

The ASHLEY Software Framework – an Efficient Approach to Develop Second Generation Integrated Modular Avionics

The project ASHLEY (Avionics Systems Hosted on modular electronics Large scale dEmonstrator for multiple tYpe of aircraft) enhances the widely established first generation Integrated Modular Avionics (IMA) modules with new decentralised modules to form a new, distributed avionics architecture. One key element of the project is the implementation of a demonstrator making use of these new IMA-modules and an innovative seamless tool-chain.

The executed avionics functions belong to different systems, including the fuel and landing gear system as well as the high lift and ventilation system. Within ASHLEY, the TUHH takes over the task of enhancing the Platform Configuration Tool (PCT) that integrates into an ASHLEY Software Framework, as well as specifying and implementing its interfaces to other IMA engineering tools. Parts of the framework are tools for planning, detailed design, evaluation, implementation, configuration, integration and verification of system applications. As the PCT realises interfaces to every tool of the tool-chain, it maintains a central role within the process. For this reason it connects already existing, mature and commonly proven tools with newly developed tools to suit the need of a smooth workflow. Starting with a textual version of the top level requirements, the system designer can design the system functions with a new Function Modelling Tool developed by one of the partners in the ASHLEY project. The resulting system functions model can be allocated to IMA-modules and be validated by the Platform Evaluation Tool provided by another partner. Further tools support the avionics architecture optimization to finish the design phase of the process. The PCT is used to process the avionics architecture model and configure the different IMA modules and the communication of the system functions. Finally, configuration documents for the system applications of different IMA modules are transferred to the previously existing and certified verification and integration tools, provided by other partners.

The paper presents the challenges and development results of the interfaces towards other tools from the perspective of the PCT. Different approaches will be shown and lessons learnt will be highlighted accordingly.

Overall, the development of IMA and an efficient toolchain to support the development process are a great challenge. But the implementation how it is done in the ASHLEY Software Framework represents a solution with many advantages. The specification of interfaces and implementation of tools to process and edit the modelled data guarantees an efficient and faultless process. The paper presents the chosen approach and concepts of the seamless toolchain in detail and discusses the advantages of model-based design.

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