7th International Planetary Probe Workshop
14-18 June 2010

WORKSHOP PROGRAM

HOST ORGANISATIONS

CTAE is a non-profit foundation established in 2005 as a technology centre dedicated to supporting the regional aerospace and space industry. The Board includes the *Generalitat of Catalunya* (the government of the autonomous region of Catalunya), 9 aerospace companies, and the *Universitat Politècnica de Catalunya* (UPC). CTAE works in Robotics and Advanced Autonomy, Safety-critical Software and Control, Navigation and Communications, Remote Sensing, and Vehicles and Environment. R&D projects are delivered at all levels from local clients to international consortia with ESA, the Galileo Supervisory Authority, and with the European Commission.

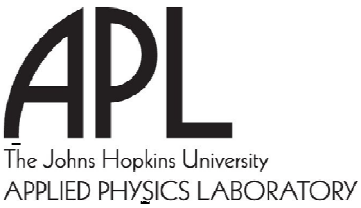
BAIE is a platform created in November 2000 that aims to promote the Metropolitan Region of Barcelona and Catalonia as competitive settings for the activities related to the aeronautical and space industry. It was an initiative of the *Ajuntament* (City Hall) of Barcelona, that was joined by the autonomous government — *Generalitat* of Catalonia (through the Department of Industry and its company CIDEM), the Spanish government (through the Ministry of Science and Technology), and a small group of companies and organisations as founding members. Today BAIE has around 80 members.

DEIMOS Space is a company funded in 2001 whose Institutional Space business is mainly oriented to ESA programmes. Atmospheric flight represents an area of excellence for DEIMOS. Participating to several System studies DEIMOS has handled Mission Analysis, Flight Mechanics and GNC combined with FDI for Launchers, Capsules, Lifting bodies and Winged vehicles. Remarkably, in the area of planetary probes and experimental vehicles, DEIMOS is today leading the EDL Mission Analysis & Design activities in EXOMARS Phase B and the Mission Analysis of the Intermediate eXperimental Vehicle (IXV) in Phase C2.

The *Ajuntament de Barcelona* (City Hall) is formed by 41 elected city councillors and is organised in two levels: a political, with elected city councillors, and an executive, which administers the programs and executes the decisions taken on the political level. The *Comissió de Govern* (Government Commission) is the executive branch and is led by the Mayor, currently Jordi Hereu. The seat of the city council is on the Plaça Sant Jaume, opposite the seat of Generalitat de Catalunya, and is the venue for the IPPW-7 welcome reception. The reception is kindly sponsored by the *Ajuntament de Barcelona*.

CIMNE (*Centre Internacional de Mètodes Numèrics en Enginyeria*) is a research centre created in 1987 by initiative of the *Universitat Politècnica de Catalunya* (UPC) and the *Generalitat de Catalunya*. CIMNE specializes in the development and dissemination of numerical methods and software for engineering sciences.
CIMNE also operates a congress office, and provides technical and administrative secretariat services to workshops around the world, including IPPW-7.

IPPW-7 SPONSORS



SUPPORTING ORGANISATIONS

WELCOME

Welcome — both to the 7th International Planetary Probe Workshop, and to Barcelona. This year's event is resuming after a two-year hiatus following IPPW-6 in Atlanta in 2008. We have been overwhelmed by the enthusiastic response to our call for papers. The events of the past two years have generated an outstanding set of presentations and posters that you will encounter in the next four and a half days.

We are pleased to welcome an international group of scientists, technologists, engineers, mission designers, and policy makers to IPPW-7. Our committees have worked very hard in organizing the logistics for the workshop, planning the program, soliciting and evaluating nominees for the Al Seiff Award, and coordinating opportunities for student participation. We are fortunate to be meeting in the beautiful city of Barcelona, Spain; all participants will have the opportunity to enjoy its exciting architecture, culture, and food.

We encourage you to attend as many oral and poster sessions as possible, in order to benefit from the world-wide planetary probe mission experts who are attending IPPW-7. We were so impressed by the abstracts submitted for this workshop that we've scheduled two poster sessions to accommodate both the originally-submitted poster abstracts and those oral presentations that could not be accommodated in the schedule, and whose sponsors have agreed to present in a poster format.

Since IPPW-7 is indeed a workshop, we also encourage you to take advantage of the numerous opportunities during coffee breaks, lunches and social activities to build collaborative partnerships with other workshop participants. In addition, the IPPW-7 sponsors have funded a number of students who would be interested in meeting the working planetary probe participants to gain a better understanding of how to build a future career in this exciting field.

A couple of tips are in order for maximizing your experience at the workshop. Because of the wealth of abstracts selected for presentation, we will hold parallel sessions on Thursday, 17 June. Our conveners will coordinate their timing so it will be possible to move back and forth between the parallel sessions in the morning and afternoon. Of interest to our student and early career attendees is a professional development session, also scheduled on Thursday.

On Friday, 18 June, there will be a presentation on the plans for IPPW-8 in 2011. We encourage you to attend this talk so that you can learn about your next opportunity to join our community of planetary probe mission enthusiasts and experts.

Now, let's get started!

