PROJECT RESULTS

Embedded Electronic Vehicle Architecture

Meeting the challenge of integral electronic vehicle control

The next challenge in the evolution of cars is implementation of integral electronic control of in-vehicle and extra-vehicle functions in order to achieve active and predictive safety functions, enhanced comfort, improvements to the vehicle's ability to make progress on existing roadways and protection of the environment.

Integrating new in-vehicle functions

European vehicle manufacturers, together with their suppliers, are recognised world leaders in vehicle innovation and vehicle safety. To extend their competitive edge they invest substantially in R&D.

The task is to integrate different electronic systems, subsystems, modules and components, all delivered by different suppliers, into a complete vehicle network system. The challenge is to manage efficiently the constantly increasing complexity of electronically controlled functions in the vehicles of today and tomorrow.

The EAST-EEA architecture, its software engineering methods and their validation are prerequisites for this advanced technology. Through the project, Europe will be able to

influence and/or set the standards for manufacturers abroad and so sustain its automotive leadership.

The project results

EAST-EEA provided an open and layered middleware architecture with interfaces and services that support portability of embedded software modules on a high quality level. The middleware, as well as the communication layer concepts, were implemented and validated in demonstrators in the different automotive areas of body electronics, powertrain, chassis, telematics and human machine interfaces.

The software development model created by EAST-EEA consists of successive development and validation processes that act as a foundation into which all development phases and support software requirements can be incorporated for traceability. The techniques and tools developed in the project ensure conformity between requirements, design process, and the resulting products. The work resulted in a dedicated description language ADL that is available publicly.

In addition to the technical work, EAST-EEA provided a widely accepted technical glossary and elaborated a general framework for a future reference architecture. Suitable new business models for such embedded software have been defined. These not only cover the usual cost issues but also deal with the rather complex legal situation.

A common middleware

EAST-EEA enables effective in-vehicle electronic integration by

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using an open architecture to achieve hardware and software interoperability. Subsystems and components provide additional cost-efficient services and features, which cannot be realised stand-alone. The layered middleware architecture provides interfaces

car designers to implement new functions, or adapt to new legal requirements through existing hardware and firmware during after-sales service. The diversity of cars on the market will also be maintained through brand-related features.
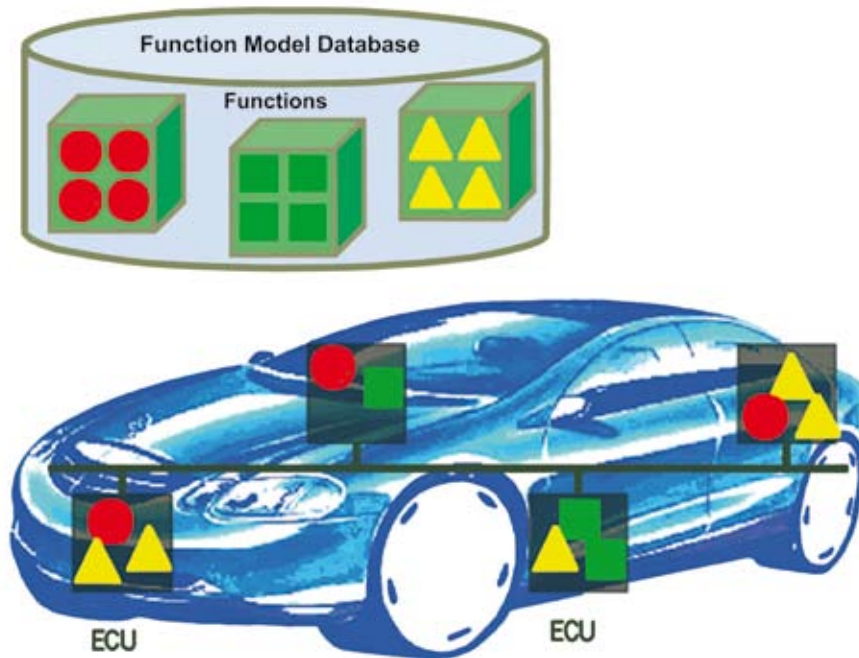
Various car functions are distributed over several Electronic Control Units (ECUs)

and services to support high-quality portability of embedded software modules. The architecture focuses on body electronics, power train, telematics, human machine interface, and chassis as well as the vehicle as a whole.

In tomorrow's vehicles high-level programming languages will enable

Thanks to the EAST-EEA approach, vehicle manufacturers will be able to use an integrated framework for software and communication interfaces, tool environments and rules. Suppliers will benefit from standard solutions and re-use will become possible. New vehicle models will be developed faster and product quality will be improved.

Major project outcomes

Dissemination
- The project glossary and the Architecture Description Language (ADL) have been released to the public
- 39 presentations and demonstrations have been given at conferences and fairs

Exploitation
The project results form the basis for the industry initiative AUTOSAR and the EU Framework 6 project EASIS.

Standardisation
While the project aimed to provide an open vehicle architecture, no formal standardisation efforts have been undertaken.

Patents
Since the project aimed for an open architecture no patents were applied for.