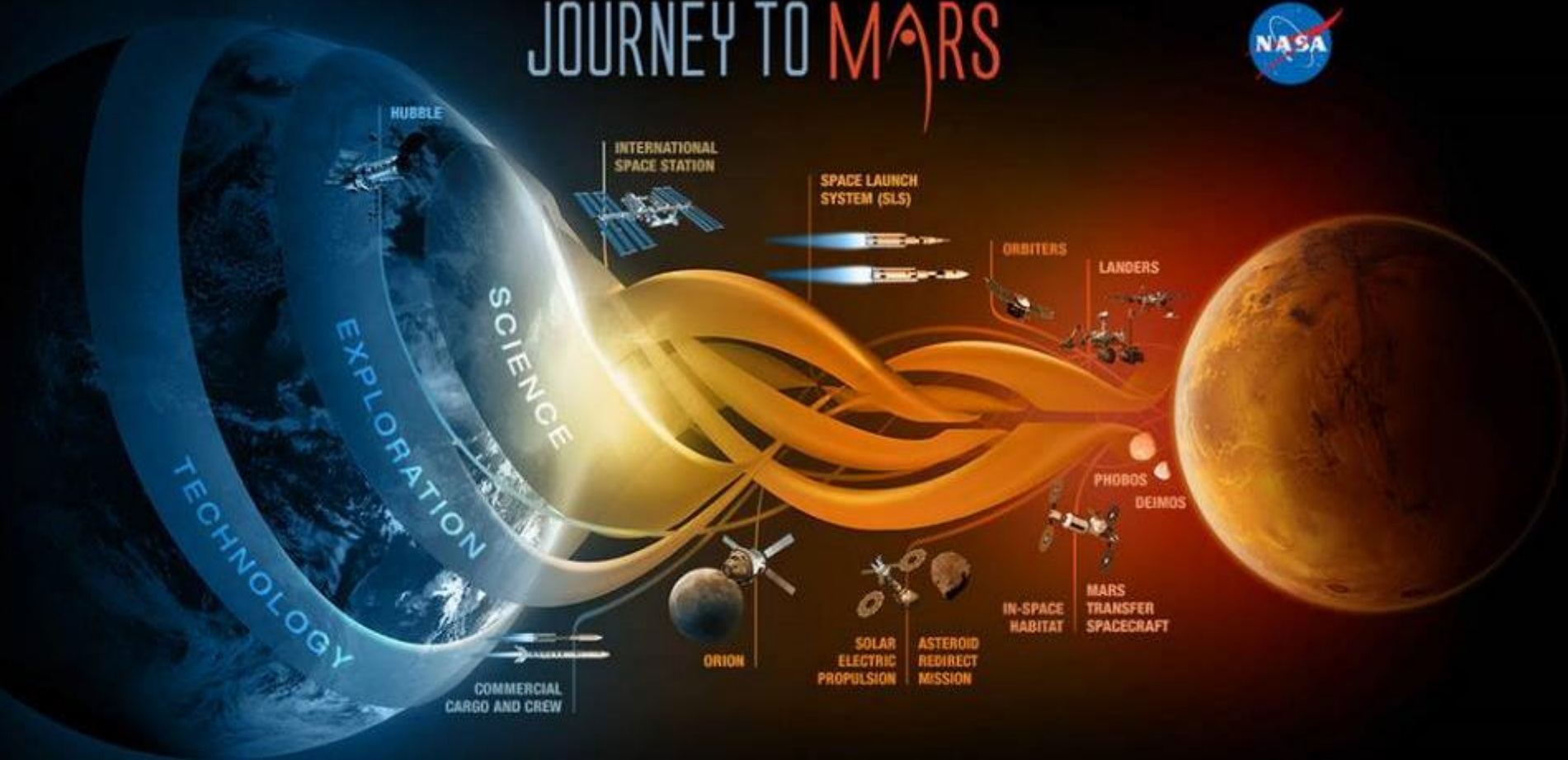


# Journey to Mars

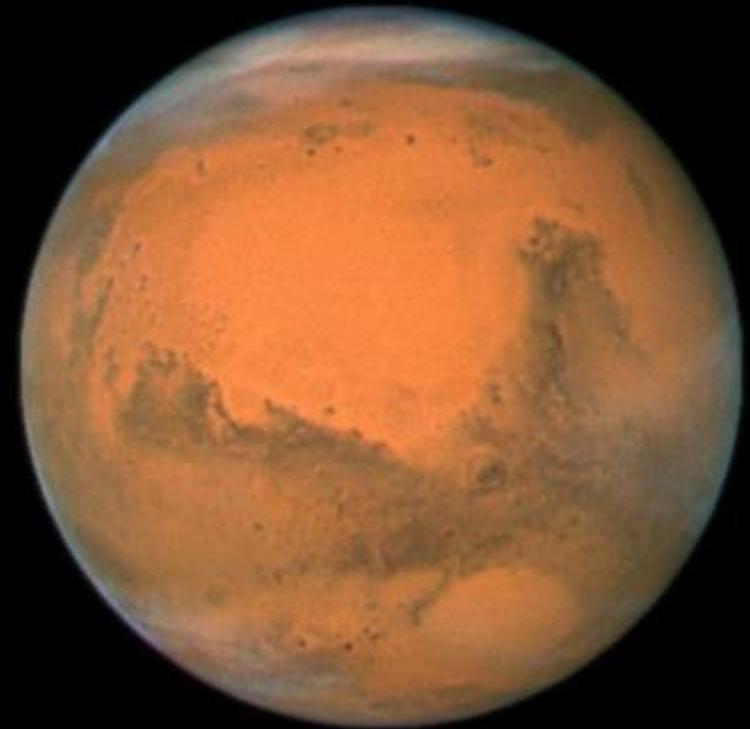


# JOURNEY TO MARS



# Mars – the Basics

- Roman god of war
- Orbit: 142 million miles from the Sun, 50% farther than Earth
- Day: 24.6 hours
- Year: 687 Earth days



# NASA's Plans for Journey to Mars

- Humans to asteroid 2025
- Humans to Mars 2030



# Past Robotic Missions

- Mariner 3-9 (1964-1971) flybys
- Viking 1 & 2 (1975) landed on Mars
- Mars Orbiter (1992) lost contact
- Pathfinder (1996) lander and rover
- Mars Climate Orbiter (1998) and Mars Polar Lander (1999) lost on arrival
- Mars Global Surveyor (1996) successful orbit
- Phoenix (2007) landed on polar regions





# Current Robotic Missions

- Mars Reconnaissance Orbiter (2005) powerful camera capturing images of Mars
- Mars Exploration Rovers (Spirit & Opportunity) (2003) exploring different parts of Mars
- Mars Express (2003) ESA
- Mars Odessey (2001) orbiting spacecraft
- Curiosity (2011) large rover/ science laboratory collecting samples and determining habitability



# Step 1: Near Space

- Robotic Explorers have studied Mars for more than 40 years
- Curiosity Rover measured radiation on the way to Mars and from the surface
- ISS – technology, communication, omics



# Step 2: Deep Space

- Robotic mission to capture and redirect an asteroid to orbit the moon
- Human exploration of asteroid in 2025
- Test Solar Electric Propulsion – needed to send cargo to Mars
- Space Launch System (SLS) and Orion will be most powerful rockets ever flown





# How will we get there?

- SLS and Orion were successfully tested in 2014
- Exploration Mission 1 (EM-1) will be a 3 week mission going past the moon
- First crewed flight is planned for 2021

