

SPACE OPERATIONS SYMPOSIUM (B6)  
New Operations Concepts and Commercial Space Operations (2)

Author: Mr. Christian Laroque  
Telespazio VEGA Deutschland GmbH, Germany

Mrs. Sylvie Haag  
ESOC - European Space Agency, Germany

Mr. Dario Lucia  
Telespazio VEGA Deutschland GmbH, Germany

REDUCING COST IN OPERATIONAL PROCEDURE DESIGN, VALIDATION, AND LONG TERM  
MAINTENANCE.

**Abstract**

Well designed and validated operational procedures are crucial to successful missions. Often the process of validating operational procedures can be long and manual process..

VEGA, with its significant experience in spacecraft operations and ground segment systems, has run a study for ESA with the prime objective to develop innovative concepts and tools to automate the validation of operations procedures. During this study, the concept for a Model Based Operations Validation System (OPSVAL) was established, and a system supporting this concept developed.

The concepts allow automatic validation of procedures at all stages of their development: initial development, upgrade to accommodate a new database or On-Board Software (OBSW) version, modification resulting from test campaign activities, and regression testing. Tools using validation models have been designed, prototyped, and evaluated with extensive involvement of perspective users. These tools can be shared between industry, spacecraft manufacturers, the operations teams and any party for the validation of procedures. The means that the effort for procedure development and maintenance is reduced, and that procedures developed by one party can be provided and re-used by the other parties with minimum effort.

In addition to OPSVAL, VEGA has developed the VEGA Operations Toolkit Procedure Editor (VOT-PE) which can be integrated with OPSVAL to form a complete system. This operations procedure editor can prepare operations by providing an editor for the Flight Operation Procedures. It is based on an open architecture allowing exchanges with other systems, is platform independent (Java-based) and does not require any non-free 3rd party product or COTs. Editing of procedures is performed in a design view setting the main procedure layout directly in a graph, and editing the details via a tabular view. The editor supports all common types of procedure steps (Perform, Decisional I/F, Pre-conditional, Wait, Switch) and statements, and performs consistency checking with the spacecraft database.

The resulting system can reduce the cost for Operational Procedure design, validation, and long term maintenance. The system, runs on any standard platform, allows procedure development, automated testing, and maintenance from a single integrated system. This integrated system provides management of test suites, generation of reports and statistics and export of documentation. The round trip time between procedure edition and testing is reduced to the minimum.