

A long-exposure photograph of a highway at night, showing light trails from cars. The sky is filled with the Milky Way galaxy, creating a starry, blue-toned background. The highway curves through a dark landscape with some distant lights.

TTTech

RazorMotion - The next level of
development and evaluation is here

Highly automated driving platform
for development and evaluation

RazorMotion – Highly automated driving platform for development and evaluation

RazorMotion is a highly automated driving platform designed for application development and evaluation of advanced driver assistance systems (ADAS). It combines premium hardware with the MotionWise software framework. The design is based on several years of experience in the ADAS domain and is ready to act as an A-sample to reduce time to market for product development. RazorMotion reaches further than classical evaluation platforms by implementing a design close to series requirements which enables it to be used during the development process as well as during the testing phase in vehicles. Combined with the proven software framework of the middleware MotionWise, RazorMotion is ready for any safety-critical mission and serves as a powerful platform for the evaluation of future ADAS.

Key Benefits

- High-performance computing for ADAS
- Direct connection of up to 12 cameras
- Based on a safety concept up to ASIL D
- Supports Deterministic Ethernet backbone
- Proven SW framework available
- Comes with robust automotive housing



High performance computing for ADAS

The combination of two Renesas R-Car-H3 SoCs and the Renesas RH850P/1H-C MCU provides the perfect mix of processing power and automotive microcontroller resources to target the autonomous driving era. The ARM Cortex A57 (quad) and A53 (quad) cores of the R-Car-H3 together with its high performance real-time image recognition processor (IMP-X5) provide massive computing power for handling the input from up to 12 camera interfaces. The RH850P/1H-C is a high-end microcontroller for in-vehicle applications compliant to functional safety ISO 26262.

Technical safety concept for ASIL D

The RazorMotion architecture is based on a series proven technical safety concept. The integrated hardware measures include i.e. safe state switch-off paths, a dedicated independent watchdog as well as voltage monitoring resources. The RH850P/1H-C provides on-chip features for hosting applications up to the highest ASIL. In addition, a Deterministic Ethernet backbone enables safety-critical application data exchange. Together with the MotionWise software framework from TTTech, the RazorMotion platform is ready to host applications up to ASIL D.



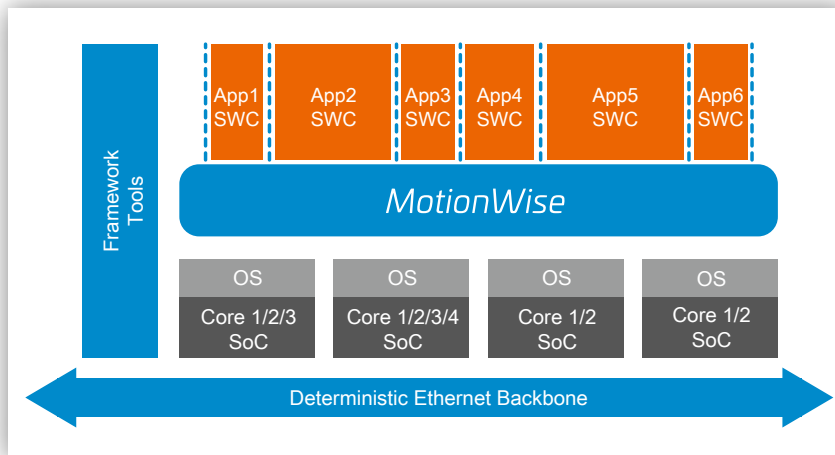
MotionWise framework

The MotionWise framework provides methods necessary to ease application software integration in highly complex environments, as it is the case for ADAS ECUs.

As the key element, MotionWise abstracts communication, memory, hardware and operating system, hence enabling the application software providers to focus on their core competences and application development.

The MotionWise framework, together with the Deterministic Ethernet switch, fulfills the safety requirements of demanding ADAS applications such as:

- Event chains (guaranteed end-to-end latency)
- Interference-free composability



Heterogenous architectures and the increase of application complexity require cross-platform SW, providing a homogeneous API towards communication and services.

MotionWise platform services

In order to cover demanding automotive requirements, the MotionWise framework includes a set of services:

- Life cycle service
- Diagnosis
- Event data recorder
- Persistency
- Camera framework
- GPU handler
- ECU flashing

Application integration services

The constantly increasing complexity of the applications along with the different application suppliers for ADAS platforms definitely generates a need for application integration.

The MotionWise approach eases the integration of applications due to the boundaries applied to the different applications in the time domain as well as in the memory domain.

The process follows a black box approach in order to protect the different suppliers' IP.



Technical Specifications

Processing Resources	1x Renesas RH850P/1H-C (ASIL D MCU with lockstep cores @ 240MHz) 2x Renesas R-Car H3 (ASIL B SoC with 4x Cortex A57, 4x Cortex A53, 1x Cortex R7, 1x IMP-X5, 1x IMG GX6650 GPU)
Video Interfaces	12 x camera inputs (GMSL) incl. remote supply (PoC) 2 x display outputs (FPD-Link III)
Communication Interfaces	4x OABR 100BASE-T1 2 x FlexRay (A/B channel) – wakeup capable 2 x HS-CAN – wakeup capable 4 x CAN-FD 2 x LIN
I/O Interfaces	2 x analog/digital inputs 2 x high side outputs 1 x sensor supply output (5V)
Development Interfaces	1 x Ethernet (1Gbit/s) (i.e. for SWC-Co-Simulation on PC) 3 x RS232 2 x USB 2.0 2 x HDMI (type A) 2 x M.2 extension interface (i.e. for SSD) JTAG interfaces
ECU Wake-Up Options	FlexRay, HS-CAN, ignition (KL15)
Environmental Conditions	Operating temperature range -40°C to 85°C Not EMC compliance tested Not designed for series production
Power Supply	Operating voltage range 9V to 16V (Vnom = 12V) Max. current consumption 5A
Housing	Milled aluminum housing 258 mm x 173 mm x 30 mm IP51
Weight	<1.4 kg (incl. housing)
Accessories	Robust aluminum housing Forced cooling option (heatsink incl. fan) Cable harness 1,5m (breaks out vehicle connector signals to industry standardized connections) Robust transport case

Taking the right turn with safe and modular solutions from TTTech

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