

The

I N T E R N A T I O N A L

Planetary Probe Workshop



IPPW-10 • June 17, 2013

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Government Sponsorship Acknowledged**

The International Planetary Probe Workshop

The First Ten Years

Jean-Pierre Lebreton
ESA/ESTEC, LPC2E & LESIA

David H. Atkinson
Univ. Idaho

Bernie Bienstock
JPL, Caltech

Ethiraj Venkatapathy
NASA Ames

Tibor Balint
NASA HQ

IPPW-1: Afzul Suleman

IPPW-6: Bobby Braun

IPPW-2: Ethiraj Venkatapathy

IPPW-7: Ed Chester

IPPW-3: George Vekinis

IPPW-8: Michelle Munk

IPPW-4: Jim Cutts

IPPW-9: David Mimoun

IPPW-5: Jean-Marc Bouilly

IPPW-10: Periklis Papadopoulos

Beginnings

- Conceived by Dr. J.-P. Lebreton and Dr. D.H. Atkinson in 1998
- Motivated by studies of Huygens entry / descent trajectory reconstruction by Huygens Descent Trajectory Working Group
- Originally intended to be a one-time meeting dedicated to entry probe entry / descent trajectory analysis and reconstruction

International Workshop

Planetary Probe Atmospheric Entry and Descent Trajectory Analysis and Science

6-9 October 2003
Lisbon, Portugal

At the Instituto Superior Técnico (IST) of the Technical University of Lisbon (UTL)

Local Organizing Committee

- A. Suleman, Chair (IST)
- M. Roos-Serote (IOAL/FCUL), Co-Chair
- T. Hormigo (IST)
- Y. Vieira (IST)
- R. Serodio (IST)
- P. Gil (IST)

Science Organizing Committee

- D. Atkinson, Chair (U. Idaho, USA)
- A. Suleman, Co-Chair (IST, Portugal)
- J.-P. Lebreton (RSSD/ESTEC, The Netherlands)
- B. Kazemirajad (SR, Austria)
- R. Lorenz (LPL, Univ. Arizona, USA)
- F. Ferri (CISAS, Univ. Padova, Italy)
- T. Schofield (JPL/NASA, USA)
- R. Young (NASA ARC, USA)
- T. Spilker (JPL/NASA, USA)
- V. Karafanovich (JPL/NASA, USA)
- J. Zarnecki (Open University, UK)
- R. Blanchard (GWU, USA)
- R. Beebe (NMSU, USA)
- H. Niemann (NASA GSFC, USA)
- P. Wercinski (NASA HQ, USA)
- R. Powell (NASA LaRC, USA)

<http://www.sstep.org/entryws/index.html>

Lisbon

“An international workshop on the topic of *Planetary Probe Atmospheric Entry and Descent Trajectory Analysis and Science* will take place on 6-9 October 2003 in Lisbon, Portugal. The purpose of the workshop is to bring together the community of planetary scientists, spacecraft engineers, and mission designers and planners whose expertise, experience, and interests are in the area of entry probe trajectory and attitude determination, and aerodynamics and measurement of aerodynamical and aerothermodynamical properties of planetary entry vehicles.”



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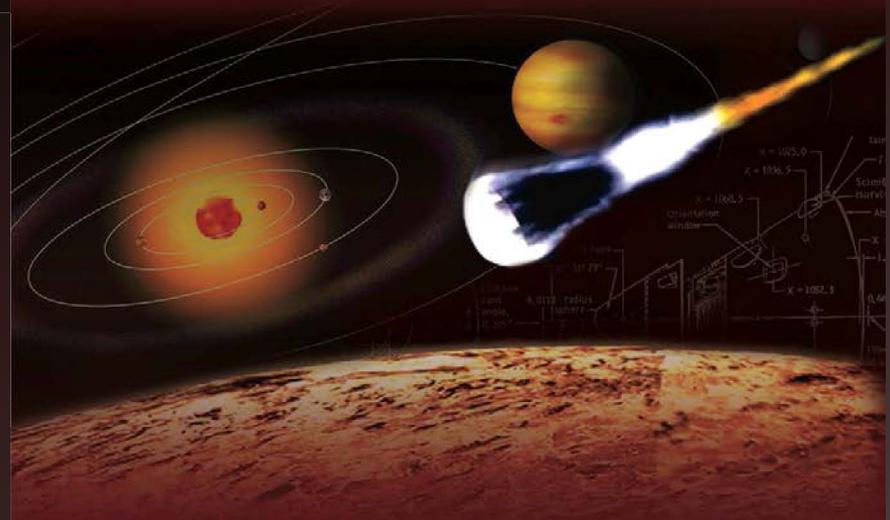
<http://www.sstep.org/entryws/index.html>

