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COLUMBUS NEW SYSTEM DATA MANAGEMENT INFRASTRUCTURE

Abstract

The ISS Module Columbus provides different communication Lines to Payload Experiments. These Data Links are legacy Services as MIL Bus 1553, Medium Rate Data Link in CCSDS Protocol and the High rate Data Link as unidirectional Link in TAXI Protocol; on the other hand there is IP Communication in Columbus since 2018, an extension to Joint station LAN, called Multi-Purpose Computer and Communication (MPCC). The MPCC architecture mainly comprises of a Laptop Computer, namely the European IP Communication laptop (EICL) and a Columbus Payload LAN switch. Selection of Station-based Laptops as backbone to MPCC was important in the first phases of the Project, but stability of the System needs improvements.

The already planned MPCC updates are part of Data Management System Modernization, with enhancements through Columbus LAN Switch Mark 2, the Columbus Network Monitoring and Administration Unit (CMAU), supplemented by a Network Attached Storage device (NAS); the plan foresees to install and activate these enhancements in Sept. 2022. A significant enhancement of the flexibility and utilization of the System can be expected.

Further evolution of the System will be addressed by this abstract and the presentation, introducing the Columbus System embedded new Data Management Infrastructure. The current / legacy Data Management System will be introduced, potential candidates for removal will be proposed and the resulting Volumes will provide accommodation Volumes to the new Units, replacing the Services of Laptop-based EICL and CMAU, adding more stability and reliability to the System. The new System will be built modular to allow maintenance Services to Units, based on commercial parts. New paths for the downlink of current Data Links will be identified to sustain existing tasks of the legacy DMS. New Services will add additional use cases, supporting the Flight crew and Ground Operations. The primary aim of the new System is to provide stable IP Communication Services to Payload Experiments and Carriers like Bartolomeo. This shall be realized without large Interface budgets, which are required by the Experiments, such as Power and Heat Load to the Cabin Air; this Design goal will be achieved by Integration into the existing System perimeter and a scalable platform of the new System Data Management Infrastructure.