



SCALEXIO

Power

Experiencing and Testing
New Functions in Early
Development Phases

for the Trunk

SCALEXIO, the universal real-time platform from dSPACE, is adding a new member to the family: The SCALEXIO AutoBox, a very powerful in-vehicle system from dSPACE that offers tremendous processing power, excellent real-time properties, and comprehensive support for automotive bus systems. Developers can now experience and test new functions at an early stage in real driving tests. In this interview, Christian Wördehoff, Product Manager for Rapid Prototyping Systems at dSPACE, discusses the key aspects of using real-time systems in real vehicles.

What are the use cases for the SCALEXIO AutoBox?

Our customers in the automotive industry are increasingly demanding powerful prototyping systems that enable them to test complex functions directly on the road. In particular, the development of functions for highly automated driving leads to an increased demand for computing power and the data bandwidths required for the integration of high-quality assistance and automation functions in the vehicle network, for example. However, in the area of e-mobility, fast closed-loop behavior as well as high accuracy of signal processing and generation play an important role. The SCALEXIO platform, which has been on the market for several years, offers all of these options. The SCALEXIO AutoBox now takes this added value from the laboratory to the road.

What are the core characteristics of a mobile system for in-vehicle operation?

First of all, stable operation must be guaranteed in all general automotive conditions. A critical point is the power supply. This is why we have equipped the AutoBox with a wide-range power supply unit that supports operation in the typical on-board network architectures from 12 to 48 V. It is important to be able to compensate for short-term voltage drops or peaks, such as those that occur when high power loads are switched on or off.

This can happen quite frequently, especially when vehicle components are still in the development phase. Furthermore, operation of the real-time system in real driving tests requires an extended temperature range compared to laboratory use, not to mention an increased resistance to shock and vibration. Therefore, a powerful active cooling concept optimized in-vehicle applications is a key AutoBox feature. In addition, the AutoBox has a special shock and vibration damping system. The robustness of the system has been tested by an external institute according to the ISO 16750-3 standard.

How does AutoBox fit into the large SCALEXIO family in terms of technology?

We gave the SCALEXIO AutoBox exactly the same DNA as all other systems in the family: the latest Intel processors and customer-programmable FPGA components for the fast calculation of complex applications, a high-performance real-time operating system, and our intelligent I/O network, IOCNET, which provides not only low transmission latencies but also plenty of database bandwidth. The modular concept of SCALEXIO also offers a high degree of flexibility and scalability.

Typical project durations in automotive development are three to four years. How about the longevity of the systems?

Experience has shown that some of our customers continue to use their systems far beyond the specified standard lifecycle. For example, I know of users whose real-time systems have been in reliable operation for over ten years. To achieve the highest possible availability of the system, we test our SCALEXIO AutoBox systems in extreme conditions that correspond to a mileage of far more than 100,000 kilometers in standard road operation. When our customers use our products over many years and for various projects, it is also important that they are always able to adapt AutoBox to more demanding and changing requirements. Especially when developing functions in the areas of driver assistance or autonomous driving, the market is still quite dynamic for example with regard to new Ethernet interfaces or the increasing demand for more computing power to cope with the constantly growing complexity of algorithms. We can keep the modular systems up to date in the field over the long term, for example, by offering new, more powerful processors and plug-in cards with new interfaces. This enables us to provide our customers with a protection on their investment.

Final question: What makes the SCALEXIO AutoBox so unique compared to other products on the market?

The strength of dSPACE prototyping systems is the combination of powerful hardware, high reliability, and convenient customer access with an impressive level of functional depth. This combination makes the SCALEXIO AutoBox unique. Ultimately, our goal is to provide our customers with a worry-free solution so they can fully concentrate on their own development tasks - today and in the future.

Mr. Wördehoff, thank you very much for this interview.