IPPW Goals

- **To Review** state-of-the-art in science, mission design, and technologies for *in situ* robotic exploration of Solar System
- **To Share** ideas, mission opportunities, and emerging technologies
- **To Serve** as forum for discussions of innovative methodologies and techniques
- **To Attract** early career scientists and engineers
- **To Foster** international collaboration

2ND INTERNATIONAL PLANETARY PROBE WORKSHOP



AUGUST 23-27, 2004
MOFFETT FIELD, CALIFORNIA USA
NASA AMES CONFERENCE CENTER

[HTTP://PROBEWS2.ARC.NASA.GOV](http://PROBEWS2.ARC.NASA.GOV)

INTERNATIONAL STEERING COMMITTEE (ISC)

Ethiraj Venkatesh, Chair (NASA, USA)
David Atkinson, Co-Chair (U of Idaho, USA)
Jean-Pierre Labreton, Co-Chair (ESA/ESTEC, The Netherlands)

Jim Arnold (UARC, UC Santa Cruz, USA)
Reta Beebe (New Mexico State U, USA)
Bobby Braun (Georgia Tech, USA)
Marcello Coradini (ESA HQ, France)
Prasun Desai (NASA, USA)
Francesca Ferri (U of Padova, Italy)
Tobias Owen (U of Hawaii, USA)
Maarten Raas-Serote (CAAUL, Portugal)
Bill Willcockson (Lockheed-Martin, USA)
John Zarnetcki (PSSRI/Open U, UK)

Sushil Atreja (U of Michigan, USA)
Bernie Bionstock (Boeing, USA)
Rodolphe Cledassou (CNES, France)
Jim Cutts (JPL, USA)
Larry Esposito (U of Colorado, USA)
Ralph Lorenz (U of Arizona, USA and PSSRI/Open U, UK)
Jim Robinson (NASA HQ, USA)
Tom Spilker (JPL, USA)
Rich Young (NASA, USA)



Organizing Committees

- International Organizing/Steering Committee (IOC)
- Local Organizing Committee (LOC)
- Program Organizing Committee (POC)
- Student Organizing Committee (SOC)
- Al Seiff Committee
- Short Course Committee
- Long Term Planning Committee

3RD INTERNATIONAL
PLANETARY PROBE
WORKSHOP

JUNE 27-JULY 1, 2005
ANAVYSSOS, ATTIKI, GREECE
EDEN BEACH HOTEL-CLUB

EMAIL IPPW-3@IMS.DEMOKRITOS.GR

www.ims.demokritos.gr/IPPW-3

Logos: ESA, NASA, Alcatel Space, ARX, Verity, EADS, Demokritos, University of Athens

International Organizing Committee Chairs

IPPW-1: J.-P. Lebreton, D. Atkinson

IPPW-2: E. Venkatapathy, D. Atkinson, J.-P. Lebreton

IPPW-3: J.-P. Lebreton, D. Atkinson, E. Venkatapathy

IPPW-4: D. Atkinson

IPPW-5: J.-P. Lebreton, D. Atkinson

IPPW-6: B. Bienstock, A. Ball

IPPW-7: B. Bienstock, E. Chester, A. Ball

IPPW-8: B. Bienstock, E. Chester

IPPW-9: B. Bienstock, J.-P. Lebreton

IPPW-10: B. Bienstock, O. Karatekin

Program Organizing Committee Chairs

IPPW-1: D. Atkinson, A. Suleman

IPPW-2: E. Venkatapathy, D. Atkinson, J.-P. Lebreton

IPPW-3: J.-P. Lebreton, D. Atkinson, T. Spilker

IPPW-4: E. Kolawa, R. Lorenz, M. Roos-Serote

IPPW-5: A. Coustenis, B. Braun

IPPW-6: M. Wright, B. Kaziminejad

IPPW-7: D. Hash, O. Witasse, A. Coustenis, R. Lorenz, R. Trautner

IPPW-8: K. Edquist, R. Haya Ramos

IPPW-9: C. Szalai, D. Atkinson, O. Karatekin, C. Wilson

IPPW-10: A. Sengupta, D. Atkinson

Student Organizing Committee Chairs

IPPW-4: B. Braun, M. Roos-Serote

IPPW-5: A. Ball, P. Papadopoulos

IPPW-6: P. Papadopoulos, Ed Chester

IPPW-7: Georg Herdrich, P. Papadopoulos

IPPW-8: S. Ruffin, A. Sole

IPPW-9: O. Witasse, S. Ruffin

IPPW-10: S. Ruffin, J.-P. Lebreton

Short Course Organizing Committee Chairs

IPPW-2: E. Venkatapathy

IPPW-3: S. Lingard

IPPW-4: J. Cutts

IPPW-5: F. Coron, B. Braun, A. Ball

IPPW-6: E. Kolawa

IPPW-7: T. Balint, D. Atkinson

IPPW-8: T. Balint

IPPW-9: T. Balint

IPPW-10: A. Morris

International Participation and Venues

- International participation has always been and continues to be the most important hallmark of the IPPW
- Beginning with IPPW-2, we decided that all future IPPWs would be hosted on alternating sides of the Atlantic

