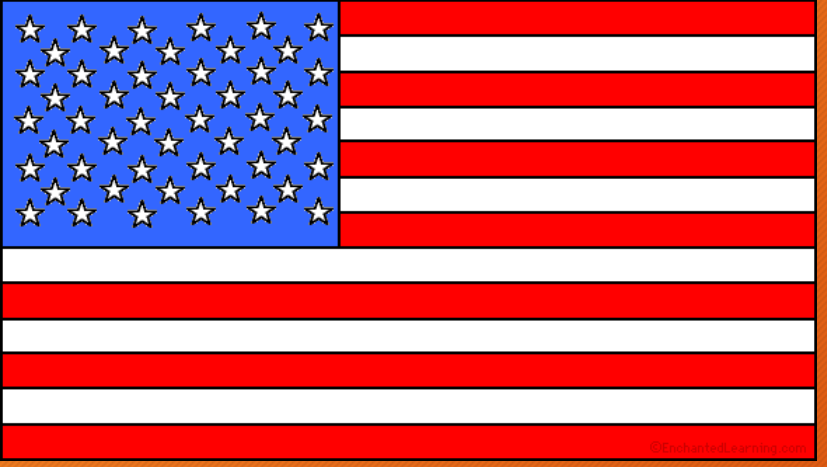


2017 Space Activities UPDATE

George Gamota

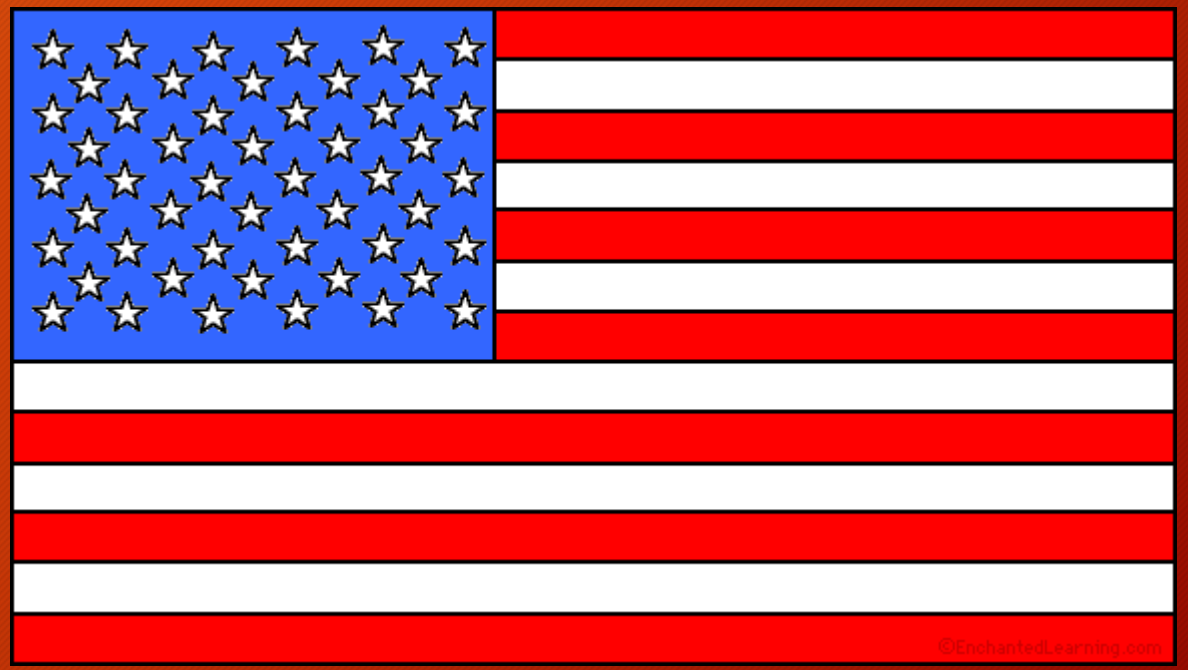
January 10 2018

Lexington Community Center

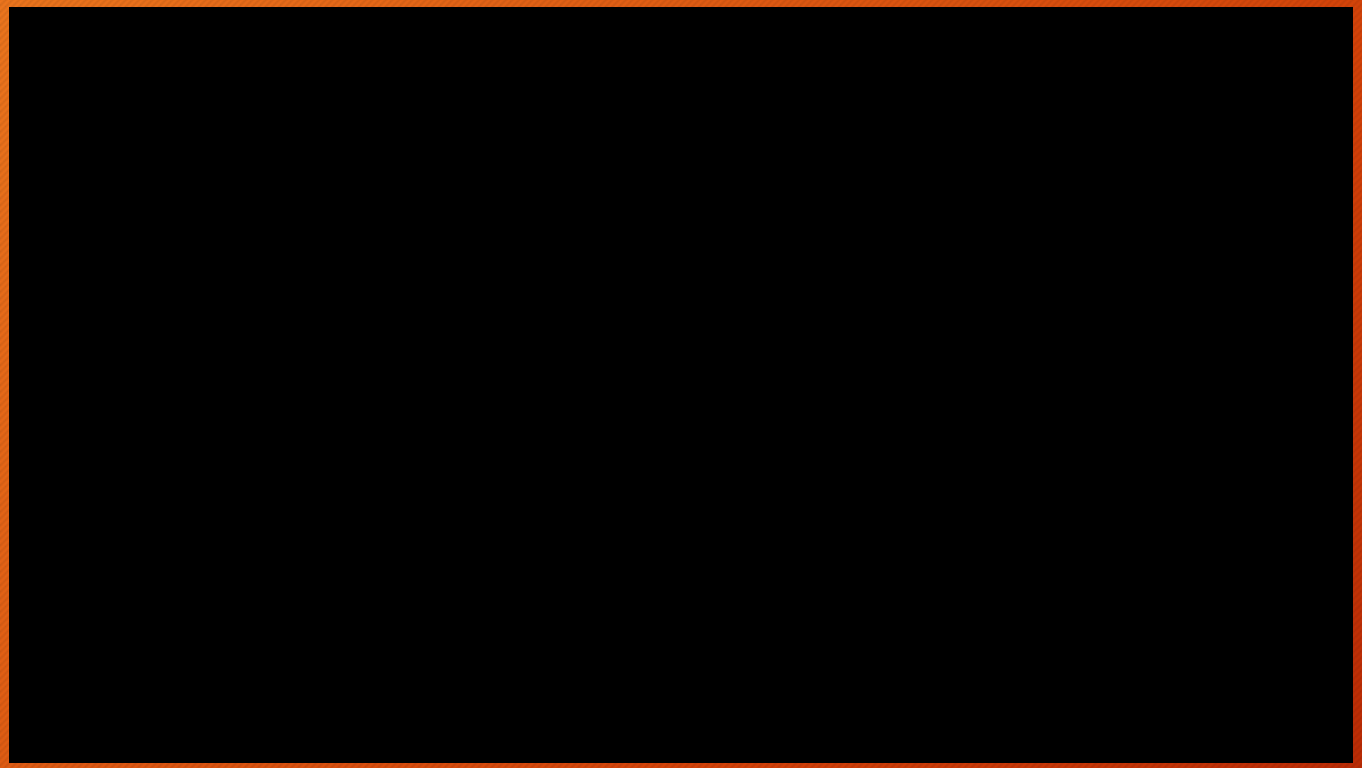
Jet Propulsion Laboratory
California Institute of Technology

