

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Utilization & Exploitation of Human Spaceflight Systems (3)

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COLUMBUS INFRASTRUCTURE UTILIZATION BEYOND 2020
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Abstract

Columbus module is operating since February 2008 and is facing several more years of planned utilization. Columbus System has supported various science missions in appearance of external Payloads, pressurized Class-1 / Class-2 Payload Missions, Centre aisle Payload Missions and small Payload Missions.

Recent System evolutions yield to new opportunities for scientific experiments: Current and future Payloads are supported by LAN Interfaces, using IP protocol that allows more utilization of commercial items. Network Services provide System capabilities that are no longer required on Payload level. Commercial Interfaces in combination with Columbus Multi-Purpose Computer and Communication (MPCC) network capabilities allow installation and operational readiness with low crew attention.

Future applications, supported by Columbus MPCC will provide network storage capabilities and computing capabilities, including e.g. science data compression. This will allow cost optimized operations, using new downlink opportunities and enhanced access for scientist via Ground Segment or from home desk.

Centralized services create effective conditions for de-complexed Class-1 Payloads, being supplied by the module with existing supply lines, but standardized and cost attractive Interfaces for cooling, gas, Power and Data. These new Class-1 Payloads will also contribute to the current state of the art logistic chain, using commercial launchers and standardized cargo bags.

Utilization of the module is however not only driven by the existing or future infrastructure. Class-2 Payloads and Centre aisle Payloads have to contribute as well, using the Service as provided by the module, using less complex architecture that allows Columbus infrastructure to effectively support. Cost optimization is not limited to Small Payloads; also Class-1, Class-2 and Centre Aisle Payloads can adapt CoTS or hybrid CoTS approaches. The effective use of standard equipment among different Payloads is one of the major tasks of future System Payload Integration and shall start earlier and shall be more involved into Payload Development and AIT process.

Safety aspects shall be streamlined to allow enhanced use of similarity effects. Payload equipment qualification and/or certification shall follow reliability aspects. Payload Engineering Products shall be conducted on data bases rather than Interface Control Documentation and current end products.

The future ISS utilization from 2020 on is a decisive step towards manned space projects within LEO or beyond. Airbus DS aims to increase Columbus utilization to conduct more scientific experiment Missions. The approach is taking benefit of successful project and science Mission results of Fluid Science Lab.