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TEMPORARY STOWAGE RACKS – DESIGN AND OPERATIONAL SCENARIO

Abstract

At the time of the first ATV (ATV 1 - Jules Verne), the launch configuration in the Pressurized Module consisted of 6 out of the possible 8 racks. The ATV attached phase to ISS was for a maximum of 6 months, during which time the ATV was mostly in the "Dormant" mode. Throughout the 6 months of attached phase, the ATV also provided an increase of the ISS Stowage capability. In order to fully exploit that capability, the 2 empty rack locations (ATV1D1 and ATV1O1) were planned to be utilized for temporary and staged stowage. A proposed solution for making use of the empty rack bays was to make a so-called bungee jail. However, since the CoG of the ATV dry cargo needs to stay within 40 x 40 x 30 cm (height x length x depth), ESA gave a contract at that time (2007) to ALTEC to design, manufacture and procure two Temporary Stowage Racks (TSRs) to provide, in the two empty locations, a means for temporary and staged stowage. The TSR is a soft rack, compatible with ATV's rack locations, made of NOMEX capable of stowing on-orbit items and, in particular, at least the equivalent of 18 CTBE (CTB Equivalent, i.e. Full-size (single) CTB) and 6 ICC Rack Adapter Plates. The TSR was planned to be installed in ATV only on-orbit. As such, the relevant design did not take into consideration the launch / landing loads; only the handling on-ground loads as well as the loads coming from an emergency un-docking and return in the cargo fully loaded configuration were considered. Further operational improvements, in particular, saving crew time during ATV operations as well as saving volume for cargo up-mass, inspired the initiative to extend the TSR capability to be launched in its deployed configuration in ATV. Purposes of this paper are to present the design, operational capabilities and utilizations of the TSRs, highlighting also potential further improvements. The paper was not presented at previous meetings and financing and attendance of the author at 61st IAC to present the paper is assured.