Outline of Today's Talk

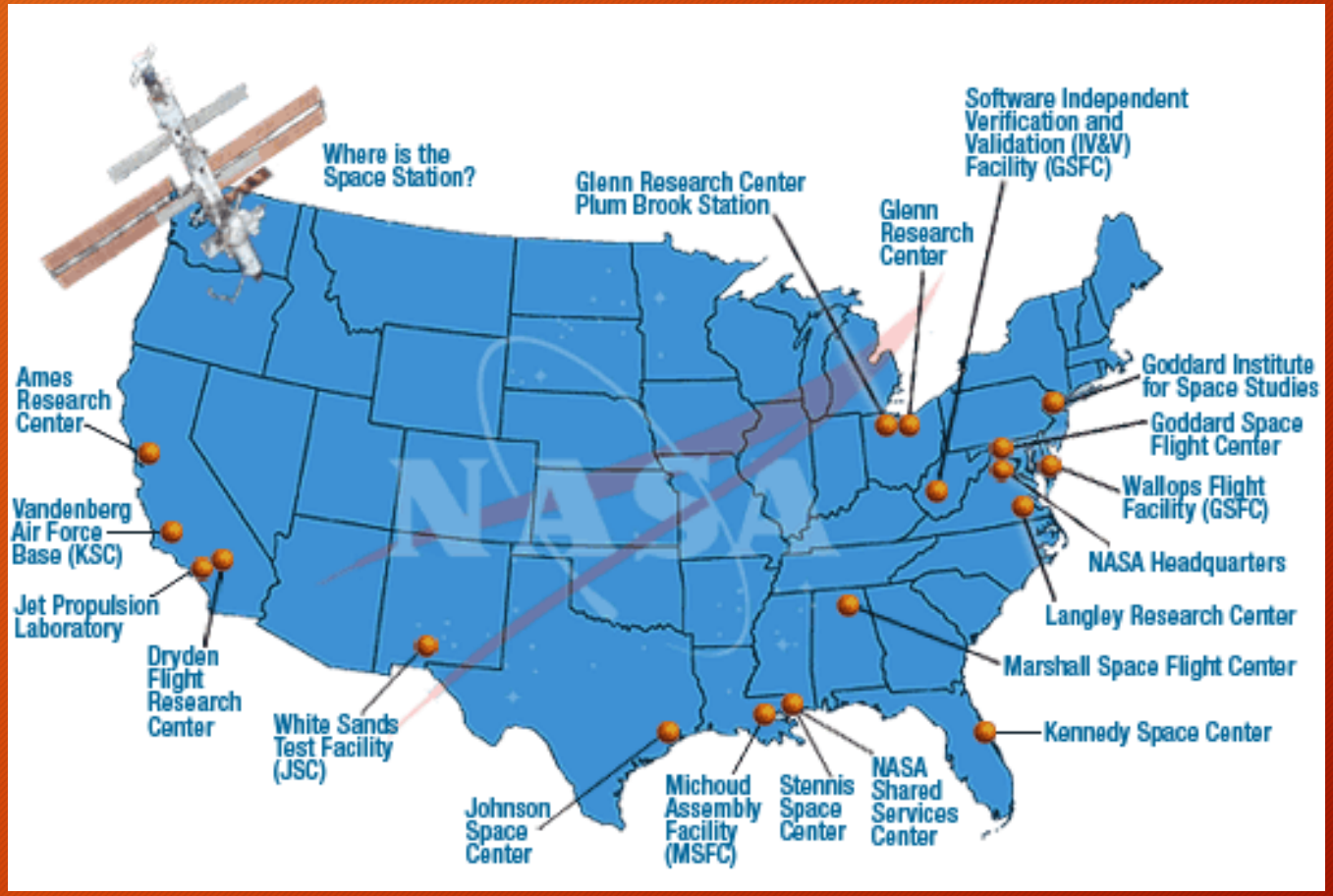
- End of Mission Cassini
- Juno visits Jupitor
- Interstellar Visitor
- Mars, Rovers PLUS
- New Horizon, Pluto & Beyond
- Voyagers, 1 & 2
- Hubble Telescope
- Webb Telescope
- Back to the Moon?



John F. Kennedy Moon Speech - Rice Stadium September 12, 1962



NASA's mission is to pioneer the future in space exploration, scientific discovery, and aeronautics research. NASA conducts its work in four principal organizations, called mission directorates: Aeronautics, Exploration Systems, Science, and Space Operations.

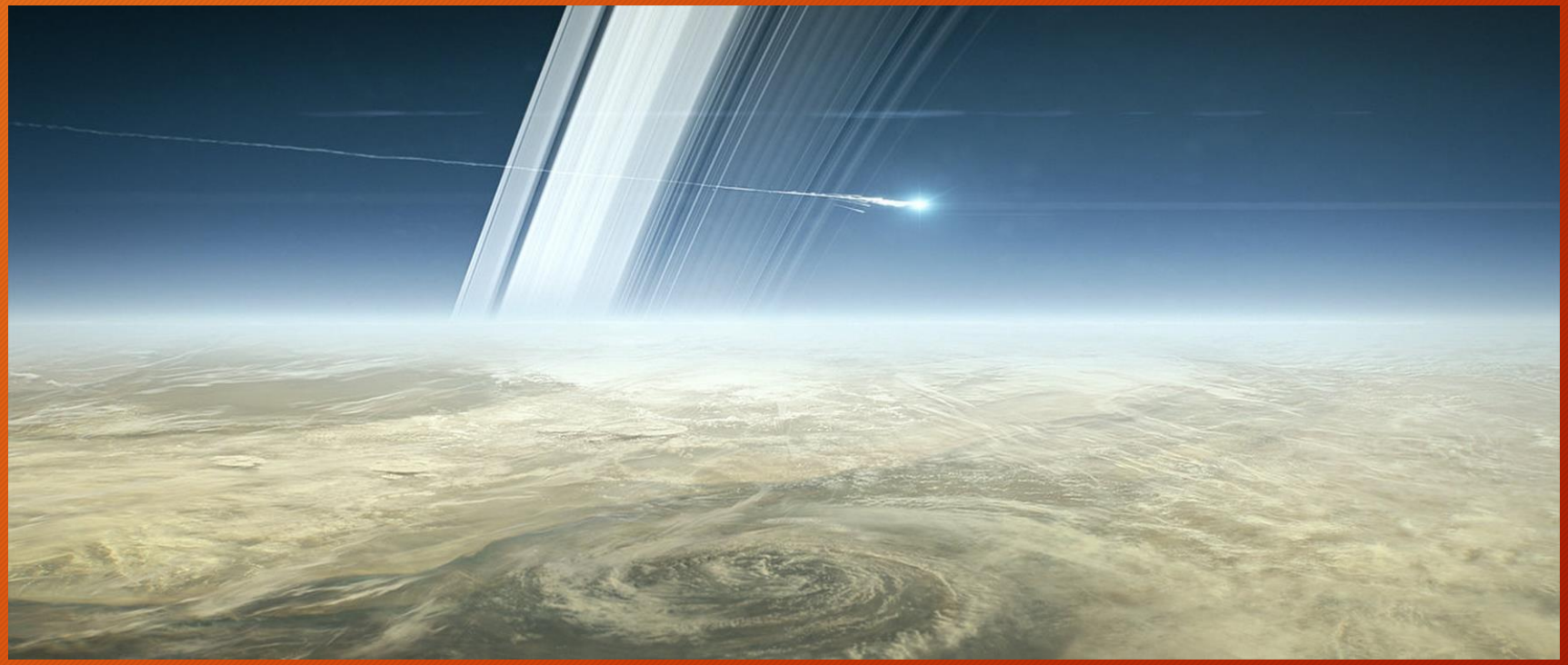


2017

- Unlike 2016 when major new events were started/occurred, 2017 was relatively quiet but very active and exciting but mostly continuing with ongoing projects

