INTEGRATED PLATFORM SOLUTION WITH TATA ELXSI'S DRIVER MONITORING SYSTEM

AUTOSAR Adaptive & Green Hills Software INTEGRITY RTOS

Dynamic and demanding mobility requirements

Automakers and suppliers are frequently confronted with complex and unique requirements in hardware and software to achieve safety, security, performance while keeping in check cost and time to market.

The demand for sophisticated, flexible, and scalable platform solutions for ECUs in vehicles is increasing due to current automotive trends. To address this issue, ecosystems focused on core technologies develop and form platforms to mitigate risk for suppliers and carmakers during the product selection phase are required.

Global vehicle manufacturers and their suppliers are increasingly incorporating safety features to comply with regulatory requirements and improve buyers' user experience and safety.

Safe & reliable platforms for automotive systems

The need for interchangeability of modules to enable a variety of custom solutions, standardization for reusability, domain-oriented architecture, and inter and intra-ECU communication is supported by AUTOSAR Adaptive. It also aids in the creation of a modular configuration that ensures flexibility.
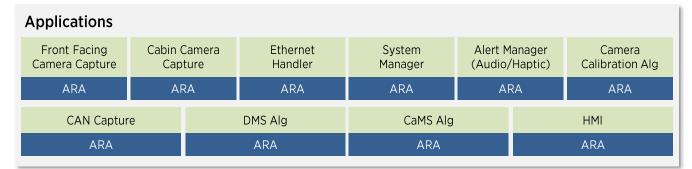
AUTOSAR Adaptive ECUs cater to the need of use cases requiring high computing power and complex algorithm implementation by using the increased bandwidth of Ethernet.

These platforms can be used to run safety application software and digital algorithms, such as identifying aggressive drivers, predictive vehicle diagnostics, and orchestrating actions to automate driver engagement.

Keeping in mind the industry's requirement for reliable platform solutions addressing driver safety, we are excited to collaborate with Green HILLS Software for an integrated Platform solution with Tata Elxsi's Advanced Driver Monitoring System (VOEOSYS), AUTOSAR Adaptive & Green Hills Software INTEGRITY RTOS.

Service Framework

Applications

Front Facing Camera Capture	Cabin Camera Capture	Ethernet Handler	System Manager	Alert Manager (Audio/Haptic)	Camera Calibration Alg
ARA	ARA	ARA	ARA	ARA	ARA

CAN Capture	DMS Alg	CaMS Alg	HMI
ARA	ARA	ARA	ARA

ASR Adaptive Middleware

API	API	API	API
Communication Management	Execution Management	State Manager	Platform Health Management

API	API	API	API	API
Update & Configuration Management	Persistency	Core Types	Log & Trace	Diagnostic Management

Libraries

CV Package Lib
OpenGL Library
ffmpeg
boost
VSomeIP
DLT
rapidjson

Green Hills Software INTEGRITY RTOS Platform

INTEGRITY RTOS	Secure Hypervisor	Board Support Package	System Services	Cryptography Toolkit	Debug and Trace Infrastructure

Bootloader

Application Cores

- Tata Elxsi Developed Components
- Standard Libraries
- Green Hills Software Provided Components
- SOC Provided Components

Target SoCs
i.   NXP i.mx8 and S32 family of devices
ii. Renesas RCAR family of devices
iii. Qualcomm Snapdragon family of devices

Technology

- In-house Driver Monitoring System software (VOEOSYS) powered by hybrid vision pipeline architecture combining vehicle data (direction, speed) with the driver's eye gaze direction, head orientation, and facial expression.

- Functional safety compliant AUTOSAR Adaptive stack from Tata Elxsi based on 19.11, with a feature-rich configuration tool.

- Safe, secure, and deterministic run-time foundation for the DMS software, powered by the INTEGRITY RTOS, pre-certified to ISO 26262 ASIL D and ready for cybersecurity standard ISO 21434

- Hardware Platform validated across multiple camera types (IR, NIR, HDR, webcam, monochrome, and custom-made camera modules)

Features

- Standardization for reusability

- Modular configuration assuring flexibility

- Exchangeability of modules to enable a variety of custom solutions

- Scalable to domain-oriented architecture

- Available to early-access customers

- Runs currently on Renesas R-Car & portable to other leading automotive processors such as those from NXP, Texas Instruments, and Qualcomm