Bernie Bienstock
JPL
IPPW-7 International Organizing Committee
US Co-Chair

Ed Chester
CTAE
IPPW-7 International Organizing Committee
European Co-Chair;
Local Organizing Committee Chair

SCHEDULE OVERVIEW

<table>
<tr><td>Day</td><td>14/6
Mon</td><td>15/6
Tue</td><td>16/6
Wed</td><td colspan="2">17/6
Thu (PARALLEL SESSIONS)</td><td>18/6
Fri</td></tr>
<tr><td>Morning</td><td>Session 1: Opening; Outlook for Probe Missions</td><td>Session 3: Terminal Descent</td><td>Session 5: EDL Technology Development and GNC</td><td>Session 6A: Entry Sensors; Payloads; Penetrators</td><td>Session 6B: Drag; Aerobraking; Aerocapture</td><td>Session 8: Closing Session; Awards; Panel</td></tr>
<tr><td>Afternoon</td><td>Session 2: Probe Missions</td><td>Session 4: Science from Probes and Penetrators</td><td>Field Trips</td><td>Session 7A: New Technologies</td><td>Session 7B: Airless Body Surface Missions</td><td></td></tr>
<tr><td>Evening</td><td rowspan="2">Welcome Reception</td><td>Poster Session 1</td><td rowspan="2">Banquet</td><td colspan="2">Poster Session 2</td><td></td></tr>
<tr><td></td><td colspan="2">IOC Dinner</td><td></td></tr>
</table>

REGISTRATION

On-site registration (collection of badge and delegate pack) can be performed at the following times:

- Early Registration: Sunday 13/June, Hotel Alimara, Besalú Room (IPPW Secretariat)
  18:00 – 20:00
- Main Registration: Monday 14/June, Besalú Room
  08:00 – 08:45
- Later Registration: Whenever you arrive, Besalú Room

STUDENT PROGRAM

Student Welcome Dinner

Date: Sunday, June 13

Time: 7:45pm / 19:45

Cost: €5

Meeting Location: Agora (where most of the students will be staying) or **MUNDET** metro station (between Agora and Alimara)

Dinner Location: Market Hotel Restaurant, c/ Compte Borrell, 68

The Student Dinner Social will take place Sunday evening, June 13. All students are welcome to attend. This will be a great opportunity for students to get to know each other in a relaxed atmosphere, plus there will be (almost) free food! The social will take place at a restaurant in the city centre of Barcelona. There is no dress code, but being that it will be Sunday night, it is strongly suggested to not wear T-shirts and shorts. If you plan to attend the student social, please meet at the front desk of the Agora BCN at 7:45pm (19:45). The students will travel in a group via public transportation to the restaurant in the city centre. If you are staying in Alimara, please meet at the MUNDET metro station.

A very nominal charge of €5 per person will be collected from each student prior to departure from the meeting point.

Professional Development Session

Date: Thursday, June 17

Time: 13:30 – 15:00

Meeting Location: Medes Room

The goal of the Professional Development session is to provide a forum for students to engage and interact with professionals on topics relevant to careers in planetary sciences, technologies and engineering. The session will include brief presentations from a panel of representatives from U.S. and European aerospace industry, academia, NASA, ESA, and a recent graduate now employed in the aerospace industry. Students will have ample opportunity to ask questions of the panelists. Specific topics of discussion include expert advice from the panelists on careers in planetary sciences and aerospace engineering, the outlook for near-term hiring and employment, different career path options, as well as lessons learned and advice.

Note: Food is <u>not</u> allowed in the room so please eat lunch prior to arriving at the session.

Student Poster/Paper Awards

Date: Friday, June 18

Time: 10:00 – 10:30

Meeting Location: Catalunya Room

A ballot will be included in the registration material for IPPW participants to vote on the student oral and poster presentations. Based on the voting outcome, awards for outstanding student presentations will be presented during the closing session on Friday.

14 June 2010	DAY 1	MONDAY MORNING

SESSION 1:

Opening, Al Seiff Award Speakers, and the Outlook for Probe Missions

Session Conveners:

- B. Bienstock, NASA Jet Propulsion Laboratory (USA)
- E. Venkatapathy, NASA Ames Research Center (USA)
- M. Amato, NASA Goddard Spaceflight Center (USA)

Times		
08:00	**08:45**	**Delegate Registration (Besalú Room)**
08:45	**09:00**	**Opening Welcome and Logistics** *E. Chester — Logistics* *G. Garcia Cuadrado — Welcome from Barcelona Aeronautics and Space Association* *B. Bienstock — Opening of IPPW-7*
09:00	**09:15**	**Alvin Seiff Award Presentations** *J. Arnold*
09:15	**09:45**	**Al Seiff: Thoughts About, and Lessons from, a Great Engineer** *M. Tauber*
09:45	**10:15**	**Reflections on a Career in Planetary Science** *M. Tomasko*
10:15	**10:45**	**Outlook for Probe and Lander Missions in ESA's Programmes** *J.-P. Lebreton*
10:45	**11:15**	*COFFEE BREAK* *(Garden)*
11:15	**11:45**	**NASA Overview** *Doug McCuistion*
11:45	**12:30**	**NASA's Technology and Innovation Programs** *B. Braun*
12:30	**13:00**	**Mars Sample Return Campaign – Building on the Shoulders of Missions Past and Contributing to the Eventual Human Flight to Mars** *F. Naderi*
13:00	**14:30**	*LUNCH* *(Garden)*