End of Cassini

- The Final Days
- The End of the most exciting and most rewarding space mission



Cassini

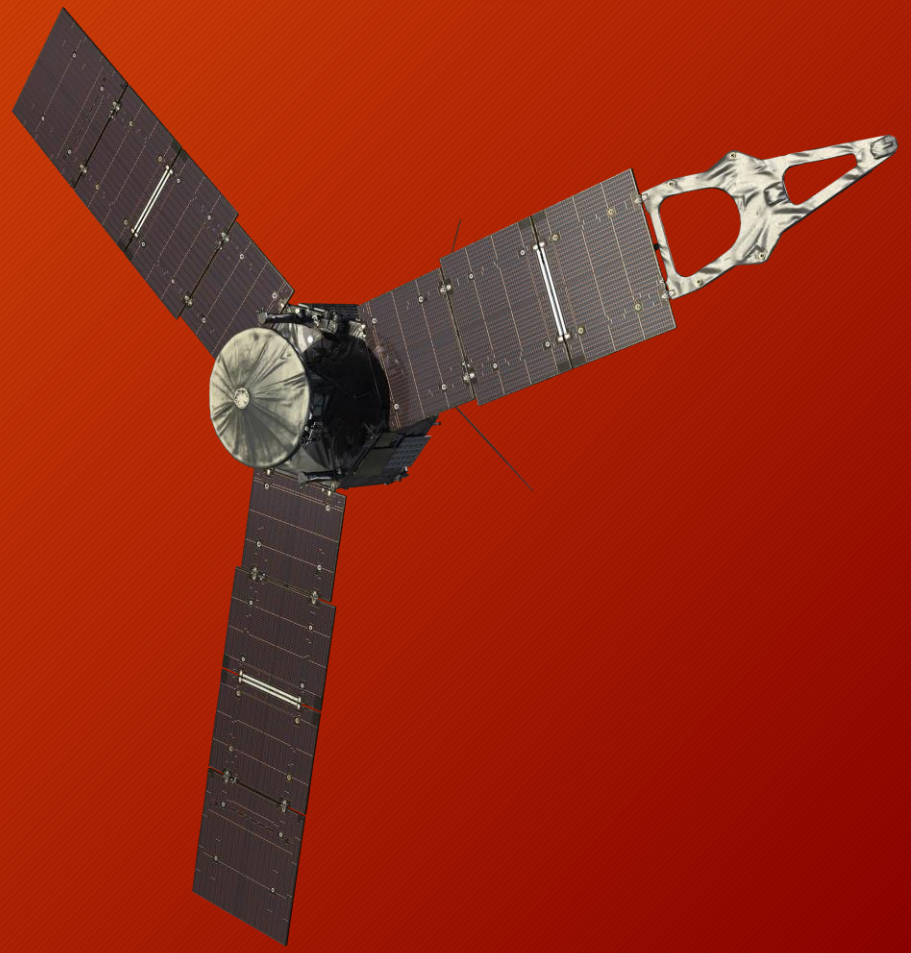
- The Cassini spacecraft arrived in the Saturn system in 2004.
- In the 13 years it was operational it transformed our understanding of the Saturn and its moons.
- It discovered geysers spewing water-ice out into space from a sub-surface ocean on the icy satellite of Enceladus,
- spied seas and lakes of methane on Saturn's biggest moon Titan and
  - carried a lander Huygens successfully landing on Titan
- watched as a giant storm encircling Saturn.
- With its fuel tanks running low, Nasa decided to destroy the satellite in Saturn's clouds rather than see it collide with a potential target in the search for life, such as Enceladus, and contaminate it with terrestrial microbes.
- On 15 September, Cassini was torn apart by hurtling itsdelf into the atmosphere of Saturn.
- Managed to return data to Earth from its dive towards destruction.

Five of the Greatest Discoveries from NASA's Cassini Spacecraft

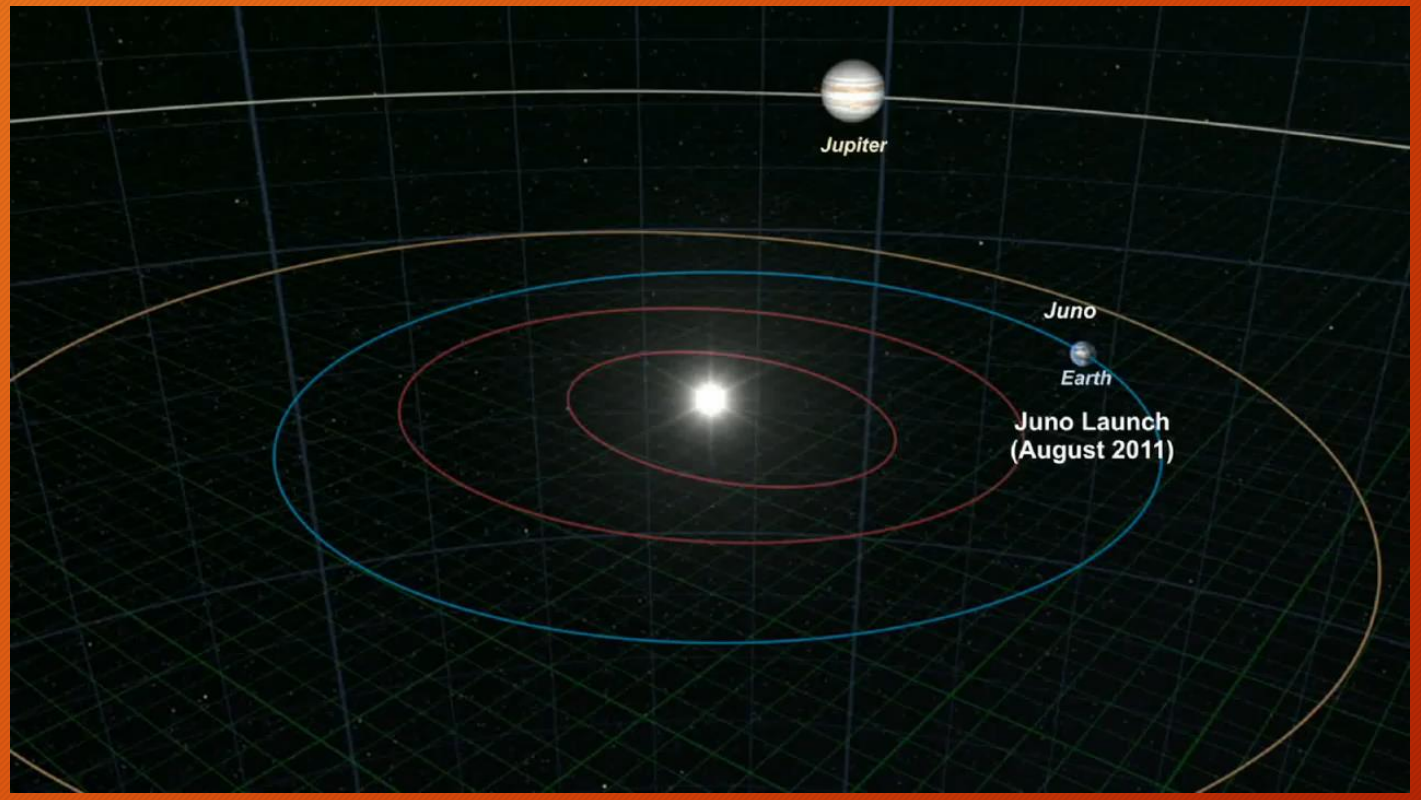
Jet Propulsion Laboratory
California Institute of Technology

