Elektrobit

Test drive with the tablet

A great many test miles have to be covered in the development and validation of driver assistance systems. A tablet with Elektrobit (EB) software simplifies measuring technology operation.

Modern driver assistance systems are highly complex. They link the data from various sensors and, at the same time, they have to satisfy high safety standards because they influence driving behavior and perform an increasing number of tasks for the driver. Extensive testing of the individual and integrated systems is therefore essential. The developers need intelligent tools that can deal with this complexity and improve the efficiency of test procedures, enabling the team to focus on its core task – the development and optimization of innovative functions. EB developed the EB Assist Car Data Recorder for this purpose. With an iPad and the

EB Assist Car Data Recorder Toolbox as a display and control platform, both test and demonstration drives are more efficient and comprehensible. Space consuming and expensive monitors, keyboards and cables in the passenger compartment are replaced by a less expensive tablet that communicates with the EB Assist ADTF (Automotive Data and Time-Triggered Framework) development system in the test vehicle's boot.

EB Assist Car Data Recorder Toolbox in EB Assist ADTF on Car-PC

EB Assist Visor on Tablet-PC
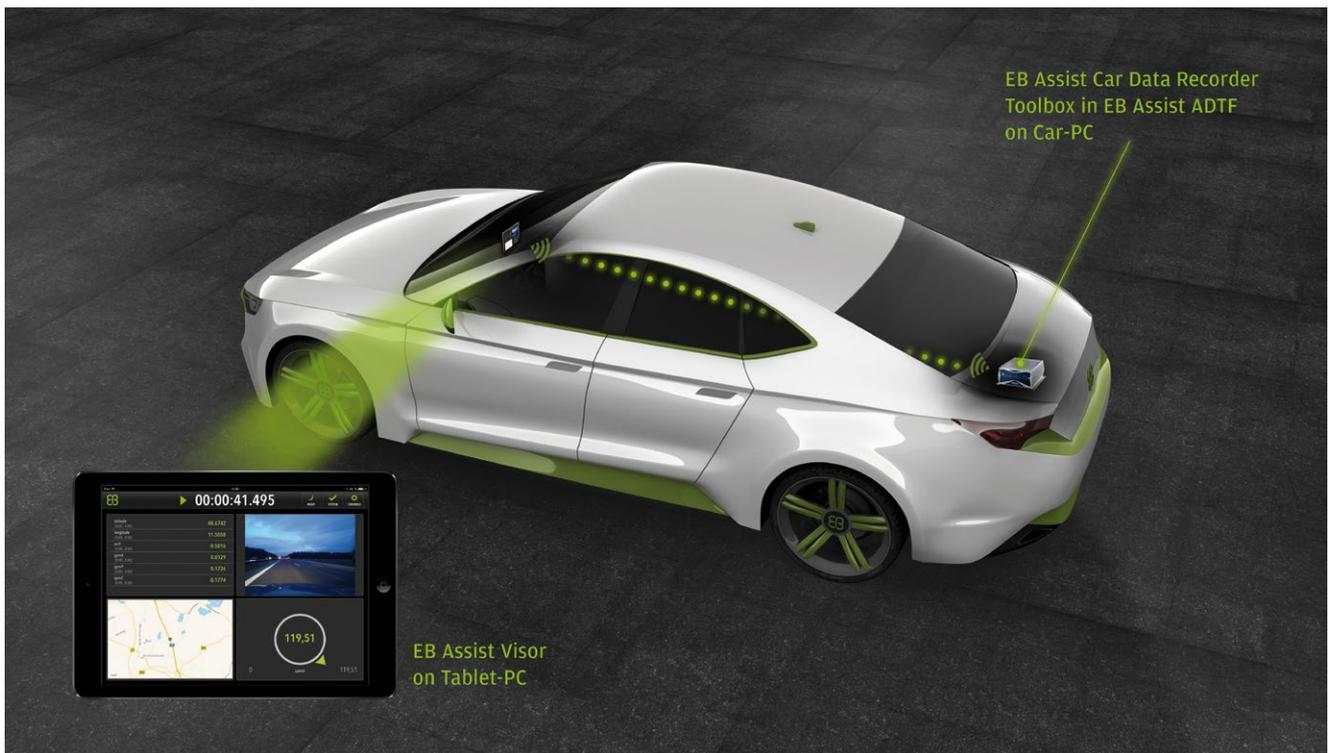
The EB Assist Car Data Recorder – with a tablet as display and control platform more convenient and efficient test and demonstration drives are possible.

