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City University of Applied Sciences

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Arun Kumar Keshava Reddy

Development of a Simulink Structure for Linking Bus and I/O Signals to a Generic Rest Bus Environment Model.

ABSTRACT - Masterthesis

As the vehicles today are becoming electronically complex and as their technological intelligence grow, the number of Electronic Control Units (ECUs) and the challenges involved in testing and validation of the embedded software for an ECU are also high. Restbus Simulation (RBS) is a technique that is employed when testing devices on communication networks where the 'rest of the bus' is simulated in order to facilitate testing the ECU in question. The network's communication information which is to be simulated in the bus is usually available in the standard communication matrix description files (DBC, FIBEX) which also describe the signal-bus routing. The communication matrix changes frequently during the development process of a project which makes it cumbersome to update the linking information between the bus and the generic model signals in the Simulink model.

The objective of this thesis is to develop a generic Restbus environment model for a dSPACE Hardware-In-the-loop (HIL) for linking bus and I/O signals to a generic Restbus environment model. First, a concept to develop a Simulink model is to be conceived and implemented for linking Bus and I/O signals to a generic Restbus environment model in such a way that all the simulation platforms (HIL, SIL - Software-In-the-loop, MIL - Model-In-the-loop) employed at ZF Friedrichshafen AG are linked with the same quality. In order to achieve seamless integration of the rest bus simulation, the next step is to integrate a generator plugin into an existing 'Test Environment Configuration tool' developed in QT. In conjunction to the user inputs in the configuration tool, the tool generates configuration files with the linking information, based on which the Simulink model is built automatically. A transformation must take place from text-based to graphical programming.

In the process of problem solving, a workflow must be created which ensures consistent data matching. The outcome of this thesis work can be validated by testing the Simulink model which was built based on the configuration files generated by the 'Test Environment Configuration tool' in a dSPACE-HIL.