# NovaCarts CAPE/FPGA-Toolchain

Simulating electric motors precisely requires extremely fast simulation models with small increments of one microsecond or less. As even fast off-the-shelf processors no longer generally meet today's requirements, they are often replaced by simulation in FPGAs.

Matlab/Simulink is frequently used for modeling. Many users already have their own simulation models created in Simulink. NovaCarts CAPE/FPGA Toolchain (NC-CAPE-FPGA) provides these users with a set of tools to create FPGA images and FPGA bitfiles from Simulink models. Individual files are implemented as Simulink models and compiled into FPGA-specific bitfiles using the Xilinx System Generator. MicroNova provides corresponding Simulink blocks for connecting the models to I/O and to higher-level mechanical simulations such as driver or transmission models (Figure 1).

NC-CAPE-FPGA can be used to generate FPGA models for NovaCarts boards, e.g. for the high-performance FPGA board NovaCarts High Speed I/O Board (NC-GMB3010). The simulation models are clocked at an interval of 10ns (100 MHz). Implementation within the FPGA allows very fast models to be executed thanks to parallel processing.

Access is provided to parameters from the data-base, analog I/Os as well as digital I/Os within the FPGA model.
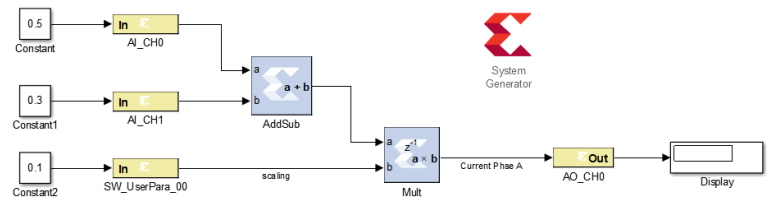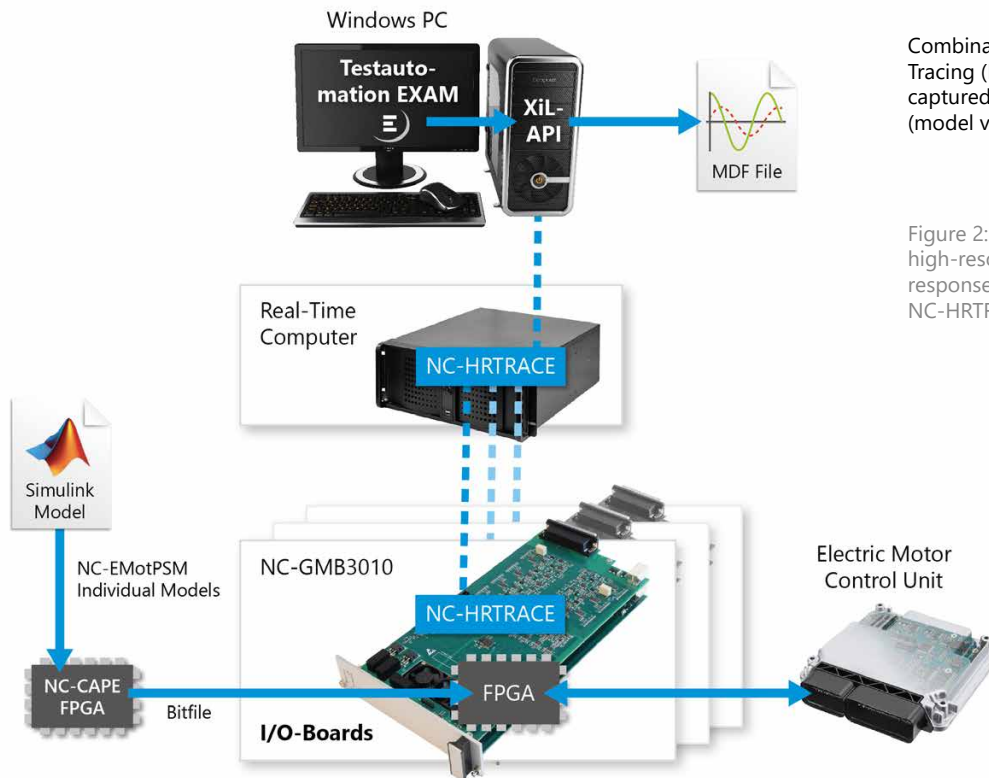


Figure 1: Simulink block set to connect user programs and I/Os



Combination with NovaCarts High Resolution Tracing (NC-HRTRACE) also allows signals to be captured at high resolution within the FPGAs (model values and I/Os).

Figure 2: NovaCarts hardware and tools for high-resolution simulations (recording of time responses from Simulink models and I/Os with NC-HRTRACE)

# MicroNova
## Software and Systems

# Data Sheet

Order number: **NC-CAPE-FPGA**

Data sheet version: **1V0**

## Features

» FPGA models clocked at 10ns executable directly on NovaCarts I/O boards
» Access to analog and digital I/Os
» Access to software parameters from the NovaCarts database (64 read and write parameters)
» Assignment of custom names for the software parameters in Matlab/Simulink®
» Integration with NC-HRTRACE for high-resolution signal capture
» Support for Matlab 2018a, Matlab 2018b

## Scope of Supply

» NC-CAPE-FPGA Installer
» User manual