

# Chapter XI

## Mobile Automotive Cooperative Services (MACS): Systematic Development of Personalizable Interactive Mobile Automotive Services

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### ABSTRACT

*In this chapter we describe the systematic development and implementation of mobile services in the automotive sector. This includes a design framework that represents different requirements of automotive service engineering. The framework is used following a corresponding process model which combines iterative service development with classical prototyping. The framework and the process model are applied to a new mobile service MACS MyNews, a personalizable, interactive news service, allowing the driver to be the editor and end user of his/her newscast at the same time. In order to design this service, we start with designing service scenarios. For these service scenarios a matching value-added network is derived, technologies for service provisioning are chosen, and a prototype is implemented. The service is then evaluated especially concerning driving safety. A final user evaluation helps the designers choose whether or not to include the service in series production before planning the service roll-out.*

## **INTRODUCTION AND BACKGROUND**

Mobile services in the automotive sector have been rather unsuccessful in Germany over the past years. Of all car manufacturers that offered services in this field only BMW and Fiat still offered mobile services in their cars in 2004/2005. The three main reasons for discontinuing mobile services are usually mentioned: (1) the costs for data transfer were too high (Frost & Sullivan, 2003), (2) the services offered did not fit adequately to the users' needs (Fuhr, 2001), and (3) mobile services were too focused on technology (Werder, 2005) and had hardly any economic aspects considered making it almost impossible to deliver viable and sustainable services.

But things are changing: The recent availability of new digital transmission channels such as the Universal Mobile Telecommunications System (UMTS) or digital audio broadcast (DAB), digital radio and the declining prices especially for cellular radio (i.e., mobile phone fees) almost eliminated the problem of transmission cost, leaving only two problems to solve. This is the starting point for the project MACS, a research project funded by the German Federal Ministry of Education and Research FKZ 01 HW 0207, and its central research question: "How can innovative mobile automotive services be systematically developed, structured and which steps have to be taken for deploying mobile services successfully?"

In order to address the problem of designing services that meet the end users' needs, the first step is to find and evaluate service scenarios that seem promising for new mobile services. Based on the scenarios found, the process of deriving a business model out of those scenarios has to be defined. Extracting common factors from these scenarios and models and finding common interfaces for mobile services are necessary for allowing a large and heterogeneous group of service providers to offer their products in the future. From an economic point of view there are

several requirements a systematic design of mobile automotive services has to be able to deliver:

- Defining service scenarios and use cases which are comprehensible for the average car user and that are to be frequently used (in contrast to, e.g., emergency call services).
- Integrating mobile broadband services (DAB/UMTS/etc.) into mobile automotive services allowing data exchange at high data rates and thus enabling more powerful services in the years to come.

The following presented MACS design framework for developing mobile automotive services was designed to meet these criteria and to incorporate a wide variety of different solutions from different technical domains of mobile services. One of the main challenges for such a design framework which is unique to automotive mobile services, is the lifecycle mismatch between the car and the software in the car (Hartmann, 2004). While the average lifetime of a car is roughly 10 years, new technology and software comes to market every 2 to 3 years, thus making the manufacturing lifecycle complicated to manage (Mohan, 2006). The technological aspects, for problems imposed by the car as the service carrier, addressed by the MACS design framework thus are:

- Design and implementation of mobile services completely integrated into the car's infrastructure and operational concept
- Design of a modular infrastructure for mobile services, which is independent from individual car manufacturers' platforms in order to enable independent service providers to develop own services and reduce development costs
- Ensuring drivers' safety when using mobile services through responsible usage of different channels of user interaction (e.g., visual vs. audible content) in excess to complying with the current legal requirements

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