



# Juno

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# Juno Status

- Launched August 2011
- Earth flyby October 2013
- Jupiter arrival July 4, 2016
- Spacecraft is healthy and all instruments are working.



# Juno's Science Objectives

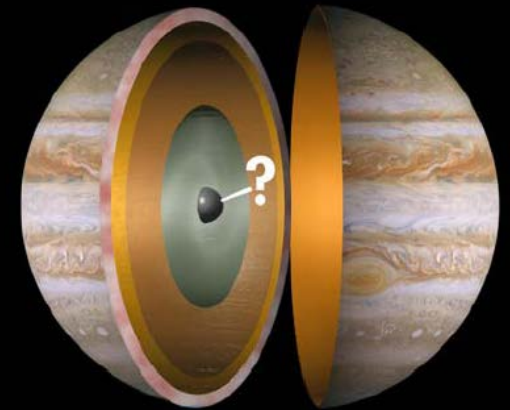
## Origin

Determine O/H ratio (water abundance) and constrain core mass to decide among alternative theories of origin.



## Interior

Understand Jupiter's interior structure and dynamical properties by mapping its gravitational and magnetic fields

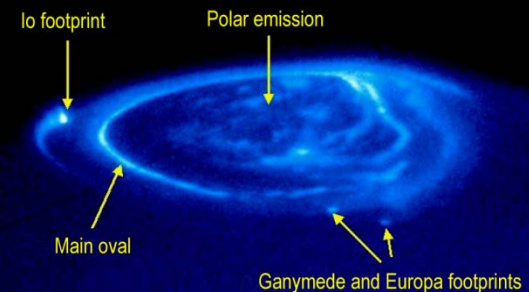


## Atmosphere

Map variations in atmospheric composition, temperature, cloud opacity and dynamics to depths greater than 100 bars at all latitudes.

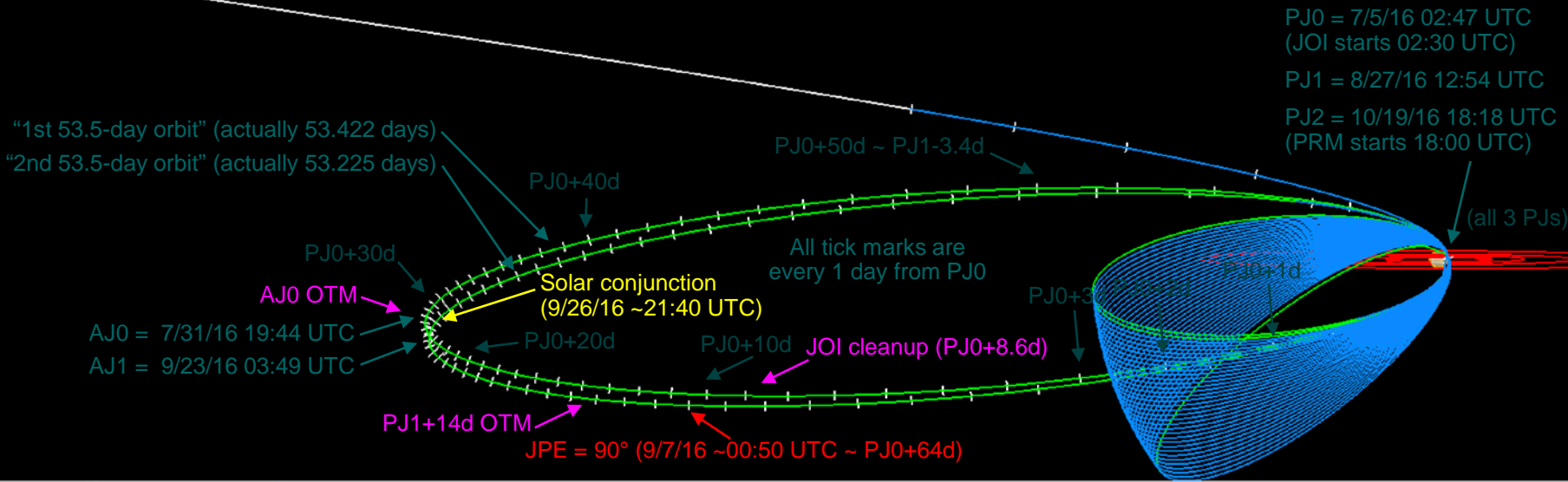
## Magnetosphere

Characterize and explore the three-dimensional structure of Jupiter's polar magnetosphere and auroras.