14 June 2010	DAY 1	MONDAY AFTERNOON

SESSION 2:

Probe Missions: Concepts and Ongoing Studies of In-situ Exploration Missions

Session Conveners:

- W. Lee, NASA Jet Propulsion Laboratory (USA)
- A.-M. Schipper, Thales Alenia Space (Italy)
- J. Hall, NASA Jet Propulsion Laboratory (USA)

Times		
15:00	**16:00**	**Future Multi-Probe Missions to Titan and Enceladus** *K. Reh and J. Elliot*
16:00	**16:30**	**Technology Development for Long Duration Mid-Cloud Level Venus Balloon** *J. Hall, A. Yavrouian et al.*
16:30	**17:00**	*COFFEE BREAK* *(Garden)*
17:00	**17:30**	**Venus Mobile Explorer: A Mission Concept Study for the National Research Council Planetary Decadal Survey** *L. Glaze, C. Baker et al.*
17:30	**18:00**	**The Europa Jupiter System Mission: A Pathfinder for Future Landings in the Jupiter System** *O. Grasset, M. Blanc et al.*
18:00	**18:30**	**Landing Site Targeting and Constraints for ExoMars 2016 Mission** *S. Portigliotti, M. Dumontel et al.*
18:30	**19:00**	**Aerobot Autonomous Navigation And Mapping For Planetary Exploration** *A. Aboudan, G. Colombatti, et al.*
Approx. 19:30		*Travel by Metro to City Centre*
20:00	**22:00**	**Welcome Reception at Barcelona City Hall** *Sponsored and hosted by City of Barcelona — details on next page.*

WELCOME RECEPTION

Day: Monday 14 June 2010

Times: 20:00 – 20:30 — Arrival

20:30 – 22:00 — Reception (drinks and light refreshments)

Location: Barcelona City Hall — Ajuntament de Barcelona

Address: c/ Ciutat 2,
Plaça Sant Jaume (SE side, opposite the Generalitat)

Dress Code: Smart Casual

Arrival: A short metro ride of 10-15mins from the Hotel Alimara stop (**MUNDET**, Line 3) to station **LICEU**.

250m walk via Ramblas and Carrer Ferran. Maps are available in delegate packs.

Please inform us during registration of any special dietary or mobility requirements.

La Casa de la Ciutat de Barcelona (City Hall), the building and headquarters of Barcelona City Council, is located in the historical centre of the city, in Plaça de Sant Jaume, facing the *Palau de la Generalitat de Catalunya* (the seat of the Catalan government).

The construction of the Casa de la Ciutat was carried out over several centuries. The present-day main facade, on Plaça Sant Jaume, is neoclassical in style and dates to 1847, but the origin of the building was in 1369 when construction began of the *Saló de Cent* (Hall of the Hundred). This was the seat of Barcelona's medieval government, the predecessor of the city council. In the side street on the left (carrer Ciutat) is the old Gothic facade from 1399, which was used as the main door until 1847.

The present-day main door opens onto the courtyard, Gothic in style but with some Renaissance decorative elements. Its construction began in 1391 and it was originally accessed from the Gothic facade. On the left-hand side of the courtyard is the staircase of honour, which leads up to the Hall of the Hundred.

RECEPTION SPONSORED AND HOSTED BY:

Ajuntament de Barcelona

15 June 2010	DAY 2	TUESDAY MORNING

SESSION 3:

Terminal Descent Issues, Target Landing Site Selection, and Trajectory Reconstruction

Session Conveners:

- A. Coustenis, Observatoire de Paris (France)
- T. Spilker, NASA JPL (USA)
- G. Chen, NASA Jet Propulsion Laboratory (USA)

Times		
09:00	**09:30**	**Guidance and Control for Atmospheric Entry** *R. Frampton et al.*
09:30	**10:00**	**Scientific Objectives and Engineering Constraints of Future Titan Landing Sites** *R. Jaumann et al.*
10:00	**10:30**	**Radio Astronomy Experiments with Planetary Probes** *L. Gurvits et al.*
10:30	**11:00**	*COFFEE BREAK — Sponsored by* **MONOCROM** *(Garden)*
11:00	**11:20**	**MSL EDL Terminal Descent Strategy and Challenges** *S. Sell*
11:20	**11:40**	**Terrain Safety Assessment Approach for MSL** *D. Kipp*
11:40	**12:00**	**Reconstruction of EDL Communications for the 2007 Phoenix Mars Lander** *R. Kornfeld, K. Bruvold et al.*
12:00	**12:20**	**Marsnext Multiple Lander Targeting Trajectory Computation And Navigation** *D. García Yárnoz, J.M. Sánchez Pérez*
12:20	**12:40**	**Evolution of the ExoMars EDL Mission Analysis** *R. Haya Ramos et al.*
12:40	**13:00**	**An Analysis of Illumination and Communication Conditions near Lunar South Pole based on Kaguya data** *B. Vanoutryve, D. De Rosa et al.*
13:00	**14:30**	*LUNCH* *(Garden)*

