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Stratospheric Balloon Flight Experiment Campaing For the Simulation of the Huygens Probe Mission: Verification of HASI (Huygens Atmospheric Structure Instrument) Performance in Terrestrial Atmosphere

P.F. Lion Stoppato , C. Bettanini, G. Colombatti[1], F. Ferri [1,2], M. Antonello, S. Bastianello, A. Aboudan [1], E. Flamini [3], V. Gaborit [4], J.C. Zarnecki, B. Hathi [2], A.M. Harri, A. Lehto [5], G. Bianchini, F. Angrilli [1], M. Fulchignoni [4]

(1) CISAS "G.Colombo" - Universit di Padova, Via Venezia, 1 35131 Padova, Italy
(2) PSSRI - Open University, Walton Hall, Milton Keynes, MK7 6AA, United Kingdom
(3) Agenzia Spaziale Italiana, viale Liegi 26, 00198 Roma, Italy
(4) LESIA, Universite Paris 7, Observatoire de Paris-Meudon, 5 place Jules Janssen, 92190 Meudon, France
(5) FMI (Finnish Meteorological Institute), Vuorikatu 15A, 00101 Helsinki, Finland

email:

A stratospheric balloon flight experiment campaign is in progress, in collaboration with the Italian Space Agency (ASI), to simulate the Huygens probe descent on Titan.

The main purposes of this campaign of experiments are:

- to verify sensors for planetary atmosphere entry probes effective performance in conditions similar to those of the actual mission descent
- to obtain a set of data useful for the analysis of the probe trajectory as well as for the attitude reconstruction
- to determine the atmospheric vertical profiles.

A mock up of the Huygens probe carrying onboard HASI instrument and other Huygens instrumentation is launched with a stratospheric balloon from the ASI launch base of Trapani for a local flight on Sicily.

The probe is lifted up to an altitude higher than 32 kilometres by means of a stratospheric balloon. Once the balloon is cut away, the probe starts to descend dragged by the parachute till the impact on ground. During the descent phase the probe spins at a rate inside the range of velocities expected for the mission thanks to straight line cascade and the de-coupling of the probe rotation from that one of the parachute.

The measurements carried out during all the ascending and descending phases are transmitted in real time to ground by telemetry to check the system functionality and send telecommand, if needed. At the same time data are recorded and stored on board for post-flight processing. After landing the gondola and payload are recovered.

Both the 2002 and 2003 flights have been extremely successful in terms of quantity and quality of acquired data, furthermore the equipment has been recovered working properly so that it will possible to re-use it in future flights.