

Exploring the Solar System
Examples of NASA Missions

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The Knack

“The Knack”

It is being Curious about anything

Each of us are curious, in our own way!

Each of us explore things!

That is what Knack is all about.

We all have the Knack

What's My Knack? - Materials

- What is a Materials Scientist?
 - The study of stuff
 - What I studied in college
 - University of Washington (Go Huskies!)
- What is a Thermal Protection System?
 - It protects a spacecraft from the extreme heat generated when a vehicle enters the atmosphere of a planet or moon
 - My day job is to invent new materials



Why Explore Space? – To Answer Fundamental Questions

Origins of Life

- Follow the water
- Mars, Europa, Enceladus



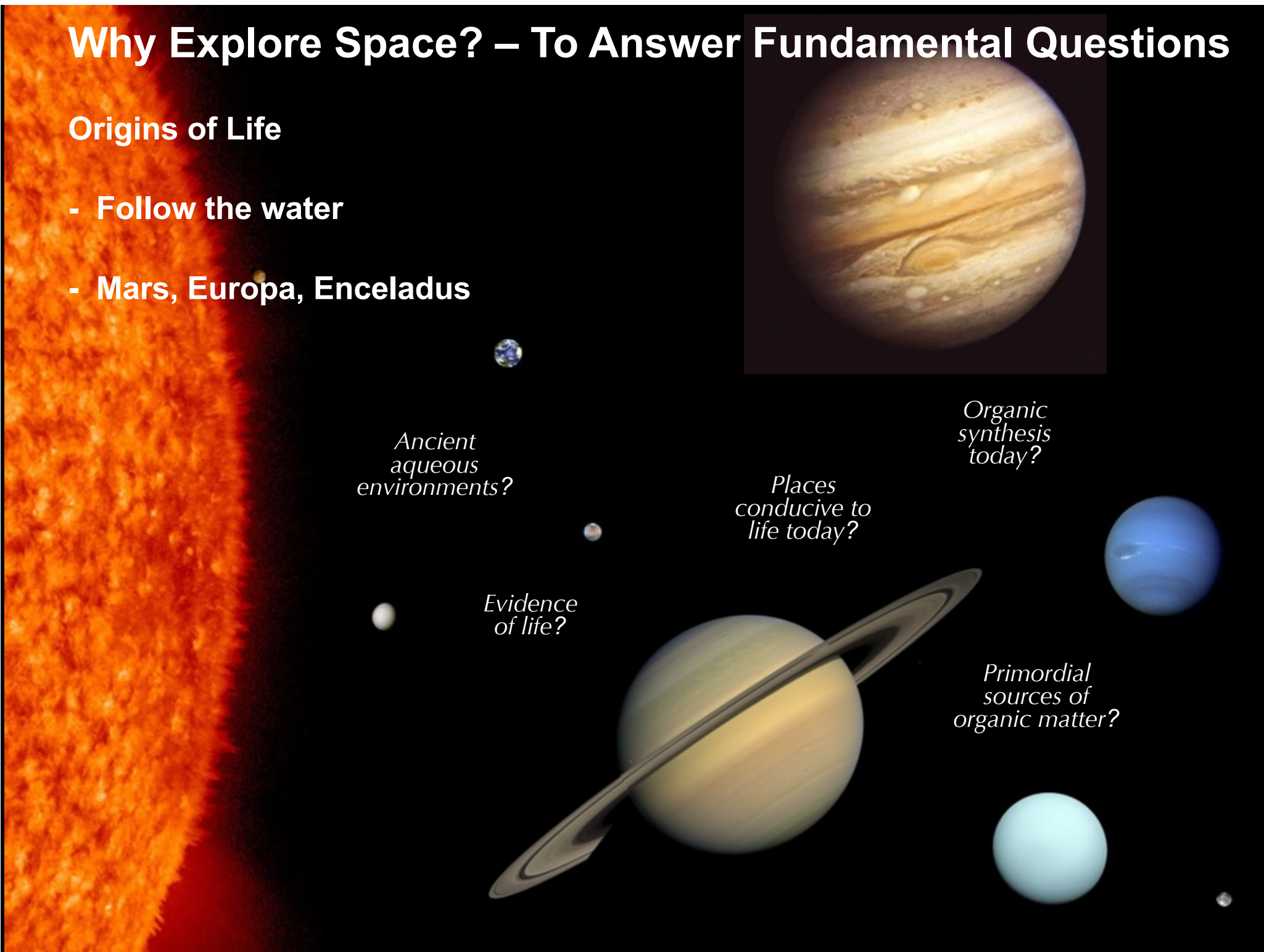
*Ancient
aqueous
environments?*

*Places
conducive to
life today?*

*Organic
synthesis
today?*

*Evidence
of life?*

*Primordial
sources of
organic matter?*



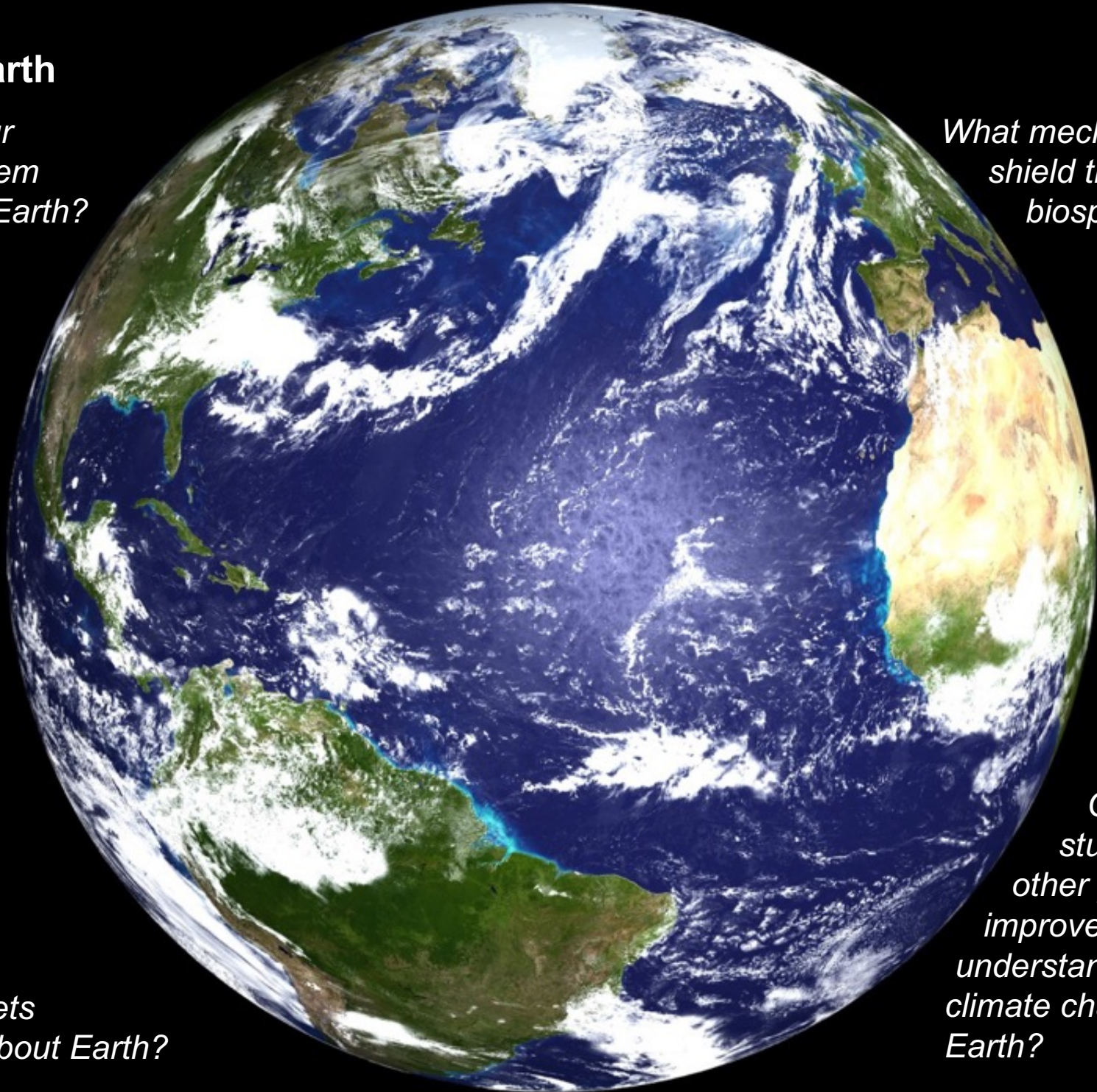
Safer Earth

*What in our
Solar System
threatens Earth?*

*What mechanisms
shield the Earth's
biosphere?*

*What can
other planets
teach us about Earth?*

*Can
studying
other planets
improve our
understanding of
climate change on
Earth?*



How fast are we talking?



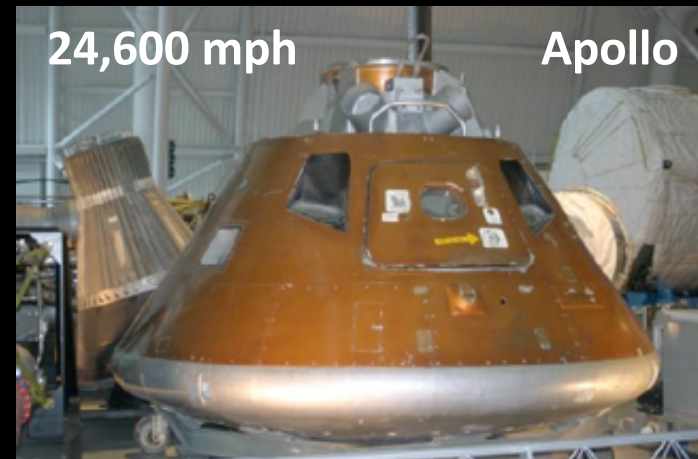
60 mph



15,600 mph



600 mph



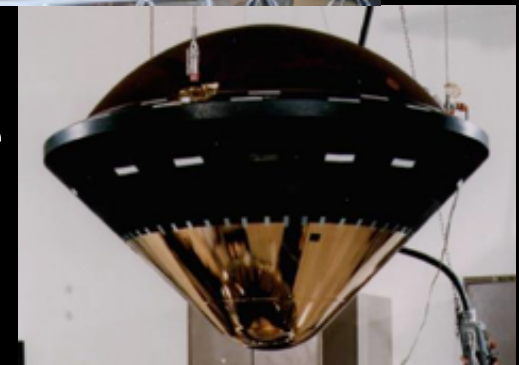
24,600 mph

Apollo



2,700 mph

Galileo Probe
at Jupiter
105,000 mph



How far are we talking?



