

Strategy for coordination 2020+

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Where Are the Opportunities for Advancement of Ice Giant Science Goals?

- ▶ Mission studies (National and Agency-level)
- ▶ NASA activities associated with the Decadal Survey
- ▶ ESA activities associated with Vision 2050 and prep for CMIN22.
- ▶ Grass-roots science
 - ▶ Ice Giant sessions at annual conferences
 - ▶ Future Ice Giant-specific workshops and conferences?
 - ▶ Continuing to publish high-quality new science!
- ▶ Where else?

Some of the Completed Major NASA and ESA Studies

Year	Study	URL:
2010	NASA Ice Giants Decadal Study	https://sites.nationalacademies.org/cs/groups/ssbsite/documents/webpage/ssb_059323.pdf
2010	ESA Probe Study (Ice Giants, Venus)	http://sci.esa.int/sci-fmp/47568-pep-assessment-study-internal-final-presentation/
2011	ESA M-Class Uranus Pathfinder	https://en.wikipedia.org/wiki/Uranus_Pathfinder
2017	NASA Ice Giant Study	https://www.lpi.usra.edu/icegiants/mission_study/Full-Report.pdf
2018	ESA Ice Giant mission contributed elements	https://sci.esa.int/web/future-missions-department/-/61307-cdf-study-report-ice-giant
2019	ESA Ice Giant stand-alone mission	https://sci.esa.int/web/future-missions-department/-/61471-epig-cdf-study-summary-report

And many more

A Few Words on Mission Concepts

- ▶ Many concepts have been studied and/or proposed to the last ESA M/L Class and NASA Discovery calls (Trident, Louise Prockter PI).
- ▶ A Neptune/Triton mission is currently underway as part of NASA's Planetary Mission Concepts Studies (Abi Rymer, PI).
- ▶ Many concepts are in White Papers for the current and in-process Decadal Surveys (discussed later).
- ▶ International cooperation is key to maximizing the science return.
- ▶ It seems likely that NASA will be the lead agency on any future mission, but activities from other agencies are important to keep momentum going.

Next Steps for ESA Concept Studies

► Olivier Witasse

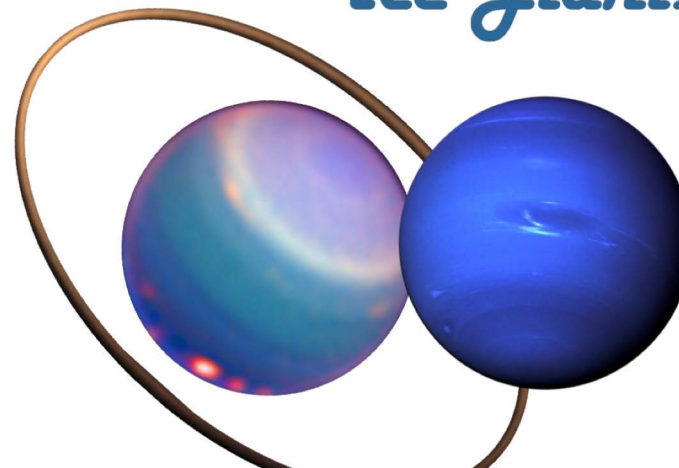


Ice Giants
CDF Study Report: CDF-187(C)
January 2019
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CDF Study Report Ice Giants

A Mission to the Ice Giants – Neptune and Uranus

Ice Giants



The Decadal Survey Process

- ▶ Pre-Decadal Studies (community-led), 2020
- ▶ White papers (community-led), 2/2020 – 7/2020
- ▶ Decadal Panels meet, 2020-2021
 - ▶ Decide on science (and mission study??) priorities
 - ▶ Follow-on mission studies?
- ▶ Panels present priorities to steering group, 2021
- ▶ Steering group synthesis and prioritization, 2021
 - ▶ Draft report 10/2021
 - ▶ Release 3/2022

A Few Words on Decadal Survey White Papers

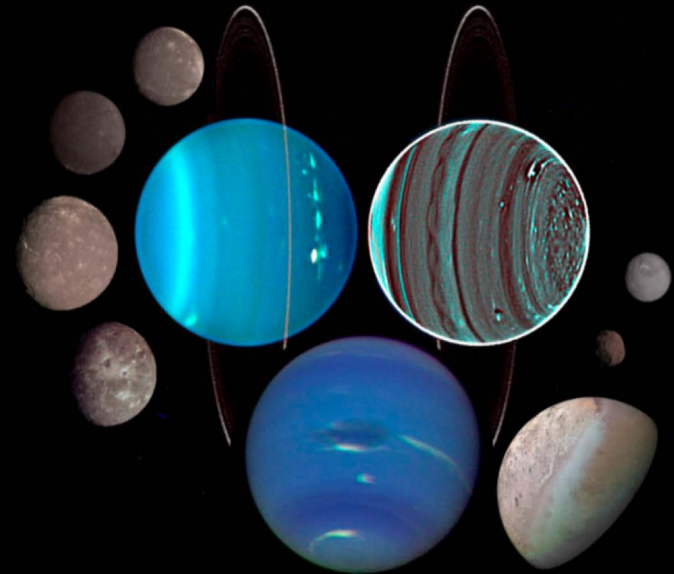
- ▶ Many white papers out there, and more being discussed in advance of the next Decadal:
 - ▶ Last Decadal: <https://www.lpi.usra.edu/decadal/opag/>
 - ▶ Voyage 2050: <https://www.cosmos.esa.int/web/voyage-2050/white-papers>
 - ▶ Next Decadal planning:
<https://docs.google.com/spreadsheets/d/1Vpafk79WyoMx7OtybDvNa7DzhFPGe8PeAaCoYdfvOCg/edit?usp=sharing>