15 June 2010	DAY 2	TUESDAY AFTERNOON

SESSION 4:
Science from Entry and Descent Probes and Penetrators

Session Conveners:

- R. Lorenz, John Hopkins University APL (USA)
- R. Beebe, PDS/NMSU University (USA)
- J.-P. Lebreton, ESA ESTEC (Netherlands)

Times		
14:30	**15:00**	**Results from the Phoenix Atmospheric Structure Experiment** *P. Withers, D. Catling*
15:00	**15:30**	**The Venus Flagship Study: Atmospheric Science From Two Descent/Landing Vehicles And Two Balloons** *M. Bullock, J. Hall, T. Balint*
15:30	**16:00**	**The SAGE New Frontiers Mission to Venus** *B. Bienstock, G. Burdick*
16:00	**16:30**	*COFFEE BREAK — Sponsored by* **MONOCROM** *(Garden)*
16:30	**16:50**	**Science, Instrumentation, and Operations Concepts for a Titan Airplane** *J.W. Barnes*
16:50	**17:10**	**Detection of Aerosols in Planetary Atmospheres using the New Light Aerosol Counter LOAC** *J.-B. Renard, G. Berthet et al.*
17:10	**17:30**	**Characterizing Titan's Haze With A Balloon-Borne Spectropolarimeter** *N. Silvestri, D.M. Stam et al.*
17:30	**17:50**	**Investigating the Origin and Evolution of Venus with Descent Probe Mass Spectrometry** *W. Brinckerhoff, P. Mahaffy*
17:50	**18:10**	**Science-Quality Oscillators for Deep Space Probes** *S. Asmar, D. Atkinson et al.*
18:10	**18:30**	**A Fresh Look at the Huygens Radar Altimeter Problem: New Results and Science Opportunities** *R. Trautner, H. Svedhem, J.-P. Lebreton*
19:00	**21:00**	**POSTER SESSION 1** *Poster Titles and Authors are listed on pages 11-13.*

POSTER SESSION 1

Session Conveners:

- R. Haya Ramos, Deimos Space (Spain)
- D. Atkinson, University of Idaho (USA)
- A. Jaime, Technical University of Catalonia (Spain)

Title

Models Of Spectral Radiation Heat Transfer For Martian Space Vehicles
Daniil Andrienko

DRIFT/VISC-Distributed, Redundant, and Inherently Fault Tolerant Microprobe Concept
Mark Arnold

Entry Probe Missions to the Giant Planets
David Atkinson

Venus Intrepid Tessera Explorer (VITaL): A Mission Concept Study For The National Research Council Planetary Decacal Survey
Charles Baker

Venus Mobile Explorer (VME): Near-Surface Traversing with Metallic Bellows
Tibor Balint

Science, Instrumentation, and Operations Concepts for a Titan Airplane
Jason W. Barnes

Earth Entry Vehicle Impact Analysis
Nicole Bauer

Testing and Verification for the SOAREX-7 TDRV Flight
Kenny Boronowsky

A UHF High Power Transceiver System With Wireless Interface Modules For High Altitude Data Acquisition And Control
Anna Camery

The Recovery Of In-Space Cubesat Experiments (RICE) Nanosatellite
Bryan Chan

Atmospheric Sensitivities and Characterization Efforts for the Mars Science Laboratory Entry, Descent, and Landing System
Allen Chen

Development of Design and Production Processes for a Block-Ablator Heatshield with Preliminary Test Results
William Congdon

Scientific Objectives For A Future Titan Mission
Athena Coustenis

Application of CEV Sizing Process of PICA to Stardust
Ioana Cozmuta

VELOONUS: A Computational Tool For Balloon Trajectories In Venus
Maria de Soria-Santacruz Pich

Title

Effects Of The Venus Ground Ambient Environment On Materials
Linda Del Castillo

Plans For NASA's Deep Space Network and Possibilities For Planetary Probe Mission Support
Leslie Deutsch

Planetary Entry Probes For Venus, Saturn, Neptune And Uranus
Kelly Geelen

Neural Networks As A Guidance Solution For Aerocapture, Hypersonic Entry And Soft-Landing
Gregory Gelly

New EDLS Architecture For Small Mars Landers
Giacomo Giovangrossi

Modelling Of Uncontrolled Atmospheric Entry Taking Into Account Mass Loss And Body Shape Variation
Maria Gritsevich

Exomars Planetary Protection Training Experience
Vincenzo Guarnieri

Next Generation Penetrator - MetNet for Mars
Harri Haukka

Global Entry Corridor: Accurate Tool For Landing Site Selection In Planetary Exploration
Rodrigo Haya Ramos

Stratospheric Stability Of A Probe Descending Under Parachute
Brandy Holmes

Small Probes as Flight Test Beds for Thermal Protection Materials
Austin Howard

Titan's New Pole: Implications For The Huygens Probe Impact Coordinates
Bobby Kazeminejad

