FOREWORD

In 1957 the Soviet Union launched Sputnik, the first artificial satellite. The Soviets achieved another success in 1966 by delivering the Venera 3 spacecraft to the surface of Venus making it the first manmade object to traverse the atmosphere and reach the surface of another world. In the years between these milestones, Al Seiff of NASA Ames began studying means by which *in situ* measurements of the structure and composition of planetary atmospheres could be studied by inverting the technologically challenging entry physics problem using sensors and the known properties of the entry vehicle. This technique was successfully demonstrated by Seiff et al. with the Planetary Atmosphere Experiments Test (PAET) in 1971 [1, 2].

In the years since the PAET demonstration, spacecraft have safely reached the surfaces of Venus and Mars, and the deep atmosphere of Jupiter, providing a unique picture of the atmospheric structure, dynamics and chemistry of these worlds. As the design requirements of entry and descent spacecraft and landers have become more demanding, the science, engineering and technology have become increasingly complex and intertwined. It has become increasingly clear that the science will push the technology, and the advanced technology will allow the science.

To define and address many of the science, engineering and technology issues relevant to planetary probe entry and descent engineering, technology and science, an international workshop on the topic of 'Planetary Probe Atmospheric Entry and Descent Trajectory Analysis and Science' took place in Lisbon, Portugal on 6-9 October 2003. The workshop brought together representatives of the different communities of planetary scientists, spacecraft engineers, mission designers and planners, and educators with expertise, experience and interests in the area of entry probe trajectory and attitude determination, and the aerodynamics and measurement of the aerodynamical and aerothermodynamical properties of planetary entry vehicles.

The 4-day workshop comprised over 40 invited talks, contributed oral presentations and posters on past, current and future methods and instrument technologies for entry and descent science including *in situ* measurements of atmospheric properties, and the reconstruction and analysis of probe entry and descent trajectories. Topics addressed included instrumentation, methods and algorithms currently employed, results from previous entry probe missions such as Venera, Galileo and Mars Pathfinder, upcoming missions such as Huygens, Beagle 2 and MER, and new and novel instrumentation and techniques for future missions.

Sponsorship for the workshop was provided by the European Space Agency (ESA), The Foundation for Science and Technology of the Portuguese Ministry for Science and Higher Education (FCT FACC), NASA Ames and Langley Research Centers, the Aerocapture Technology Project/In-Space Propulsion Program at NASA Marshall

Space Flight Center, the National Institute of Aerospace (NIA), the University of Idaho Research Office and the Instituto Superior Técnico, Universidade Técnica de Lisboa.

David Atkinson
SOC Chair

Afzal Suleman
LOC Chair/SOC co-Chair

References:

1. J.O. Arnold and E. Venktapathy, 'Developments in Nanotechnology and Implications for Future Atmospheric Entry Probes', International Workshop on Planetary Probe Atmospheric Entry and Descent Trajectory Analysis and Science, 6-9 October 2003, Lisbon, Portugal. [This volume.]
2. A. Seiff, D. Reese, S. Sommer, D. Kirk, E. Whiting, and H. Niemann, PAET, 'An Entry Probe Experiment in the Earth's Atmosphere,' *Icarus*, **18**, 525-563, 1973.