Some of NASA's Visits to the Solar System

Mercury: MESSENGER

Venus: Pioneer Venus

Mars: Mars Science Laboratory/Pathfinder/Sojourner

Jupiter: Galileo Probe/Voyager

Saturn: Cassini/Voyager

Uranus/Neptune: Voyager

Pluto: New Horizons

How long will it take to get from Earth to Mars
(~50 million miles from Earth)?

1. At the speed of an Airplane?
2. At the Speed of Space Shuttle?
3. At the Speed of Light? (670 million miles/hour)

How long will it take to get from Earth to Mars?

1. At the speed of an Airplane (600 miles/hour)?
 - 100,000 hrs (4,166 days) (11 years)
2. At the Speed of Space Shuttle (15,600 miles/hour)?
 - 2860 hrs. (119 days) (4 months)
3. At the Speed of Light? (670 million miles/hour)
 - 5 minutes

Think about this...

If you send a text message to some one on Mars, it will take 5 min to get there and if they replied it will take 5 more min to get back to earth.

Missions at Planet Earth

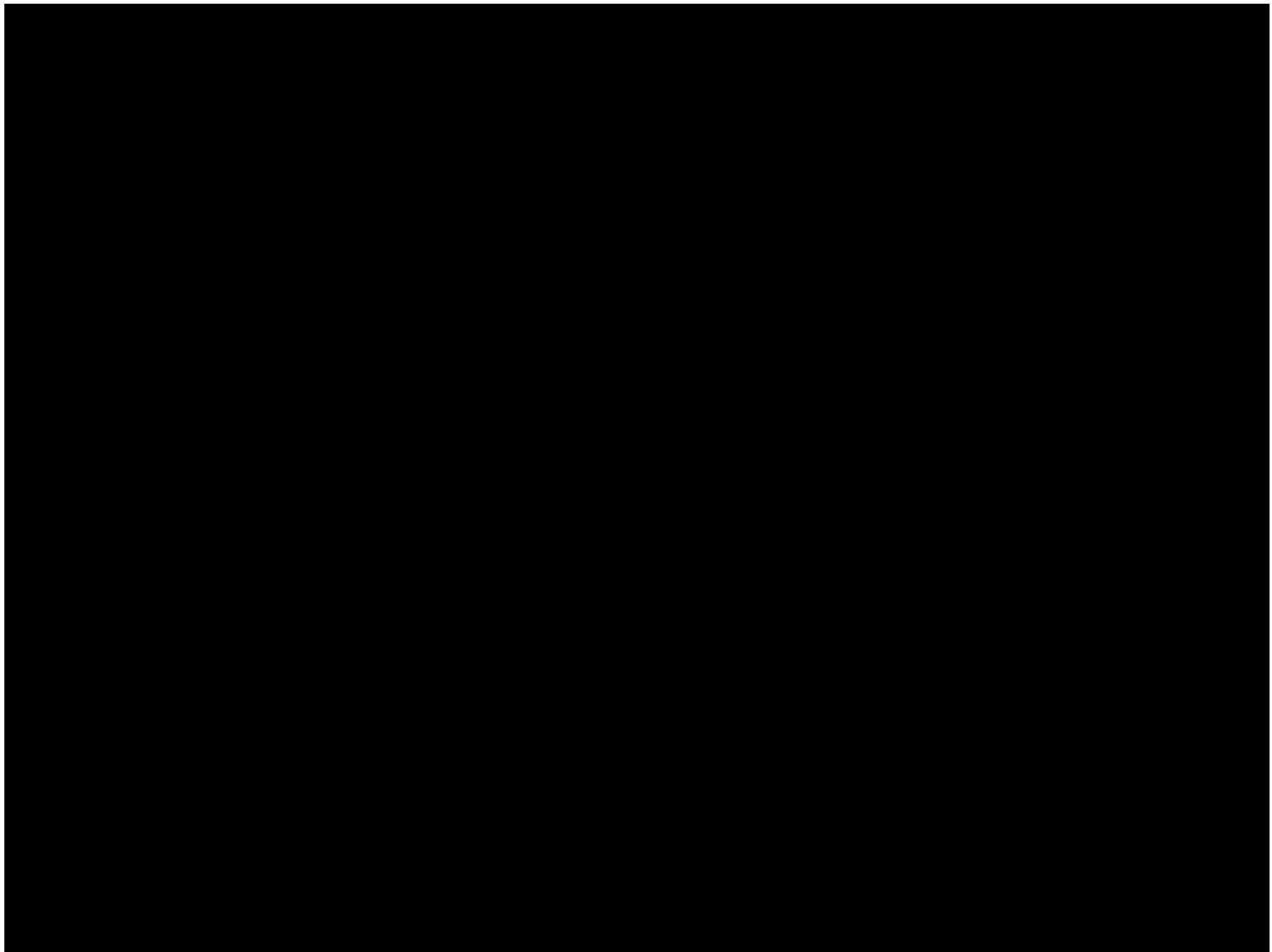


The Astronauts are in Space !

