Paper ID: 31317
oral
student

SPACE SYSTEMS SYMPOSIUM (D1)
Hosted Payloads - Concepts, Techniques and Challenges, Missions and Applications (7)

Author: Dr. Nicole Viola
Politecnico di Torino, Italy, nicole.viola@polito.it

Ms. Martina Mammarella
Politecnico di Torino, Italy, martina.mammarella90@gmail.com
Dr. Fabrizio Stesina
Politecnico di Torino, Italy, fabrizio.stesina@polito.it
Mr. Marco Camisassa
Politecnico di Torino, Italy, marco.camisassa@studenti.polito.it
Mr. Alessio Antioco Muggianu
Politecnico di Torino, Italy, alessio.muggianu@gmail.com

METHODOLOGY FOR ASSEMBLY, INTEGRATION AND VERIFICATION OF THE AVIONIC SYSTEM OF A TECHNOLOGICAL EXPERIMENT ON-BOARD THE INTERNATIONAL SPACE STATION

Abstract

This paper presents a methodology to carry out the Assembly, Integration and Verification of the avionic system of a techological experiment on-board the Internation Space Station. The avionic system consists of three main subsystems, i.e. the on-board data handling, the electric power and the health management subsystem, and supports a technological experiment which focuses on the investigation of passive thermal control subsystem. The Assembly, Integration and Verification (AIV) campaign is a fundamental step of the design process, as the final objective of the AIV is to demonstrate that the end product meets the specified requirements. The selection of simple technical solutions and the necessity to keep cost down have driven the definition of the AIV plan, which has been tailored for the avionic system under consideration. Main purpose of the methodology for the Assembly, Integration and Verification is to provide the designer with a step-by-step procedure to accomplish the verification and validation of the avionc system. The methodology shall pursue an incremental approach, which defines the test plan from components to parts, subsystems and system levels through subsequent integrations. Being the AIV a crucial process for the mission reliability of any system, the proposed methodology shall pursue the enhancement of the system reliability and safety by defining, for instance, the most appropriate verification methods to verify the compliance with requirements, the tests to perform and the most correct tests sequence. Models phylosophies are discussed and the most suitable model phylosophy for the avionic system is selected. The methodology has been developed fot the avionic system of a technological experiment but is flexible enough to be applicable to multi-purpose avionic system, capable to support different types of experiments. This paper provides an introduction to the avionic system, then it proceeds with the description of the AIV methodology and the main results obtained by its application to the avionic system. Eventually main conclusions are drawn.