Unlike fixed installation test hardware, the tablet can be flexibly operated and passed from person to person. This means that several experts can assess a test situation. It is possible to connect several tablets to the ADTF development system and test results can be tracked in real time, which means that measurement errors can be immediately recognized and remedied. This avoids expenditure of time and money on repeating test drives that later prove to have errors.

The Car Data Recorder user interface has no overlapping windows, so the navigation arrangement is clear, even when there are many displays. For example, the user can swipe backwards and forwards between the detailed CAN message display for the developer and the more graphically complex display of the generated warnings.

In addition to controlling the ADTF development system's start and stop recording function, the Car Data Recorder displays the test and development results. They range from easy-to-read charts of measurement values to series-quality display prototypes. The earlier measurement values and interim results are clearly displayed and driver assistance functions are visualized, the sooner it is possible to focus on optimizations. Another advantage of an easy-to-read display and intuitive operation is that driving scenarios can be evaluated and selected during the test drive. Markers and notes can be added in written form or as audio annotation during the test drive rather than having to be painstakingly entered afterwards. This simplifies the evaluation of driving scenarios and the preparation of test sequences.
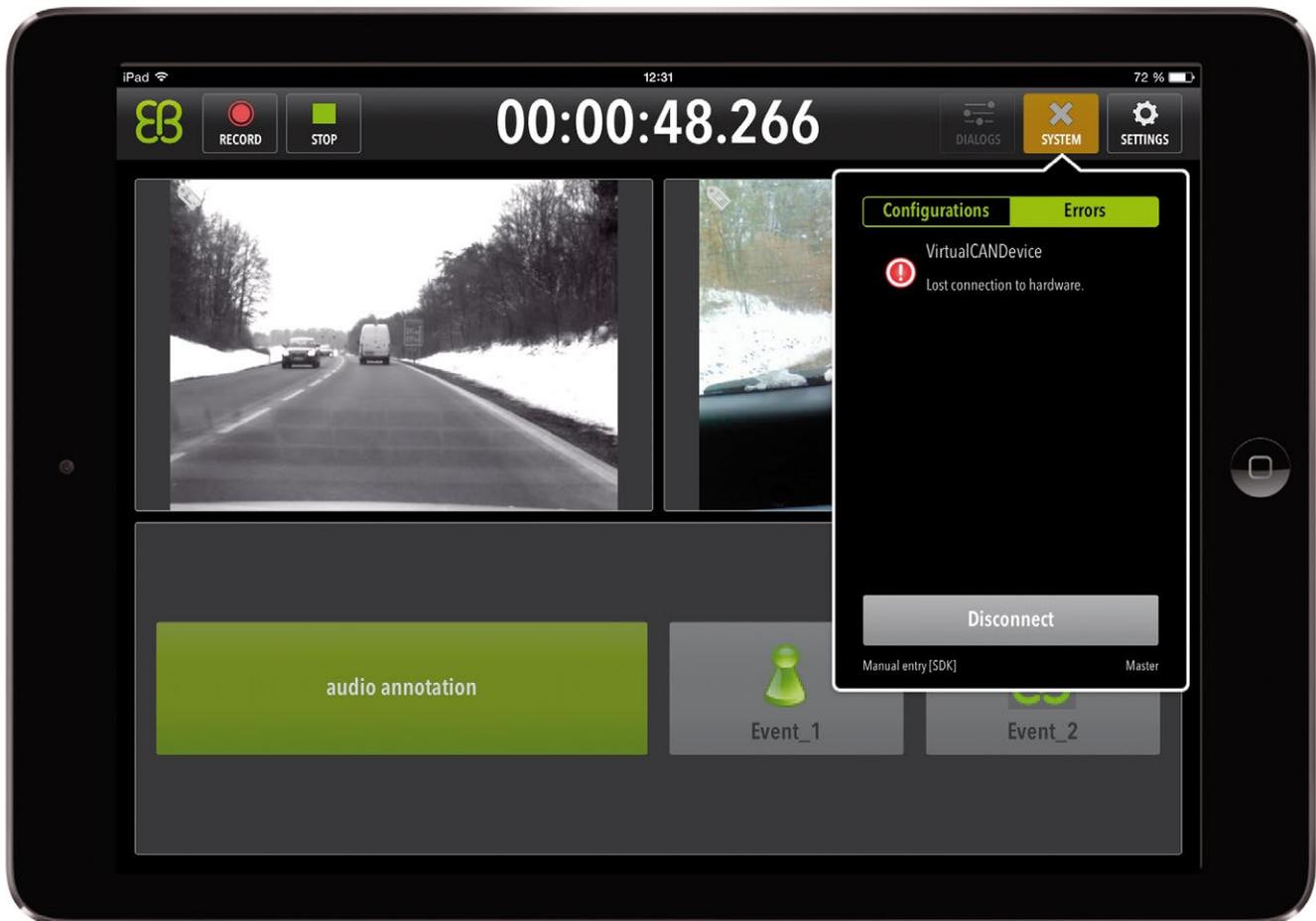
Errors are immediately recognized during the recording process and displayed in an error list.

