

SYMPOSIUM ON STEPPING STONES TO THE FUTURE: STRATEGIES, ARCHITECTURES,
CONCEPTS AND TECHNOLOGIES (D3)
Infrastructures and Systems to Enable Ambitious Future Exploration and Utilization of Space (3)

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INFUSION OF INNOVATIVE TECHNOLOGIES FOR MISSION OPERATIONS

Abstract

The Advanced Mission Concepts and Technologies Office (Technology Office) at the European Space Operations Centre (ESOC) of ESA is entrusted with research and development of innovative mission operations concepts systems and provides operations support to special projects.

Vision of future missions and request for improvements from currently flying missions are the two major sources of inspiration to conceptualise innovative or improved mission operations processes. They include monitoring and diagnostic, planning and scheduling, resource management and optimisation.

The newly identified operations concepts are then proofed by means of prototypes, built with embedded enabling technology and deployed as shadow applications in mission operations for an extended validation phase.

The technology so far exploited includes informatics, artificial intelligence and operational research branches. Outstanding results include gyro monitoring and diagnostic system for Envisat, based on fuzzy logic, artificial intelligence planning and scheduling applications for Mars Express, space weather monitoring system for the Integral space telescope and a suite of growing applications coded MUST, Mission Utilities Support Tools.

The research, development and validation activity at the Technology Office are performed together with a network of research institutes across Europe. The objective is narrowing the gap between enabling and innovative technology and mission operations.

The paper first addresses samples of technology infusion cases with their lessons learnt. The second part is focused on the process and the methodology used at the Technology Office to fulfil its objectives. The third part is aiming at the possibility of sharing similar experiences with other organizations and research institutes to facilitate the infusion of mission operations and get ready to implement and operate future challenging missions.