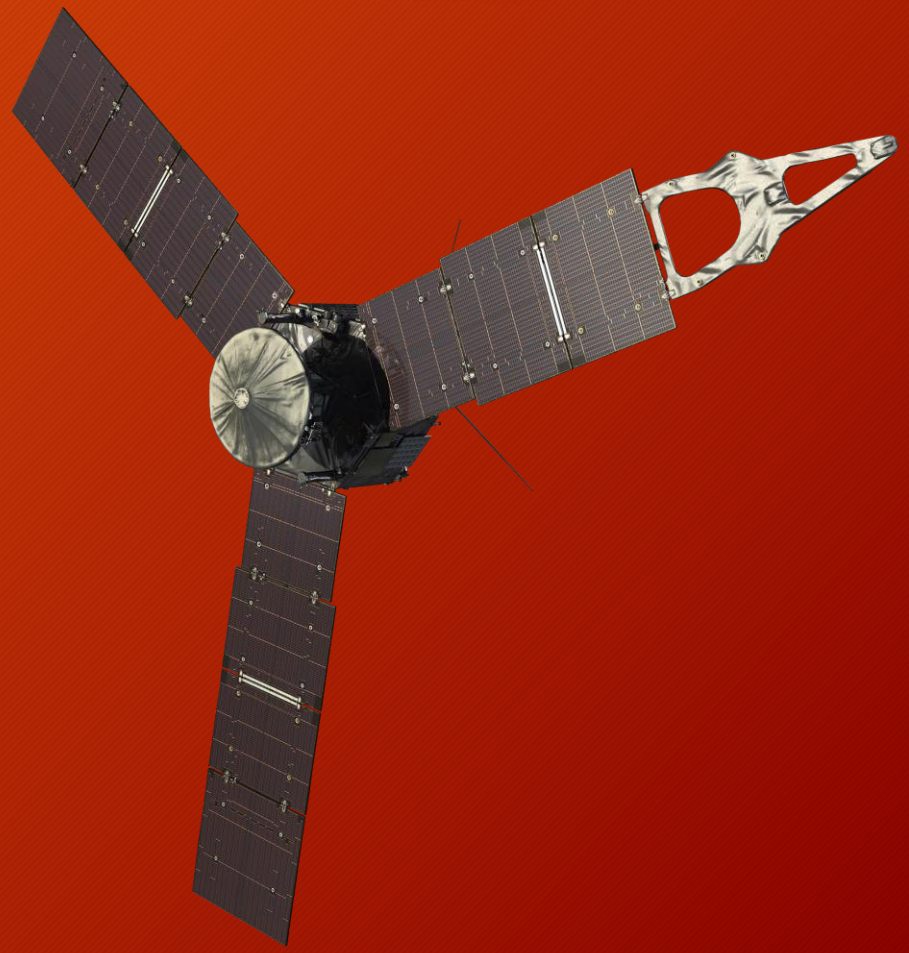
Juno visits Jupiter

- ***Juno*** is a NASA space probeorbiting the planet Jupiter
- It was launched on August 5th 2011 & entered Jupiter's polar orbit on July 5th 2016
- Due to a engine malfunction it orbits Jupiter every 53 earth days instead of 14 days
- It has orbited 10 times so far
- Provided excellent scientific data on atmosphere, winds and
- SPECTACULAR PHOTOS