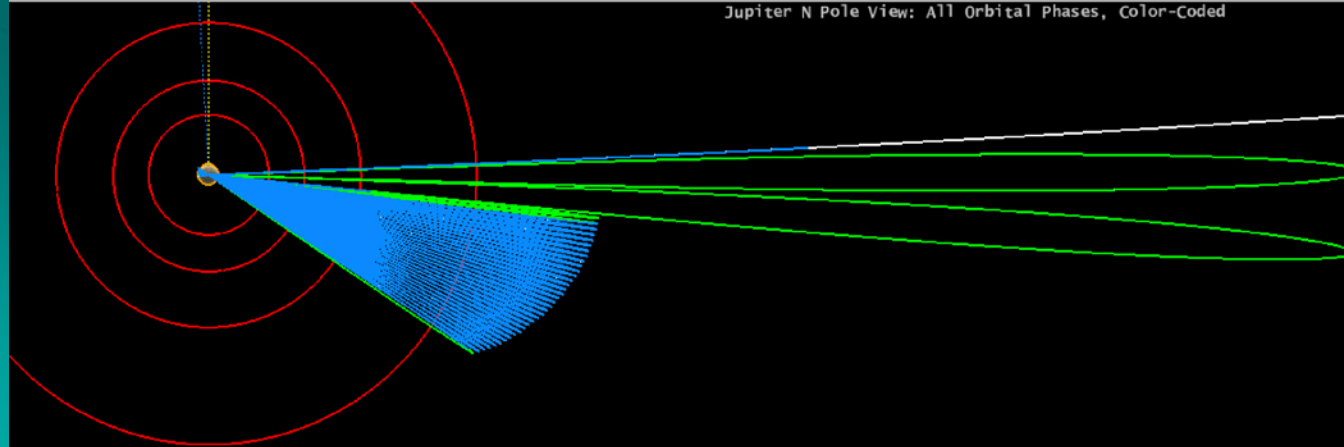


# Overview of two 53.5 day orbits and PJ1

Earth to Jupiter View: All Orbital Phases, Color-Coded  
 2016/10/19 18:00:00.0000 UTC



