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THE RELATIONSHIP BETWEEN THE MODEL BASED SYSTEMS ENGINEERING MODELS AND INFORMATION SYSTEMS TO SUPPORT SPACE PRODUCTS LIFECYCLE PROCESSES

Abstract

Motivated by the needs of the Integration and Testing Laboratory (LIT) of the Brazilian Institute for Space Research (INPE), this paper aims to analyze how the information of space products life cycle processes are determined from the models used for their development, considering a model-based approach. With a focus on Space Systems Engineering, exemplified with the satellites Assembly, Integration and Testing (AIT) process, we analyzed the relationship between Systems Engineering models with a future Information System to support the product lifecycle process. There are various business processes to perform the satellite life cycle phases. Integrated with each other, they deliver the final result. A business process is a set of activities or related tasks that are performed to deliver an expected result. Information Systems are a good way to improve the business processes performance. AIT is one of the satellite life cycle processes. Doing AIT is so complex and many equipment, people, tasks and information are involved in it. So far, at LIT/INPE there is not an Information System that support the whole AIT process practiced there, and the storage and exchange of AIT information is document based. The use of documents as a primary source of data makes it difficult to retrieve information during the process, requires a lot of effort from the team involved in it, and sometimes causes delays in activities. There is a worldwide trend for a shift from the document-centric to the model-centric approach to engineering complex systems. Model Based Systems Engineering (MBSE) improves Systems Engineering practices using models to represent the system in various aspects. Models are built to represent requirements, structure and behavior of systems. These models, among other advantages, become consistent and reliable sources of information to support the various phases of the product lifecycle. Concerning the LIT case, the MBSE benefits as well as the adoption of Information Systems can improve the AIT process. We must consider that build good models that faithfully represent a system demands effort and skilled workforce. Equivalent effort and workforce are needed to build Information Systems that faithfully meet the needs of a business process. There is a relationship between these two activities and collaboration between them can be helpful to reduce development effort.