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SPACE OPERATIONS SYMPOSIUM (B6)
Human Spaceflight Operations (1)

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7 YEARS AND 5 MISSIONS OF THE AUTOMATED TRANSFER VEHICLE (ATV) OPERATIONS BY VEHICLE ENGINEER TEAM

Abstract

On 09th March 2008, the first European spacecraft Automated Transfer Vehicle (ATV) Jules Verne successfully completed its Launch and early orbit operations. Last ATV (N5) George Lemaitre will be launched mid-2014 with planned safe destructive re-entry planned 6 months later. This 5th mission will also be the end of 7 years of operations. CNES contribution to this major Program consist in implementing the ATV control Center (ATV-CC) in Toulouse (France) and performing ATV operations (command and control) in relation with ESA, Astrium experts and International Partners.

The mission sequence is quite complex but can be split in two very different phases: - A Free Flight : from Ariane 5 separation up to the docking with the ISS and from undocking to reentry. These activities can lasts from few days to few weeks with a high density of critical operations. - An attached phase with the ISS with a lower density of operations like propulsive support to the station (to counterbalance the atmospheric and solar drag), control of the ISS attitude, debris avoidance maneuvers (DAM), cargo supply, evacuation of the ISS wastes.

Vehicle Engineer Team (VET) is composed by about 25 technicians and engineers trained through simulation campaigns before real operations. VET is in charge of commanding and monitoring the vehicle in real time from the launch to the reentry managing contingencies and recoveries.

Besides operational tasks, an important work is done for the operations preparation (database management, operational products creation and validation, training...).

Since first ATV flight, ATV-CC vehicle team associated to the whole operation teams, has built and improved dedicated processes, has developed specific tools and advanced training in order to face most of contingency during the mission. The lessons learnt from previous flights were taken into account to improve the training, processes and tools and to make a good trade-off between automation and human dependability during operations.

The purpose of this paper is to describe the last operations concepts and methods used by ATV Vehicle Engineer Team, taking into account safety and international partners requirements. Therefore this paper will be the final summary of 7 years of operations concepts evolutions for ATV Vehicle Engineer Team and may be benefit to present or future space cargo missions. Major topics like team organization, manning, contingencies management will be tackled.