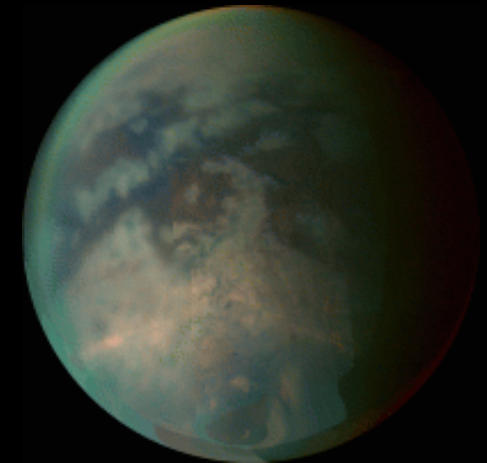
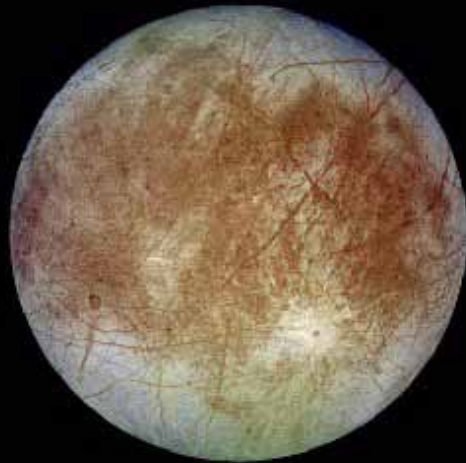




Outer Planets Flagship Mission Studies



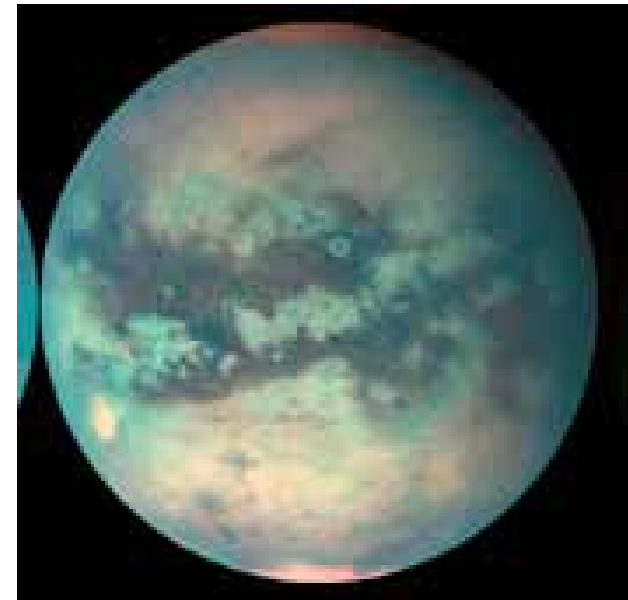
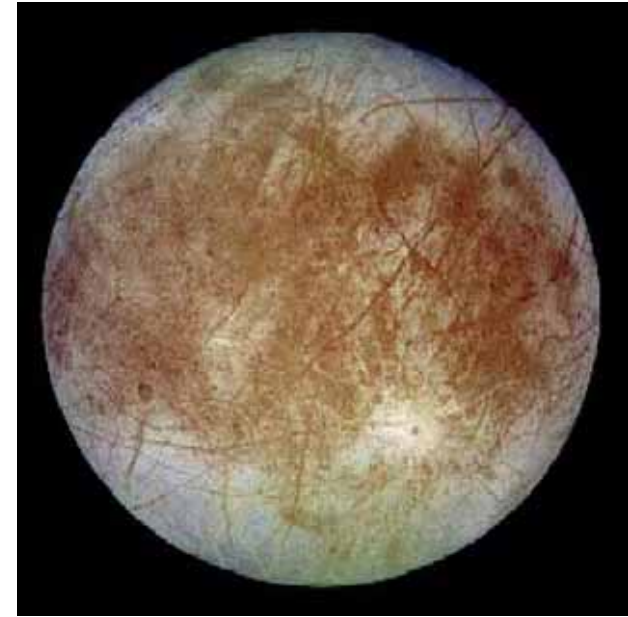
**Curt Niebur
OPF Program Scientist
NASA Headquarters**

**Planetary Science
Subcommittee
October 3, 2008**



Overview

- **NASA is currently finishing a nine month long outer planet flagship mission study which is being conducted jointly with ESA. Two missions are being studied:**
 - Europa Jupiter System Mission (EJSM)
 - Titan Saturn System Mission (TSSM)
- **NASA plans to select a single Outer Planet Flagship mission in February 2009 which will be pursued jointly with ESA and other international partners.**

