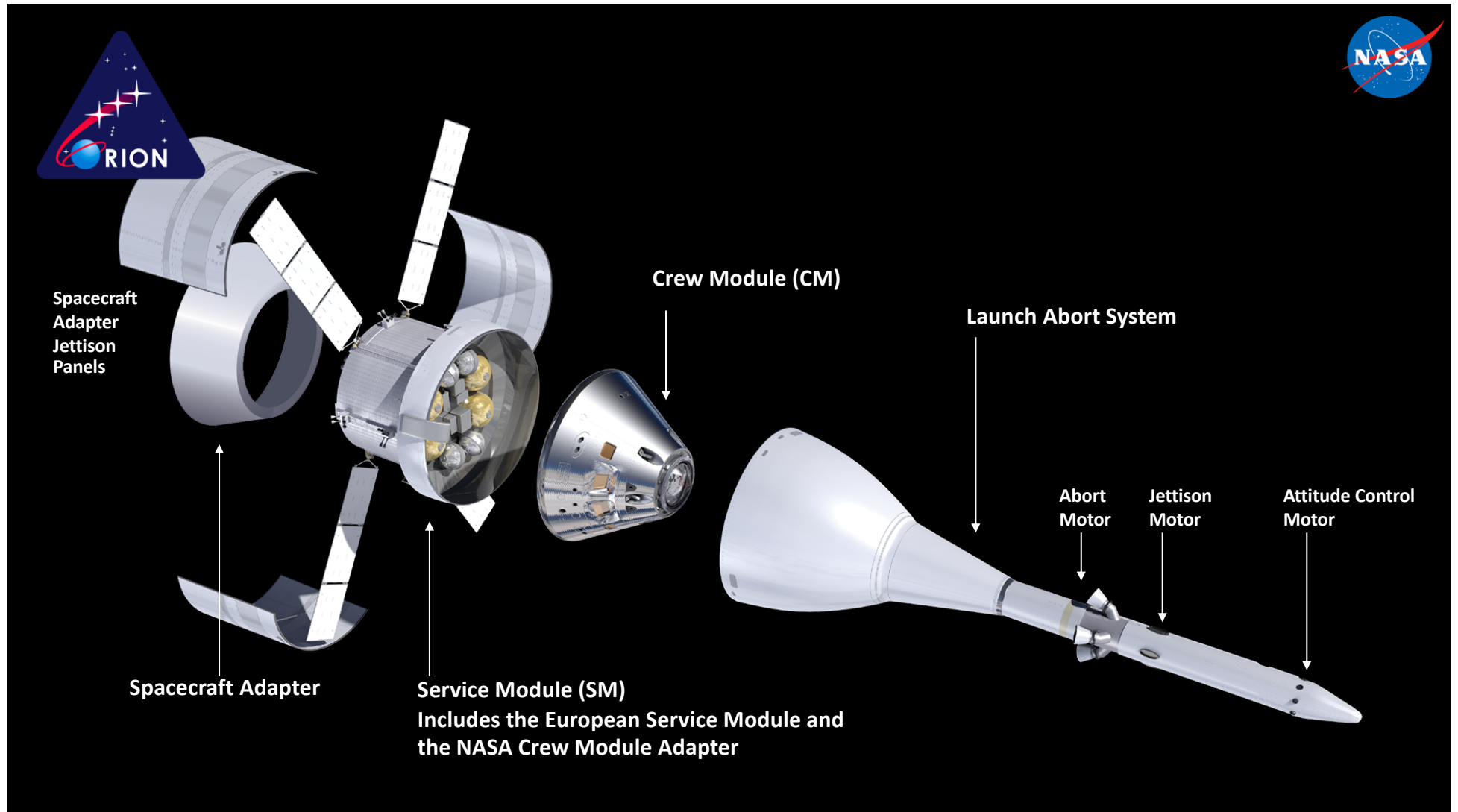
Crew Module (CM)

