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COLUMBUS HYBRID PAYLOAD CONFIGURATIONS

Abstract

Columbus supports a growing number of pressurized Payload Experiments, based on commercial equipment. For modern Payload Experiments this means a growing number of already qualified equipment on the one hand and, but requirements to comply to the aging infrastructure on the other hand. Within the Concept Phase of new Payloads there are two major drivers that impose effects onto the Design of the Payload Experiments; this is mainly the Interface Requirements of the Module and Safety Requirements.

The modernization of the Columbus infrastructure aims to support commercial equipment integration and associated accommodation as hybrid configurations. Hybrid configurations are Payload Experiments, accommodated in existing Payload Racks, but allow utilization of Internet Protocol communication and Multi-Purpose outfitting equipment. This helps to keep the number of acquired Services from Rack or Module low, especially Services that are complex or part of legacy Data Management System. Hybrid configurations may be also based on Centre Aisle architecture, which are not limited to Standard Utility Interface Panel Resources or budgets.

Hybrid configurations reduce the amount of Verification at User Support and Operations Centers significantly; the development of new Units is supported by flight-like, but simplified Ground Support Equipment. Final validation steps for acceptance encompass less risk and less duration within the Rack Engineering Models. The simplification of Interface Requirements and reduction of Means of Verification (Test) that require access to Engineering Models, which do also provide operational support to the Rack operators assists to cut-down development and verification time of new Payload Experiments.

The approach of Hybrid configurations aims to support more utilization within Columbus and to provide more Service options, using standard equipment and the Columbus modernized Data Management Infrastructure. Thereby the Payloads can save procurement- and qualification efforts in order to reduce overall Project lead times. Hybrid configurations can therefore help to reduce the timespan from Phase A to D to an overall 12 months, dependent on the Payloads' complexity and acquired Interface resources from Rack or Module. Consequently this approach is predestined to support national Missions or future private Missions with short lead times and limited times for training.