

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

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STRUCTURAL ANALYSIS AND VERIFICATION OF A RECOVERY SUBSYSTEM FOR THE
ATMOSPHERIC REENTRY SATELLITE

Abstract

The article describes the development and structural analysis of a Recovery Subsystem of SARA Suborbital Platform. The SARA (Atmospheric Reentry Satellite) is a recoverable satellite which is being designed to perform scientific and technological experiments on a microgravity environment. The Recovery Subsystem (RS) consists of a Drag Parachute and two Main Parachutes which aim to reduce the rate of SARA velocity during descend atmosphere phase. The RS is designed mainly in composite materials, allowing a significant structural mass reduction. This reduction provides not only structural optimization but also an increase in the structural stiffness. The materials used for analysis are aluminum and sandwich (honeycomb) with carbon/epoxy facesheet and aluminum core while the main provision for equipment attachment are also designed to resist to parachute loads. The analysis provide an insight about the structural behavior of RS which the studies of dynamic and static were conducted the aim of this paper is (i) to demonstrate the failure modes of the composite structure subjected to the static load demonstrating compliance with the various established requirements, (ii) to demonstrate the project feasibility and (iii) to demonstrate the design maturate for the opening events by development tests and structural analysis. The analyses were accomplished with the Finite Element Method (FEM) by means of an Abaqus solver and the design development by means of a Pro/Engineer CAD software.