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Future Space Transportation Systems Verification and In-Flight Experimentation (6)

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THE CHALLENGES OF THE AUTONOMOUS SOFTWARE FOR THE INTERMEDIATE EXPERIMENTAL VEHICLE (IXV)

Abstract

A successful flight of a complex and innovative space vehicle, in this case, the Intermediate eXperimental Vehicle (IXV) is a challenging task involving hundreds of technological disciplines. While focusing on the successfully flown On-board Software (OBSW) subsystem, the main innovative ones have been: performing an autonomous flight, guaranteeing high configurability, ability to respond to the predefined actions in the mission timeline and to implement and validate the control software starting from the algorithms specifications.

To manage all what above outlined aspects, a consolidated development environment for critical software has been followed, including several standards (ECSS, MISRA, etc), defining a high degree of SW modularity, and ensuring the correct timing behaviour of the software. Resulting in a flawless software behaviour during the whole mission.

The most direct and remarkable outcomes of the IXV experience, without discarding the importance and visibility of all the companies involved in the project, have been to gain an invaluable master experience on operational critical software, configurability, autonomous flight, and control software development, opening a direct reuse of these disciplines on future projects not only limited to re-entry mission.