National Aeronautics and Space Administration



4 T H I N T E R N A T I O N A L
Planetary Probe Workshop

HILTON PASADENA HOTEL **JUNE 27 - 30, 2006** PASADENA, CALIFORNIA, USA



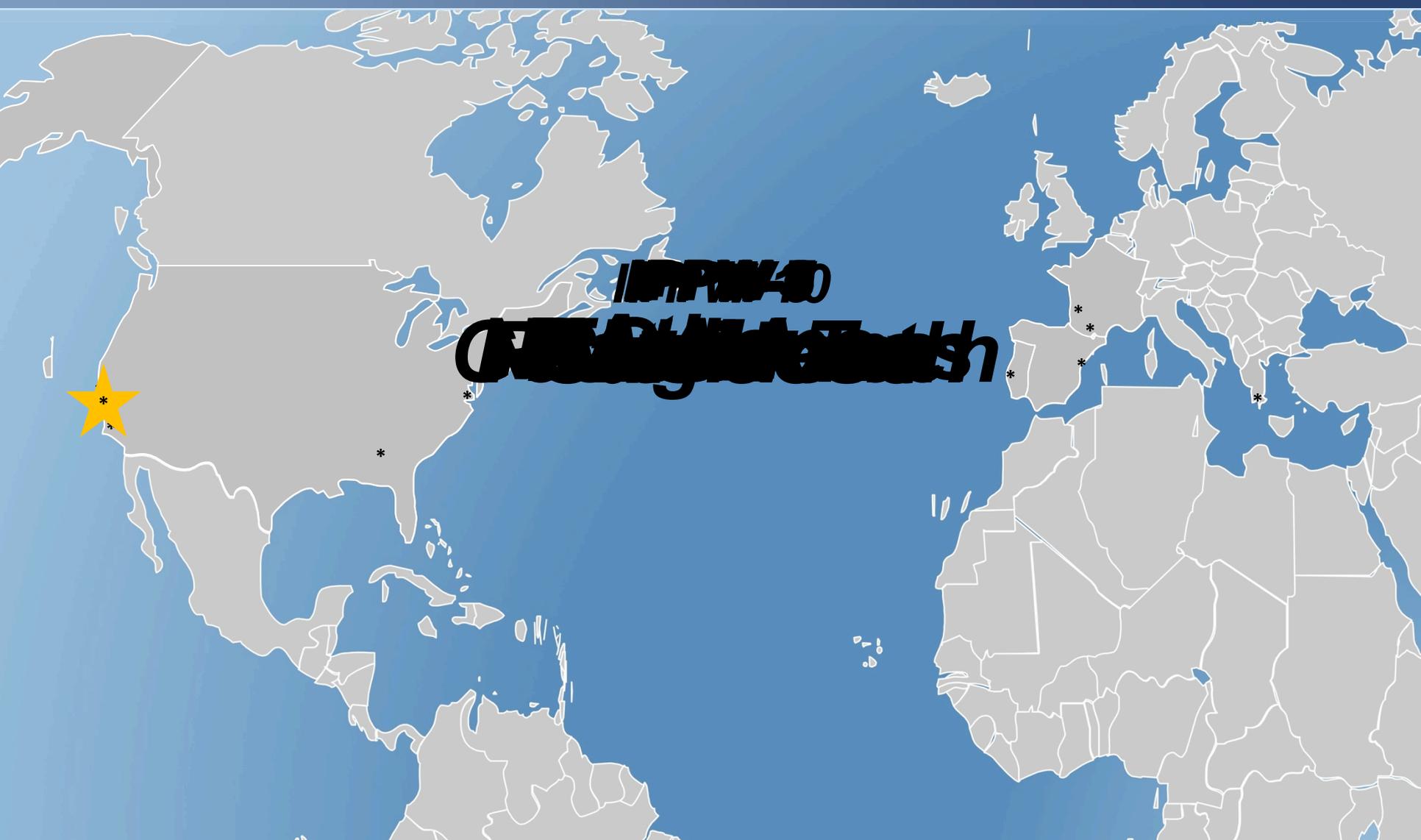
Short Course
In Situ Instruments for Planetary Probes and Aerial Platforms
June 25 - June 26, 2006
Register Online:
<http://ippw.jpl.nasa.gov>