Jupiter N Pole View: All Orbital Phases, Color-Coded



# Juno Payload

**X and Ka Band Gravity Science (JPL/ASI)**

**Magnetometer— MAG/ASC (GSFC/DTU)**

**Microwave Radiometers— MWR (JPL)**

**Energetic Particle Detectors—JEDI(APL)**

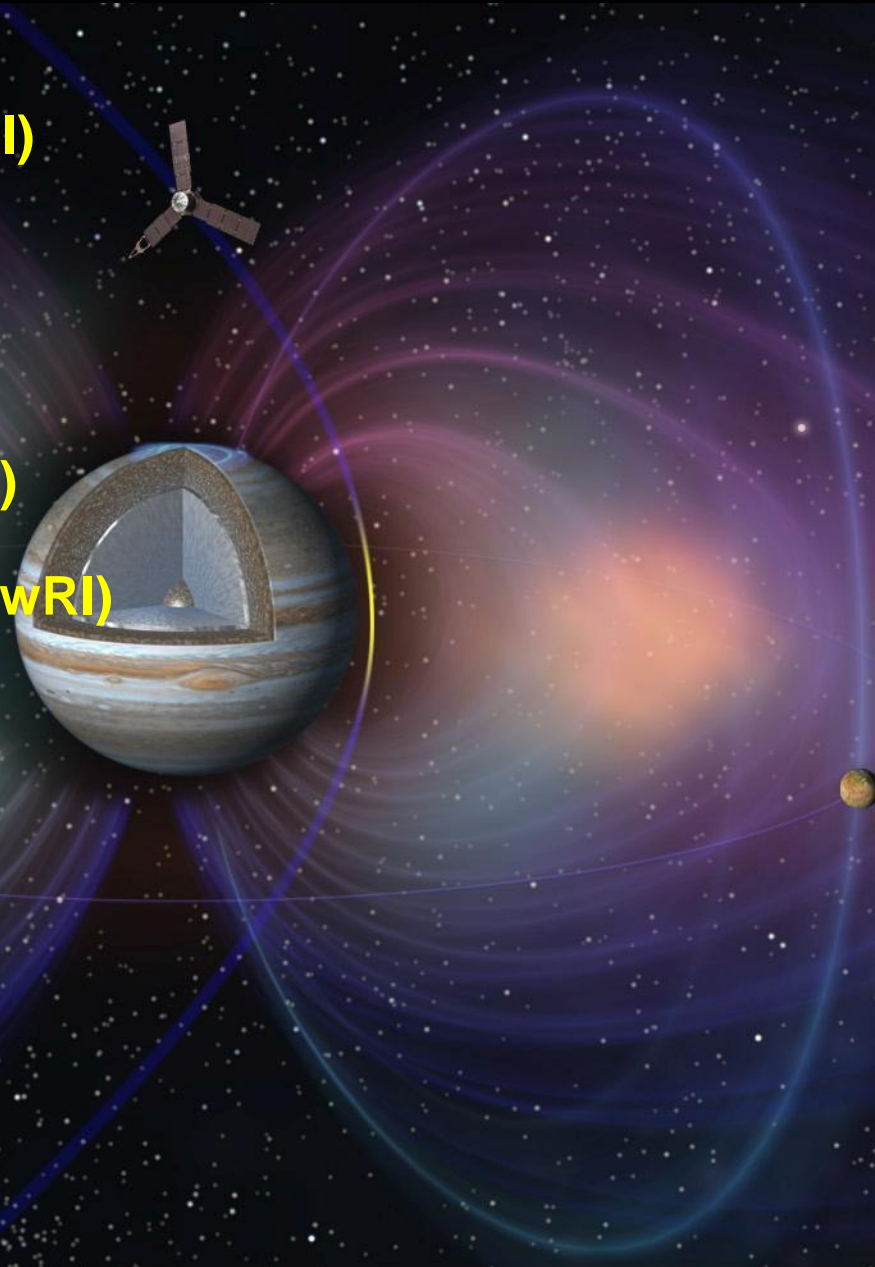
**Jovian Auroral Distributions — JADE (SwRI)**

**Waves (U of Iowa)**

**UV Spectrograph— UVS (SwRI)**

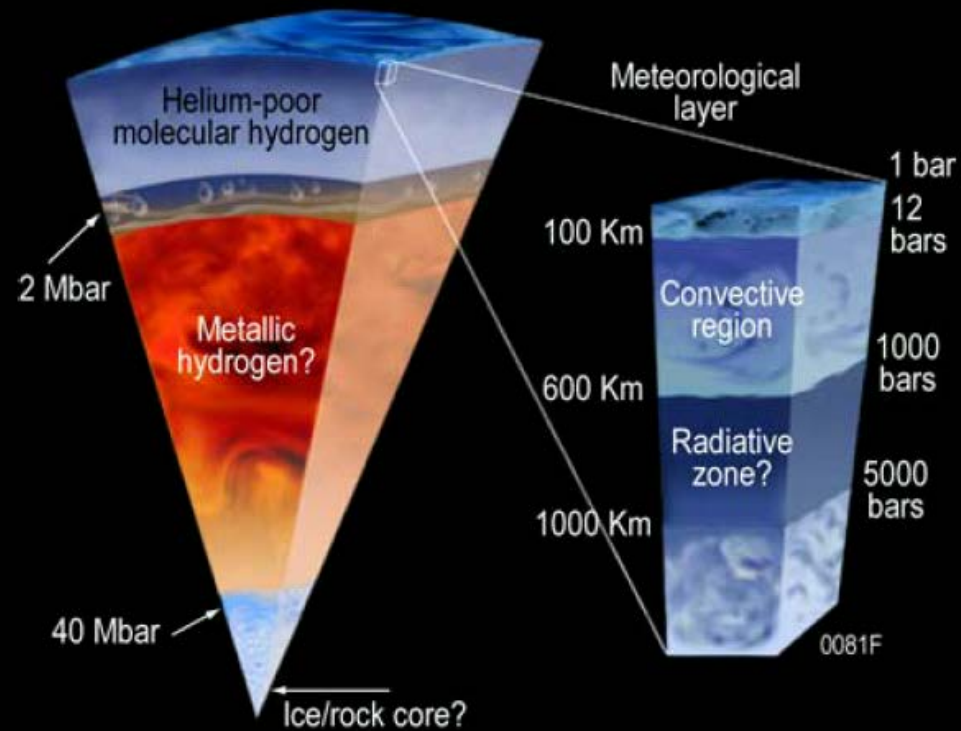
**Visible Camera - JunoCam (Malin)**

**IR Camera/Spectrometer –JIRAM (ASI)**



# Probing the deep interior from orbit

Juno maps Jupiter from the deepest interior to the atmosphere using microwaves, magnetic and gravity fields.

