ESA/NASA working group on Exploration of the Jupiter system

- Group chartered by NASA/ESA in June 2005
- Membership

ESA	NASA
Coradini Angioletta	Reta Beebe
Michel Blanc	Margaret Kivelson
Maarten Roos-Serote	Melissa McGrath
Frances Westall	Bob Pappalardo
John Zarnecky	Jerry Schubert

- Met by telecon June 17, 2005
- Met in person Sept 4, 2005 Cambridge, England
- Upcoming telecon Oct 18
- Upcoming meeting Dec 14-15 at UCLA

Brought to the table so far

- Plethora of historical documents (EO, JIMO)
- Charter (note Jupiter system, not just Europa)
- JPL Europa concept study (presented at last OPAG)
- OPAG draft science requirements
- ESA concept study (presented in Cambridge)

Where things stand with ESA

- ESA Cosmic Vision complete (equivalent of our decadal survey)
- ~1B Euros for solar system missions over 10 years
- Payload, ~20% of this total, not included in the 1B Euros
- ~ ½ for flagship mission, ½ for smaller missions
- Potential ~$1B contribution for Jupiter system mission
- After Dec 6 they will know ESA budget and issue a call for missions
- ITAR makes collaboration challenging; much more difficult now than for Cassini
- Jupiter system is priority for ESA, not just Europa

High level summary of ESA concept study

Peter Faulkner (ESA Advanced Concepts office – experience with STERO)
Gerhard Schwen (experience with SOHO), Tony Peacock

Jupiter Minisat Explorer

- Study included model payload, s/c configuration, mass budget, power considerations, challenges (radiation), and summary of future activities
- Jupiter system is ESA focus, not just Europa
- Mission has two s/c, one orbiting Europa (JEO) and one orbiting Jupiter (JRS) which does science and relays Europa data to Earth
- 66-day (elliptical) orbit for 1.5 yr at Europa – requires relay satellite; 1.5 Mrad total
- Having JRS means JEO would require less mass for communication and power, more science time
- JEO does not include a lander (landers have a x350-500 mass overhead)

ESA concept study - 2

- Launch on a Soyuz (lower performance than Arianne but lower cost)
- JRS operational lifetime 2 years
- Considered launch dates of 2010-2033, baseline January 2017; trip time 5.9 yr
- Launch 3000kg, chemical propulsion, SEP backup
- Solar powered using “Dutch windmill” solar arrays; looking at RTGs
- Dry masses: JEO 400kg; JRS 600kg
- Payloads: JEO 34kg, 33W; JRS 16kg, 10W
- Studied instruments in detail; looked at a penetrator <~1kg

Bob Pappalardo then presented:

- JPL concept study slide package shown at the last OPAG mtg
- OPAG Europa subgroup draft science requirements

Common ground/issues

- Scope of ESA/NASA mission concepts is very different
- Europa is high priority for both ESA/NASA
- Major issue to address is whether to include a lander
- Concept of a relay satellite to do Jupiter science was very attractive to the group – good potential collaborative split between ESA/NASA
- ESA can’t do mission before 2015 (budget)
- Level of capability of a relay
- Power (RPS or solar)

Next steps

- Continue to refine science requirements
- More detailed concept study in 2006, perhaps incorporating some of the ESA ideas (e.g., relay satellite)
- Consider need for lander more carefully
- IMPORTANT to have the science requirements group working closely with concept study group