National Aeronautics and Space Administration

Outer Planets Program Status

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OPAG Meeting
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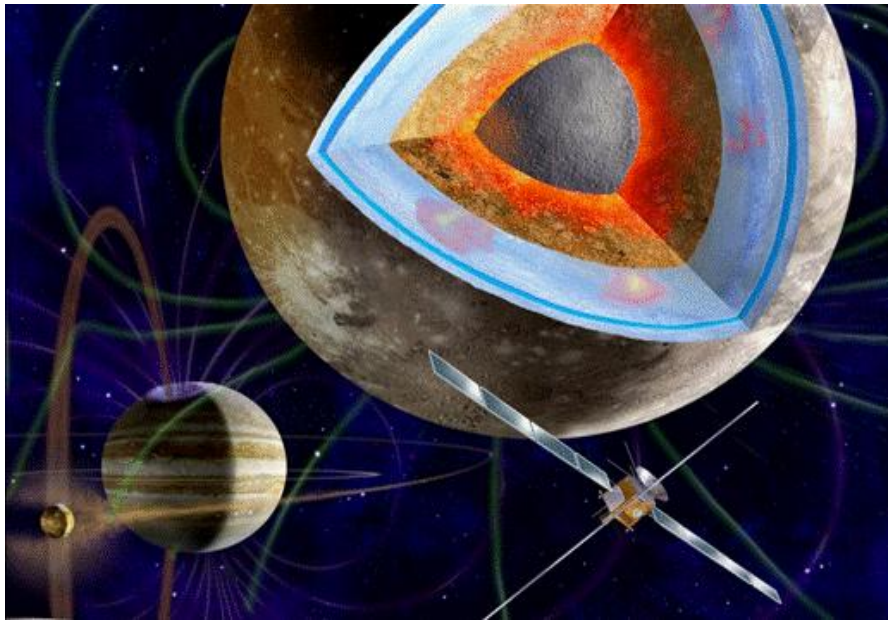
Science Nuggets

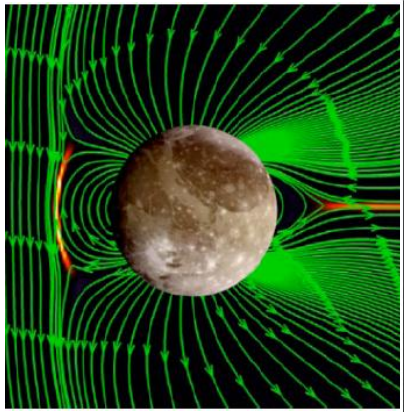
- Science nuggets are single slide, layman descriptions of fascinating science results
- These nuggets are shared with senior management inside and outside of the agency
- Missions regularly generate these, but we are always in need of nuggets from R&A efforts
- Nuggets should generate a "wow" factor and be relatable to non-experts

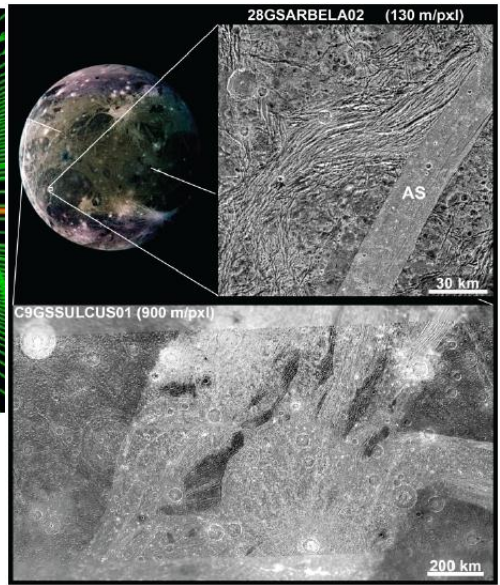
We are always in need of science nuggets. Want to brag a little?