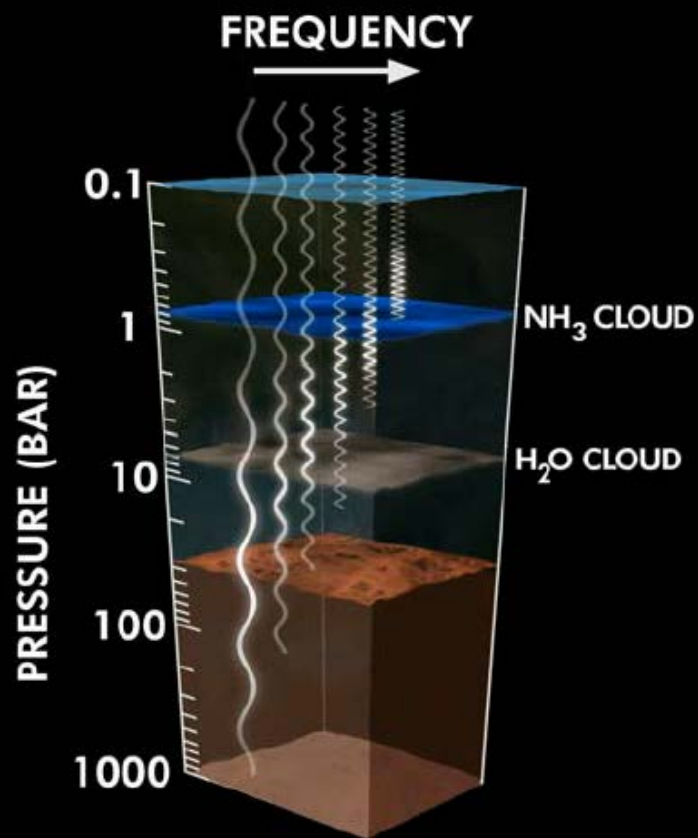
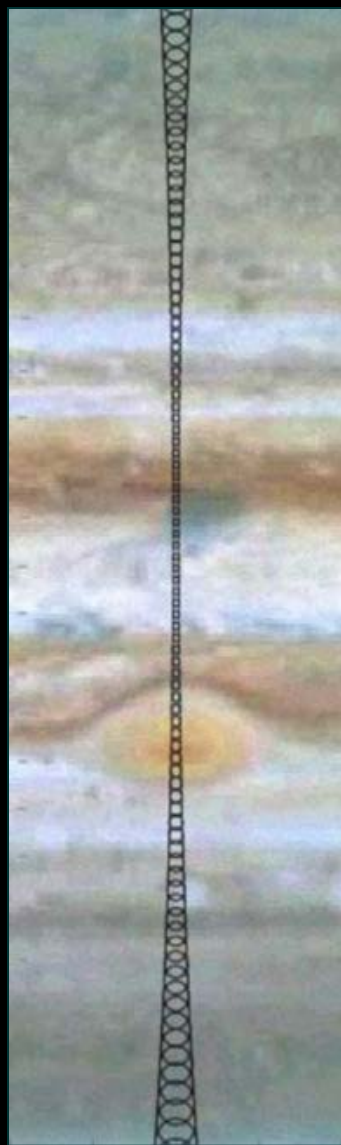