Mission to Planet Earth: Space Shuttle



***Space Shuttle Orbiter
Thermal Protection System Tile Demo***

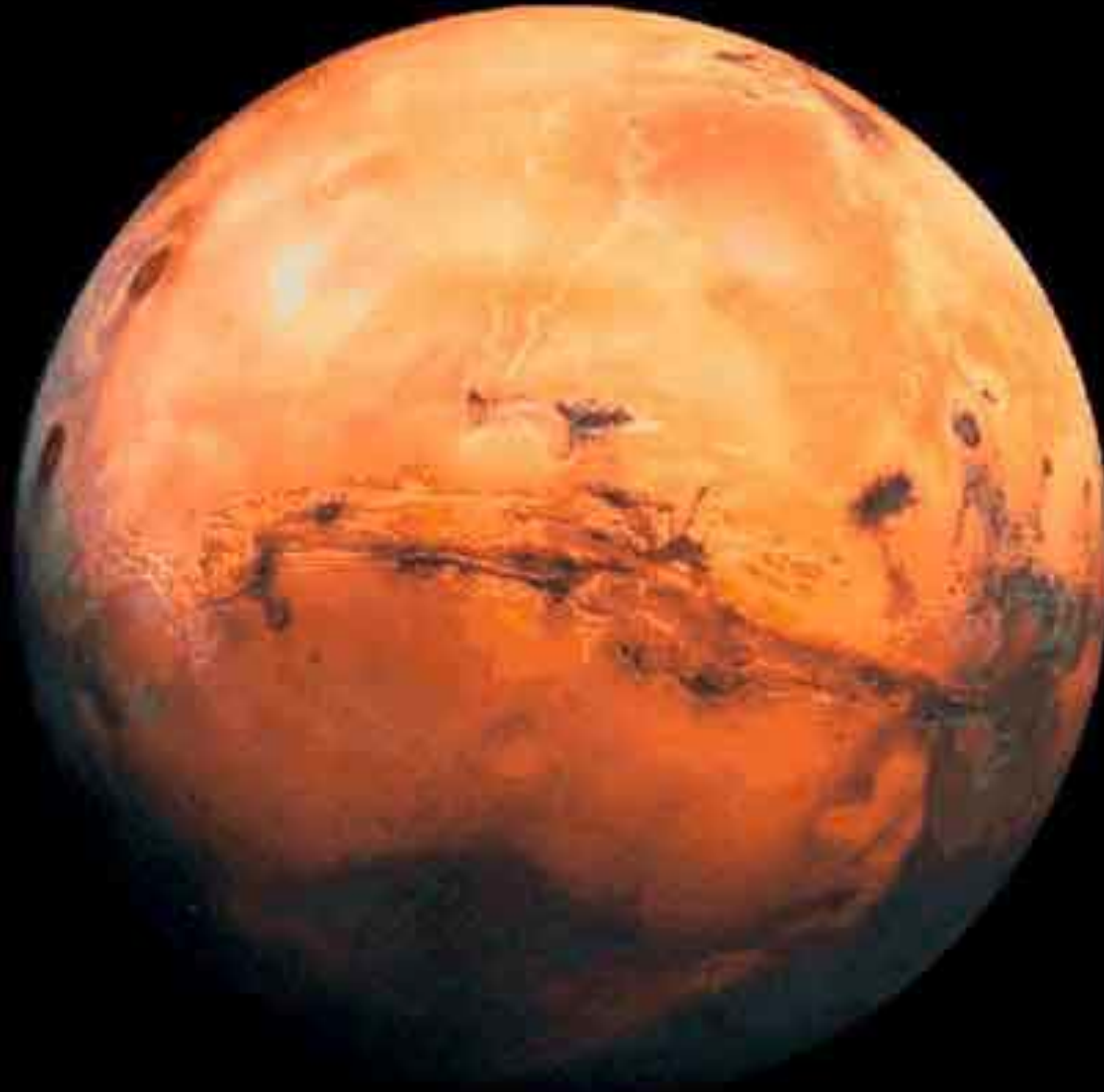