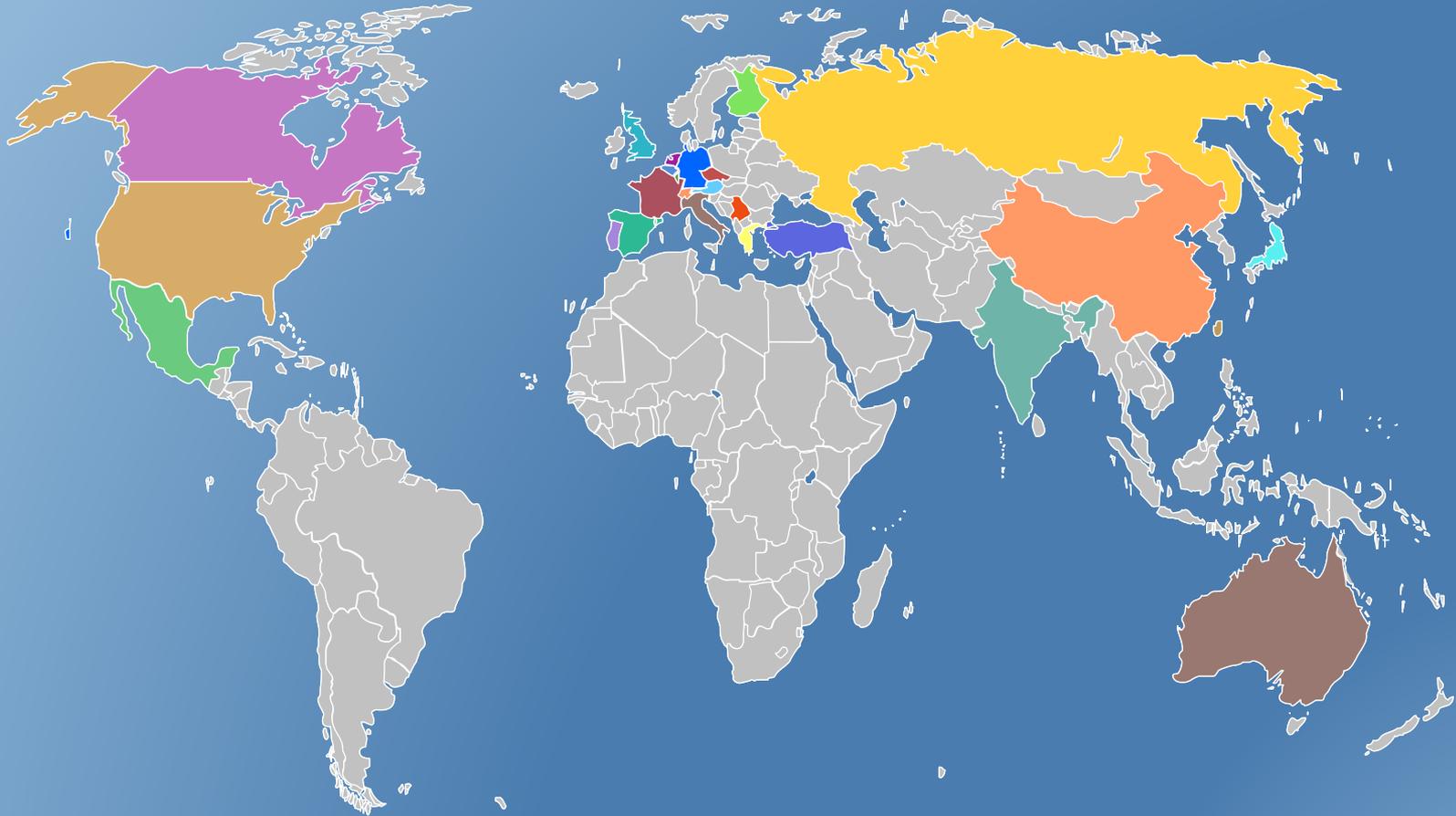
www.nasa.gov
Information: secretariat@ippw-4.jpl.nasa.gov



10 Years of IPPW Workshops



Participating Countries



Short Course

A tradition first introduced at IPPW-2 by E. Venkatapathy

- IPPW-2: Thermal Protection Systems
- IPPW-3: Parachutes
- IPPW-4: Instruments for Planetary Probes & Aerial Platforms
- IPPW-5: Controlled Entry & Descent into Planetary Atmospheres
- IPPW-6: Extreme Environment Technologies
- IPPW-7: Planetary Protection
- IPPW-8: Atmospheric Flight Technologies
- IPPW-9: Probe Science Instrument Technologies
- IPPW-10: EDL Systems

