Automotive Networks
– Are New Busses and Gateways the Answer or Just Another Challenge?

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ABSTRACT

For many years, the automotive network was a set of isolated field buses used for independent applications. With growing automotive electronics complexity, the network has become a means for systems integration. Now, gateways are used to allow the exchange of sensor data, diagnostics, and signalling for networked control. The approved design and certification process developed around the CAN bus does not easily scale to such larger networks and to interdependent embedded systems functions.

With the new FlexRay bus standard, much higher bandwidth is provided. Combined with higher performance configurable gateways, there is a good chance that next generation network bandwidth requirements will be met. However, higher bandwidth does not necessarily mean better real-time or safety properties. Also, the automotive network is still widely seen as a collection of network components that are configured by the OEM to fit an individual set of automotive functions. How does this approach match the new automotive software standard, AUTOSAR, which defines a new level of interoperability and portability hiding much of the embedded platform properties from the application software?

Would it be more appropriate to switch to an integrated automotive network that offers performance and safety guarantees based on formally defined performance and safety parameters and leave it to an independent network development how to reach such QoS data? Or are such integrated networks - as known from telecom - inappropriate and will be inferior, given the very complex function dependencies and cost pressure?

There are many more questions in this context:

- are the current protocols, architectures, design methods, and tools appropriate? What innovations are most urgently needed?

- who shall develop the networks in the future, the OEM or a 1st tier supplier? What would be the consequence for the design process?

- Do we need interoperable network service standards, e.g. as a complement to AUTOSAR? Will there be a unified automotive "internet protocol" that eventually dominates all communication in a car?

- How will future car-to-car communication be included in the automotive network strategy if it shall be used for real-time applications, such as in driver assistance systems?

The panel will start with a brief overview on the state of the art in automotive networking followed by the panel statements and discussion.

Categories and Subject Descriptors

C.2.1 [**Network Architecture and Design**]: Network communications

General Terms

Economics, Performance, Reliability, Standardization.