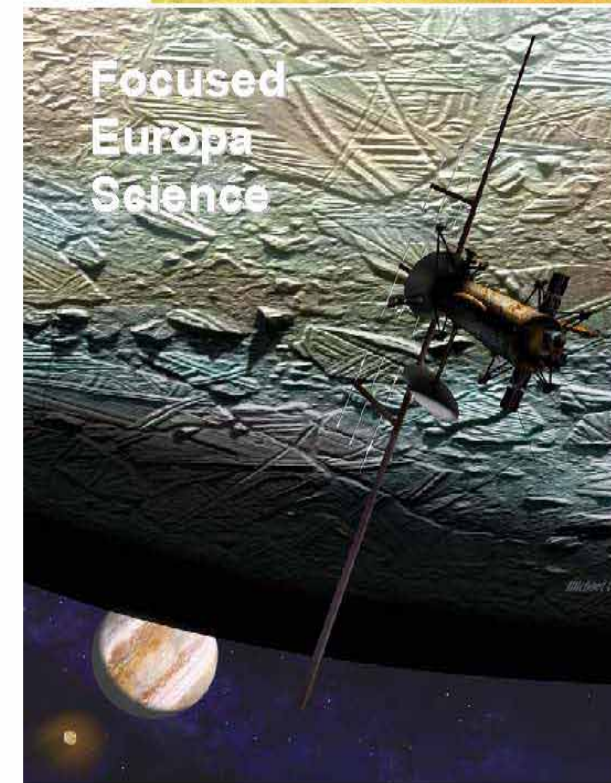
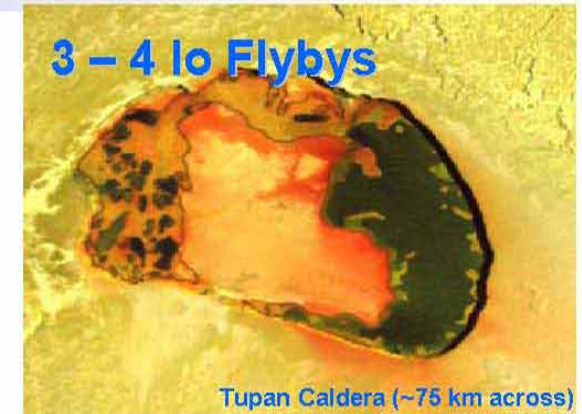




2008 JEO Sweet Spot Mission Concept



- **Objectives: Jupiter System, Europa**
- **Launch Vehicle:** Atlas V 551
- **Power Source:** 5 MMRTG or ASRG
- **Mission Timeline:**
 - Launch: 2018 to 2022
 - Jovian system tour phase: ~24-33 months
 - 3-5 Io flybys
 - 8-10 Ganymede flybys
 - 4-6 Callisto flybys
 - Europa orbital phase: 9-12 months
 - Spacecraft final disposition: Europa surface Impact
- **5 Science Objectives**
 - 12 Instruments
 - Radio Science
- **Radiation Dose:** 2.9 Mrad (behind 100 mils Al)



[Sweet Spot Analysis](#)

[Spacecraft & Technology](#)

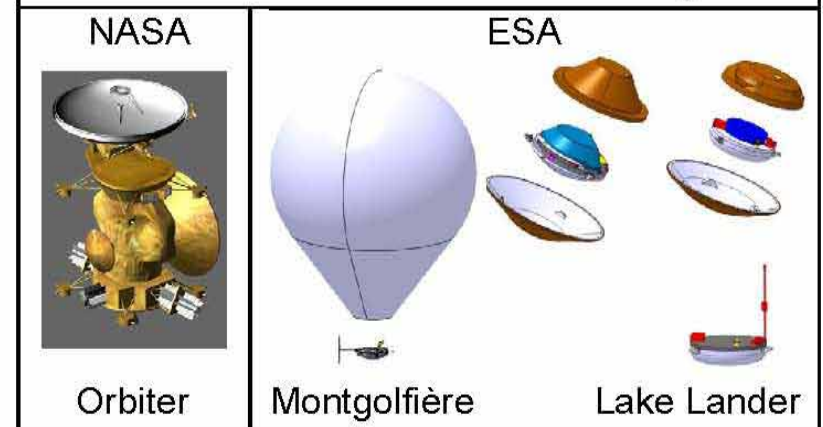
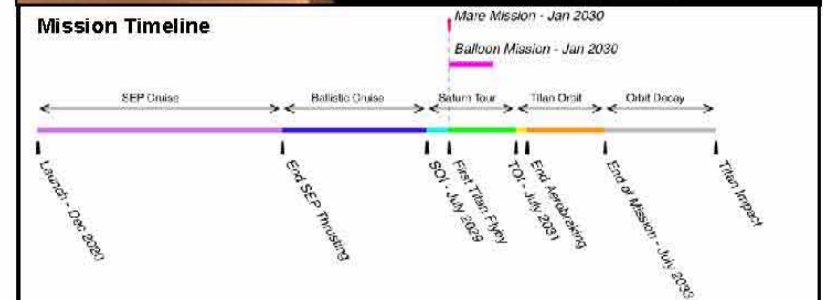
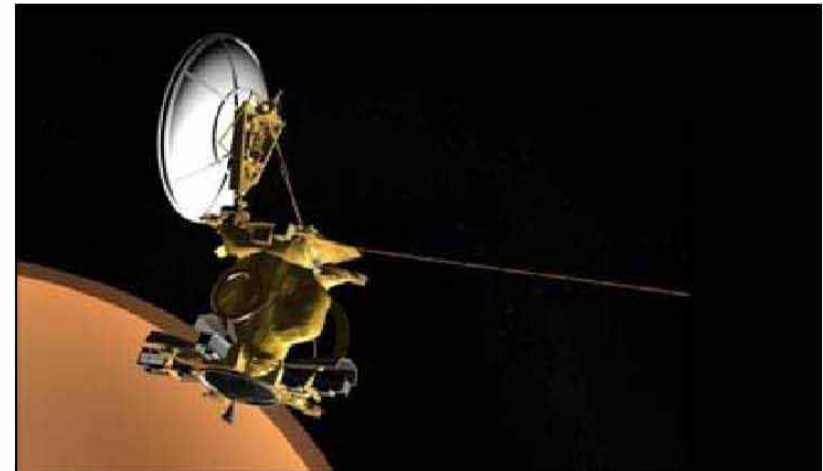