The JUpiter ICy moons Explorer Mission

- On May 2, 2012, the ESA SPC formally selected JUICE as the first Large-class mission in ESA's Cosmic Vision Program
- The JUICE mission will investigate the emergence of habitable worlds around gas giants, characterizing Ganymede, Europa and Callisto as planetary objects and potential habitats, and will also explore the Jupiter system as an archetype for gas giants.
- JUICE will first orbit Jupiter for ~2.5 years, providing 13 flybys of Callisto and 2 of Europa, and then will orbit Ganymede for 9 months
- Launch is scheduled for 2022 with Jupiter arrival in 2030, Ganymede orbit insertion in 2032, and Ganymede impact in 2033
- NASA and ESA released coordinated AOs in June 2012 to solicit the JUICE payload

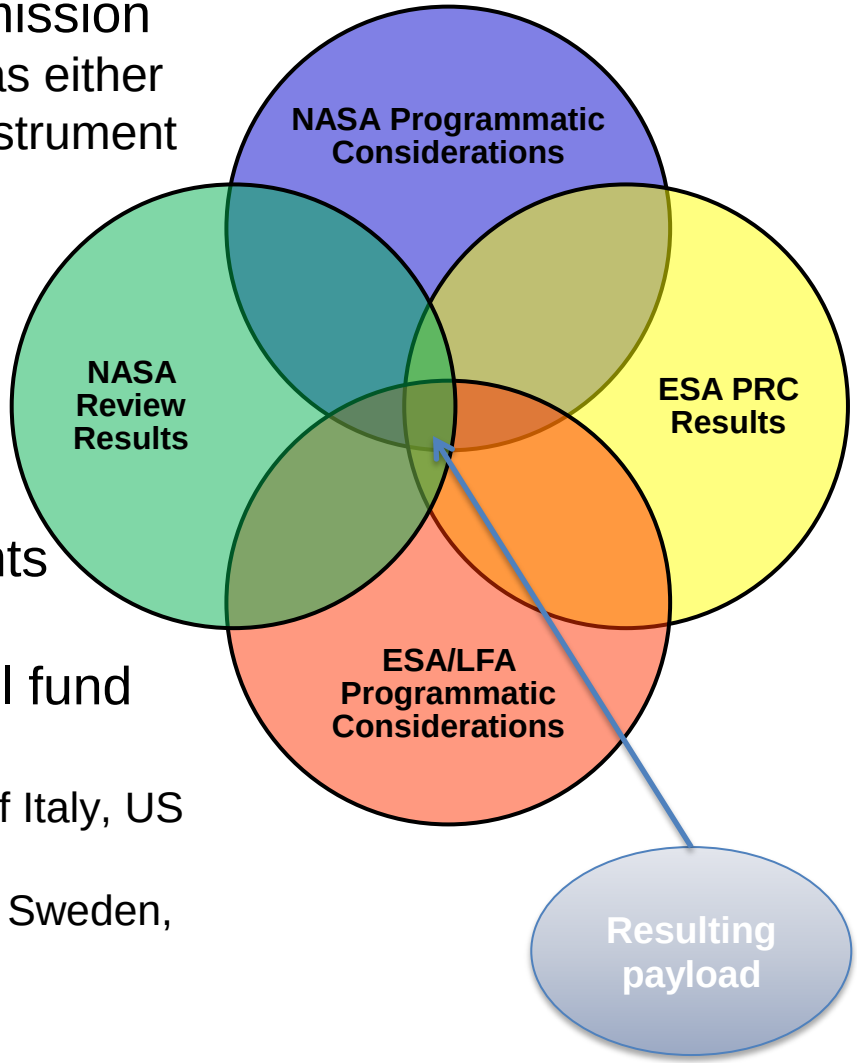






NASA Contributions to JUICE Mission

- In Feb. 2013 NASA and ESA announced the collaboratively selected payload for the JUICE mission
  - NASA offered to contribute up to $100M as either NASA-led instrument(s), NASA-funded instrument component(s) provided to European-led instrument(s), and/or NASA-funded U.S. Co-Is on European-led instrument(s).
- NASA selected the Ultraviolet Spectrograph instrument investigation (PI Randy Gladstone, SWRI)
- The remaining 10 European-led instruments on the JUICE payload contained a total of ~$190M in NASA contributions. NASA will fund contributions to
  - Radar for Icy Moon Exploration (PI Bruzzone of Italy, US Lead Jeff Plaut of JPL)
  - Particle Environment Package (PI Barabash of Sweden, US Lead Pontus Brandt of APL)



Cassini Mission Overview

Four-Year Prime Tour, Equinox Mission, and Solstice Mission (Proposed): July 2004 - July 2017

	Prime Mission				Equinox Mission		Solstice Mission						
Year of Tour	1	2	3	4	5	6	7	8	9	10	11	12	13
	'04-'05	'05-'06	'06-'07	'07-'08	'08-'09	'09-'10	'10-'11	'11-'12	'12-'13	'13-'14	'14-'15	'15-'16	'16-'17
Orbits	11	15	22	27	39	21	16	19	25	12	12	20	56
Titan	*												
Enceladus													
Other Icy Satellites (under 10,000 km)	Phoebe	Tethys, Hyperion, Dione, Telesto, Rhea		Rhea, Iapetus, Epimetheus		Rhea, Helene, Dione, G arc	Rhea, Helene	Dione, Dione, Tethys, Methone, Telesto	Rhea		Dione, Tethys	Dione, Epimetheus, G arc	
Saturn (seen from Sun)													

