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Knowledge management for space activities in the digital era (2)

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IMPROVEMENTS ON THE ECSS REQUIREMENTS FOR SIMULATION PROCESS AND DATA
MANAGEMENT ENVIRONMENTS OF SPACE SYSTEMS**Abstract**

In the context of complex and/or highly integrated systems development, especially in space projects: 1) concurrent engineering processes are being progressively used to integrate teams responsible for different design disciplines; 2) the increasing computing and communication power available, allow and even stimulate the explosive growth of the volume of data generated by simulation processes in the development of these systems; 3) the nature of data produced along the life cycle of long projects also changes; but 4) technical and legal reasons impose their storage and retrieval throughout the life cycle of the projects. All these 4 justifications impose formidable challenges to its data management.

All this results in problems such as: 1) lack of data traceability and reuse; 2) rework and unavoidable changes; 3) misuse or loss of technical and legal memory; and 4) increase of project time and cost. To deal with these problems, specialized systems for Simulation Process and Data Management (SPDM) have been developed in recent years. Particularly, the European Cooperation for Space Standardization (ECSS) published a series of requirements for SPDM environments of space systems. But they still are under development and admit/need improvements. So:

The purpose of this paper is to analyze, discuss and propose improvements on the ECSS requirements for Simulation Process and Data Management environments of space systems.

The methodology used is: 1) to review the ECSS standards and recommendations to identify the SPDM requirements suggested by them; 2) to review the available literature on information management along the life cycle of space projects; 3) to analyze them under the underlined/stated needs of space systems; 4) to synthesize the results of the previous steps as recommendations for improvements on the ECSS requirements for Simulation Process and Data Management environments of space systems.

These recommendations mention two software, the Remote Component Environment (RCE) and the Virtual Satellite (VirSat), developed by the German Aerospace Center (DLR) and the requirements for their integration. Although limited in some functionalities, the proposed requirements fulfills their objectives and can be considered by organizations which strongly use modeling and simulation and need to manage data and simulation processes in space projects.

The results are the reviews, analyses, and proposed improvements on the ECSS requirements of Simulation Process and Data Management environments of space systems.