Paper ID: 17167
oral

20th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Hitchhiking to the Moon and Beyond (8)

Author: Dr. Farid Gamgami
OHB System AG-Bremen, Germany

Mr. Jacques Blamont
Centre National d'Etudes Spatiales (CNES), France
Mr. Joel Michaud
Centre National d'Etudes Spatiales (CNES), France

PIGGYBACKING, CAPABILITIES AND LIMITS FOR COST EFFICIENT EARTH AND DEEP SPACE EXPLORATION

Abstract

Current science missions are firstly expensive and secondly have a low frequency. Standardised small satellites have the potential to enable more scientists engaging in space based science. Several launcher adapter offer small satellites the possibility for a cheap access to space via piggybacking. A large number of scenarios does exist for small satellites where each scenario combines launcher performance parameter (initial orbit, mass & volume), potential satellite payload (optical, RADAR, RF relay and generic compartment) and mission destination (Earth bound or deep space). Out of this large number of potential scenarios, 8 have been selected for detailed technical analyses; 3 scenarios are devoted to Earth bound missions (SSO and GEO), 5 are devoted to deep space missions (Mars, Moon, Venus and Lagrange point 2 in the Earth-Moon system). Some scenarios consider solely a (partly-)autonomous transfer stage with well defined interfaces to a generic payload compartment to enable modularity. Such transfer stages could be combined with any payload that is complaint with the interface requirements. Common to all scenarios are very high performance requirements on the small satellites. The analyses revealed that only a few scenarios are technically feasible and should be studied further. A rough order of magnitude cost estimation as well as a development plan have been established. The study laid the basis for an upcoming dialogue with scientists on the most promising scenarios form a scientific point of view.