INTERNATIONAL ACADEMY OF ASTRONAUTICS

Missions to the outer solar system and beyond
FIFTH IAA SYMPOSIUM ON REALISTIC NEAR-TERM ADVANCED SCIENTIFIC SPACE MISSIONS

Aosta, Italy
July 2-4, 2007

PROGRAM

July 1, 2007
18.00 Pre-registration (at Hotel Europe)
19.00 Welcome party

July 2, 2007
8.00-10.00 Registration
9.30 Welcome to the participants
9.45 Titan: Results from Cassini/Huygens mission
   R. Somma
   Thales Alenia Space, Rome, Italy
10.15 Coffee break

Session I: Exploration strategies
11.00 NASA's Discovery Program: Moving toward the Edge (of the solar system)
   L. Johnson, P. Gilbert
   NASA Marshall Space Flight Center, Huntsville, USA
11.30 ESA Strategy for long range exploration
   M. A. Perino
   Thales Alenia Space, Torino, Italy
12.00 Lunch

Session II: Technologies
14.30 Technologies to Enable Near-Term Interstellar Precursor Missions; Is 400 AU Accessible?
   L. D. Fearn
   EP Solutions, UK
15.00 Preliminary Investigation on Carbon Nanotube Membranes for Photon Solar Sails
   G. Vulpetti, S. Santoli, G. Mocci
   Galileian Plus, Rome, Italy
   INT Rome, Italy
   Telespazio, Rome, Italy
15.30 Nanomaterials in space
   A. Carpinteri, N. Pugno,
   Politecnico di Torino, Torino, Italy
16.00 Coffee break

Session III: Missions
16.30 Robotic rovers for long range exploration
   G. Genta
   Politecnico di Torino, Torino, Italy
17.00 "FOCAL" probe to 550 or 1000 AU: a status review
   C. Maccone
   IAA Member, Torino, Italy
20.00 Banquet at Hotel Europe

For registration, hotel reservation and general information, please contact Ms. Giusy Spinasaanta (gspinasanta@corep.it)
**July 3, 2007**

**Session IV: New concepts**

9.00  
**Explanation of dynamical Biefeld-Brown effect from the standpoint of ZPF field**  
T. Musha  
Yokohama, Japan

9.30  
**Theory and Technology of Generating Thrust Induced by Squeezed Vacuum**  
Y. Minami  
Space Technology Research Office, Yokohama, Japan

10.00  
**The electric sail - a new propulsion method which may enable fast missions to the outer solar system**  
P. Janhunen  
Finish Meteorological Institute, Helsinki, Finland

10.30  
**Coffee break**

**Session V: Space sails**

11.15  
**Considerations of electric sailcraft trajectory design**  
G. Mengali, A.A. Quarta, P. Janhunen  
University of Pisa, Pisa, Italy  
Finish Meteorological Institute, Helsinki, Finland

11.45  
**Interstellar Solar Sailing: A Figure of Merit for Monolayer Sails**  
G. Matloff, R.Y. Kezerashvili  
New York City College of Technology, New York, USA

12.15  
**Lunch**

15.00  
**Sightseeing tour**

20.00  
**Traditional Aosta Valley Dinner at Hotel Notre Maison, Vetan**

**July 4, 2000**

**Session VI: Human aspects in long range spaceflight**

9.00  
**Biomimetic approach to advanced space missions**  
C. Menon, T. Seidl, M. Broschart  
Simon Fraser University, Canada  
ESA, The Netherlands  
Ernst-Moritz-Arndt University Greifswald, Germany

9.30  
**Human cardiopulmonary responses to exercise performed in artificial gravity**  
C. Capelli  
University of Verona, Italy

10.00  
**Cardiovascular responses to microgravity in humans**  
Guido Ferretti  
Université de Genève, Genève, Suisse

10.30  
**Coffee break**

11.15  
**Gravity vector changes induce alteration in nervous and testicular cells in culture and in testis’ slices**  
B. Uva, F. Strollo, F. Ricci, M.A. Masini  
University of Genova, Genova, Italy  
University of Roma “La Sapienza”, Italy  
ENEA C.R. Casaccia Roma Italy

11.45  
**Hibernation as a far-reaching programme for cell nucleus activity modulation**  
M. Malatesta, M. Biggiogera, C. Zancanaro  
University of Verona, Verona, Italy  
University of Pavia, Pavia, Italy

12.15  
**Lunch**

14.30  
**Interstellar Motivations**  
A. Hanson  
QED Ltd, London, United Kingdom

15.00  
**Panel discussion**

16.00  
**Closing ceremony**

19.00  
**Farewell party**
DEADLINE for papers
We plan to distribute the book of proceedings at the symposium. This means that the papers must arrive within June 1st. A selection of the papers will be sent to the Journal of the British Interplanetary Society for publication. In the previous meetings about 80% of the papers were published and the JBIS dedicated two special issues to the symposium.

HOTEL
Hotel Europe (the best hotel in Aosta) is our best sponsor. Their sponsorship has the form of giving us a number of rooms at a very discounted rate (110€ bed and breakfast single, 150 € bed and breakfast double) including all symposium lunches, welcome and farewell parties and the symposium dinner. The hotel is located in the center of Aosta, about 100 m from the place were the most sessions will be held (the other ones will be held within the hotel). You can book directly to the hotel by fax (+39 0165 40566) specifying 5th SYMPOSIUM ON REALISTIC NEAR-TERM ADVANCED SCIENTIFIC SPACE MISSIONS.