Launch Abort System

Abort
Motor

Jettison
Motor

Attitude Control
Motor

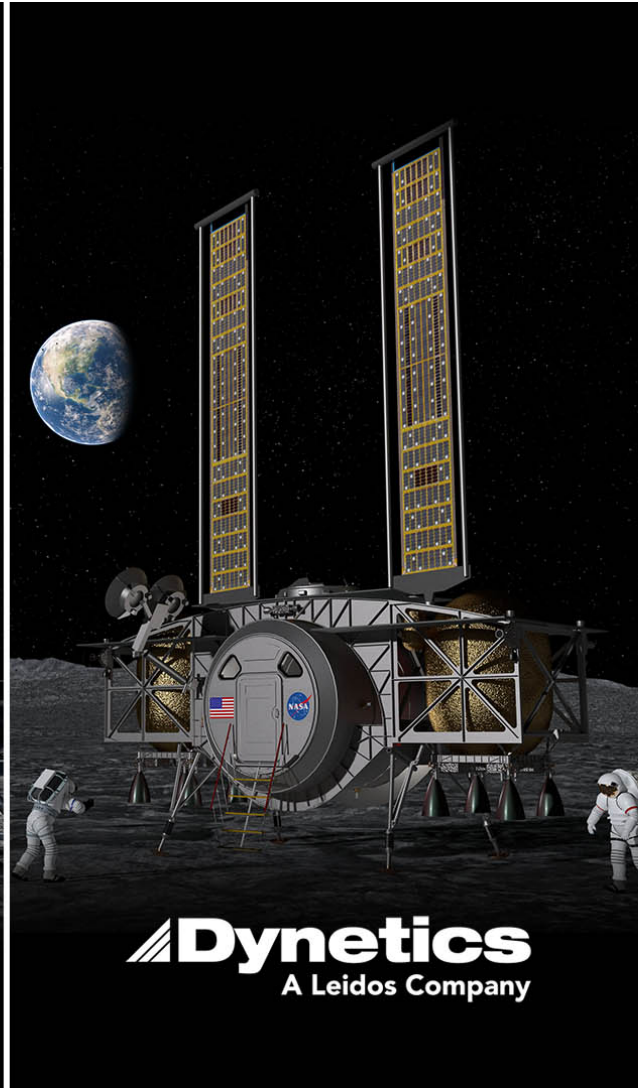




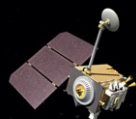
Gateway International Partners

Building on ISS partnerships to expand deep space capabilities





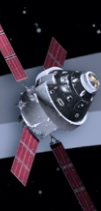
ARTEMIS: Landing Humans on the Moon



Lunar Reconnaissance Orbiter: Continued surface and landing site investigation



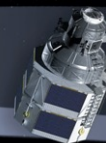
Artemis I: First human spacecraft to the Moon in the 21st century



Artemis II: First humans to orbit the Moon and rendezvous in deep space in the 21st Century



Gateway begins science operations in lunar orbit with launch of Power and Propulsion Element and Habitation and Logistics Outpost



Initial human landing system delivered to lunar orbit



Artemis III: Orion and crew dock to human landing system for crew expedition to the surface



Early South Pole Robotic Landings

Science and technology payloads delivered by Commercial Lunar Payload Services providers

Volatiles Investigating Polar Exploration Rover

First mobility-enhanced lunar volatiles survey

Humans on the Moon - 21st Century

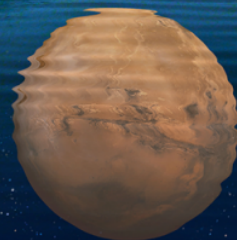
First crew leverages infrastructure left behind by previous missions

LUNAR SOUTH POLE TARGET SITE



EXPLORE MOON_{to}MARS

MOON LIGHTS THE WAY





Resources

- <https://www.nasa.gov/artemisprogram>
- <https://www.youtube.com/watch?v=vl6jn-DdafM> We Are Going
- <https://www.youtube.com/watch?v=BC5khqpKovU> Meet the Artemis Team
- <https://www.youtube.com/watch?v=dOKKkV-30dE> We Go as the Artemis Generation
- <https://www.youtube.com/watch?v=bivXt0hVufk&t=1s> We Go Forward to the Moon
- [The Women of the Moon](#) by Daniel R. Altschuler and Fernando J. Ballesteros
- <https://www.microsoft.com/en-us/teals> Technology Education and Literacy in Schools (TEALS)