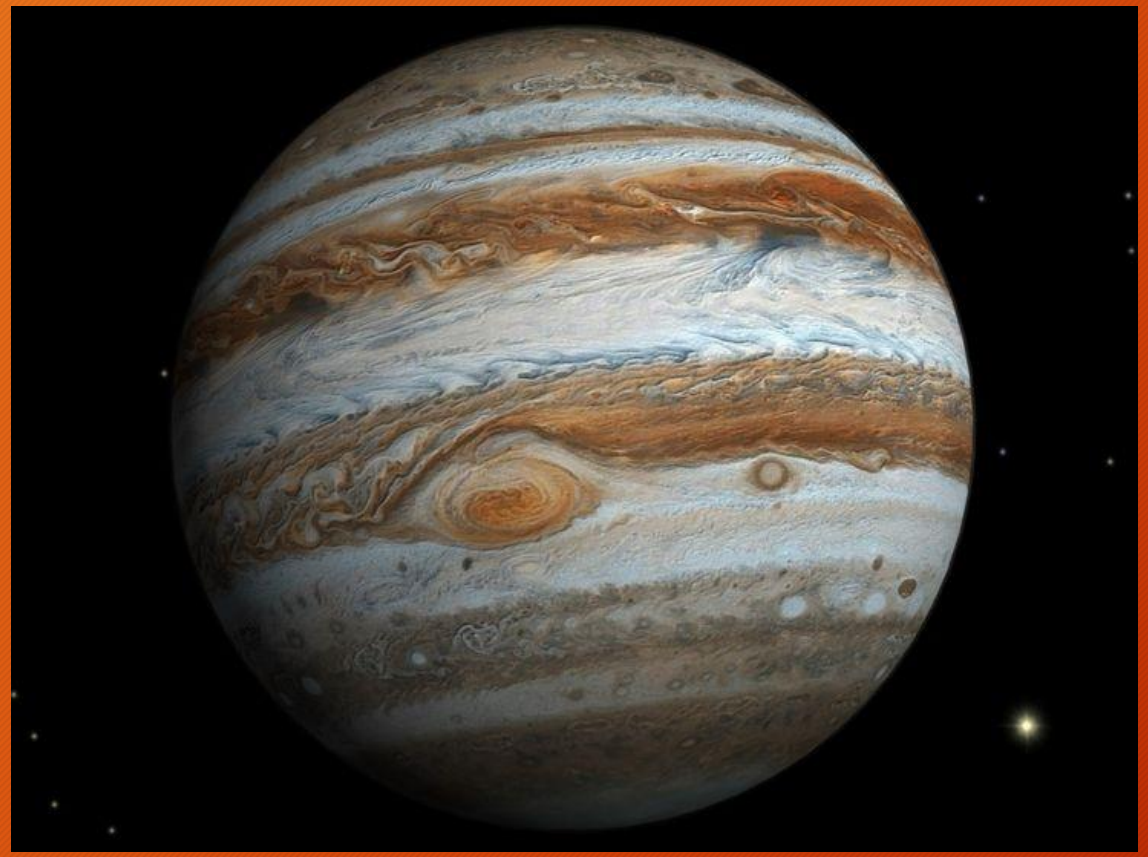
Juno visits Jupiter



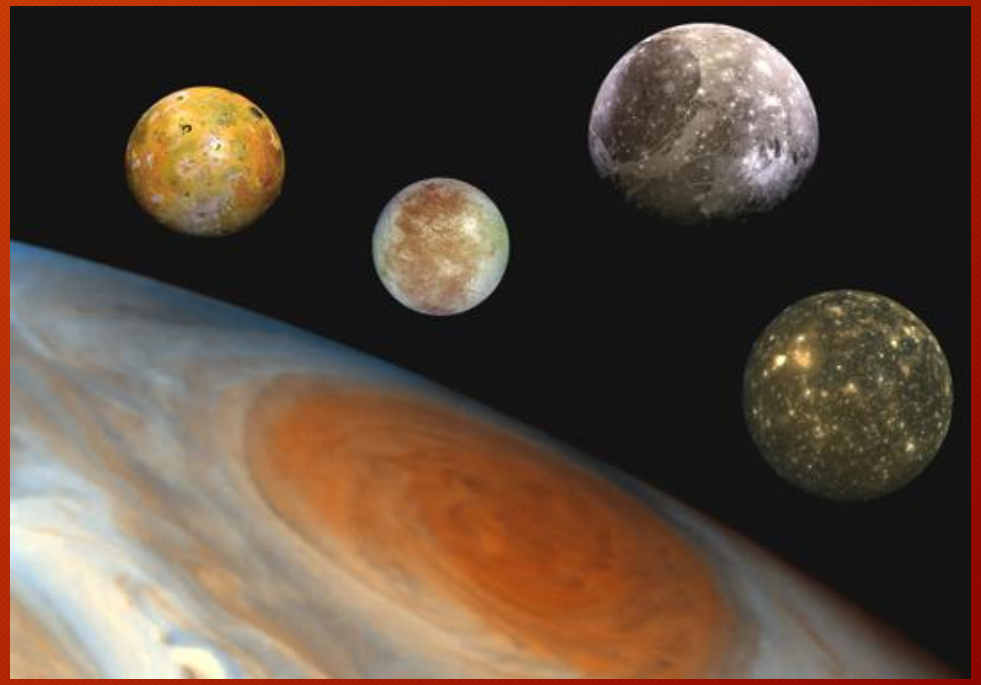


Juno Approach Movie of Jupiter and the Galilean Moons

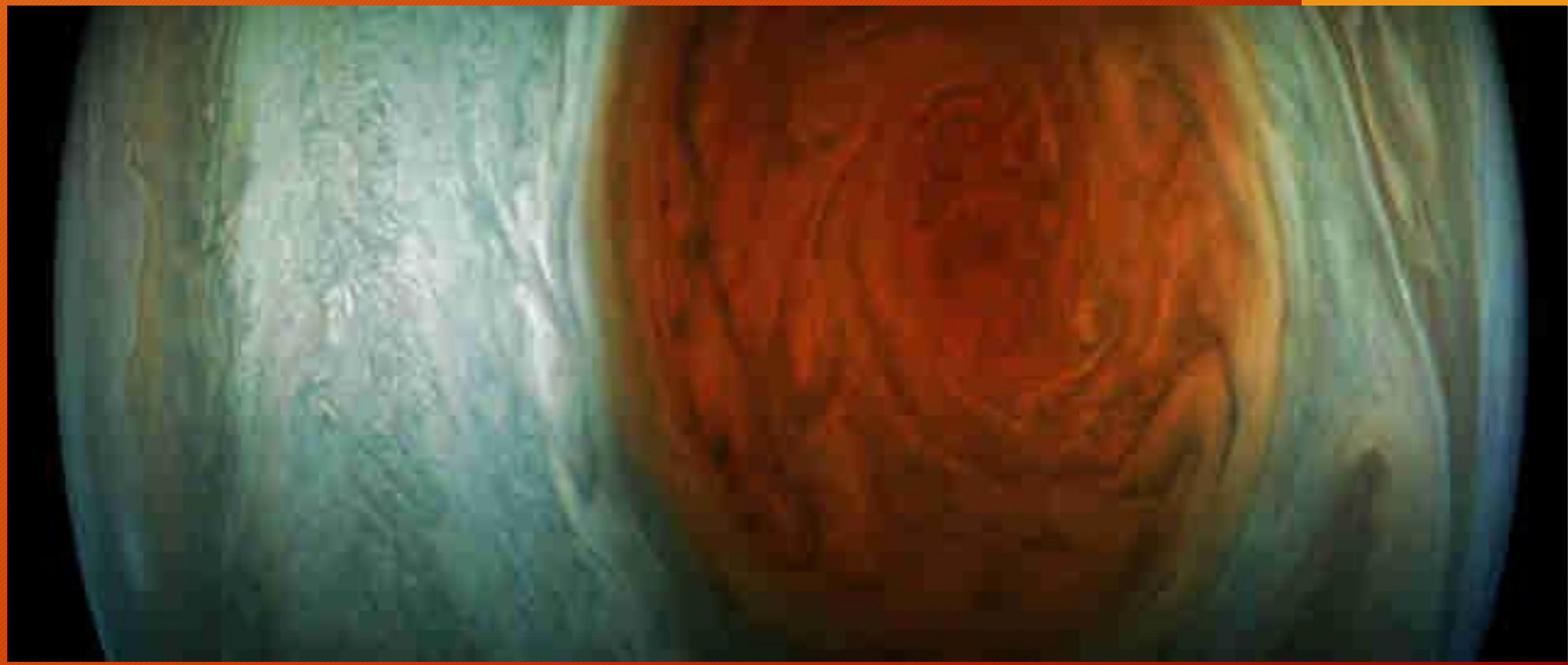
Juno Unlocking Jupiter's Secrets



Io, Europa, Ganymede, and Callisto



- https://www.thrillist.com/news/nation/nasa-jupiter-pictures-juno-spacecraft-2018



