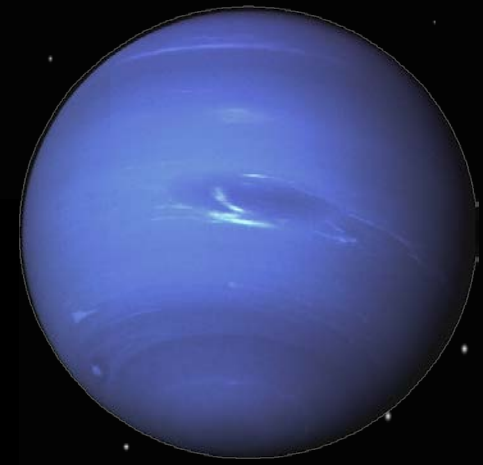
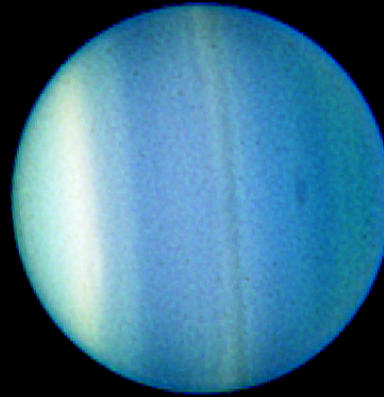
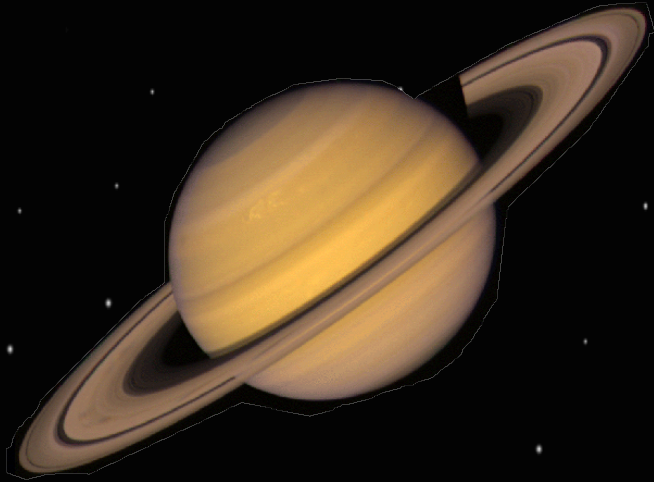


# OPAG



Goals, Tasks,  
Organization, Challenges



# Outer Planets Assessment Group Charter

- OPAG is NASA's community-based forum designed to provide science input for planning and prioritizing outer planet exploration activities for the next several decades.
  - Long-term strategy
- Open to all interested scientists, OPAG regularly evaluates outer solar system exploration goals, objectives, investigations and required measurements on the basis of the widest possible community outreach.
  - Near-term strategy

# General thoughts

*The “Visions and Voyages” writers are done – we are the voice of the outer planets community until the next decadal survey*