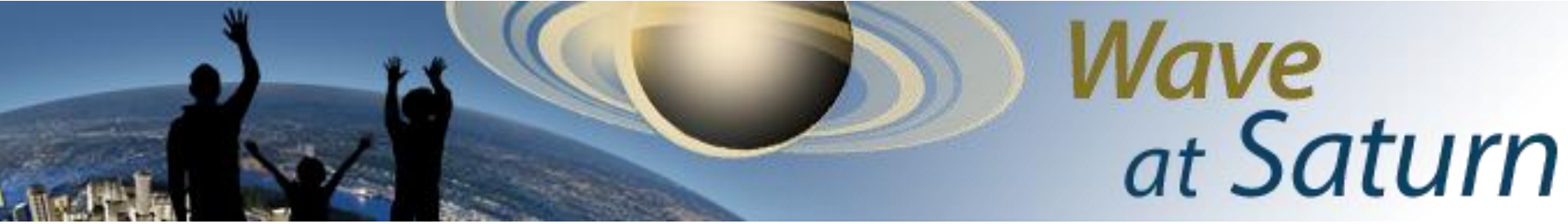
*Huygens

Approved!

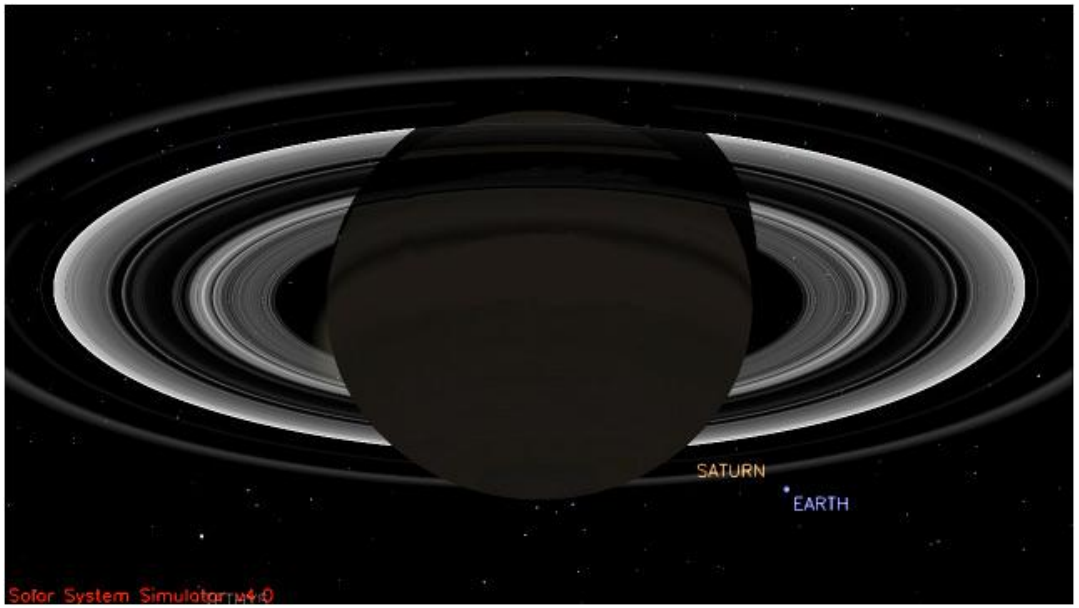
Notional

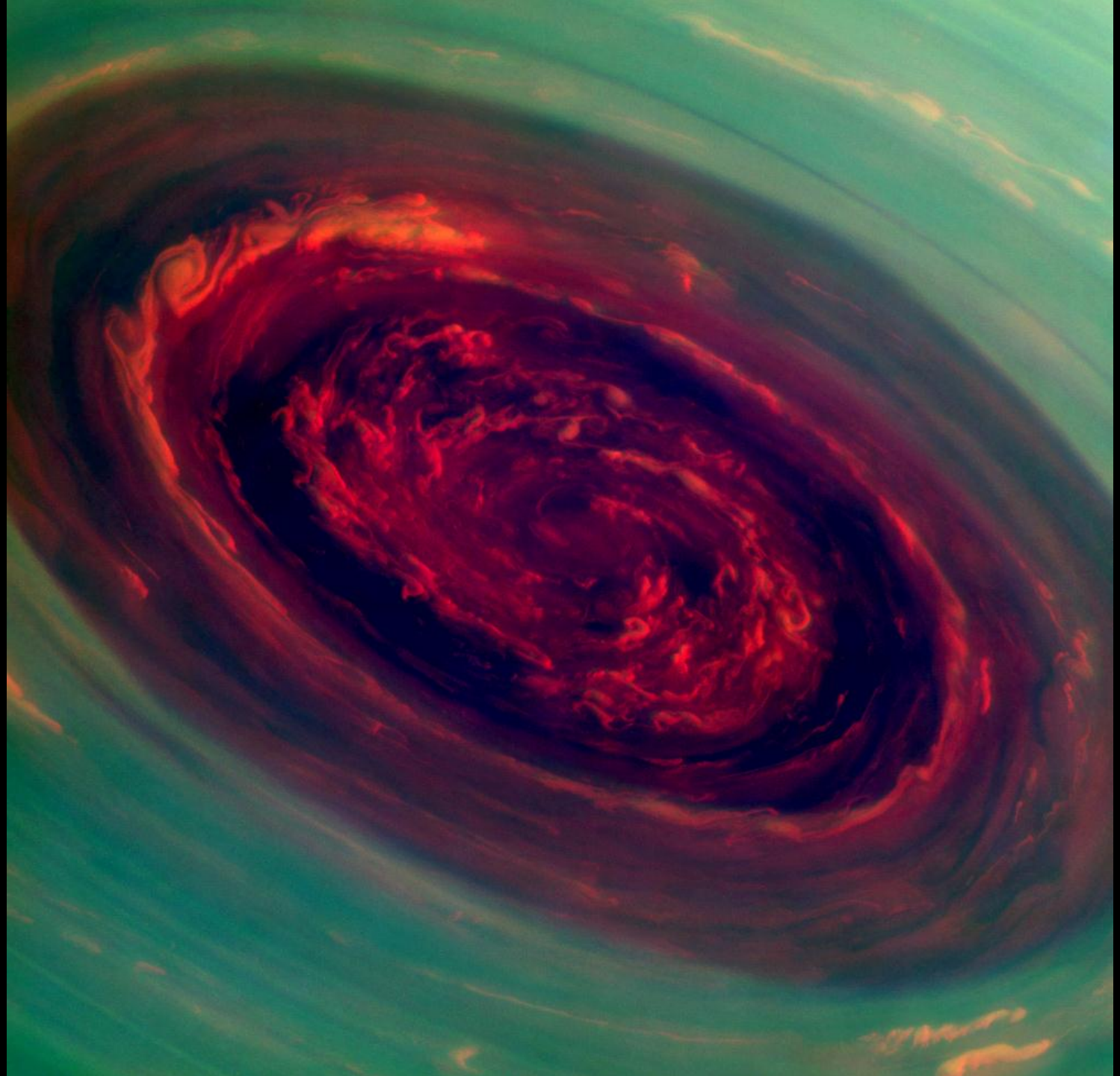
Proximal Orbits

EOM Sep 15, 2017



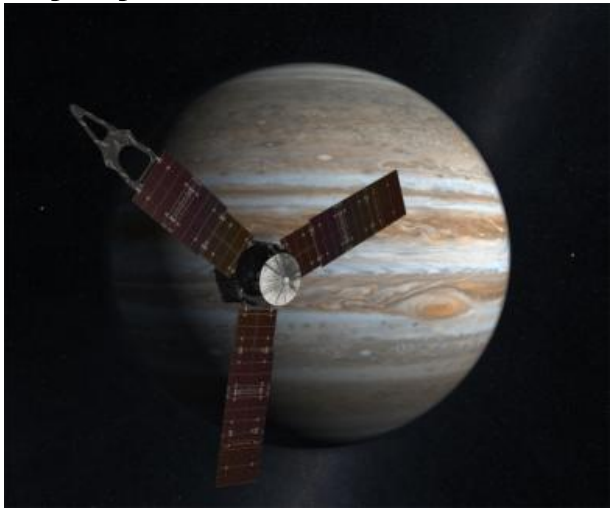
- This Friday Cassini will take its final mosaic of Saturn, its rings, and Earth
  - But this time we are giving everyone advance notice so they can be in the picture
- So on Friday, be outside from 5:27-5:42 pm eastern, look to the east, and **Wave at Saturn!**
- http://saturn.jpl.nasa.gov/news/waveatsaturn/