# Sensing the deep atmosphere

**Juno's Microwave Radiometer measures thermal radiation from the atmosphere**

**1000 atmospheres pressure (~500-600km below the visible cloud tops).**

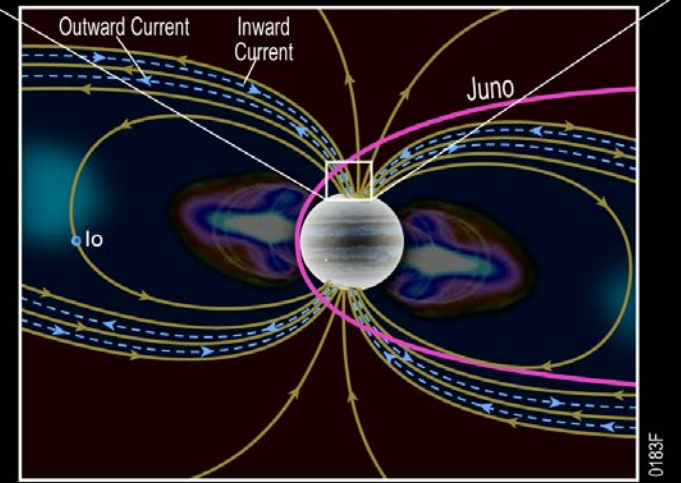
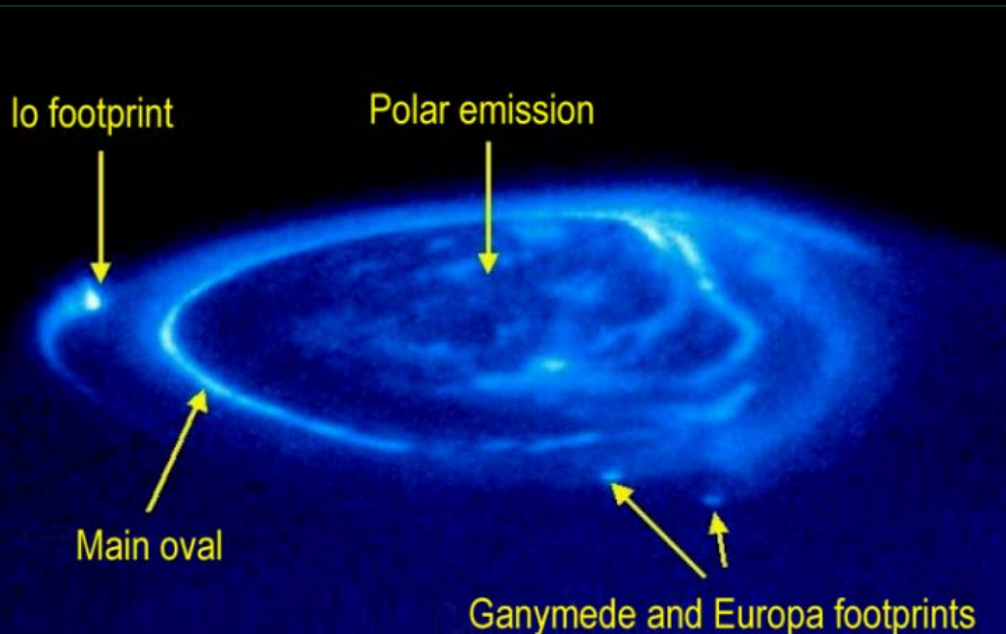
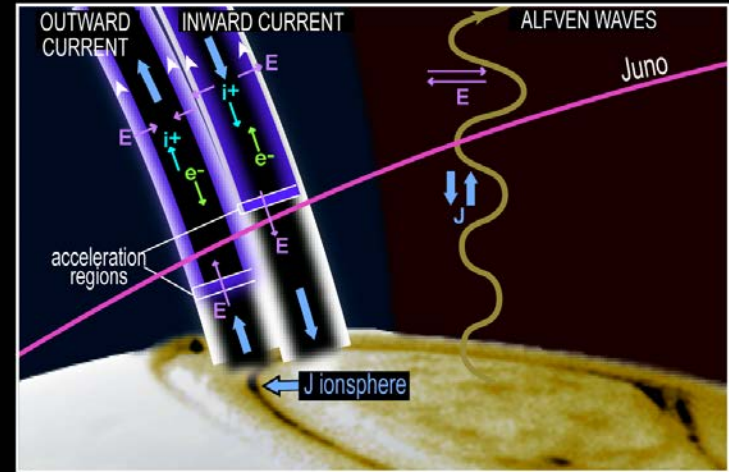
**Determines water and ammonia abundances in the atmosphere all over the planet**