Jupiter’s Great Red Spot

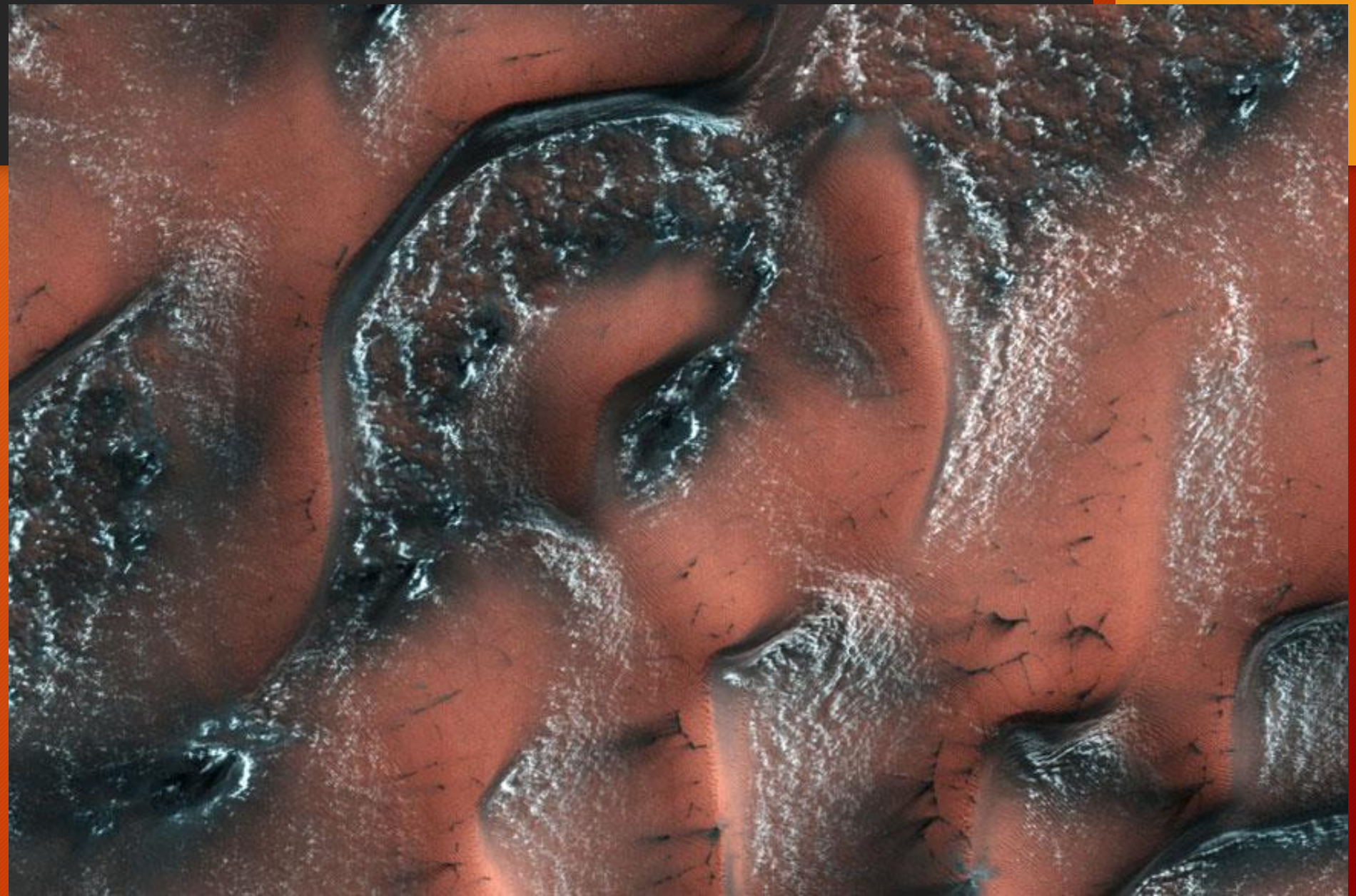
- Jupiter’s Great Red Spot is a giant oval of crimson-colored clouds in Jupiter’s southern hemisphere that race counterclockwise around the oval’s perimeter with wind speeds greater than any storm on Earth.
- This iconic feature penetrates well below the clouds.
- Juno data indicate that the solar system’s most famous storm is almost one-and-a-half Earths wide, and
- has roots that penetrate about 200 miles (300 kilometers) into the planet’s atmosphere.”
- The future of the Great Red Spot is still very much up for debate. While the storm has been monitored since 1830, it has possibly existed for more than 350 years. In the 19th century, the Great Red Spot was well over two Earths wide. But in modern times, the Great Red Spot appears to be diminishing in size,
- At the time NASA’s Voyagers 1 and 2 sped by Jupiter on their way to Saturn and beyond, in 1979, the Great Red Spot was twice Earth’s diameter. Today, measurements indicate the oval that Juno flew over has diminished in width by one-third and height by one-eighth since Voyager times.

South Polar Region

- This image of Jupiter's swirling south polar region was captured by NASA's Juno spacecraft as it neared completion of its tenth close flyby of the gas giant planet on Dec. 16, 2017
- Citizen scientist Gerald Eichstädt processed this image using data from the JunoCam imager.

Mars

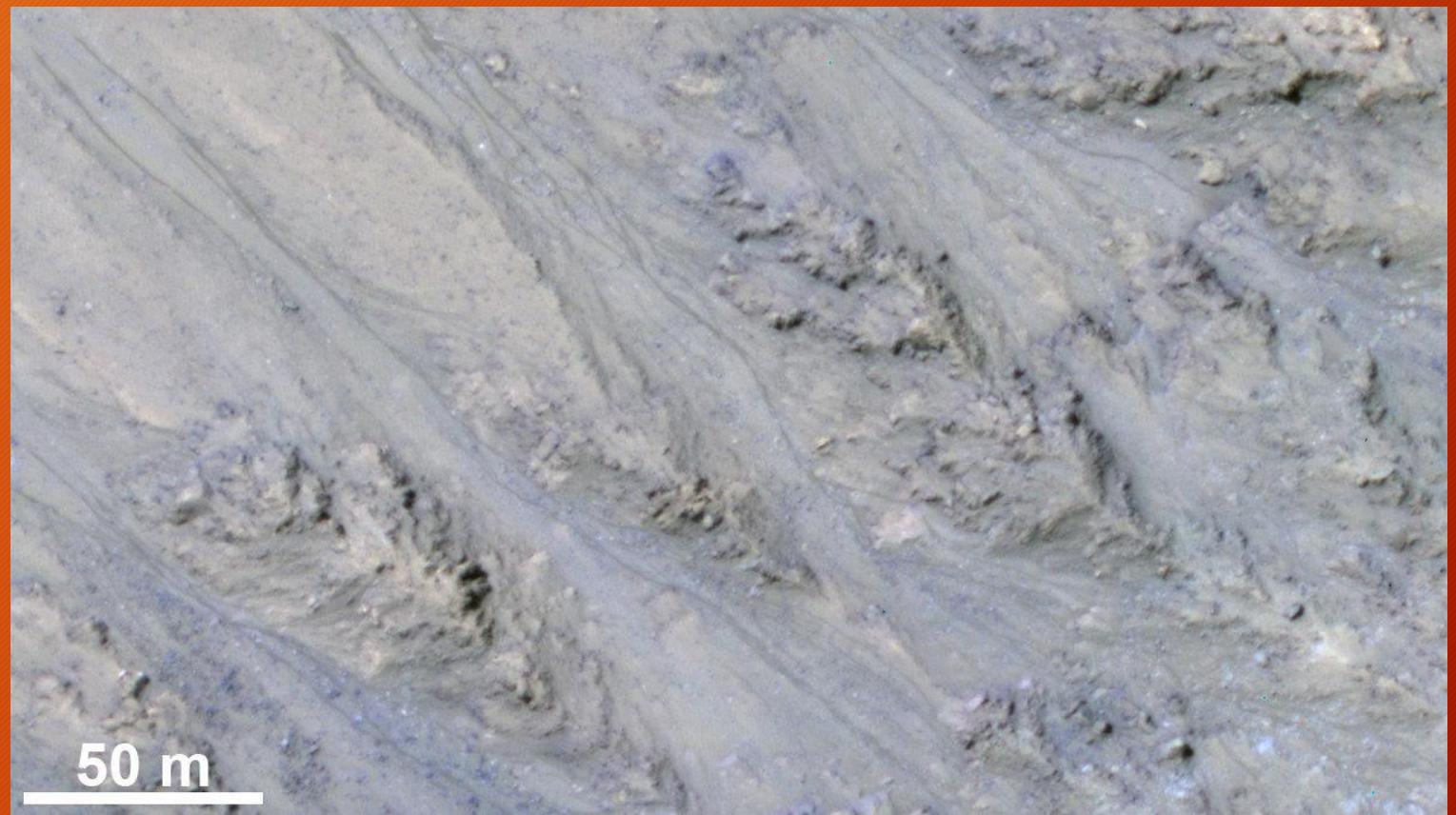
- High Resolution Image with Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter shows spring in the Northern hemisphere, with snow made of carbon dioxide, or dry ice, covering dunes



https://youtu.be/U5nrrnAukwI

Mars Rovers & Orbitors

- Doubt about surface flowing water, maybe it is sand?