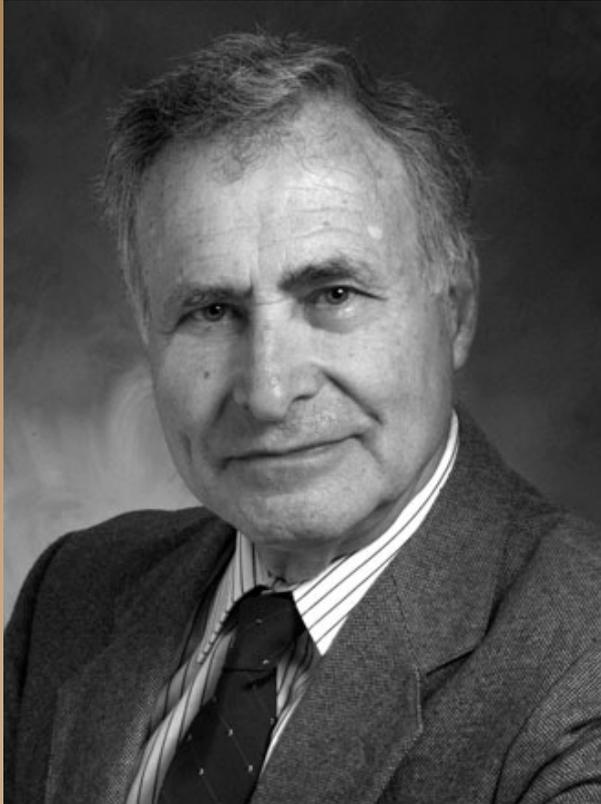
5TH INTERNATIONAL PLANETARY PROBE WORKSHOP
The workshop will be preceded by a two-day short course
"Controlled Entry and Descent into Planetary Atmospheres"

BORDEAUX, France, Short Course: 23-24 June 2007
AREPA Conference Centre Workshop: 25-29 June 2007

www.rssd.esa.int/SM/IPPW/ - email: ippw-5@rssd.esa.int

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AI Seiff Award



- 1948 – 1986 Research Engineer/Scientist, Ames
- 1986 – 2000 San Jose State Univ. Foundation
- Background in Chemical Engineering, Gas Dynamics, and Aerodynamics

AI Seiff Award introduced in 2007 at IPPW-5 in recognition of Al Seiff's lifetime contributions to fields of planetary exploration and planetary entry probe technologies, and mentorship of next generation of planetary scientists and technologists.

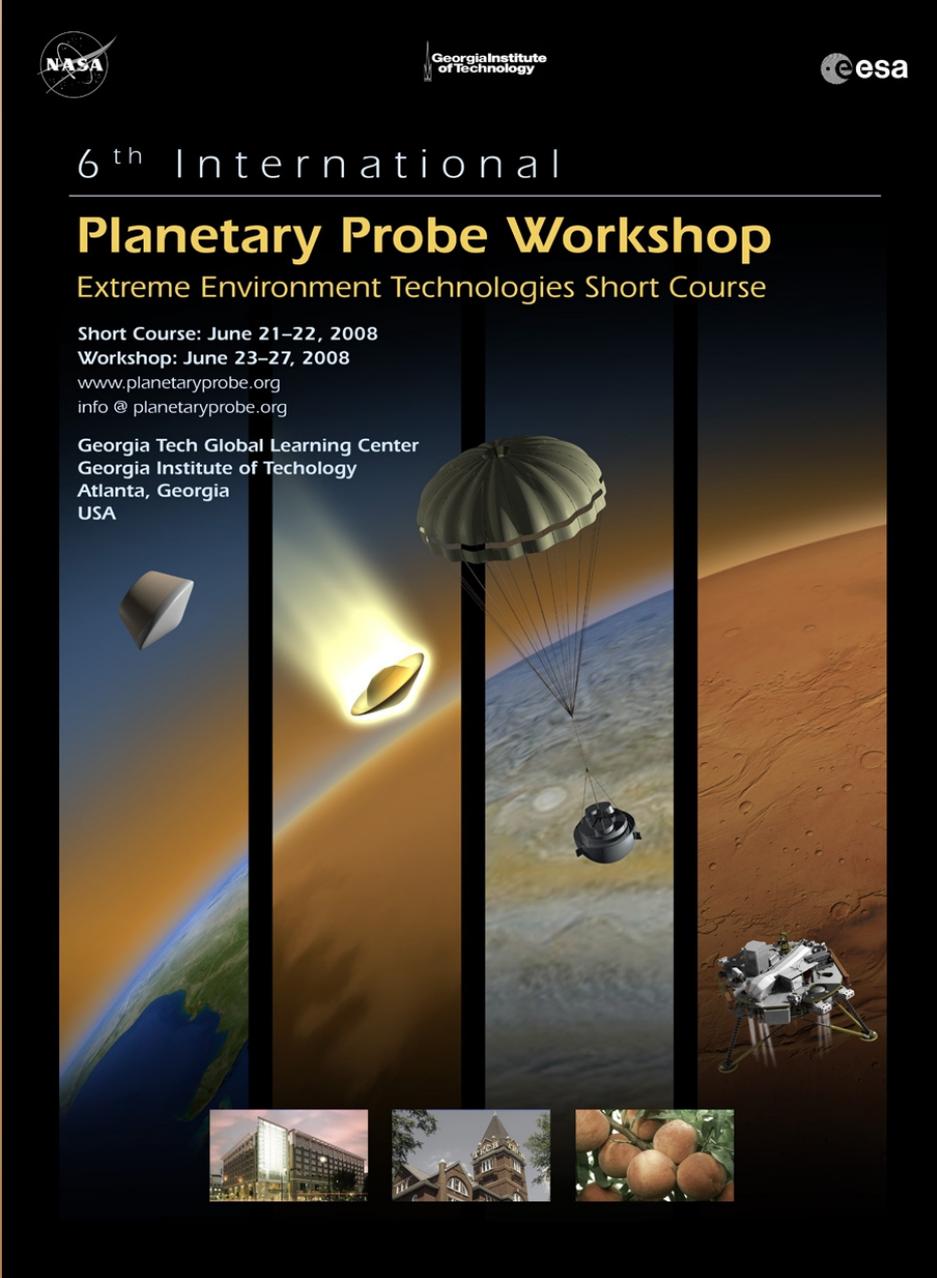
Award created to recognize and honor a scientist, engineer, technologist, or mission planner for outstanding career achievements and contributions to the understanding of planetary (including Titan) atmospheres utilizing high speed entry probes.

