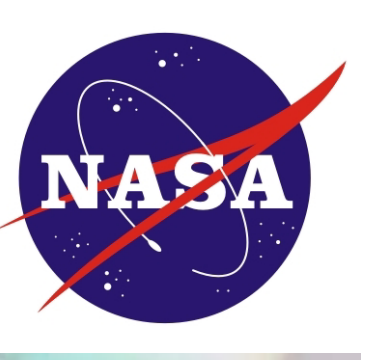

Bienvenue à Bordeaux
Welcome to Bordeaux

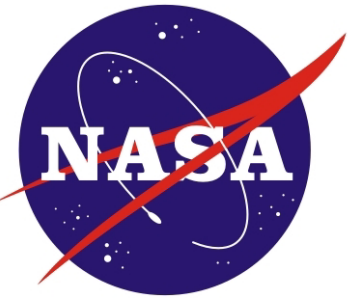


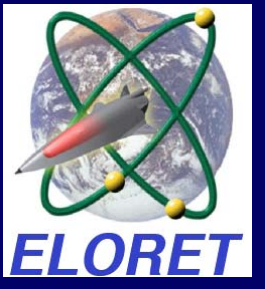
5th International Planetary Probe Workshop

IPPW-5, Bordeaux, June 23-29, 2007


Short Course
June 23-24, 2007
“Controlled Entry and Descent into Planetary Atmospheres”

Many thanks to IPPW-5 Organizers and Sponsors






...and to all those
who have prepared
this Short Course

Short Course
Day one 23rd June : Lectures

1 Introduction (15min, 09:00-09:15) Jean-Marc Bouilly, Andrew Ball

2 Separation and Arrival (65min, 09:15-10:20): Rodrigo Haya Ramos and Miguel Belló Mora (Deimos Space S.L., Spain)

-- Tea/Coffee Break (15min, 10:20-10:35)

3 Reference Atmospheres and Their Use (45min, 10:35-11:20): C. Jere Justus (NASA Marshall, USA)

4 The Entry Phase (70min, 11:20-12:30): Jacques Moulin (EADS Astrium, France)

-- Lunch Break (75min, 12:30-13:45)

5 Compositional Impact on Science and Engineering in Atmospheres (20min, 13:45-14:05): Tom Spilker (NASA JPL, USA)

6 Impact of Atmospheric Electricity on Probes (20min, 14:05-14:25): (Ralph Lorenz, JHU APL, USA)

7 Descent (45min, 14:25-15:10): ~~Steve Lingard (Vorticity~~, UK) Andrew Ball (Open U., UK)

-- Tea/Coffee Break (15min, 15:10-15:25) –

8 Communications and Tracking (45min, 15:25-16:10): Sergei Pogrebenko and Leonid Gurvits (JIVE, Netherlands)

9 Final approach (45min, 16:10-16:55): Roland Trautner (ESA ESTEC, Netherlands)

10 Thoughts for Day 2 (5min, 16:55-17:00)

Short Course
Day two 24th June : Study Case

1 Introduction and 'Thoughts for Day 2' - Guidelines for Student case study (30min, 09:00-09:30) : Short Course Co-Chairs

2 Case Study (60min, 09:30-10:30): 4 Groups

-- Tea/Coffee Break (15min, 10:30-10:45) –

2 Case Study (continued) (60min, 10:45-12:30): 4 Groups

-- Lunch Break (75min, 12:30-13:45) –

3 Presentation by Group A (30min, 13:45-14:15): Student Presenter

4 Presentation by Group B (30min, 14:15-14:45): Student Presenter

5 Presentation by Group C (30min, 14:45-15:15): Student Presenter

-- Tea/Coffee Break (15min, 15:15-15:30) –

6 Presentation by Group D (30min, 15:30-16:00): Student Presenter

7 Final Discussion (60min, 16:00-17:00): Moderator TBD

Short Course
Day two 24th June : Study Case VENUS

Chair: Tibor Balint (JPL) and Colin Wilson (Oxford)

