

Study on ARINC, ASAAC and AUTOSAR in the scope of Space System Software Domain Engineering

Jung, A¹; Rodriguez, A²; Rodriguez, P³; Salazar, E²; Stragapede, A¹

¹ESA/Estec; ²GMV; ³SoftWcare

(This paper will be presented by A. Rodriguez, GMV)

Domain engineering is the process of analysis, specification, and implementation of software assets in a domain which is used in the development of multiple software products. The objectives of the DOMENG/CorDeT projects are to establish the initial steps for a framework for the space systems domain engineering. The first activities, belonging to the overall Domain Engineering process, consist of information gathering in order to define the knowledge domain relevant to spacecrafts. This information gathering in the studies takes into the current trends in technology for space, especially those related to software Interoperability, Composition and Reuse, but also inputs from outside the space domain - in particular the aeronautics (civilian and military) and automotive domain.

The investigation of the IMA concepts (ARINC in the civilian and ASAAC in military domain) and AUTOSAR standards within the frame of the studies will be presented. The first findings indicate that:

- IMA concept, applied by both ARINC and ASAAC standards, try to improve operational and mission performance, and also reduce life cycle cost.
- ARINC is really driven by the need to execute software components of different criticalities on the same processing platform and guarantee no side effects between applications to occur (spatial and time partitioning concept).
- ASAAC is rather driven by the need to change and update hardware and software components during the aircraft lifecycle (through the use of hardware standards and the blueprint concept).
- AUTOSAR is pushed by an industrial organisation where the primes want to systematically subcontract software by cutting it into interchangeable pieces with standardized interface and distribute it on the control units (virtual functional bus concept).

The paper will investigate the rationale for each of these approaches and will attempt to define, among these rationales, the criteria that are valid for space, therefore giving an indication of what could be the solution for spacecrafts.

Practically for DOMENG and future activities, these previous experiences can help us to identify areas to model, in particular both the commonalities and variabilities of the domain, helping to avoid drawbacks obtained in previous models and take advantages of the main goals achieved.

The expected interest for ADCSS is to give a flavour of what could be the logic guiding space avionics people towards the definition of new systems.