AUTOCOGEQ - Preparation for the Qualification of Auto-Code Generated from Simulink Models

The AUTOCOGEQ activity has the main objective to define a detailed lifecycle process, methodology, set of tools and procedures that optimize the development of model-based design for spacecraft subsystems in Matlab/Simulink environment (with particular emphasis on AOCS/GNC SW) and automatic generation of production code for direct integration in on-board critical flight Software (ECSS critical software category B). The SW lifecycle that involves model-based design and autocoding has been analyzed. A methodology including a set of modelling rules has been developed and proposed for this type of SW to generate flight code from Simulink models. Evaluation of a set of tools has been performed and a baseline has been selected after a trade-off to support the complete SW development process (from design to code generation). An assessment of the impact of autocoding techniques in critical SW on the ECSS standards has been also carried out.

Along with the definition of the autocoding methodology the AUTOCOGEQ activity focuses on the development of a computer aided tool (Wizard) to help the developer with the application of the modelling process and code generation in order to advise and support the user on the compliance with the modelling/coding standards defined. This wizard integrates the baseline tools selected and purchased for this activity.

A GNC simulator with a representative complex GNC (synchronization phase for ADR scenario) has been used to demonstrate the end to end autocoding methodology and processes with the support of the wizard developed. Production code has been generated for the GNC subsystem and reports for all the verification steps of the methodology have been automatically produced.