

## KEY FACTS

**Project title:**

SafeAdapt  
Safe Adaptive Software for Fully Electric Vehicles

**Project Type:**

STREP

**Start date:**

1st July 2013

**Duration:**

36 month

**Budget:**

Total costs: € 9.2 million  
EU funding: € 5.9 million

**Project Website:**

<http://www.safeadapt.eu/>

SafeAdapt is a European research project under the Seventh Framework Programme - Grant agreement No 608945.

## PROJECT PARTNERS

- Fraunhofer Institute for Embedded Systems and Communication Technologies ESK
- TTTech Computertechnik AG
- Fico Mirrors S.A.
- Fundación Tecnalia Research & Innovation
- Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA) LIST
- Siemens AG, Corporate Technology
- Pininfarina SPA
- Duracar Holding B.V.
- Delphi Deutschland GmbH

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## SAFE ADAPTIVE SOFTWARE FOR FULLY ELECTRIC VEHICLES



# OVERVIEW

The main idea of SafeAdapt is to develop novel architecture concepts based on adaptation to address the needs of a new Electric/Electronic (E/E) architecture for Fully Electric Vehicles (FEVs) regarding safety, reliability and cost-efficiency. This will reduce the complexity of the system and the interactions by generic, system-wide fault and adaptation handling. This is especially important for increasing reliability and efficiency regarding energy consumption, costs and design simplicity.

SafeAdapt follows a holistic approach for building adaptable systems in safety-critical environments that comprises methods, tools, and building blocks for safe adaptation. This also includes certification support of safety-critical systems. The technical approach builds on the so-called SafeAdapt Platform Core, encapsulating the basic adaptation mechanisms for re-allocating and updating functionalities in the networked control systems. This will be the basis for an interoperable and standardized solution for adaptation and fault handling based on AUTOSAR. The SafeAdapt approach also considers functional safety with respect to the ISO 26262 standard.

SafeAdapt provides an integrated approach for engineering such adaptive systems, ranging from tool chain support, reference architectures, modelling of system design, up to early validation and verification. For realistic validation of the adaptation and redundancy concepts, an actual vehicle prototype with different and partly redundant applications is developed.

# OBJECTIVES

SafeAdapt addresses the issue of complex E/E architectures by a new, substantial revision of the architecture and a technology leap beyond multi-domain controllers. In this way, only a new approach can bring the actual complexity back down to only the necessary level, which results in significant improvements regarding cost and energy efficiency.

## The SafeAdapt project will:

- Provide novel architecture concepts to enhance robustness, availability, and efficiency of safety-relevant systems while preserving the functional safety in FEVs.
- Increase safety and availability by the ability to handle complex failures by the SafeAdapt Platform Core, especially failures where current systems do not degrade gracefully
- Reduce the bill of material by reducing the number of Electronic Control Units (ECUs) by providing a generic failure management based on the SafeAdapt Platform Core
- Reduce development costs (time-to-market & testing costs) in future FEVs by providing a generic failure management and software update mechanism (dealer retrofit) based on the SafeAdapt Platform Core
- Increase energy efficiency in automotive E/E architectures

# EXPECTED RESULTS

## The major results expected from SafeAdapt are as follows:

- Optimization of the energy consumption of safety-relevant features
- Handling of failures in safety-relevant systems by adaptation/reconfiguration
- Reduction of the development and testing costs
- Reduction in certification cost
- Reduction of the complexity and hardware costs of safety-relevant systems
- Improvement of the current redundancy concepts (duplication of ECUs), requiring less extra ECUs and still meeting the redundancy concept requirements

