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MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures 2 - Development and Verification (Deployable and Dimensionally Stable Structures) (2)

Author: Prof. Ernesto Vallerani
Associazione Italiana di Aeronautica e Astronautica (AIDAA), Italy, paolo.gasbarri@gmail.com

SYMPOSIUM KEYNOTE: 2ND PAOLO SANTINI MEMORIAL LECTURE: PRESSURIZED STRUCTURES FOR SUPPORTING THE HUMAN PRESENCE IN SPACE

Abstract

Over the last forty years the major contribution of the Italian Space Industries to the International Space Programs foreseeing the presence of Humans in Orbit has been the conception, design, manufacturing and testing of advanced "Pressurized Module Structures".

The evolution of the realization of such fundamental elements, starting from the early experiences of SPACELAB to the production of the latest CYGNUS Carrier Modules is traced.

The "Pressurized Modules Made in Italy" have flown forty-eight times on board of the Space Shuttle and three times on Ariane V; many more missions of Pressurized Carriers are expected to occur in the coming future on board of Expendable Launchers to support the International Space Station Logistic.

The Design Problems of these complex "Pressurized Structures" aimed at supporting the Human presence in the hostile Space Environment, are illustrated from the choice of the materials to the micrometeoroid protection, the thermal insulation and the fracture mechanics.

The activities of Manufacturing and Testing of the main components and of the complete Modules are discussed at the light of the stringent Safety Requirements imposed on these structures.

An outline of the Studies performed on the future utilization of these Modules to ensure the presence of a large number of Humans on the Moon and one day on Mars concludes the presentation.