AI Seiff Video



AI Seiff Award Recipients

- IPPW-5 (2007): **Hasso Niemann**
NASA Goddard
- IPPW-6 (2008): **Jacques Blamont**
CNES
- IPPW-7 (2010): **Marty Tomasko**
Univ. Arizona
- Mike Tauber**
Eloret Corp.
- IPPW-8 (2011): **Jean-Pierre Lebreton**
ESA/ESTEC
- IPPW-9 (2012): **Bobby Braun**
Georgia Tech
- IPPW-10 (2013): **Mikhail Marov**
Keldysh Institute for
Applied Mathematics
- Jim Arnold**
NASA Ames



NASA **Georgia Institute of Technology** **esa**

6th International
Planetary Probe Workshop
Extreme Environment Technologies Short Course

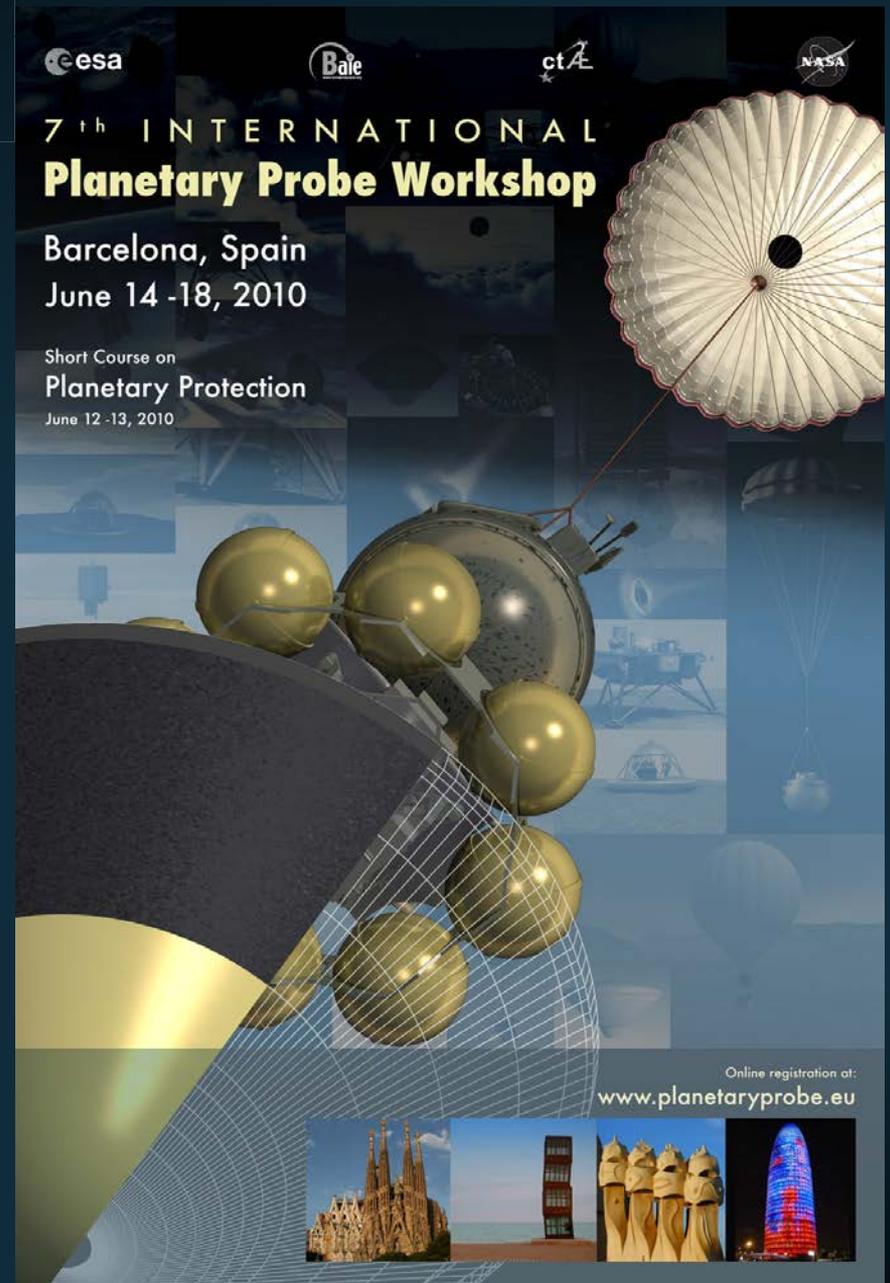
Short Course: June 21–22, 2008
Workshop: June 23–27, 2008
www.planetaryprobe.org
info@planetaryprobe.org