Tethered Balloon System To Explore The Martian Atmosphere
Roderik Koenders

Field Testing of the Mars Science Laboratory Terminal Descent Sensor
Steven Lee

Attitude and Angular Rates of Probes during Atmospheric Descent : Implications for Imaging
Ralph Lorenz

Titan Environment Models for Northern Polar Summer Exploration
Ralph Lorenz

An Application of the Multi-Mission Earth Entry Vehicle: Galahad
Robert Maddock

Multi-Species Reacting Subsonic Inlet Boundary Condition Implementation in LAURA 5 with Applications
Alireza Mazaheri

X-ray Computed Tomography of the Stardust Heat Shield
Karen M. McNamara

Venus Express Spacecraft Observations With EVN Radio Telescopes
Guifre Molera Calves

Summary of the SOAREX 6 and 7 Flight Experiments
Marcus Murbach

New Insights To The Pioneer-Venus 12.5 km Anomaly
Mihail Petkov

Title

Simple Descent Strategy Selector: A Data-Driven Monte-Carlo Tool For Trajectory-Based Comparison Of Drag Enhancement Options
Cristina Plaza Manzano

Low Ballistic Coefficient Re-Entry Probe
Kevin Ramus

Flight Performance Envelope of UAVs For In-Situ Science In Titan's Atmosphere
Bernat Roig

Potentially Active Regions On Titan: Promising Landing Sites
Anezina Solomonidou

US Planetary Science Decadal Survey Study of Saturn Probe Missions
Thomas Spilker

Guidance and Accuracy Performance of Low Ballistic Number Vehicles at Earth and Mars
Adam Steltzner

The NASA MLAS Flight Demonstration – A Review of a Highly Successful Test
Anthony Taylor

Technology Developments For European Mars Robotic Exploration Preparation
Sanjay Vijendran

The investigation of Venus by probes and balloons. The Russian mission Venera-D
Victor Vorontsov

Phoenix Location Determination Using HiRISE Imager
Grant Wells

16 June 2010	DAY 3	WEDNESDAY MORNING

SESSION 5:

EDL Technology Developments; Guidance, Navigation and Control

Session Conveners:

- C. Westhelle, NASA Johnson Space Center (USA)
- E. Hines, NASA Jet Propulsion Laboratory (USA)
- J.-M. Bouilly, EADS Astrium (France)
- P. Brugarolas, NASA Jet Propulsion Laboratory (USA)

Times		
09:00	**09:30**	**The Evolution of the MSL Heatshield (Part II)** *R. Beck, H. Hwang et al.*
09:30	**10:00**	**The Mars Science Laboratory Sky-Crane Landing Architecture: A Guidance, Navigation, and Control Perspective** *A. Miguel San Martin*
10:00	**10:30**	**The RCS Attitude Controller For the Exo-Atmospheric And Guided Entry Phases Of The Mars Science Laboratory** *P. B. Brugarolas, A. M. San Martin, E. C. Wong*
10:30	**11:00**	*COFFEE BREAK* *(Garden)*
11:00	**11:30**	**Application of Auto-Rotation for Entry, Descent and Landing on Mars** *T. Lutz, U. Westerholt et al.*
11:30	**12:00**	**High Altitude Sounding On Mars With An Inflatable Hypersonic Drag Body (Ballute)** *H.S. Griebel*
12:00	**12:30**	**Orion Thermal Protection Systems Advanced Development Project** *J. Reuther*
12:30	**13:00**	**Overview of the Orion Thermal Protection System** *J. Kowal*
		LUNCH IS NOT PROVIDED ON THIS DAY. RECOMMENDATIONS AND SUGGESTIONS ARE AVAILABLE IN EACH DELEGATE PACK.
14:30	**18:30**	**Field Trips** *(Details provided separately)*
20:30	**Late**	**IPPW Banquet at Can Cortada** *Check you have your ticket! (provided at registration)*

IPPW-7 BANQUET

Day: Wednesday 16 June 2010

Times: 20:00 – 20:30 — Arrival (Cava on Terrace)

20:30 – 22:00 — Traditional Meal catered by Grup Travi

Location: Can Cortada, Av. Estatut de Catalunya

Dress Code: Smart Casual

Arrival: 5 minute walk from Hotel Alimara.

Please inform us during registration of any special dietary or mobility requirements.

The Can Cortada Farmhouse dates from the 11th century, when the Lords of Horta built a defensive tower to protect against possible feudal attacks. During the Middle Ages, the tower was gradually extended and reinforced, until in the 15th century it was sold to Jaume Fiella, and became a farmhouse. In 1711 the property was acquired by Joan Cortada, who gave it its current name. For more than 350 years, Can Cortada has had a strong agricultural tradition, until the growth of Horta and the opening of the large roads around metropolitan Barcelona. The character and history of the place are maintained by the Soler i Ribatallada family, who opened it as a restaurant in 1994. Can Cortada is part of the Grup Travi that has many years of experience in hostelry, and the menu produced for the IPPW-7 Banquet will reflect the art and skill found in this outstanding restaurant, but also the history of the place and the region.

