

# Juno

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OPAG  
November 7, 2006  
Tucson, Arizona

Juno

## Juno Mission Design

Currently in Phase B

Launch: August 2011

5-year cruise:

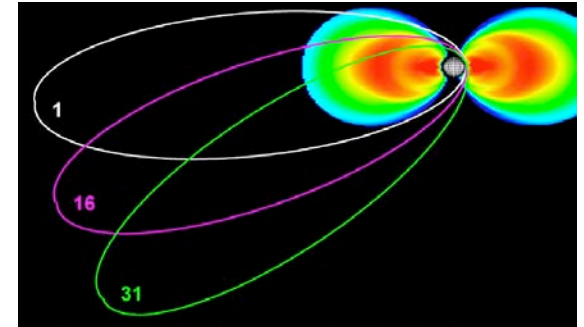
Nominal JOI  
October 19, 2016

Baseline mission:

32 polar orbits  
Perijove ~5000 km  
11-day period  
Spinner (2 RPM)  
Solar powered

Science Objectives:

Origin of Jupiter  
Interior Structure  
Atmosphere Composition & Dynamics  
Polar Magnetosphere



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Juno

## Solar System Exploration Decadal Survey 2003

Key Scientific Questions Relevant to Giant Planets:

Over what period did gas giants form, and how did birth of the ice giants (Uranus, Neptune) differ from Jupiter and its gas-giant sibling, Saturn?

What is the history of volatile compounds, especially water, across our solar system?

How do processes that shape contemporary character of planetary bodies operate and interact?

What does our solar system tell us about development and evolution of extrasolar planetary systems, and vice versa?

Juno addresses all four of these questions

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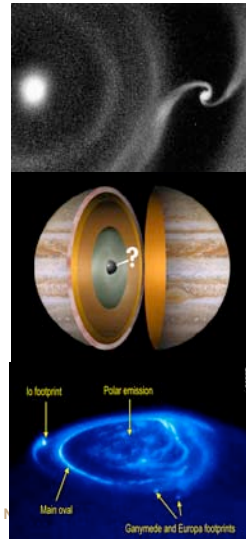
## Solar System Exploration Decadal Survey 2003

Principal objectives for a Jupiter Mission:

1. Determine if Jupiter has a central core to constrain models of its formation
2. Determine the planetary water abundance
3. Determine if the winds persist into Jupiter's interior or are confined to the weather layer
4. Assess the structure of Jupiter's magnetic field to learn how the internal dynamo works
5. Measure the polar magnetosphere to understand its rotation and relation to the aurora

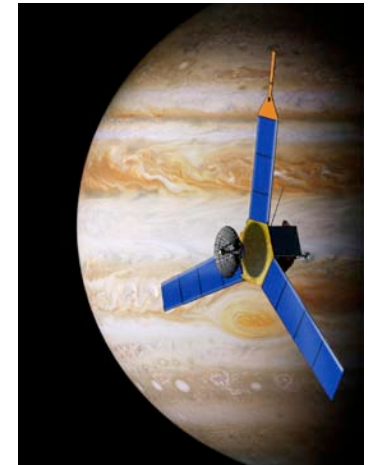
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- **Origin**
  - Determine O/H ratio (water abundance) and constrain core mass to decide among alternative theories of origin.
- **Interior**
  - Understand Jupiter's interior structure and dynamical properties by mapping its gravitational and magnetic fields.
- **Atmosphere**
  - Map variations in atmospheric composition, temperature, cloud opacity and dynamics to depths greater than 100 bars.
- **Polar Magnetosphere**
  - Explore the three-dimensional structure of Jupiter's polar magnetosphere and aurorae.



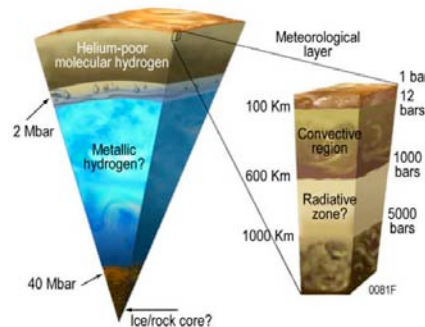
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- Gravity Science (JPL)
- Magnetometer— MAG (GSFC/JPL)
- Microwave Radiometer— MWR (JPL)
- Juno Energetic Particle Detector Instrument— JEDI (JHU/APL)
- Jovian Auroral Distributions Experiment— JADE (SwRI)
- Waves (University of Iowa)
- UV Spectrograph— UVS (SwRI)
- Visible Camera - JunoCam (Malin)



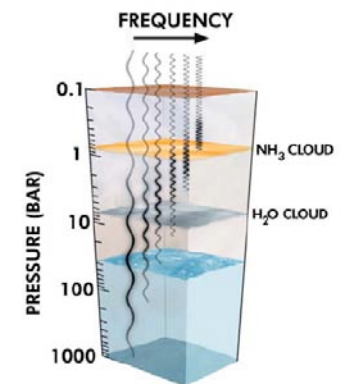
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- Radiometry probes deep into meteorological layer
- Magnetic fields probe into dynamo region of metallic hydrogen layer
- Gravity fields probe into central core region



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- Radiometry sounds the deep atmosphere
- Determines and *maps* the water and ammonia global abundances



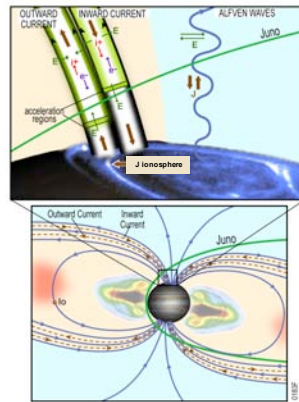
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Juno passes directly through auroral field lines

Measures particles precipitating into atmosphere creating aurora

Plasma/radio waves reveal processes responsible for particle acceleration

UV images provides context for *in-situ* observations



- **Currently in Phase B**
- **Launch date: 2011**
- **Current status:**
  - Technical: Green
  - Schedule: Green
  - Programmatic: Green
  - Resource: Green
  - Key contracts in place
  - Management and control processes in place
  - Established baseline budgets and schedules for 2011 launch
- **Capabilities and Requirements Review (October 2006)**
  - Successful first major review
  - First meeting of Juno review board
  - No major technical issues
  - Green light to proceed to PMSR (May 2007)