Georgia Tech Global Learning Center
Georgia Institute of Technology
Atlanta, Georgia
USA

The poster features a vertical sequence of images illustrating a probe's descent: a probe in space, a probe entering the atmosphere, a probe descending under a parachute, and a probe on the surface of Mars. At the bottom, there are three small images: a building at night, a building during the day, and a bunch of oranges.

Students

- Student participation is a primary focus of all International Planetary Probe Workshops
- In IPPW-4 a formal Committee was created to generate increased student participation, and to solicit funding for and provide scholarship support to many participating students
- Beginning with IPPW-2, nearly 300 students have attended the International Planetary Probe Workshops



The poster for the 7th International Planetary Probe Workshop features a collage of space-related images. At the top, logos for ESA, Biele, ctA, and NASA are displayed. The main title '7th INTERNATIONAL Planetary Probe Workshop' is prominently shown in a bold, sans-serif font. Below the title, the location 'Barcelona, Spain' and dates 'June 14 -18, 2010' are listed. A smaller section mentions a 'Short Course on Planetary Protection' from 'June 12 -13, 2010'. The central image depicts a spacecraft with several golden spherical probes and a large, white, multi-lobed parachute. At the bottom, a row of four small images shows the Sagrada Família, a modern building, a golden structure, and a tall, illuminated tower. The registration website 'www.planetaryprobe.eu' is provided in the bottom right corner.