WORKSHOP BANQUET SPONSORED BY THALES ALENIA SPACE, ITALY

ThalesAlenia Space

A Thales / Finmeccanica Company

17 June 2010	DAY 4	THURSDAY MORNING

SESSION 6A:

Planetary Entry Sensors, Payloads, Penetrators, and Systems

PARALLEL SESSION WITH 6B

Session Conveners:

- J. Santos, NASA Ames Research Center (USA)
- F. Ferri, University of Padova (Italy)
- R. Trautner, ESA ESTEC (Netherlands)
- G. Colombatti, University of Padova (Italy)

Times		
09:00	**09:30**	**Technology Package Onboard EXPERT: the European Experimental Re-entry Test Bed** *F. Ratti et al.*
09:30	**10:00**	**Design of Slug Calorimeters for Re-entry Test Vehicles** *A. Esposito, F. De Rosa*
10:00	**10:30**	**MSL EDL Instrumentation (MEDLI): From Instrumentation Concept to Flight Hardware** *M. Munk and N. Cheatwood*
10:30	**11:00**	*COFFEE BREAK* *(Garden)*
11:00	**11:20**	**Data Compression of Science and Housekeeping Data for Planetary Probe Missions** *M. Cabral, R. Trautner, R. Vitulli*
11:20	**11:40**	**Mars Science Laboratory EDL System** *A. Steltzner, M. San Martin et al.*
11:40	**12:00**	**Multiple pressure measurements on a planetary atmospheric entry vehicle for attitude determination** *O. Karatekin, S. Paris, O. Adam*
12:00	**12:20**	**A Simple Instrument to In-situ Characterize the Tensile Strength of Cometary Materials** *J.M. Trigo-Rodríguez, J.M. Valverde, J. Blum*
12:20	**12:40**	**Microscale Atmospheric Reentry Sensors** *J.A. Atchison, Z.R. Manchester, et al.*
13:00	**15:00**	*LUNCH* *(Garden)*
13:30	**15:00**	**Student Professional Development Session *(in Medes Room)***

17 June 2010	DAY 4	THURSDAY MORNING

SESSION 6B:

Drag, Aerobraking and Aerocapture Techniques

PARALLEL SESSION WITH 6A

Session Conveners:

- M. Munk, NASA Langley Research Center (USA)
- J.-M Muylaert, ESA ESTEC and VKI Institute (Netherlands)
- N. Cheatwood, NASA Langley Research Center (USA)

Times		
09:00	**09:30**	**Flight Performance of the Inflatable Reentry Vehicle Experiment (IRVE-II)** *R. Dillman, S. Hughes et al.*
09:30	**10:00**	**Subsonic and Transonic Wind Tunnel Testing of Two Inflatable Aerodynamic Decelerators** *C. Tanner, J. Cruz et al.*
10:00	**10:30**	**AEROFAST: AEROcapture for Future Space Transportation** *H. Requiston-Costantini, F. Bonnefond et al.*
10:30	**11:00**	*COFFEE BREAK* *(Garden)*
11:00	**11:20**	**Lessons Learned and Flight Experience from Planetary Parachute Development** *D. Adams*
11:20	**11:40**	**Multi-mission Earth Entry Vehicle Design Trade Space and Concept Development Status** *R. Maddock, J. Arnold et al.*
11:40	**12:00**	**Blunted Cone Heatshields for Atmospheric Entry Vehicles** *J. Sader, E. Button et al.*
12:00	**12:20**	**Evaluation of the Effects of Distributed Roughness: Induced Transition on the EXPERT Vehicle** *S. Paris, G. Grossir, O. Chazot*
12:20	**12:40**	**Stagnation Point Radiative Heat Fluxes in Neptune Aerobraking** *C. Park*
12:40	**13:00**	**Development Plan for Autonomous Aerobraking** *J. Prince, D. Murri et al.*
13:00	**15:00**	LUNCH (Garden)
13:30	**15:00**	**Student Professional Development Session**

PROFESSIONAL DEVELOPMENT SESSION

Thursday 17th June 13:30 – 15:00

Goal/Scope

The goal of the Professional Development Session is to provide a forum for students to engage and interact with professionals on topics relevant to careers in planetary sciences, technologies and engineering. The session will include brief presentations from a panel of representatives from U.S. and European aerospace industry, academia, NASA, ESA, and a recent graduate now employed in the aerospace industry. Students will have ample opportunity to ask questions of the panelists. Specific topics of discussion include expert advice from the panelists on careers in planetary sciences and aerospace engineering, the outlook for near-term hiring and employment, different career path options, as well as lessons learned and advice.

Note: Food is not allowed in the meeting rooms so lunch must be completed before the session begins!

