Dassault Aviation feedbacks on its military and civil IMA applications

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This presentation is based on two operational applications of IMA, made by Dassault Aviation as system integrator, on its aircraft families. The first one is the MDPU (Modular Data Processing Unit), an IMA dedicated to military mission systems. This solution has been jointly developed by Dassault Aviation and Thales and is based on ASAAC (Allied Standard Avionics Architecture Council) IMA concepts. It is currently used on Mirage 2000-9 and Rafale. The second application is EASy, the certified IMA used on Falcon families (F900, F2000 and F7X). This IMA is an adaptation of the IMA Primus Epic from Honeywell.

The feedbacks issued from both applications can be given at various points of view: industrial sharing, specification, development, integration.

The role of the different stakeholders should be clearly defined. The ones identified by RTCA DO-297 are a good reference.

As far as the specification phase is concerned, three main recommendations may be given:

- Engineering activities should be structured according to the system hierarchy, e.g. Aircraft, subsystem x, IMA platform, applications
- Non functional requirements such as performance, initialisation, configuration/ reconfiguration, reliability, availability and maintainability should be explicitely specified
- Observability needs should be specified at this stage and associated means identified

From the system integrator point of view, the main feedback to be highlighted in the IMA platform development phase is related to the COTS ("Commercial off the shelf") components use. COTS reuse is recommended to reduce costs and time duration. This benefit is obtained only if the COTS components are used in the domain for which they have been previously produced and used. Use outside this domain inevitably induces integration extra-work. In final in most cases total costs are higher than the ones spent for the development and the integration of a bespoke component.

As far as application development is concerned, a strong decoupling between hardware and software allow to develop applications independently from the target platform by using representative emulation means.

Main issues in the integration are related to the control of its complexity. We note that to simplify the integration of the applications on an IMA platform, use of time and spatial partitioning as implemented by ARINC653 compliant OS is highly helpful.

In conclusion, the mastership of the Software architecture and of the applications integration on an IMA platform is perceived as a key-point to successfully conduct the future programs. These latter will indeed rely on the selection of an open architecture which will allow to build avionics systems with constituents produced by the best suppliers in their domain of expertise.