**What is in our neighbourhood?
What Planets are next to Earth?**

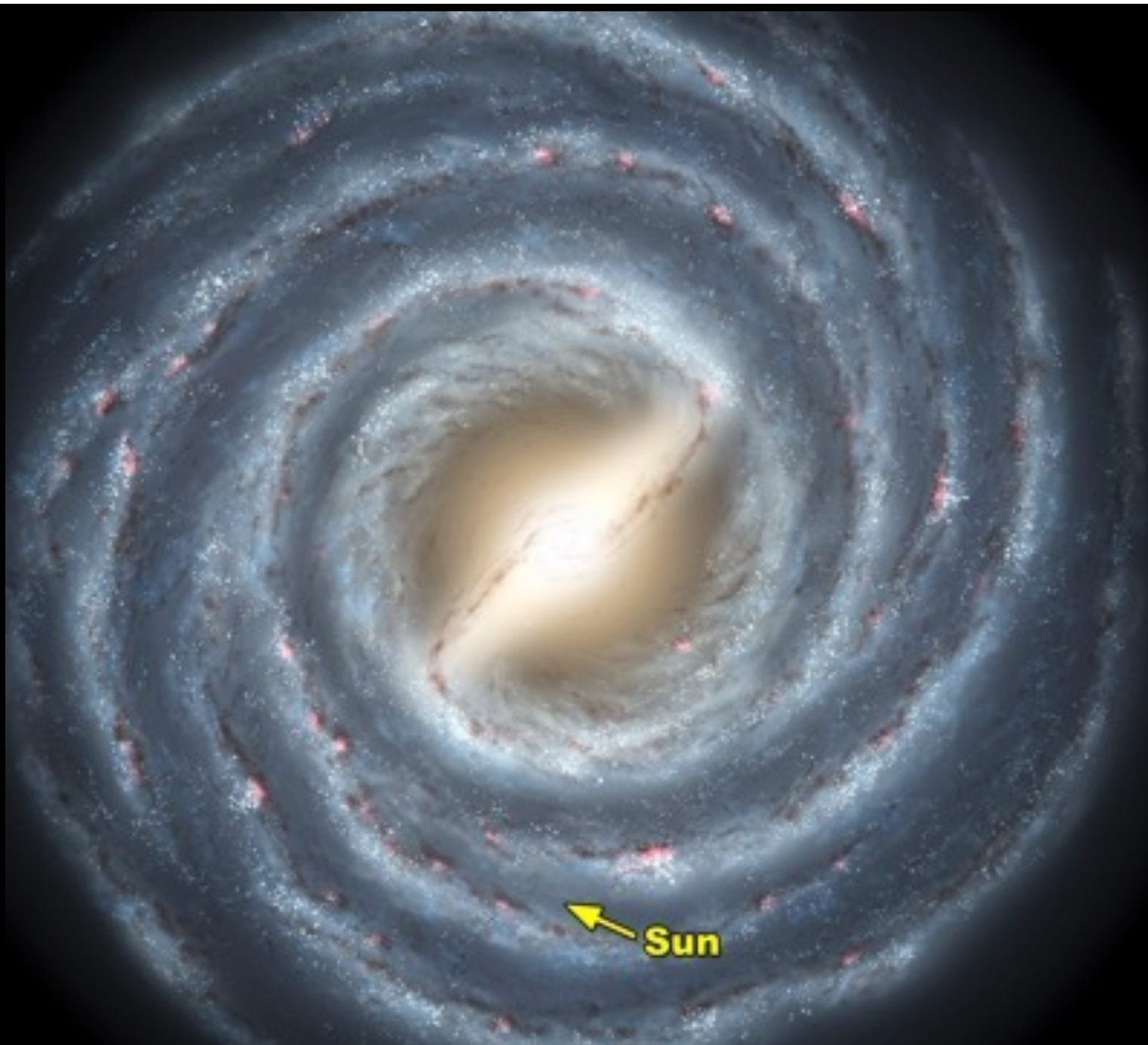


Let us go visit Mars !