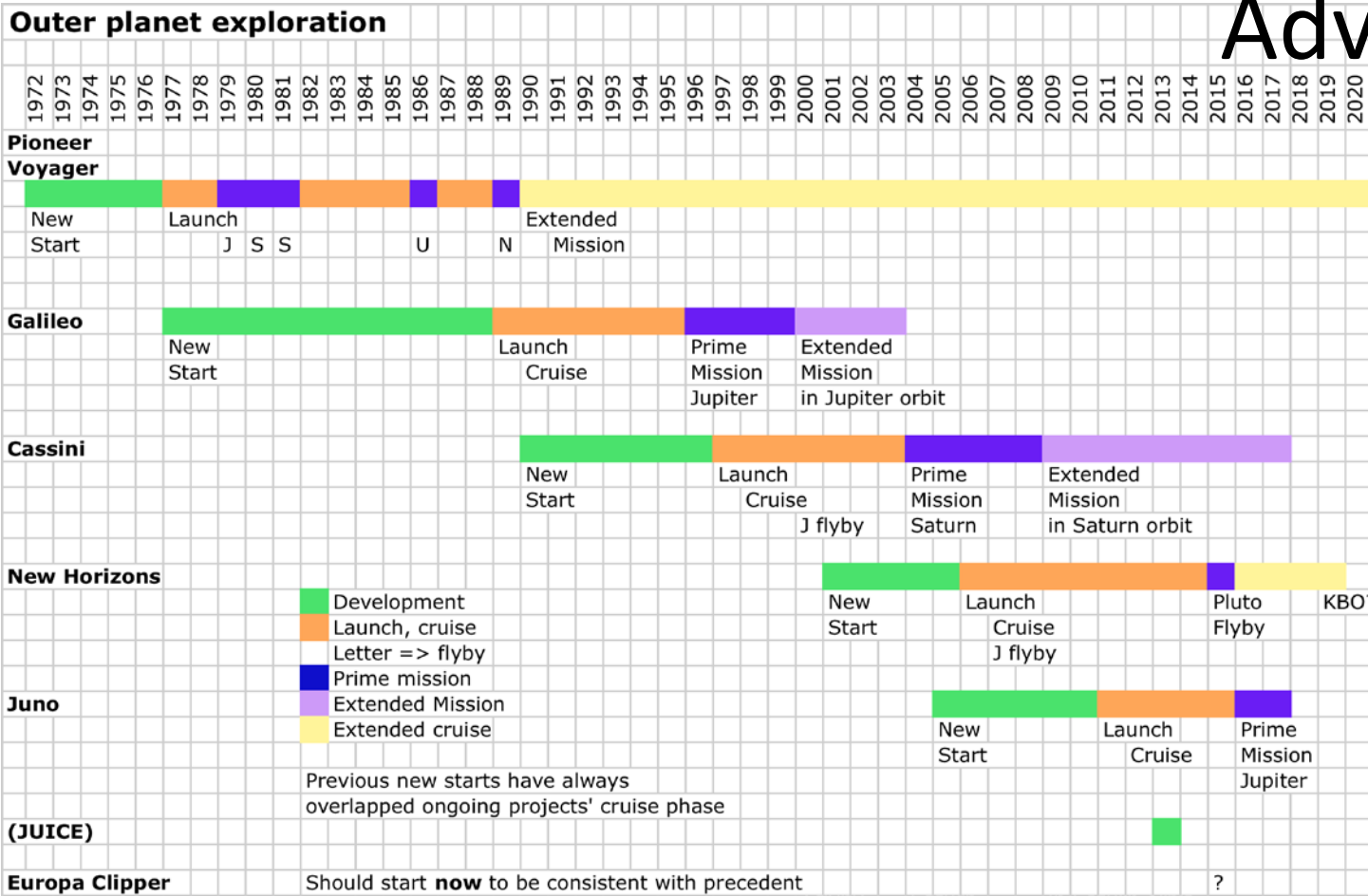
- Constructively confront new budget realities
  - Europa Clipper is responsive to the new reality
  - More focus on New Frontiers and Discovery
- React to new discoveries
- Promote technology development for outer solar system exploration
- Advocate for outer solar system exploration within the planetary community and NASA
  - E.g. articulate why it isn't enough just to go to Mars (even though we love Mars)
  - On agenda for later this morning
- Prepare for the next decadal survey
  - What to do about our target-rich dilemma?



# Sidebar

# New Frontiers

# Advantages



NF1: New Horizons

NF2: Juno

Disadvantage: No guarantees

## New Frontiers has been good for outer solar system exploration

- Competitive selection process culls out best and most feasible science goals
- PI-led missions less likely to over-run because of central decision-making
- NF3 might have gone to outer solar system if Pu238 had been available

# OPAG Path forward

- *Immediate* – update 2006 science doc
- *Then* – aggressively pursue new technology (this is an area that we should be able to influence immediately)
- *After that* – weigh in on midterm review of Visions and Voyages
- *Followed by* – studies of missions in prep for next Decadal Survey
- *As we are doing all this* – we need a strategic plan to explore our target-rich field
  - Morph our science doc? Or new roadmap?
- Consider a multi-decadal strategic vision
  - How do we get to all the 5-star destinations in the outer solar system?
  - Is the flyby-orbit-sample paradigm valid?
  - What is a possible timeline?
  - How rigid / how flexible should such a plan be?
    - Want to incorporate new discoveries and thinking without being completely helter-skelter

# OPAG Path Forward

- Immediate – update 2006 science doc
- Then – aggressively pursue new technology (this is an area that we should be able to influence immediately)
- Doesn't necessarily require PSD funding – we had a very nice presentation from OCT at the last OPAG meeting

