Visual and interactive development of hard real-time code

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http://www.modecs.cc/

Platform-Independent, deterministic specification of computation and communication activities

SampleModule

InitMode
- Task1 300Hz
- Task2 100Hz

OperationMode
- Task1 200Hz
- Task3 600Hz

Sensor

Actuator

mode switch

external functions

timing behavior (FLET!) specified independently of
- scheduling algorithm(s)
- communication and execution platform
modeling the timing + functionality of a module

functionality model, i.e., control laws

eg, Simulink-Editor

eg, Simulink Simulation Environment

Task1Impl
Task2Impl
...

TDL-Editor

M1

timing model (TDL)

fully automated generation of executable(s)

functionality model, i.e., control laws

eg, Simulink-Editor

eg, Simulink Simulation Environment

Task1Impl
Task2Impl
...

TDL-Editor

M1

timing model (TDL)

C-Code Generator

C Compiler

Linker

M1
TDL within Simulink

simple case study for demonstrating the tool chain: BMW throttle control
Definition of the TDL Controller

Definition of the TDL Program
Modeling the task functionality

Model transformation ...
... with the translator tool...

... implies FLET-behavior in the simulation
Separate TDL editor suite
modeling the timing + functionality of a module

functionality model, i.e., control laws

eg, Simulink-Editor

Task1Impl
Task2Impl
...

eg, Simulink Simulation Environment

timing model (TDL)

eg, Simulink-Editor

TDL-Editor

Mode editor
Mode transition editor

![Mode Transition Editor](image)

Mode communication editor

![Mode Communication Editor](image)
Advantages of a separate TDL editor suite

- automatic updates
  - model consistency
  - convenient editing
- appropriate, intuitive editor for each TDL aspect
  - mode+task editor
  - mode transition editor
  - mode communication editor
- interactivity (syntax-sensitiveness)