ARTEMIS Call 2011 Project
295364

DESERVE

DEvelopment platform for Safe and Efficient dRiVE

EXECUTIVE *summary*

DESERVE aims to design and develop a tool platform for embedded Advanced Driver Assistance Systems (ADAS) to exploit the benefits of cross-domain software reuse, standardised interfaces, and easy and safety-compliant integration of heterogeneous modules to cope with the expected increase of function complexity and the urgent need to reduce costs.

CONTRIBUTION *to SRA*

DESERVE will address the "Green, safe and supporting transportation" societal challenge, to achieve the "accident free mobility" scenario by researching the areas identified as key in the SRA:

- Reference designs and architectures to create an efficient tool platform and a suite of tools with which new developments can be engineered with minimal effort.
- Design methods and tools to support the introduction of *disruptive* hardware and software implementation technologies and allow for design trade-offs between aspects of evolvability and system properties, such as cost and robustness.

MARKET INNOVATION *& impact*

The introduction of new safety regulation have acted as a catalyst for the growing ADAS market. However, they are still expensive, mainly because their development is time-consuming in terms of integration and validation. Moreover, the inclusion of ADAS is not always affordable for low-cost car customers. Therefore, by reducing time and costs, the DESERVE project will promote the ADAS market, and it will spread the use of safety functions. Furthermore, the sharing of software and hardware resources will enable higher levels of complexity to be taken into consideration without a proportional increase in the price of the modules and the vehicle. Fast and significant market penetration will be promoted through relevant cost reductions and Europe's position as a key player in the ADAS market will be strengthened.

RELEVANCE & CONTRIBUTIONS *to Call Objectives*

DESERVE aims to foster the creation of a European standard reference technology platform, embodying meta-models, methods and tools for safety-critical hard real-time ADAS development supported by European tool vendors (guaranteed by their involvement in the consortium).

The DESERVE platform will provide the environment for ADAS design, development, pre-validation and even pre-certification of software and hardware modules to be integrated in ADAS

applications. With safety-critical requirements considered in the design and systems development, integrated, trusted, interoperable tools and tool-chains will become available.

The DESERVE platform will allow design trade-offs between aspects of evolvability and system properties, such as cost and robustness. This goal will be achieved by enabling the modular composition of ADAS systems based on pre-validated components and standardised interfaces, thereby reducing the development costs and allowing a basis for rapid qualification or certification of compositionally designed systems and especially post-modification rapid re-qualification or re-certification.

In terms of multi-core computing, the DESERVE platform will support the development of intrinsically multi-core computing applications since the adoption of multi-core architecture is necessary to reach the fundamental level of computing performance and, more important, level of safety.

The DESERVE project will develop methodologies for building cognitive user models that take account of perceptual, cognitive and psychomotor capabilities as well as emotional state and attitude. In fact, it will address the design and analysis of human-machine interactions by applying an extension of user-centred design approaches including driver cognitive models to enable user centred functionalities and closed-loop adaptivity. Moreover, driver monitoring tools will be developed to adapt the driver interface according to current driver state.

R&D INNOVATION *and technical excellence*

Most cars today contain heterogeneous ADAS that support safe and clean driving. However, the increasing costs and complexity are prompting the need to merge different functions to share software and hardware resources (such as sensors). Moreover, the need for a unique Human Machine Interface is becoming an issue that reflects the increasing complexity of the entire system, whereby the driver has to deal with different devices and different interaction strategies.

The three DESERVE prototypes will be integrated to the 5 demonstration vehicles including both heavy good vehicles and passenger car. The following applications are implemented during the project:

- Lane change assistance system
- Pedestrian safety systems
- Forward/Rearward looking system (distant range)
- Adaptive light control
- Park assistant
- Night vision system
- Cruise Control System
- Traffic sign and traffic light recognition
- Map supported systems (Note: only DAS scope, no driver information)
- Vehicle interior observation

The two base software platforms have been selected (RTMaps and ADTF) which creates the standardised "operating system" for adding the DESERVE functions. One example of the results is the HMI strategy to adapt different output devices (displays, acoustic and haptic) for supporting driver's night vision capability and adapting lighting according to driving situation. Moreover, cooperative and in-vehicle functions have been developed to support protection of pedestrians and intersection safety with the communication sub-systems between traffic infrastructure and vehicles.

PROJECT *partners*

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ARTEMIS

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DESERVE

Development Platform for Save and Efficient Drive

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START
September 2012

DURATION
42 months

TOTAL INVESTMENT
€25M

PARTICIPATING ORGANISATIONS
24

NUMBER OF COUNTRIES
9