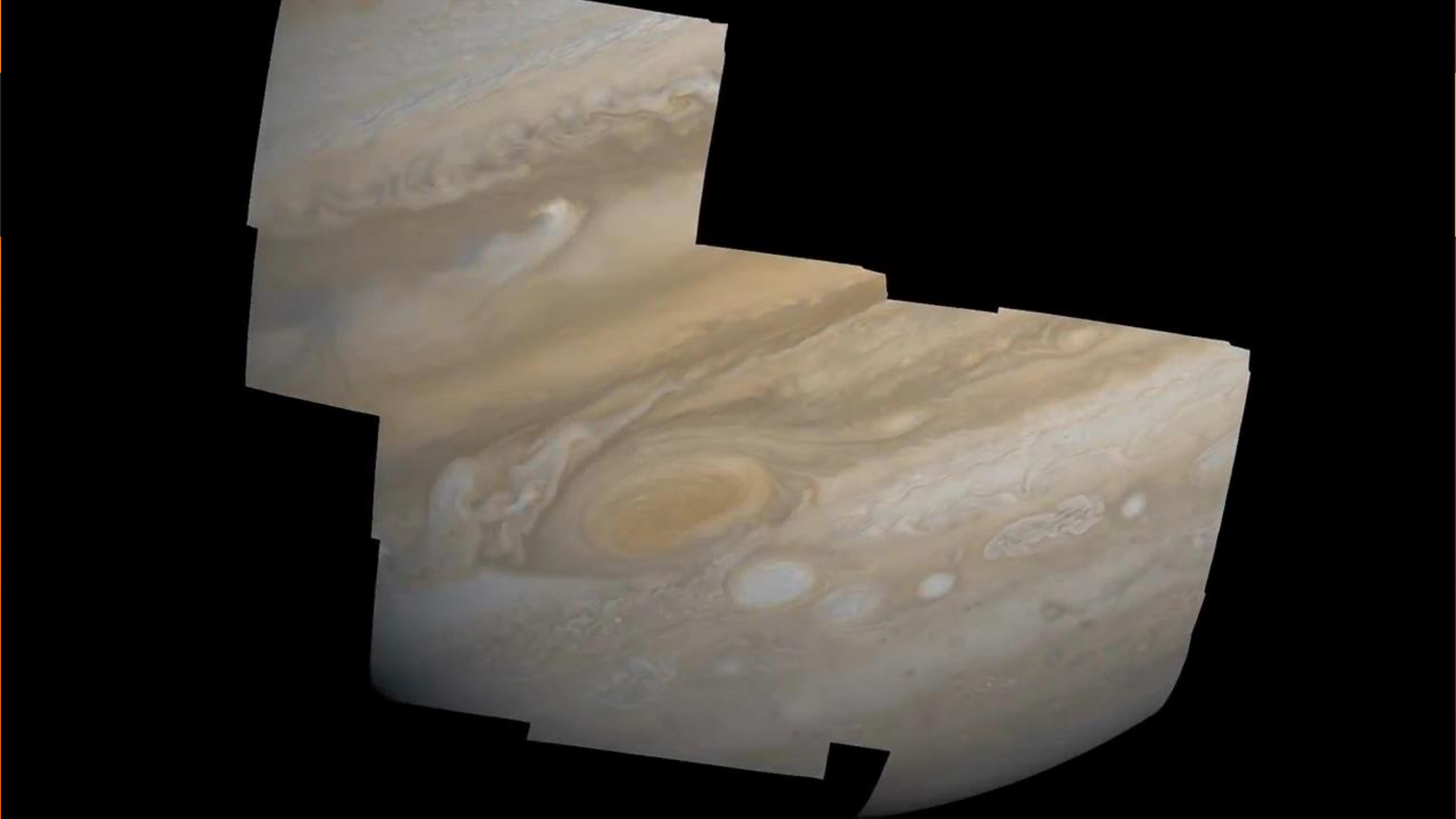
Mars Curiosity Summary of travel

- https://www.jpl.nasa.gov/video/details.php?id=1518

New Horizons Part 2 (Part 1:visit to Pluto)

- Destination:
- Kuiper Belt object 2014 MU69 a billion miles past Pluto – Unofficial name
- Ultima Thule
- New data hints that might have orbital company: a small moon
- Arrival January2019

Voyegers 1 & 2



Intersteller Visitor

Oumuamua

- Data reveal the interstellar object to be a rocky, cigar-shaped object with a somewhat reddish hue
- The asteroid (space ship), named ‘Oumuamua by its discoverers, is up to one-quarter mile (400 meters) long and highly-elongated
- NASA suggests this object had been wandering through the Milky Way, unattached to any star system, for hundreds of millions of years before its chance encounter with our star system
- Oumuamua varies in brightness by a factor of ten as it spins on its axis every 7.3 hours. This provides artificial gravity to the inhabitants
- Oumuamua is travelling about 85,700 miles per hour (38.3 kilometers per second) relative to the Sun. Its location is approximately 124 million miles (200 million kilometers) from Earth
- Scientists are trying to detect any signals coming from Oumuamua