Mars



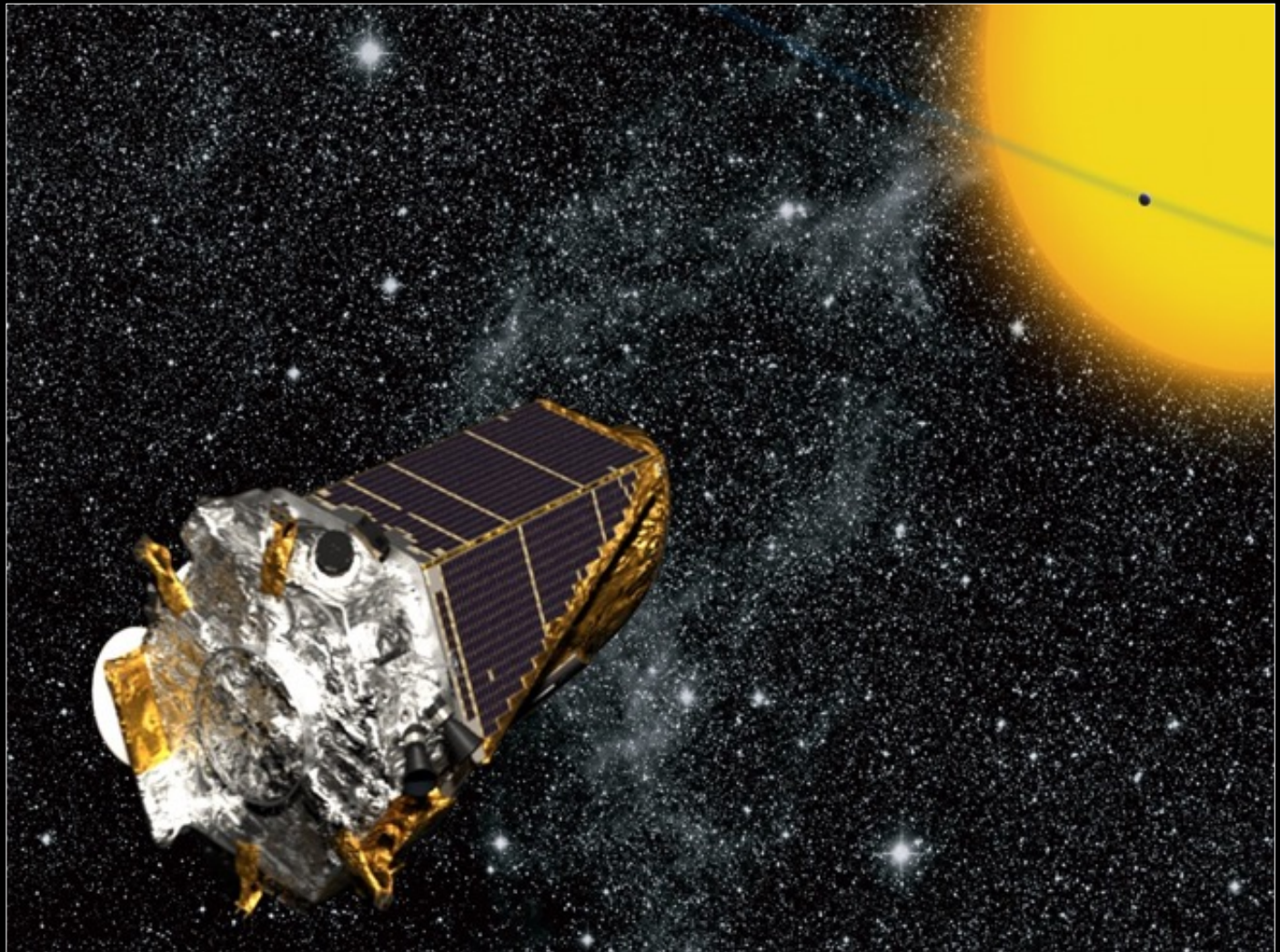
Mars Science Laboratory



We are in Milky Way Galaxy

Kepler

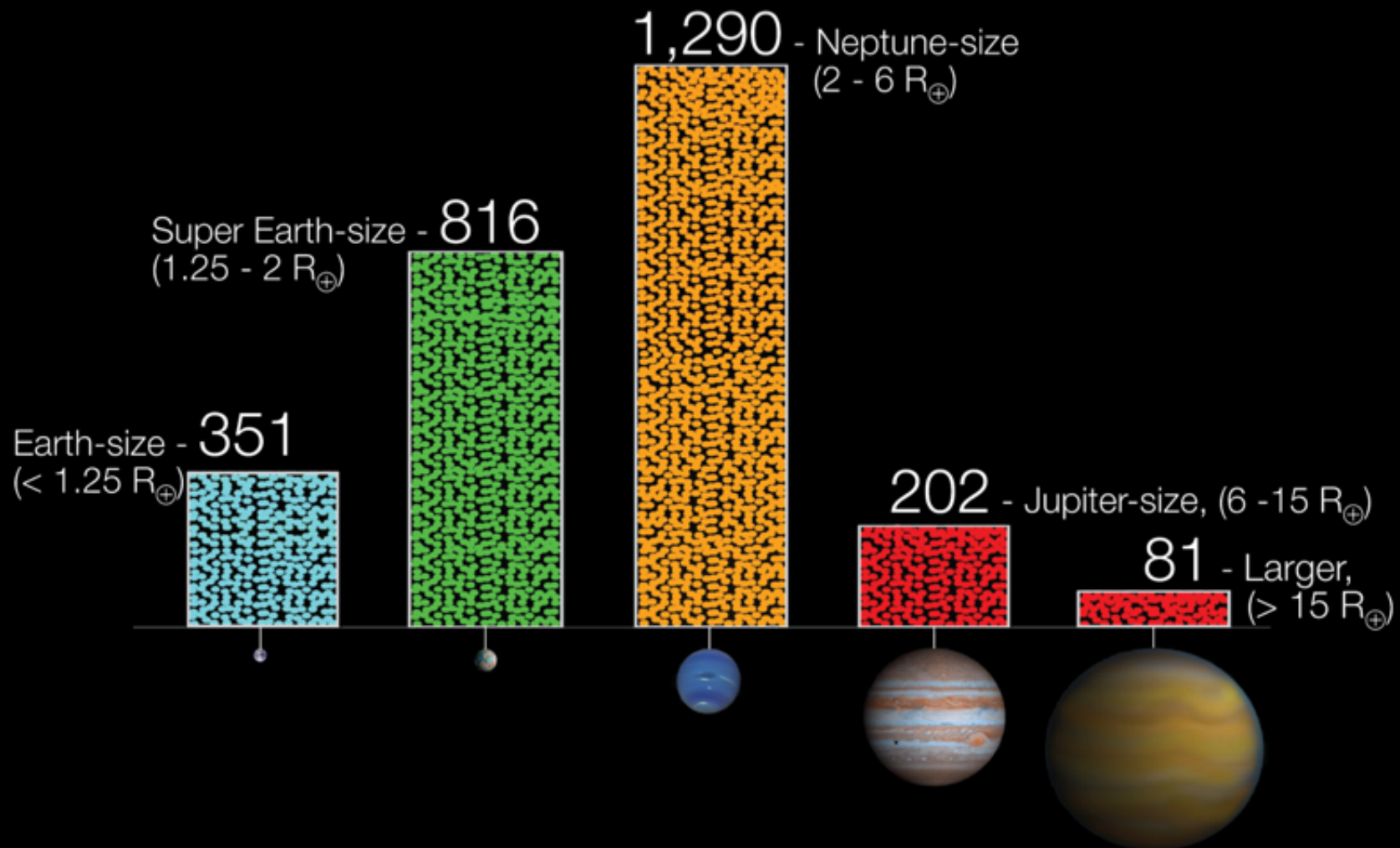
NASA's Kepler Mission: Searching for planets like our own