# Polar Magnetosphere Exploration

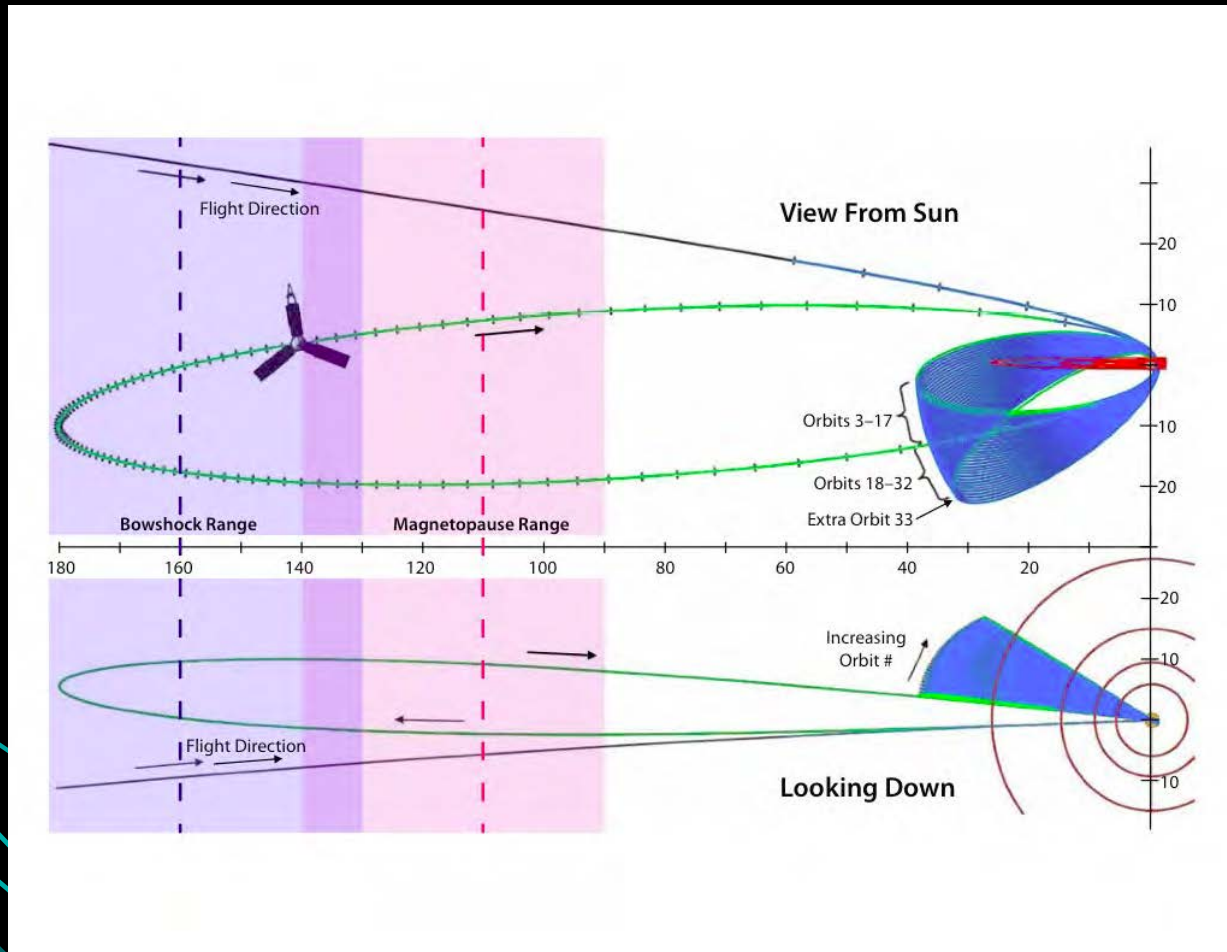
**Location is Key: Juno passes directly through auroral field lines.**

