Integrating the Simulink Qgen Qualifiable Code Generator in the TASTE Framework

QGen is a qualifiable and tuneable code generation and model verification tool for a safe subset of Simulink® and Stateflow® models. It reduces the development and verification costs for safety-critical applications through qualifiable code generation and model verification. The tool allows one-click code generation from Simulink and Stateflow to MISRA C or SPARK-compliant Ada. Seamless integration with SPARK and Codepeer allows to verify the input model against logical inconsistencies (overflow, dead branches) and prove safety properties defined using the Assertions blocks.

During the 1,5-year long PECS project IB Krates has integrated this tool to the TASTE framework and adapted a real-life case study (Integrated Motor Controller for Mechanisms) to demonstrate the code generation directly from Simulink as well as integration between TASTE and QGen.

The recent integration with TASTE allows:
- define the architecture of an application using TASTE
- specify functionality of each module in Simulink
- use taste frontend for generating both functional code (by launching QGenc for each module) and the glue code binding the modules
- a separate test harness generator allows to package the functional modules with test vectors from Simulink and run regression tests on target hardware without the need for actual IO.

The project presentation will include:
- Introduction of the QGen toolset capabilities
- Overview of the developments done on TASTE integration and test harness generation
- Demonstration of the TASTE integration and test harness generation