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7th AUTOSAR Open Conference
Keynote Address: 7th AUTOSAR Open Conference

Introduce new organization within General Motors focused on Vehicle Systems Engineering

The complexity of future E/E Systems drives the need for a holistic approach to vehicle design by OEMs

Look for AUTOSAR Development Cooperation to continue to meet the challenges of

• Managing the E/E complexity
• Integrating new technologies
Global Product Integrity Organization

A new organization has been created at General Motors - Global Product Integrity, or GPI.

This team is accountable for system integration and oversight across the Vehicle and Powertrain functions to ensure delivery of award-winning vehicles with consistent safety and compliance performance.

Within GPI,

• The Global Vehicle Safety Organization was strengthened by establishing single point accountability.

• The Systems Engineering organization was created to increase focus on systems interactions.
Methodology: Systems Thinking

Vehicle–Level Requirements

Global Product Integrity
Systems Engineering

Component & Subsystems
GM believes that robust system engineering is foundational for execution of sophisticated, complex distributed control systems

- These are the dominant systems of the future – active safety, semi-autonomous, ....
- Functional safety requirements also drive the need for robust tools, process for system engineering
**Systems Engineering - Features**

**Feature Technical Specification**
- Feature Functions
- Requirements for Feature
- Allocation of Feature to Domain Systems

**System Technical Specification**
- Allocation of Feature Requirements to SMT
  - Subsystem
  - Component where Subsystem does not exist

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- **Feature**: Entity - Specification
- **Domain System**: S
- **Sub-System**: SS
- **Component**: C

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AUTOSAR Vision Supports GM’s Goals!

AUTOSAR aims to improve complexity management of integrated E/E architectures through increased reuse and exchangeability of SW modules between OEMs and suppliers.

Motivation and Principles
GM Current Position on AUTOSAR

AUTOSAR 4.x forms the cornerstone of our next global Electrical Architecture

We know that AUTOSAR can form the foundation of automotive systems that deliver the features our customers want – with high quality

We have a long (20 year) experience with internally developed SW and the importance of strong architectures, process and tools for robust system development
Due to our scale and global reach, we need to have a comprehensive solution across our internally/externally developed software space.

Stable, standardized interfaces to BSW (integrations with non-AUTOSAR systems) are key.
Challenges for the Auto Industry

Dramatically increasing functional requirements – active safety, new fuel consumption / GreenHouseGas regulation – while maintaining an excellent value for our customers

Increased expectations for functional safety of embedded systems.

Potential ‘threats’ from hackers leading to new demands for cybersecurity

Speed of new feature deployment to customers accustomed to consumer electronics industry product cycle times
GM’s Priorities - Required Support from AUTOSAR

System Safety
Cybersecurity
Ethernet and Diagnostics
Automated Driving
Connected Vehicles
Upon definition, each feature will be examined for its influence on System Safety. If the feature contains safety hazards, a formal “System Safety Case” become part of the systems engineering deliverables for that feature.
Systems Engineering provides a framework to allow for the secure end to end design, development and testing of connected and critical vehicle systems.
Future Needs in Ethernet and Diagnostics

Current State of the Industry

• Typical subnets still designed around CAN or CAN-FD bandwidth capacity
• Ethernet is of interest for specific applications requiring high capacity, high speed, time sensitive networks (High End Infotainment and Active Safety)
• Legacy “point-to-point” diagnostic strategies with off-board test tools
• Vehicle Flash Programming data sizes measured in Megabytes

Ethernet - Future of Automotive Electrical Architecture?

• Significant number of applications requiring high bandwidth, time sensitive, and most importantly - secure networks
• Flat, self-healing architectures with significant shared data and redundancy
• “Big data” in the vehicle with multiple test tools and continuous monitoring
• Vehicle Flash Programming data sizes measured in Gigabytes
Key Challenges for AUTOSAR

Defining standardized interfaces with non-AUTOSAR systems, AUTOSAR enables GM to stay focused on our system-engineering based approach.

Maintaining AUTOSAR as a relevant, vital global standard is in the best interest of the global automotive industry.

Finding ways to accelerate the pace of new technology introduction while preserving the stability of the standard.