TRAVEL
Aosta has only a small airfield, with two flights a day to and from Rome, only in week days (Monday to friday). The flights are run by Air Vallee (http://www.airvallee.com/). The simplest way to reach Aosta is by flying to Torino (Caselle) airport, that is well connected with Rome and major European Cities (Paris, Zurich, Frankfurt Munich and other ones), and then taking a bus directly from the airport. Bus schedules from and to Aosta can be found on http://www.savda.it/orari_tariffe_dx.htm
The schedule to and from the airport is the following:

<table>
<thead>
<tr>
<th>Route</th>
<th>Times</th>
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<tbody>
<tr>
<td>Torino Airport to Aosta</td>
<td>09.30 (Mo-Fri)</td>
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<td></td>
<td>10.45 (Sa-Sun)</td>
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<td>22.15 (every day)</td>
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<tr>
<td>Aosta to Torino Airport</td>
<td>11.05</td>
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<td>12.20</td>
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<td>23.50</td>
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<tr>
<td>Aosta to Torino Airport</td>
<td>04.30 (Mo-Fri)</td>
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<td></td>
<td>08.15 (Sa-Sun)</td>
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<tr>
<td></td>
<td>17.30 (every day)</td>
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<tr>
<td>Torino Airport to Aosta</td>
<td>06.15</td>
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<td></td>
<td>10.30</td>
</tr>
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<td></td>
<td>19.15</td>
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</tbody>
</table>

Alternatively it is possible (although I do not suggest to do so) to fly to Milan Malpensa airport, but there is no direct bus to Aosta. From the airport it is possible to take a bus to downtown Milan and then a train to Aosta.

Aosta can be reached by train from both Torino Porta Susa railway station and Milan railway station. Aosta station is not far from Hotel Europe: just few minutes walking. Taxis are always available at the railway station.

PLEASE, REMEMBER THAT TAXIS IN ITALY ARE VERY, VERY EXPENSIVE FOR INTERCITY TRAVEL: A TAXI FROM MALPENSA AIRPORT TO AOSTA MAY COST 300 €.

Aosta is a touristic city, both in winter for skiing and in the summer, so try to book early.
SYMPOSIUM DATES AND LOCATION
After the success of the previous four Symposiums on Realistic Near-term Advanced Scientific Space Missions, organized by the International Academy of Astronautics and Politecnico di Torino which were held in Torino in June 1996 and in Aosta in July 1998, 2000 and 2005, a new three-days International Symposium on Outer- and Extra-Solar Missions will be organized in Aosta in July 2007. Local supporting organization will be the Department of Mechanics of the Politecnico (Engineering School) of Turin. The Symposium will be held in Aosta, from 2 to 4 July 2007.

SYMPOSIUM GOALS
The aim of this 5th symposium on deep space missions is to promote an exchange of ideas and experiences among those interested in the various scientific and technological aspects of outer solar system and interstellar exploration and to propose new missions. Papers regarding the motivations and human aspect of deep space exploration are welcome. Special results from this fourth symposium are intended to be submitted to the leading Space Agencies as Proposals for space missions to the outer Solar System and beyond which are feasible within near term technology.

AREAS OF INTEREST
Scientific Objectives and Payload Requirements
Power and Propulsion Systems
Trajectory Optimization, Mission Profiles
Attitude Dynamics
Navigation, Guidance and Control
Very Deep Space Telecommunications
Sensors, Detectors and Lens Systems
Missions beyond 400 A.U. (i.e. the minimum goal of the extended NASA’s Interstellar Probe): Perspectives & New Concepts
Forms of International Cooperation
Motivations and human aspects

Two dedicated sessions will be held on the following topics

- Nanotechnology and Robotics
- Hybernation and long-range spaceflight

PAPERS FOR PRESENTATION
Abstracts of Papers intended for Presentation at the Symposium must be written in English on a single A4 page with the title, Author's name affiliation and complete address. Authors are encouraged to send abstracts by e-mail or to send also a disk copy for PC-compatible (.txt, .doc, .pdf, .ps, .tex files).

Abstracts must be mailed to:
Prof. Giancarlo Genta
Dept. of Mechanics, Politecnico di Torino
Corso Duca degli Abruzzi 24
I-10129 Torino (TO), ITALY
Phone: ++39 011 564 6922
Fax: ++39 011 564 6999
E-mail: giancarlo.genta@polito.it
www.giancarlogenta.it

All intended Papers will be examined by an International Scientific Committee chaired by Dr. Giovanni Vulpetti and Dr. Leslie Shepherd.

CO-CHAIRMEN
Leslie Shepherd
Giovanni Vulpetti

SCIENTIFIC COMMITTEE
Jean-Michel Contant
Michael Gruntman
Les Johnson
Yoshinari Minami
Salvatore Santoli
Giovanni Vulpetti

Giancarlo Genta
Heiner Klinkrad
Gregory Matloff
Eberhard Moebius
Leslie Shepherd

PRE-REGISTRATION FORM

I plan to attend the Symposium
I plan to present a paper

Tentative title: ___________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

[] Please, send me further information

Name _________________________________________
Affiliation _____________________________________
Address _______________________________________
City __________________________________________
Country _______________________________________
Telephone _______________________
FAX _______________________
e-mail _______________________

to be mailed or e-mailed back to giancarlo.genta@polito.it
DEADLINES

Submission of abstract                      December 31, 2006
Notification of acceptance                February 15, 2007
Submission of camera-ready texts    March 31, 2007

SYMPOSIUM FEE

The Symposium Fee is 450 €, entitling to receive a copy of the Symposium Proceedings (expected to be available at the symposium), and to attend the Symposium Dinner. For payments received by April 30, 2007 a discount of € 50 will apply.

Sponsorships for Participants not backed by national organizations, and particularly for Participants from the Eastern European Countries, may be available. Official language of the Symposium will be English.

A Program for Accompanying Parties will be arranged, if the number of participants will be sufficient.

SECRETARIAT

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