# Science pathways via OPAG

- Last full document was in 2006
  - “Scientific Goals and Pathways for Exploration of the Outer Solar System”: A Report of the Outer Planets Assessment Group (OPAG) 2006
  - Plus the Decadal Survey white paper 2009
  - Plus the Technology Recommendations 2009
- Time to update the OPAG Goals and Pathways report
  - Make more consistent with Visions and Voyages
  - NASA has implemented many of the findings elucidated in 2006
- Science sections need some, but sadly not many, updates
  - This is due to lack of new missions (so mainly Cassini updates to include)
  - But we’ll have lots in 2015-2017
- Plan of attack: Morph the old doc by first updating the science, then the associated findings
- Then update the technology document

# Broadbrush Changes Needed

- Bring our document in-line with Decadal goals
  - Add goals for Io, add Saturn probe, beef up Uranus
  - Update connections to new decadal, replacing references to old 2003 decadal survey
- Update Titan and Enceladus sections
- Add how exoplanet comparisons motivate Uranus and Neptune investigations
- Re-write Europa to be consistent with Clipper concept
- Update Cassini science results
- Identify missions that could be carried out within a New Frontiers budget
- Identify science goals that are important yet focused enough that they could potentially be addressed by a Discovery mission like TIME or IVO



# The OPAG Committee

	Interest / Expertise
Heidi Hammel	Gas / Ice Giants
Mark Hofstadter	Gas / Ice Giants
Linda Spilker	Rings
Jack Connerney	Magnetospheres
Kevin Baines	Atmospheres - big and medium-size
Jason Barnes	Titan
Ralph Lorenz	Titan, technology
Jani Radebaugh	Titan, Io
(David Williams)	Io
Britney Schmidt	Europa
Jeff Moore	Icy sat's geology
Candy Hansen	Icy sat's activity & exospheres; Triton
Bill McKinnon	Icy sat interiors, planetary evolution
Pat Beauchamp	Technology

# Broadbrush Changes Needed

- Bring our document in-line with Decadal goals
  - Add goals for Io (Jani), add Saturn probe (Kevin, Mark, Heidi), beef up Uranus (Mark)
  - Update connections to new decadal, replacing references to old decadal (Heidi)
- Beef up Titan (Jason, Ralph) and Enceladus (Jeff, Candy) sections
- Add exoplanet comparisons (Heidi, Mark)
- Re-write Europa to be consistent with Clipper concept (Britney)
- Update Cassini science results (Linda)

# Broadbrush Changes Needed (cont.)

- Identify missions that could be carried out with a New Frontiers mission rather than flagships (all); technology required to make them feasible and competitive (Pat)
- Identify science goals that are important yet focused enough that they could be addressed by a Discovery mission like TIME or IVO (all) ; technology required to make them feasible and competitive (Pat)

# Near-Term Plan

- Have new sections written by the time of the next OPAG meeting
- Collectively we will go through the old findings and draft new ones
- Solicit mission ideas and required technologies from all your colleagues – report at next OPAG meeting
- Collectively we will go through these ideas and identify with Pat the technologies we'll want to push for
  - Taking advantage of sources of funding beyond PSD

# OPAG Path forward

- After that – weigh in on midterm review of Visions and Voyages
- Followed by – studies of missions in prep for next Decadal Survey
- Finally, recommendations for the next Decadal Survey
  - We have so many fabulous places to explore!

# Our Dilemma of Destinations

*Do we attack this like a Michelin guide?*

Worth a journey

Worth a detour

Interesting

*Or should we recommend a decadal survey with science goals and no particular mission recommendations?*

Juno was selected because it met the science goals, not the mission description, in the 2003 decadal survey

*Or we could recommend no flagships at all – just a New Frontiers free-for-all*

As many as possible

Classic free enterprise competition

Most responsive to new discoveries

# OPAG Path forward

- We need a strategic plan to explore our target-rich field
  - A new roadmap?
- Consider a **multi-decadal** strategic vision
  - How do we get to all the 5-star destinations in the outer solar system?
  - Is the flyby-orbit-sample paradigm valid?
  - What is a possible timeline?
  - How rigid / how flexible should such a plan be?
    - Want to incorporate new discoveries and thinking without being completely helter-skelter
- I'd like to form a small group just to take a stab at this, first for review by the committee, then the community
  - **Volunteers?**

# OPAG Subcommittees

- Early career researchers
  - Jani
  - Britney
- Technology development
  - Pat
  - Ralph
  - Jason?
- Multi-decade strategic vision