Venus Exploration is prominently featured in the NASA roadmap and is being proposed for the ESA Cosmic Vision programme; JAXA-ISAS will soon launch a Venus orbiter and IKI plans a long-term Venus lander in the next decade. While orbiter missions - such as Venus Express and the proposed Venus Climate Orbiter - provide outstanding science data, in situ exploration of Venus will be required to address key science questions on habitability of terrestrial planets, and the history, evolution, processes and composition of Venus. The objective of this case study is to design a mission concept for long lived in situ exploration of Venus, with special focus on the various mission phases and the interdependencies between science goals, related instruments, and technology solutions to address possible pre-entry science, atmospheric entry, air mobility, mitigation of the extreme environment, power system trades and telecommunications. The impact of add-on elements (e.g., microprobes) on the mission architecture could also be discussed. Further details on the study concept and supporting backup material will be provided to the team during the first day of the short course.

Short Course
Day two 24th June : Study Case MARS

Chair: Craig Peterson and Kim Reh (NASA JPL)

- **The Mars Exploration Programmes from both ESA and NASA have provided outstanding science results over the past decades. Orbiter missions mapped the surface in detail (e.g, Mars Express, MGS, Mars Odyssey, MRO), while the Mars Exploration Rovers, Spirit and Opportunity, are demonstrating the value of long-lived in situ missions, providing high science return. Future plans from both NASA and ESA include rovers, lander networks, and sample return concepts, but other mission architectures involving balloons and aerial vehicles have also been studied and proposed. The objective of this case study is to design a mission concept for in situ Mars exploration that could study the surface and the atmosphere over an extended period of time, with special focus on the various mission phases and the interdependencies between science goals, related instruments, and technology solutions to address possible pre-entry science, atmospheric entry, (air) mobility, power system trades and telecommunications. The concept should fit strategically into the broader international exploration programmes. Further details on the study concept and supporting backup material will be provided to the team during the first day of the short course.**

Short Course
Day two 24th June : Study Case TITAN

Chair: Ralph Lorenz (JHU APL)

- **The Cassini-Huygens mission is considered as one of the most successful examples for international collaboration. While ongoing Cassini flybys continuously increase our knowledge about Titan, the Huygens probe gave us haunting images of a familiar yet alien world. Titan, with its cold and dense atmosphere lends itself to exploration with a Montgolfiere (hot air balloon), supported by an orbiter. Titan's pre-biotic chemistry may give us clues about the origin and development of life in the Universe, while its planetary processes may help to understand the formation and evolution of our Solar System. The objective of this case study is to design a mission concept for long-lived in situ exploration of Titan, with special focus on the various mission phases and the interdependencies between science goals, related instruments, and technology solutions to address possible pre-entry science, atmospheric entry, air mobility, mitigation of the cold environment, telecommunications, and power system trades including support to air mobility. Further details on the study concept and supporting backup material will be provided to the team during the first day of the short course.**

Short Course
Day two 24th June : Study Case SATURN

Chair: Tom Spilker (JPL)

- **Understanding solar system formation is one of the key science objectives in planetary exploration. Comparing isotopic abundances of certain key diagnostic elements among the Sun and the Giant Planets requires in situ measurements of atmospheric composition to appropriate depths, at times supported by remote sensing measurements. Other in situ measurements, such as atmospheric thermal structure, address other high-priority science objectives. NASA's 2006 Solar System Exploration Roadmap proposes a multi-probe mission to Saturn, and one response to ESA's 2006 Cosmic Vision AO will be a Saturn multi-probe mission proposal, closely linked to NASA's plans through international collaboration. Due to the deeper gravity wells, entry heat fluxes and loads experienced by probes to Giant Planets are significantly higher than those of probes to other planets or moons with atmospheres. Larger atmospheric scale heights at Saturn limit depths usefully accessible with probes, while deeper measurements, needed to complete the suite of elements observed, must rely on remote sensing techniques. The objective of this case study is to produce a high-level mission concept for in situ exploration of Saturn's upper troposphere using multiple probes, with special focus on the various mission phases and the interdependencies among science goals, related instruments, and technology solutions to address possible pre-entry science, atmospheric entry, probe descent options, and power system trades on the probe and the flyby element. Discussions should include trades between orbiter vs. flyby and direct-to-Earth vs. relay communications, and their impacts on remote sensing measurements. Further details on the study concept and supporting backup material will be provided to the team during the first day of the short course**