

HUMAN SPACEFLIGHT SYMPOSIUM (B3)

Flight & Ground Operations of HSF Systems – Joint Session of the Human Spaceflight and Space Operations Symposia (4-B6.5)

Author: Mr. Petrus Batenburg

Airbus Defence and Space, The Netherlands, pawbatenburg@gmail.com

Mr. Dieter Arndt

Airbus Defence and Space, Germany, Dieter.Arndt@airbus.com

Mr. Horst Himmelskamp

Airbus Defence and Space, Germany, Horst.Himmelskamp@airbus.com

EVOLUTION OF THE DATA MANAGEMENT SYSTEM OF THE EUROPEAN COLUMBUS
MODULE: IMPROVING AND ADAPTING FOR FUTURE NEEDS

Abstract

Based on computer technology of the 90's, the Data Management System (DMS) of the European Columbus module uses a two layer system for operating the module. A vital layer is used with high reliable SW and HW to guarantee control of the vital systems as well as the Emergency, Warning and Caution System (EWACS) functionalities for safety of the crew. A Nominal layer which partially complements the interfaces to the ISS station wide CDH. The DMS nominal layer allows for a more flexible programming to allow adapting of the SW for new needs and correcting anomalies. Last but not least a dedicated Portable Work Station (PWS) was implemented for command and control of the nominal layer by crew; where the USOS Portable Computer System (PCS) is used for command and control of the vital layer by crew. The European Columbus module has now been in Orbit for over 6 years. Like the other partners ESA also has observed an increase of small standalone payloads next to the Class 1 payloads that are run in the payload racks. These so called Class 3 payloads often apply new commercial technologies which require interfaces of actual state-of-the-art technology levels. In addition the operations of the Columbus module showed that sometimes a more flexible and faster method is required for new engineering needs or corrections of failures. This paper describes what major anomalies have been observed over the 6 years of operations and what was done to correct them. In addition it provides what improvements have been made to the DMS to allow for faster and more flexible control without impacting the vital and nominal operations of the DMS. Finally this paper discusses the upgrades that are currently in work for the life time extension and the additional DMS functionalities and technical capabilities that are being demanding for the new (type of) payloads that will fly in the next years. Additionally the benefits w.r.t. low cost, less time and improved efficiency gained by the performed evolution of the DMS up to now and in the future will be characterised. All over it will be discussed how the core functions of the DMS will be kept high reliable and secure with the envisaged technology improvement integrated and deployed.