TSSM Baseline Mission



- **Titan Orbit, Saturn system, Enceladus**
- **NASA Orbiter with ESA in situ elements**
 - Chemical orbiter + Solar Electric Propulsion (SEP) stage
 - Lake Lander and Montgolfière Balloon
 - NASA provided Launch Vehicle and RPS
- **Mission Design**
 - 2020 Earth Gravity Assist SEP trajectory
 - 8.8 yr to Saturn arrival
 - SEP stage released 5.8 yr after launch
 - Balloon released on 1st Titan flyby, Lander on subsequent flyby
 - ~4 year prime mission: 2 year Saturn tour, 2 mo Titan aerosampling; 18 mo Titan orbit
- **Orbiter payload; 6 Inst. + Radio Science**

-Optimizes science, cost and risk
-Leverages NASA-ESA collaboration





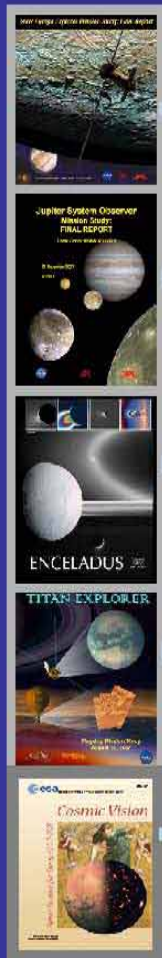
NASA-ESA 2008 Outer Planet Flagship Studies Decision Process



Submitted 8/07

Down-selected 12/07

Key Milestones



- Initial Instrument Workshop.....June 3-5, 2008
- Final Report due to HQ.....Nov 3, 2008
- Site Visit.....Dec 9,11, 2008
- Review complete.....Jan 15, 2009
- Down-selectMid February, 2009

<http://opfm.jpl.nasa.gov>

Down-select 02/09

Titan Saturn System Mission
 or
 Europa Jupiter System Mission

Key Aspects

- International cooperation integral to both concepts
 - ESA is primary international partner
 - JAXA & ESA member-states may participate
- **JPL leads partnership with APL**, other NASA centers
- President's FY09 budget: funding begins in FY09



Reporting Requirements and Review Process

- **For each mission concept, the NASA-ESA study teams will produce three reports:**
 - NASA Study Report: a technical report prepared by the NASA study team and JSST and focused on the NASA contribution
 - ESA Assessment Report: a technical report prepared by ESTEC and the JSST and focused on the ESA contribution
 - NASA-ESA Joint Summary Report: a less technical summary report describing the joint mission and linkages between NASA and ESA contributions
- **NASA and ESA will each conduct independent reviews of the results of their own studies**
 - NASA will conduct a standard independent STMC review of the NASA Study Reports for EJSM and TSSM
 - Site visits are scheduled for Dec. 9-12 and results will be briefed to HQ in Jan. 2009
 - ESA will conduct review of the ESA Assessment reports tailored to the level of technical detail that is available on the ESA contributions
 - Science will be reviewed by ESA's Solar System Working Group
 - Technical feasibility, cost and risk will be independently reviewed by a team of ESA project managers
- **NASA and ESA management will meet in early 2009 to discuss study results of studies and reviews and select a mission**