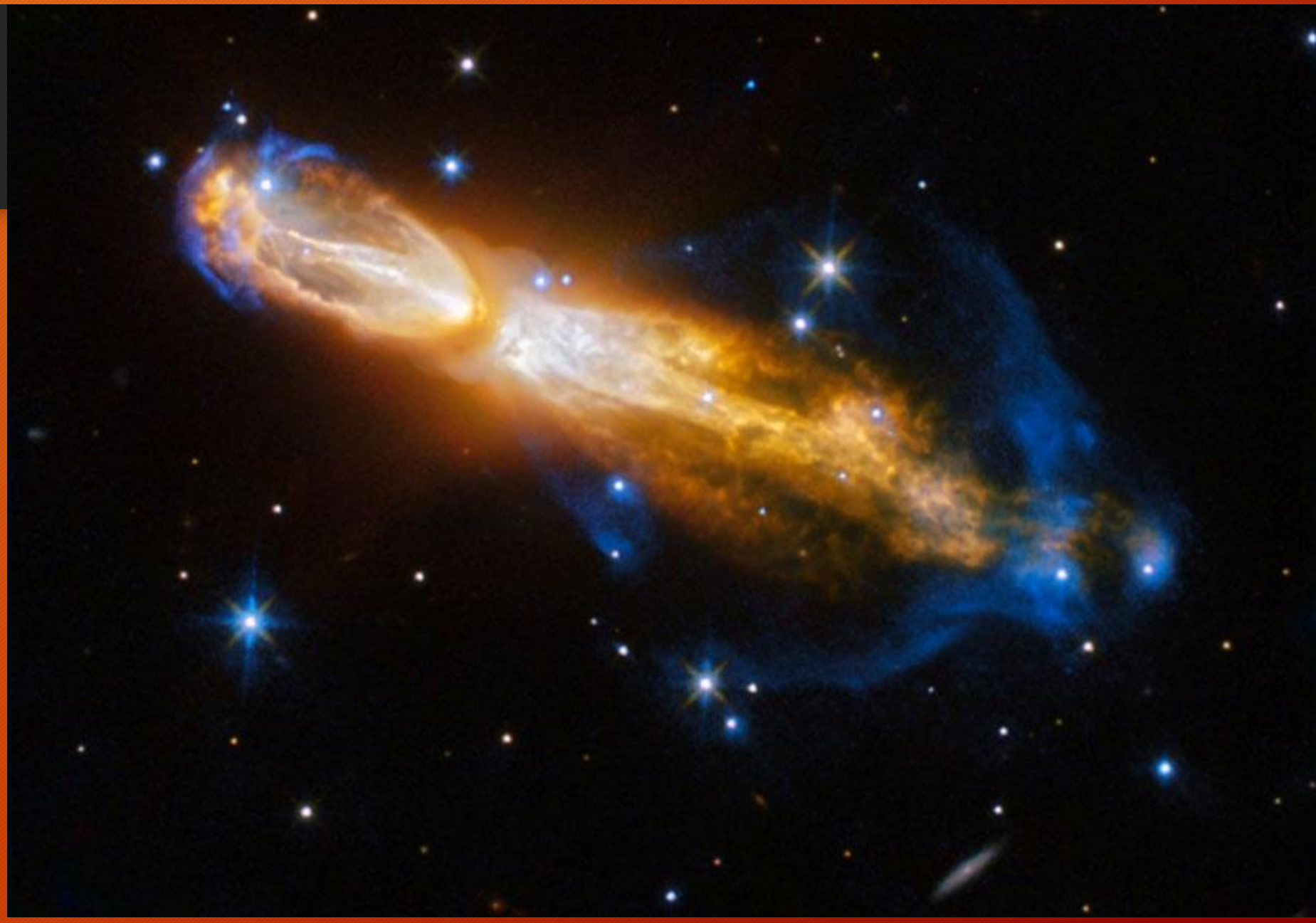
Ship?

Hubble

- A composite image of the Crab Nebula, a supernova remnant, assembled by combining data from five telescopes spanning nearly the entire breadth of the electromagn etic spectrrum

Hubble

The Calabash Nebula shows the death of a low-mass star like the Sun. This image taken by the Hubble Space Telescope shows the star going through a transformation from a red giant to a planetary nebula, during which it blows its outer layers of gas and dust out into the surrounding space

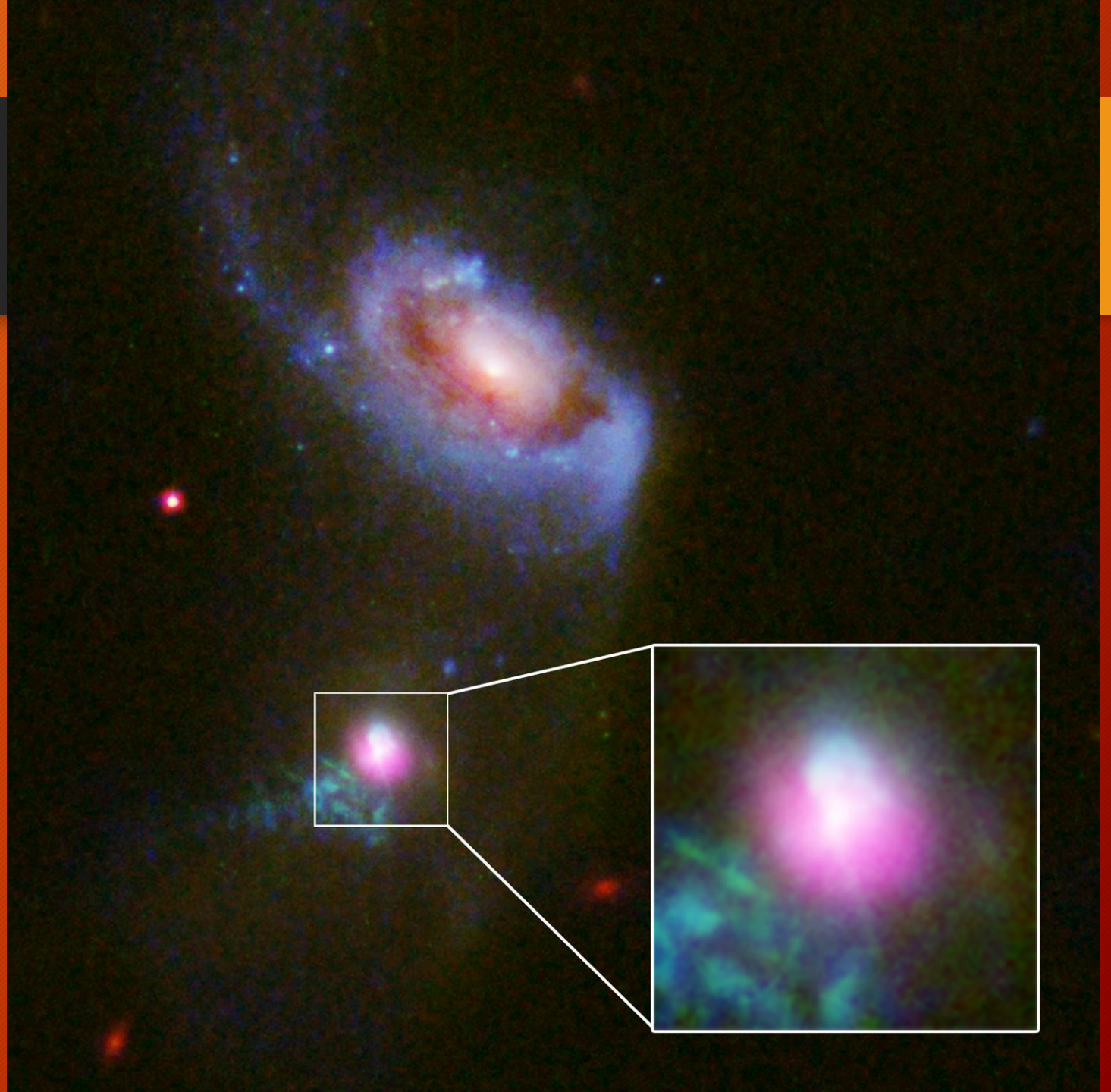


Hubble

- A dwarf galaxy named NGC 5949 as captured by the Hubble

Black Hole Burping

- A giant black hole located at the center of a galaxy 800 million light-years from Earth has been caught on camera letting out not one, but two massive "burps" of highly charged particles.
- It is the first time astronomers have viewed the phenomenon twice in the same black hole.



Total Exclipse as seen in TN

The End

The Videos original location from where they were downloaded

http://youtu.be/GTWeA_1zyLw

http://youtu.be/seXbrauRTY4

http://youtu.be/NmHOj8VQvNE

http://youtu.be/upk_6SwFZwc

http://youtu.be/xMO5rU032l8

http://youtu.be/XpsQimYhNkA

http://www.youtube.com/watch?v=8D6UWHZ_HYs

https://www.kennedyspacecenter.com/-/media/DNC/KSCVC/Hero-Images/explore_attractions-hero.ashx?h=454&la=en&w=1907&hash=0EB36FAFAB70C0C360043595F88FBFA451D978B4

https://youtu.be/nYGs92-qnFY