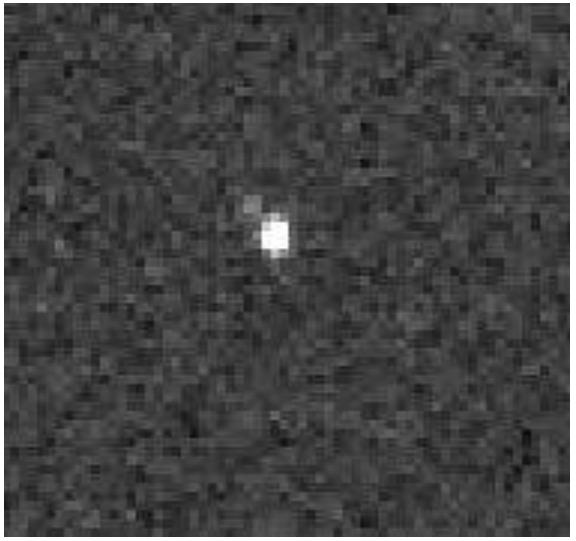


Mission Status – Juno and New Horizons

- Juno is in excellent health and operating nominally
- Spacecraft has covered ~45% of the 19-AU-long trajectory (12% further since last OPAG meeting)
- JOI in 3 years, and Earth flyby on Oct. 9, 2013

