

SPACE OPERATIONS SYMPOSIUM (B6)
Human Spaceflight Operations (1)

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EVOLUTIONARY IMPROVEMENTS FOR THE COLUMBUS SOFTWARE CYCLE TRANSITION
PROCESS**Abstract**

The Data Management System (DMS) is a high-availability network of electronic equipment that enables system and payload operations onboard Columbus, the European Laboratory of the International Space Station.

The set of software units loaded on the individual machines constitutes a Software Cycle. In order to minimize the impact on ongoing operations, improvements and upgrades are applied simultaneously via Software Cycle Transitions.

Since the beginning of the Columbus mission in 2008, four Software Cycle Transitions have been performed in 2008, 2009, 2012 and 2014. The steady improvement of the onboard software via this process has gradually increased the capabilities and features of the DMS while solving existing issues.

This work focuses on the transition performed in January 2014, updating the DMS from Software Cycle 13 to Software Cycle 14.

In this work, the preparation, execution and post-execution analysis of Software Cycle 14 Transition is described, from the first operational tests on the Engineering Test Model, to the lessons learnt process, including the real-time implementation phase. Improvements to this process are implemented in order to further reduce the impact to payload operations and to the crew.

A particular emphasis is given to the planning and the preparation of the operational and ground products needed for the transition, and to the interfaces between the Columbus Flight Control Team, Engineering Support Team and International Counterparts.

This work aims to set a standard for future transitions, and to provide guidelines and best practices for similar operations in other missions.