The new BMW 7 series – process and methods facilitating an evolution of the revolutionary iDrive

Dr.-Ing. Bernhard Niedermaier, BMW Group, Germany
Dipl.-Ing. Stephan Durach, BMW Group, Germany
Dr.-Ing. Lutz Eckstein, BMW Group, Germany
Dr.-phil. Andreas Keinath, BMW Group, Germany
Dipl.-Ing. Jürgen Rossband, BMW Group, Germany

With iDrive the BMW Group introduced in 2001 a revolutionary HMI concept in the automotive sector. It was designed to optimally support drivers in their various tasks while driving. The basic iDrive concept can be described as separating driving functions from comfort functions as well as separating displays from the controls. This basic concept together with a highly mounted display ensured that controls could be reached without looking at them and that the central display was easy and quick to access. The remarkable idea behind the iDrive can be seen as the basic concept has been widely adopted in the automotive industries. To push further the idea of an optimal information presentation in 2003 BMW introduced the HUD Display (5 series), which is yet another good example of the iDrive idea.

This paper outlines the iterative design and evaluation process that led to the new generation iDrive coming in 2008 with new BMW 7 series. The basic challenge was how to come up with an evolution of the iDrive concept by improving it without loosing the revolutionary approach to automotive HMI design.

One precondition for the design of such a new HMI is to know your customer worldwide. This is especially true if the HMI should be designed for customer needs incorporating the latest and upcoming technology without being technology driven. Hence, before starting the actual design process customer requirement clinics in the core markets have been set up and public available reports from numerous sources have been reviewed to understand current user needs and to extrapolate future trends. In cooperation with various Universities a number of projects was started with a broad scope for defining new methods for evaluation and conceptual work.

As a first step of the design process the necessary functionality has to be analyzed according to its priority of operating while driving. With this common starting point an iterative concept development process with initially four teams in competition was started. Accompanied by ongoing usability-tests each team developed an individual interpretation of the new iDrive. One team was based in the US to identify specific user needs of the US market. Each team built up an operational mock-up suitable to be connected to the driving simulator. These concept alternatives have been evaluated with involvement of representative customers measuring subjective and objective usability parameters. The scenarios and use cases which have been used for customer testing are a result of the described customer requirements clinics. They have been regularly adapted according to the upcoming trends in the consumer electronics market.

Based on these results the most promising ideas of each concept have been reassembled to two alternatives. Both have been detailed within the strong constraints of the complete vehicle development process. After a second loop of usability testing with customers, the two alternatives have been narrowed down to one concept, including a number of specific market solutions for the optimal usage for specific demands e.g. destination input in Japan. The final

concept has been specified in all details and implemented in a prototype vehicle. In a following worldwide study traditional methods of market research and usability testing have been combined to verify the suitability and attractiveness of the new concept in the important markets.

To summarize, this paper gives an insight into the development of the next generation of BMW Group's iDrive HMI concept. It describes how customers and their requirements have been put in the focus of the concept development process. To accomplish the iDrive goals traditional market research and a wide variety of new usability testing methods had to be combined and efficiently applied together in the different phases of the product development process.