ESA/NASA working group on Exploration of the Jupiter system

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

**ESA**
Coradini Angioletta  
Michel Blanc  
Maarten Roos-Serote  
Frances Westall  
John Zarnecky

**NASA**
Reta Beebe  
Margaret Kivelson  
Melissa McGrath  
Bob Pappalardo  
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- Plethora of historical documents (EO, JIMO)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