**A suite of instruments are used to understand the physics:  
JADE, JEDI, MAG, Waves, JIRAM, UVS**



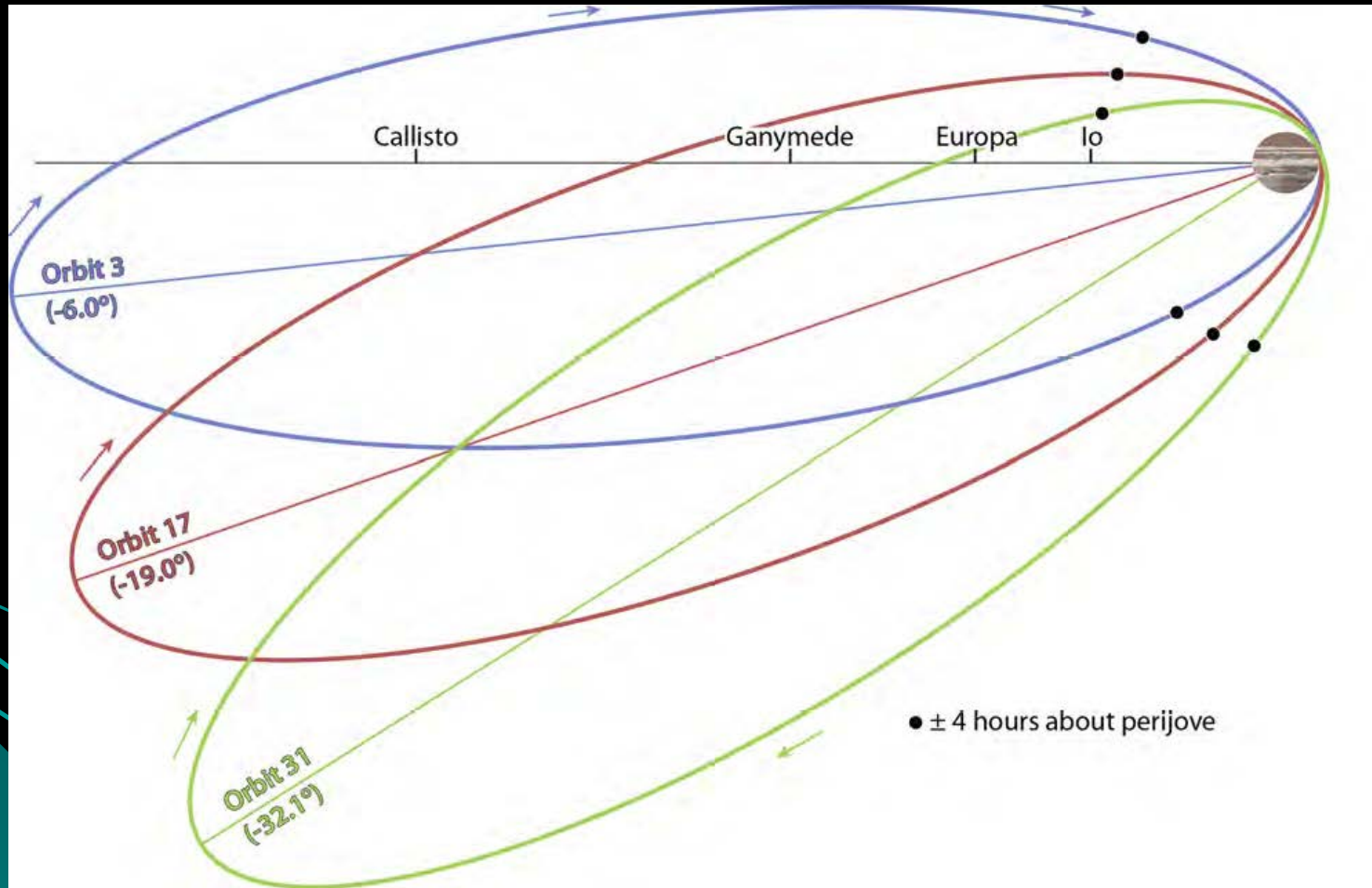


# Juno Orbit Geometry



Geometry of Juno's orbits viewed with the dawn flank on the left, (top) from the Sun with north up, and (bottom) looking down on the system, the Sun below.