esa Biele ctA NASA

7th INTERNATIONAL
Planetary Probe Workshop

Barcelona, Spain
June 14 -18, 2010

Short Course on
Planetary Protection
June 12 -13, 2010

Online registration at:
www.planetaryprobe.eu

Special Thanks to Tibor Balint

- Created posters for IPPWs



IPPW-4
2006

IPPW-6
2008

IPPW-7
2010

IPPW-8
2011

IPPW-9
2012



IPPW-10
2013

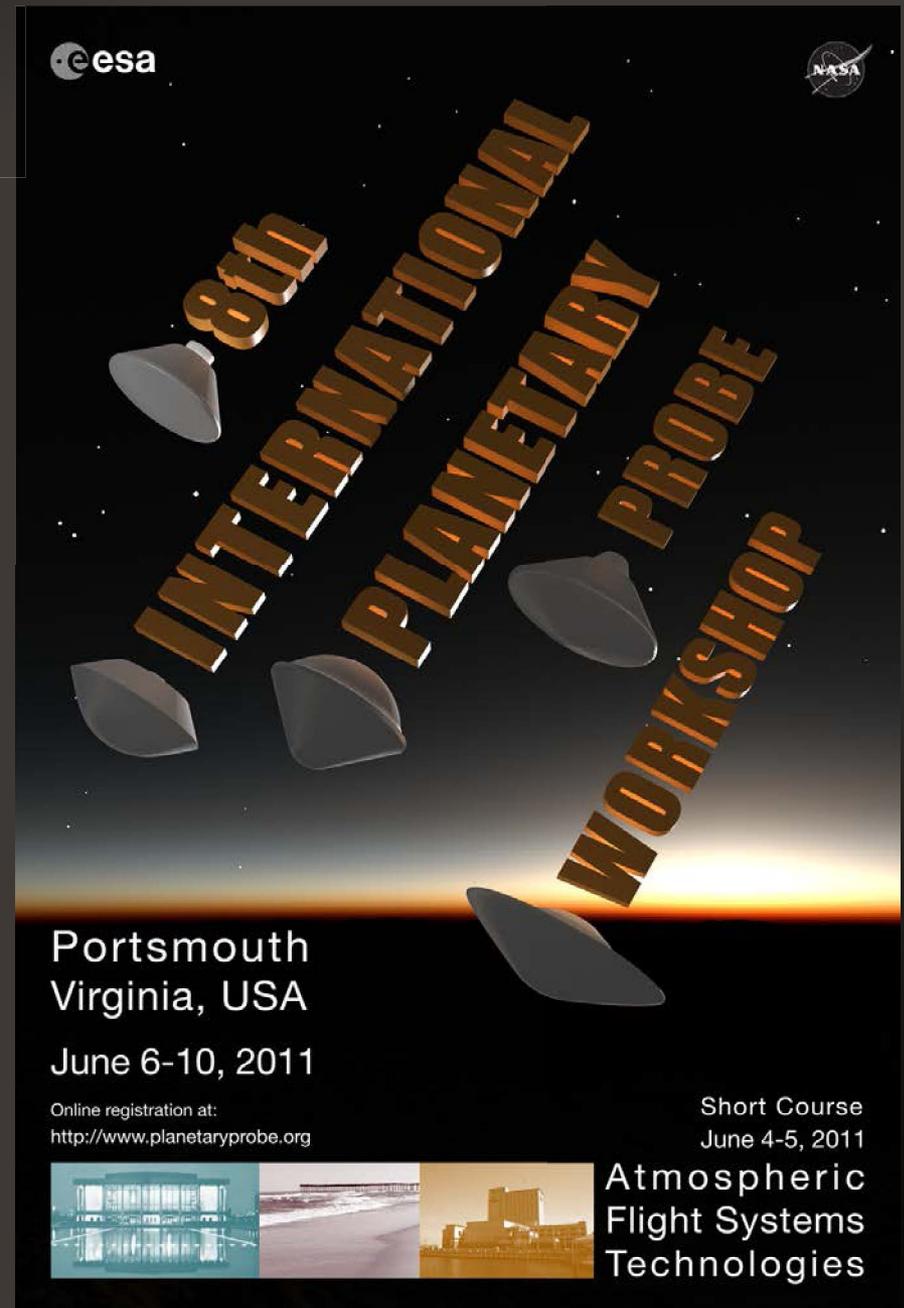
- Short Course Committee Chair for IPPW-7 (Barcelona), IPPW-8 (Portsmouth), and IPPW-9 (Toulouse)

- IPPW Logo



Relevance

- Planetary probes, via their in situ capability, generate the most accurate atmospheric and surface science from planets and moons in our solar system
- Many atmospheric properties and constituents are inaccessible from remote sensing, and can only be measured by directly sampling



The poster features a dark space background with a bright horizon line at the bottom. Several grey, teardrop-shaped probe models are scattered across the scene. The title '8th INTERNATIONAL PLANETARY PROBE WORKSHOP' is written in large, 3D, gold-colored letters, slanted diagonally. Logos for ESA and NASA are in the top corners. Text at the bottom provides location, dates, registration information, and a short course announcement.

esa

NASA

**8th
INTERNATIONAL
PLANETARY
PROBE
WORKSHOP**

Portsmouth
Virginia, USA

June 6-10, 2011

Online registration at:
<http://www.planetaryprobe.org>

Short Course
June 4-5, 2011

Atmospheric
Flight Systems
Technologies



Sponsors

Agencies

NASA: HQ, ARC, JPL, LaRC
ESA, CNES, Demokritos

Universities, Institutes, and Research Centers

Georgia Tech, Instituto Superior Tecnico, ISAE,
San Jose State University, University of Idaho

Industry

Aerospace Valley	EADS
Alcatel Space	ELORET
Aquitaine	Lockheed Martin
Areva	Snecma Propulsion Solide
Astrium	Thales Alenia Space
Boeing	Vorticity

Other

ARA, BAIE, CTAE, Europlanet, National Institute of Aerospace, SSTEP

9th INTERNATIONAL PLANETARY PROBE WORKSHOP
Toulouse, France June 18-22, 2012 www.planetaryprobe.eu
Short Course: Probe Science Instrumentation Technologies June 16-17

Impact and Future

Impact

- After discussions during several IPPWs that the Huygens heat shield was not instrumented, ESA decided to properly instrument the Exomars 2016 DEM entry heatshield
- Discussions at an IPPW led to the abandonment of the very technically challenging Jupiter Deep Probe mission, with replacement by a Saturn probe mission

Future

- Continued solar system exploration by planetary entry probes is indeed promising
- Exploration of increasingly diverse planetary bodies with challenging entry system requirements requires new materials, advanced instrumentation, creative techniques, and international partnerships

10th INTERNATIONAL PLANETARY PROBE WORKSHOP

San Jose, CA, USA
June 17-21, 2013

Short Course: EDL Systems Overview June 15-16, 2013

www.ippw10.com