17 June 2010	DAY 4	THURSDAY AFTERNOON

SESSION 7A:
New Technologies

PARALLEL SESSION WITH 7B

Session Conveners:

- R. French, NASA Jet Propulsion Laboratory (USA)
- E. Chassefiere, CNRS Jussieu (France)
- K. Trumble, NASA Ames Research Center (USA)
- E. Laan, Dutch Space (Netherlands)

Times		
15:00	**15:30**	**Autonomous Precision Landing and Hazard Avoidance Technology (ALHAT) Project Status as of May 2010** *S. Striepe et al.*
15:30	**15:50**	**Fusion of Absolute Vision-based Localization and Visual Odometry for spacecraft pinpoint landing** *B.V. Pham, S. Lacroix et al.*
15:50	**16:20**	**Vented Airbags: A New Promising Technology for Mars Landers** *G. Giovangrossi*
16:20	**16:50**	*COFFEE BREAK* *(Garden)*
16:50	**17:20**	**Touchdown Systems Technology for Space Exploration** *T. Rivellini*
17:20	**17:40**	**Mars Science Laboratory SkyCrane New Technologies** *S. Sell, D. Burkhart et al.*
17:40	**18:00**	**Development of a Lightweight, Energy Absorbing Soft-Landing System for Robotic Probes** *S. Cooper, G. Maahs, D. Ponnusamy*
18:00	**18:20**	**Throttling Bipropellant System for Terminal Descent Propulsion** *R. Baker*
18:20	**18:40**	**Phoenix Mars Lander Robotic Arm Mission Operations** *R. Volpe, R. Bonitz et al.*
18:40	**19:00**	**A Sample Handling, Encapsulation, and Containerization Subsystem for Mars Sample Caching Missions** *P. Younse, C. Collins, P. Backes*
19:00	**21:00**	**POSTER SESSION 2** *Poster Titles and Authors are listed on pages 21-23.*

17 June 2010	DAY 4	THURSDAY AFTERNOON

SESSION 7B:
Airless Body Surface Missions

PARALLEL SESSION WITH 7A

Session Conveners:

- A. Smith, University College London (UK)
- B. Cohen, NASA Marshall Spaceflight Center (USA)
- S. Tanaka, JAXA (Japan)

Times		
15:00	**15:30**	**Robotic Lunar Landers for Science and Exploration** *G. Chavers, B. Cohen et al.*
15:30	**15:50**	**Lower-cost Relocatable Lunar Polar Lander and Lunar Surface Sample Return** *M. Amato, J. Garvin et al.*
15:50	**16:20**	**An Overview of the MoonRise Lunar Sample Return Mission from the South Pole-Aitken Basin** *L. Alkalai, B. Jolliff, D. Papanastassiou*
16:20	**16:50**	*COFFEE BREAK* *(Garden)*
16:50	**17:20**	**Potential Micro-Penetrator Applications in the Solar System** *R. Gowen*
17:20	**17:40**	**A Penetrator for the Jupiter Ganymede Orbiter Mission** *S. Vijendran, J. Fielding, J. Kohler*
17:40	**18:00**	**Penetrators are not a Panacea : A Critical Review and Remarks on Application to the Outer Solar System** *R. Lorenz*
18:00	**18:20**	**Baseline Design of a Mobile Asteroid Surface Scout (MASCOT) for the Hayabusa-2 Mission** *C. Lange, C. Dietze et al.*
18:20	**18:40**	**Marco Polo: An Asteroid Sample Returns to Earth** *L. Peacocke, M-C. Perkinson et al.*
18:40	**19:00**	**From the Rosetta Lander Philae to an Asteroid Hopper: Lander Concepts for Small Bodies Missions** *S. Ulamec, J. Biele*
19:00	**21:00**	**POSTER SESSION 2** *Poster Titles and Authors are listed on pages 21-23.*

POSTER SESSION 2

Session Conveners:

- R. Haya Ramos, Deimos Space (Spain)
- D. Atkinson, University of Idaho (USA)
- A. Jaime, Technical University of Catalonia (Spain)

Title

The Galahad Asteroid Sample Return Mission
Mark Adler

Analysis and Design of Microrover Delivery System
Laura Aivar Garcia

LCROSS Lunar Impactor - Pioneering Risk-Tolerant Exploration In A Search For Water On The Moon
Daniel Andrews

Aerothermodynamics Of Descent Space Vehicles At Strong Coupled Radiative-Gasdynamic Interaction
Daniil Andrienko

New Control System for Space instruments, Application to MEDUSA Experiment
Beatriz Aparicio

Validation Testing of a New Dual Heat Pulse, Dual Layer TPS
Jim Arnold

Ultra-High Temperature Ceramics For Hypersonic Entry Of Slender-Shaped Advanced Space Vehicles
Marianne Balat-Pichelin

Solar Probe and Mission: VUV Radiation Coupled To High Temperatures On Carbon/Carbon Composites
Marianne Balat-Pichelin

In-situ Chemical Analysis Of Small Bodies With Laser Mass Spectrometry
William Brinckerhoff

A Monte Carlo-based Thermal Margin Derivation for Flight Environments
Ioana Cozmuta

Mars Science Laboratory Parachute Dynamics Modeling and Simulation
Eleanor Crane

POST2 End-To-End Descent And Landing Simulation For ALHAT Design Analysis Cycle 2
Jody Davis

Concept of Operations Study of a Killer Asteroid Destruction Flight Demonstrator Program
Nik Djordjevic

Minimally Shielded Extreme Environment Power Electronic System for Flywheel Energy Storage
Christopher Douglas

Penetration Testing For Subsurface Regolith Probes In Martian Analog Material
Ahmed ElShafie

