

METHODOLOGIES AND TOOLS FOR SPACE SOFTWARE SYSTEMS DOMAIN ENGINEERING

Round table: Avionics Reference Architectures

Position paper

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ABSTRACT

The European Space Technology Harmonisation Dossier for On-Board software stresses the need to identify generic architectures and standardized building blocks as well as to define families of space software systems. Given that the problem of systematic reuse grows increasingly complex with the rising complexity of system requirements, a clear need arises for specialised and detailed guidelines on how reuse objectives have to be set and understood and on what measures should be taken into account in projects to actively pursue those objectives. The DOMENG and COrDeT projects aim at establishing the foundation for space software systems domain engineering.

Domain engineering is an element of system engineering, which is an integrated set of engineering disciplines that supports the design, development, and operation of large-scale systems. Domain engineering is distinct from system engineering in that it involves designing assets for *multiple* applications, as opposed to designing the best solution for a single application. The domain engineering process involves the identification of models describing the domain, the design of domain (generic) architectures for families of systems in the domain, and the identification and construction of assets for use in the implementation of those architectures. This definition implies three groups of activities: domain analysis, domain design, and domain implementation.

From the survey and assessment of the vast number of domain engineering methodologies that have been proposed in the last two decades, the DOMENG and COrDeT projects have proposed an approach to domain engineering for Space systems. Languages have been selected to create the generic models needed to describe the model architecture for system families or product lines. Recommendations on the support tools for use in projects have also been put forward.

This paper will present the methodologies and tools –and their justification– identified during the first phase of the DOMENG and COrDeT projects as suited for the space software system domain engineering process in the conceptual framework of the ISO12207 domain engineering process. The utilisation of methods and tools for each activity is a key element for the successful execution of the whole domain engineering process and it will also facilitate the exploratory application of the domain engineering practice to Space Systems.