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Rapid Firmware Prototyping with Matlab/Simulink for MicroTCA.4

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The new MicroTCA.4 hardware platform facilitates control of complex system with a large number of actuators and sensors. However, the number of available devices and their complexity makes it increasingly difficult to simulate and implement a controller design. The usual work flow includes simulating the system behavior, building and testing a controller in the simulation and, finally, translating it to a hardware-description language and building the firmware. This requires expertise on both topics, the simulation and controller design as well as the HDL development, which usually means dividing the work between application engineers and FPGA programmers.

The Xillinx System Generator Toolbox for Matlab Simulink allows the application engineer to use a model based approach to design the application and precisely simulate the final behavior e.g. taking the fixed point representation of numbers into account. The new toolbox developed at DESY complements System Generator and allows the user to add and simulate board specific interfaces and generate the VHDL code and netlists that reflect the design for a specific AMC with possible FMC and RTM extensions. This contribution will demonstrate the capabilities of this toolbox and show the simplicity of building a small control application from scratch.

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