NESC Thermal Performance Database Development
Richard French

Title

AEROFAST Project: Aerocapture Guidance, Navigation and Control Design
Gregory Gelly

The Scientific And Public Outreach Value Of Low Resolution Visual Monitoring Cameras On Planetary Probes
Hannes Griebel

Aerobraking Strategy For Mars Exploration Missions
Rodrigo Haya Ramos

Atmospheric Entry Simulation Capabilities of the IRS Plasma Wind Tunnel PWK3 for Mars and Venus
Georg Herdrich

Trajectory Optimization To Delay Turbulent Transition For Mars Entry Vehicle
Roman Jits

Improving Mars-GRAM: Increasing The Accuracy Of Sensitivity Studies At Large Optical Depths
Hilary Justh

Performance And Aerodynamic Characterization Of Supersonic Retropropulsion For Mars Entry, Descent, And Landing
Ashley Korzun

Planetary Probe Laser Propulsion Concept
Tuyet Le

Performance of Radioisotope Power Systems at Titan Surface Conditions : A Simple Model
Ralph Lorenz

Thermal Protection Tradeoffs for Ballute Versus Aeroshell Entry and Descent at Mars (Part II)
Kristin Gates Medlock

Titan Organic Explorer : A One Kg UAV for Organic Compounds Search
David Mimoun

Preliminary Sizing Of An Alternate Demolander Mission For Exomars 2016
David Mimoun

Performance Assessment Of Vision Based Navigation For Hazard Avoidance During Lunar And Martian Landing
Baltazar Parreira

Effects of the Venus Atmosphere on the Behavior of Thermal Insulating Materials
Michael Pauken

Preliminary Study On A Novel Coring System For Planetary Surface Sampling
Simone Pirrotta

Technology Development For Exploration In The Extreme Environments Of Venus
James Polk

Measuring Outgassing And Impact Events From The Lunar Surface
Jani Radebaugh

Impact Of Insertion Location On The Longevity Of A Mars Balloon
Scot Rafkin

Planetary Probe Science Payload Mission Design Tool
Keith Schreck

DSMC Solutions Of Hypersonic Flow Over A Planetary Probe Using Fully Automated Adaptive Mesh Refinement And Cut-Cell Algorithms
Thomas Schwartzentruber

A Historical Review of Inflatable Aerodynamic Decelerator Technology Development
Brandon Smith

Title

Instrument capabilities of the HP3 Permittivity Probe
Alexander Stiegler

EAGLE: An Extensible, End-to-End Simulation and Evaluation Framework for Planetary EDLS
Ender StJohn-Olcayto

Micrometeoroid and Orbital Debris Damage Recording System
Greg Swanson

Multi-Objective Aerothermodynamic Shape Optimization Of Hypersonic Entry Aeroshells
John Theisinger

Sample Return Missions From Comets And Primitive Bodies: A Future Landmark In Space Exploration
Josep Trigo-Rodriguez

Multi-mission Earth Entry Vehicle Aerodynamic and Aerothermal Analysis
Kerry Trumble

AEROFAST: Thermal/Ablation Analysis Of The Front Heat Shield For A Martian Aerocapture Mission
Tom van Eekelen

Using Technology And Techniques From Outside The Space Industry To Overcome Engineering Challenges Posed By Planetary Protection And Ultra-Clean Requirements On Flight Hardware
John Vrublevskis

Aerodynamic Decelerators For Modern Venus Probes/Landers
Allen Witkowski

Lunar Atmosphere And Dust Environment Explorer Integration And Test
Michael Wright

Ground Mole Demonstrator For Subsoil Exploration: System Development, Integration And Testing
Mirco Zaccariotto

The Block-Ablator-In-A-Honeycomb Heat Shield Architecture
Peter Zell

18 June 2010	DAY 5	FRIDAY MORNING

SESSION 8:

Closing Session, Student Awards, and the Future

Session Conveners:

- E. Chester, CTAE (Aerospace Research and Technology Centre, Spain)
- J. Cutts, NASA Jet Propulsion Laboratory (USA)

Times		
09:00	**09:30**	**An Assessment of the Thermal Protection System Technology for In-Situ Science Missions to Mars, Venus, Outer Planet and Sample Return to Earth** *E. Venkatapathy*
09:30	**10:00**	**Overview of the NASA Entry, Descent, and Landing Systems Analysis** *M. Munk*
10:00	**10:30**	**Student Awards Presentations** *Presented by P. Papadopoulos*
10:30	**11:00**	*COFFEE BREAK* *(Garden)*
11:00	**11:30**	**The Long Dry Season: Science Funding in the US** *K. Marvel*
11:30	**12:00**	**Mitigating the Mission Risks of Uncertain Natural Surfaces: Lessons for Mars and Asteroids** *M. Adler*
12:00	**12:45**	**Panel Discussion** *Theme to be selected based on the emerging issues of the workshop.* *Moderated by B. Bienstock*
12:45	**13:00**	**Introduction and Welcome to IPPW-8** *Presented by N. Cheatwood and M. Munk*
13:00	**13:30**	**Closing Comments**