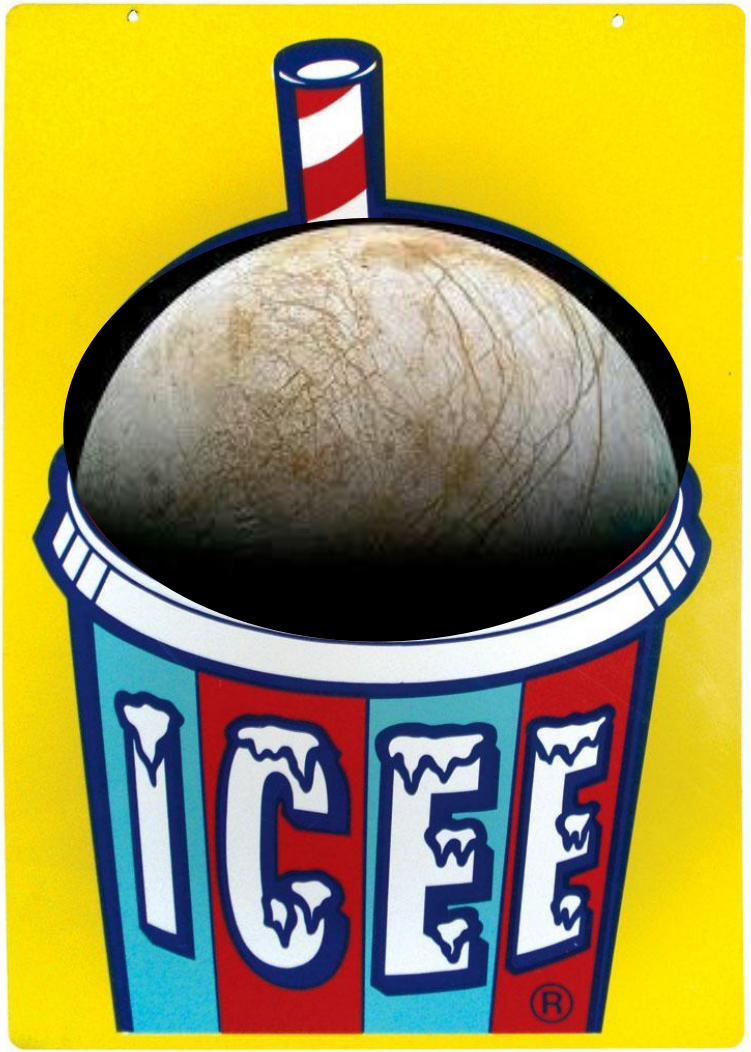


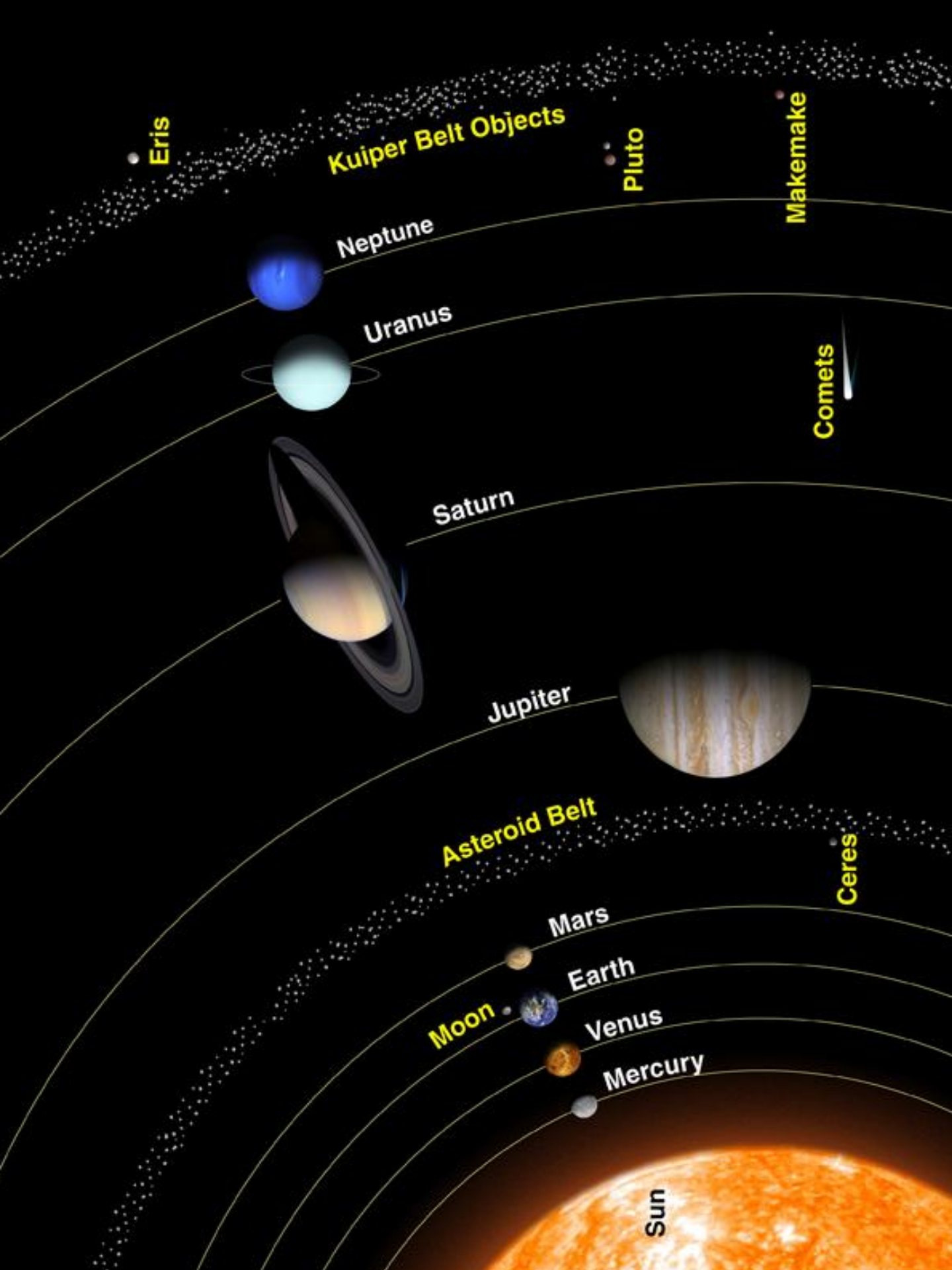
- New Horizons is in excellent health and operating nominally
- Spacecraft is 26.7 AU from the sun and 7.4 AU from Pluto system (1.5 AU closer than last OPAG meeting)
- Just completed successful rehearsal



Europa Flagship Mission

- Congress provided funding in FY13 to continue study and formulation of Europa Clipper
  - We need to extend the funding into F responsibly
  - We need to wait and see what the Pr about Europa Clipper (~February 20 reacts (~spring 2014)
- Instrument Concepts for Europa E
  - Goal of the ICEE program is to matu risk of instruments for a potential futu point where they may be proposed ir announcement of flight opportunity (extensive technology development
- Clipper remains shovel ready!




Eris
Kuiper Belt Objects
Pluto
Makemake
Neptune
Uranus
Comets
Saturn
Jupiter
Asteroid Belt
Ceres
Mars
Earth
Moon
Venus
Mercury
Sun