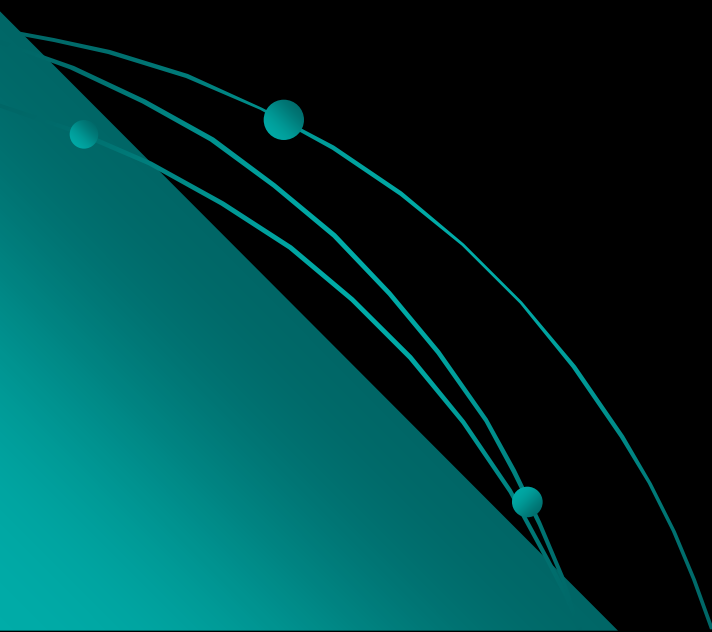
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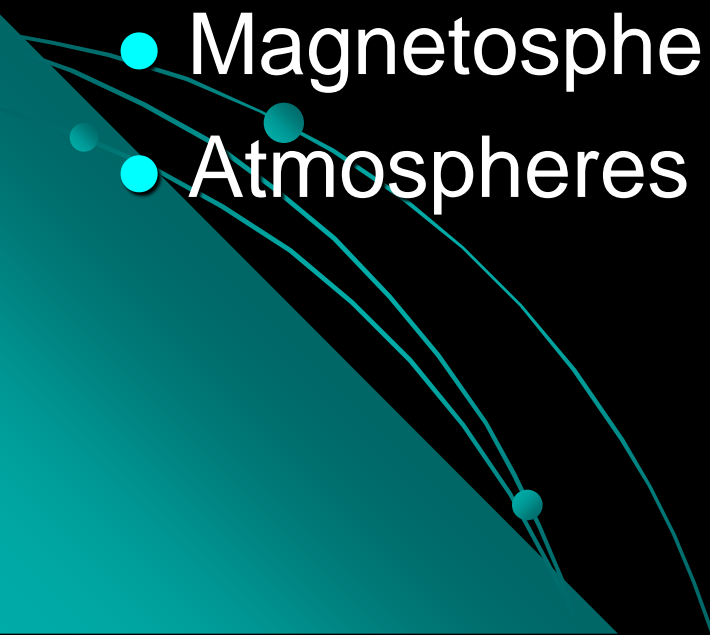
Three Juno orbits: (2016 Nov, 2017 Apr, 2017 Sep) showing precession of line of apsides relative to Jupiter's geographic equator.

# Earth based support astronomy

- Amateur and professional
- Coordinated by Glenn Orton (JPL)



# Joint Juno-Cassini Workshops

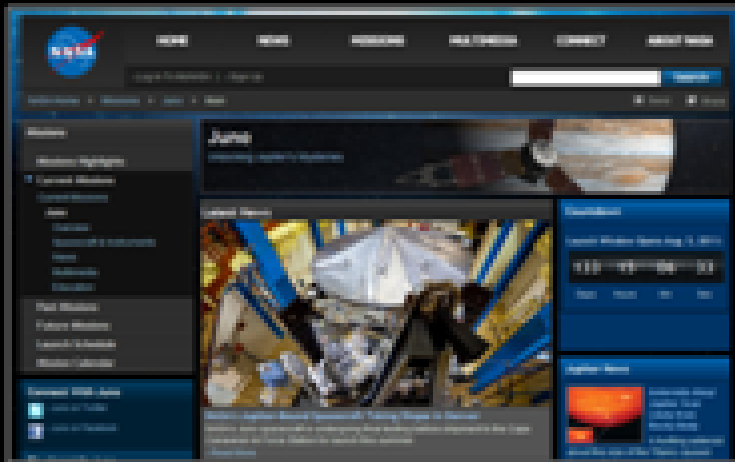
- Initiated joint working group meetings this year to facilitate planning and data analysis
  - Interiors and Origins meeting held dec 14
  - Magnetospheres meeting planned june 15
  - Atmospheres meeting later this year
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# For more information...



<http://missionjuno.swri.edu>



<http://www.nasa.gov/juno>