Paper ID: 31332
student

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Interactive Presentations (IP)

Author: Mr. Blazej Marciniak
Institute of Aviation, Poland

Dr. Jan Kindracki
Warsaw University of Technology (WUT), Poland
Prof. Piotr Wolanski
Polish Academy of Sciences, Poland

DESIGNING AND TESTING PARACHUTE RECOVERY SYSTEM FOR SOUNDING ROCKET

Abstract

Designing trustworthy recovery system for spacecraft's and sounding rockets is a crucial task. A reliable recovery system reduces operational cost by enabling re-usability of a spacecraft. The most common approach is to use a parachute, due to its relative simplicity, low cost and reliability. The main goal of this paper is to present the tests of parachutes and whole recovery system designed for sounding rocket with apogee up to 100km. The issue is currently being developed at the Institute of Aviation in Warsaw. The research has been mainly performed in the wind tunnel at Warsaw University of Technology, with flow speed up to 100 m/s. The test stand consist primarily of; the load cell enabling acquisition of force exerted on the parachute riser while deploying from mortar (in airflow) and the high-speed cameras acquiring canopy area in inflation process. The results have been compared with numerical and analytical calculations. Design of test stand and data acquisition system is also presented. Different types of a parachute have been considered as main one. Ultimately the cross type one has been selected due to its stability, relatively high drag coefficient and ease of manufacturing. The main goal of the tests was to determine the values of forces occurring in inflation process and an attempt to develop reliable method for calculation them.