A Few Words on Vision 2050

► Chris Arridge

Ice Giant Systems

*The Scientific Potential of Missions to
the Uranus and Neptune Systems*



*A White Paper Submitted to
ESA's Voyage 2050 Call*

Upcoming Meetings

- ▶ LPSC: 1 -21 March 2020, Houston TX
 - ▶ Ice Giant workshop requested
- ▶ EGU: 3-8 May 2020, Vienna, Austria
 - ▶ Dedicated Ice Giant Session (Session PS5.1)
- ▶ COSPAR: 15-22 August 2020, Sydney, Australia
 - ▶ Abstract Deadline is Feb 14!!
 - ▶ Dedicated Ice Giant Session is planned (Commission B)

Discussion Panel

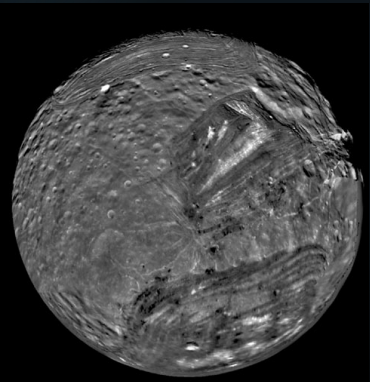
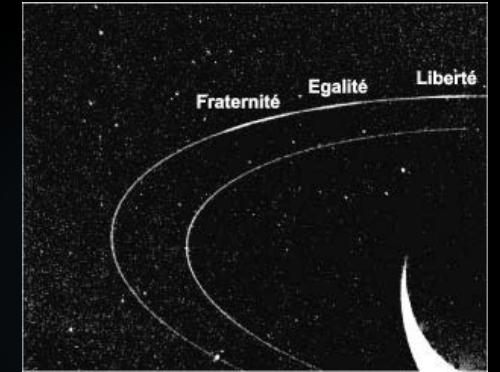
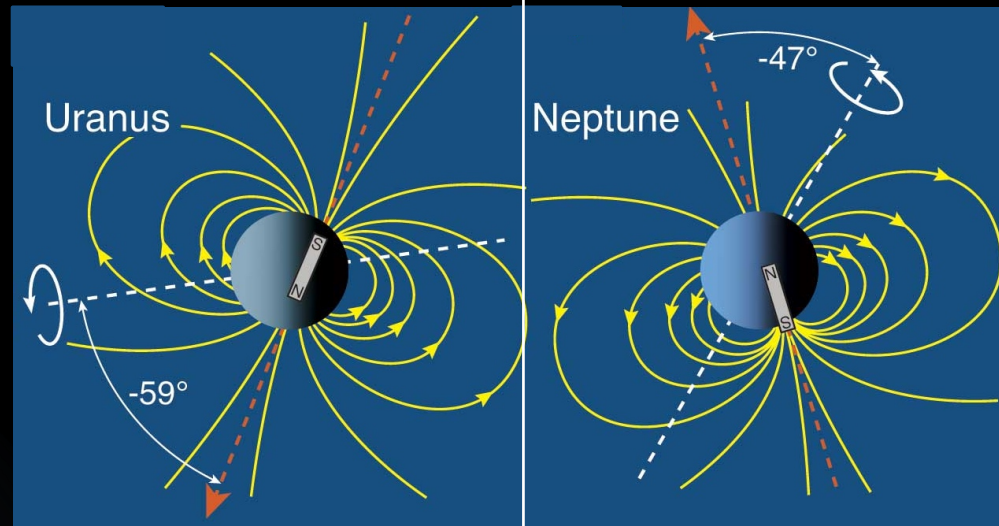
Sushil Atreya, Athena Coustenis, Kim Reh, Amy Simon, Elizabeth Turtle

- ▶ White papers
- ▶ Outcome of ESA's Ministerial process and roadmap for 2022.
- ▶ Desired observations, simulations/models, and tech development
- ▶ Open discussion on next steps

Beyond London2020

- ▶ Enormous thanks to everyone for enthusiastic participation!
- ▶ Not over yet: parallel meetings tomorrow (9.30am for 10am start):
 - ▶ Origins, Interiors & Atmospheres: Royal Astronomical Society
 - ▶ Satellites, Rings, & Magnetosphere: Geological Society
- ▶ Review papers for *Philosophical Transactions of the Royal Society A*.
- ▶ Statement of Meeting Outcomes for ESA, OPAG, agencies, etc.
- ▶ *A decade to turn our Ice Giant ambitions into reality!*

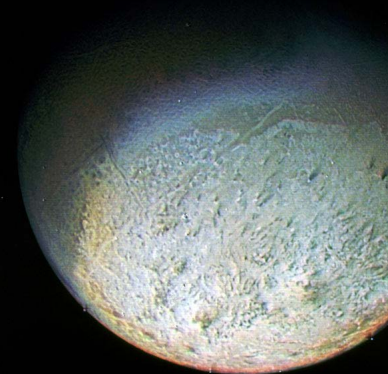
Onwards to the Ice Giants!



Miranda



Umbriel



Triton