2,740 Planet Candidates

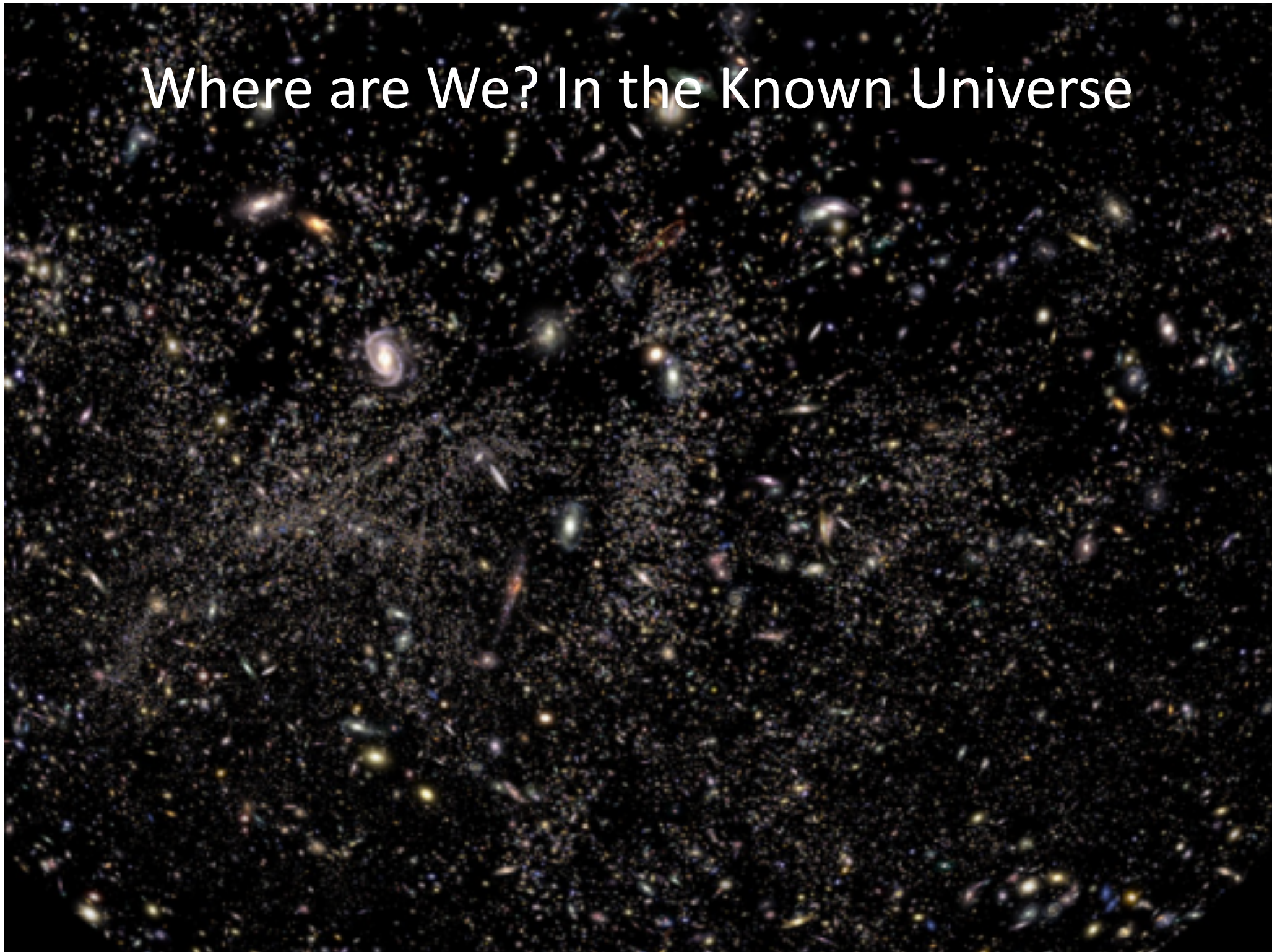
As of January 2013



Kepler

The word "Kepler" is written in a blue, cursive font with a slight 3D effect. A yellow line representing an orbital path loops around the letters. A small blue planet with white clouds is positioned at the top of the orbit, near the letter 'e'.

Where are We? In the Known Universe



What is Beyond Our Solar System?

- Millions and Millions of Galaxies with Billions and Billions of Stars
 - Each star is like our Sun – Our Sun is a Star
- These Stars have planets revolving around them
 - A telescope called Kepler and it is finding planets around the stars
- Some of those planets seems to be just the right size and some evidence that they have water
 - Just like our Earth.

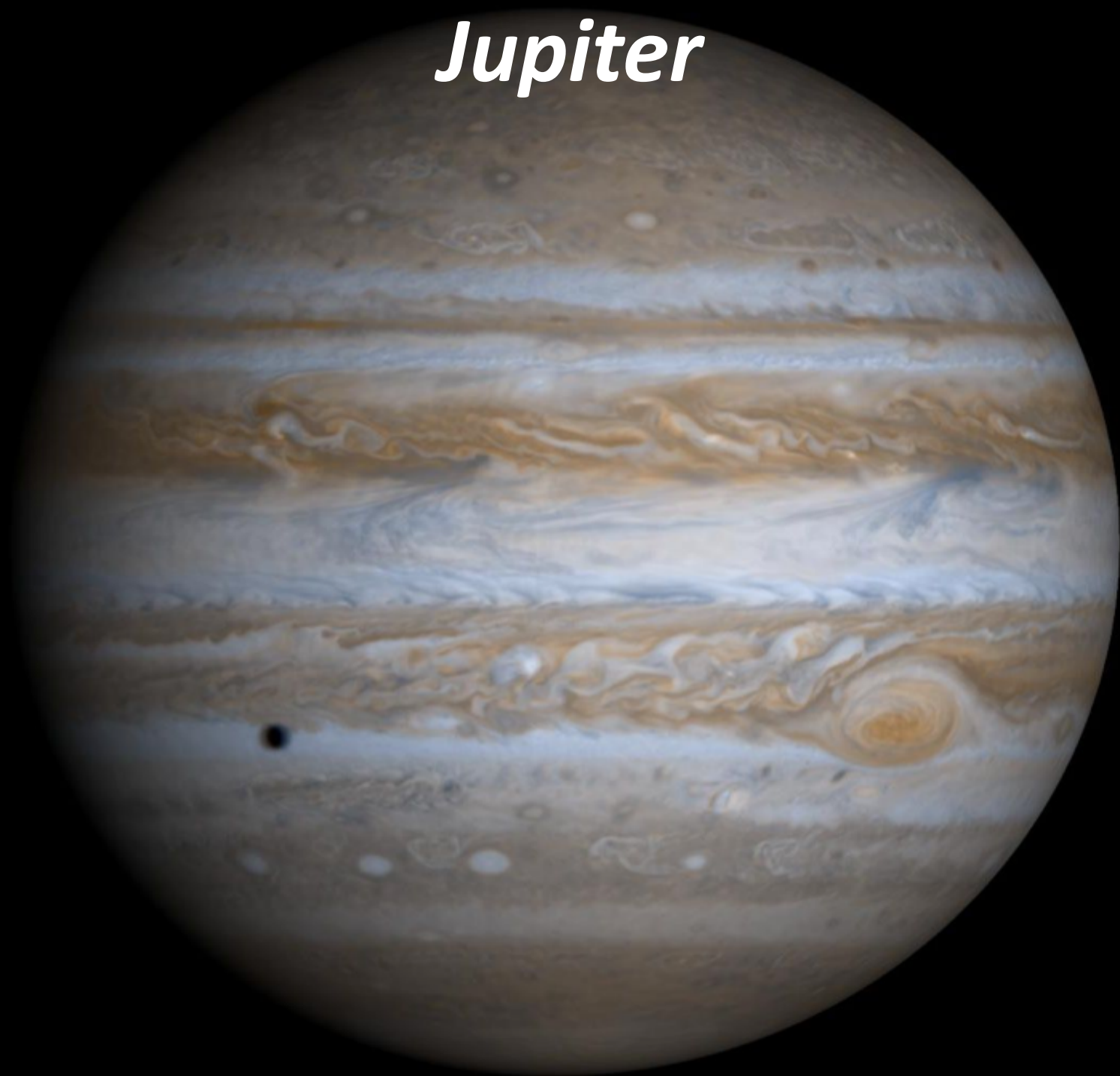
Those “earth like” planets, could they harbor Life?

What if Life is unique to Planet Earth?

Questions and Answers

I work at
NASA Ames Research Center

Jupiter



What is the planet next to Mars?



**Do you know how BIG is Jupiter?
Why is it called a Gas Giant?
Do you guys want to go visit Jupiter !**

The Galileo Probe to Jupiter

We have been to Jupiter !