Remote ADTF

The simplest application is starting, stopping and monitoring recordings during test drives. If the Car Data Recorder is in the same Wi-Fi network as the car PC with the ADTF development system, a connection is established and the recording starts when the user touches the record symbol. If one of the sensors or adapters that are connected to the car PC generates an error message, the system icon warns the user immediately. Touching the icon in the error list reveals the reason for the warning and the error can quickly be remedied. At the same time, when a recording is started, the hard disk icon indicates how full the hard disk is. Touching the icon lists the current data rate and number of media samples, such as the number of frames per second in video recordings. These simple interaction elements can be extremely valuable. For instance, timely warnings can save a test drive that would otherwise have failed.

Function development

The Curve Speed Warning system informs the driver when he is approaching a sharp, blind corner too fast. This system essentially only requires information about road geometry and vehicle speed. The curve data for the entire route is stored in the navigation system and made available via the electronic horizon (ADASIS protocol). Generally, both values can be read into the car PC from the vehicle's CAN bus via a standard adapter. With the ADTF development environment on the car PC, input data can be computed with just a few code lines to issue a warning. In this example, the EB Assist Car Data Recorder isn't just used to control the ADTF development environment during the test drive, but also to display warnings such as those that the driver will see in the combined device later on. At the same time, the input data, i.e. the vehicle's current position, curve information in the electronic horizon, vehicle speed and internal algorithm values such as the interval between the warning signal and the threshold can be logically displayed on several screen pages. With a swipe gesture, the tester can quickly switch from view to view. For example, if you are driving with a display prototype and discover that the application is not working properly in a new driving situation, you can swipe into the detailed view of the individual signals. An analysis can be performed on the spot so that, if necessary, this section of the test drive can be repeated again immediately. The Property Dialogue function can be used to parameterize algorithms straight from the tablet. Several variations on the same section of the route can be driven in quick succession with different configurations. This saves the testers' valuable time, which is often scarce because they are in high demand. In the case of the Curve Speed Warning function, for example, it is possible to test the "comfort", "standard" and "sport" settings in quick succession without stopping the vehicle and to record all relevant data plus a reference video.

The EB Assist Car Data Recorder can also be used for test drive evaluation purposes. After driving through a specific situation, the test driver's subjective impression can be entered in a pop-up window on the tablet. Was the warning properly timed, or did it come too early or late? Pre-defined response options simplify data entry and the uniform evaluation of several test drives. In some cases it is even possible for the test driver's feedback to directly influence parameters and automatically optimize the function's behavior.

Management and customer demonstrations

Test recording equipment often isn't able to display innovative functions. It either isn't possible to modify the infotainment system or the integration of additional displays on the central display is simply too complex an undertaking. In future, it will be possible to prototypically implement driver assistance functions at highest graphic level on the high-resolution iPad. This enables the management or customers to directly experience innovations during demonstrations.

In addition to displaying SVGs (Scalable Vector Graphics) the Car Data Recorder has a multi-tablet mode which supports demonstrations. A so-called "Master iPad" takes over control of the ADTF development environment and thus the demonstration. The "Client iPads" can either be configured as display devices, or as interactive devices. This permits access to selected details in addition to the prototype display in order to reveal the function of an underlying algorithm.

Further applications

The applications previously described are just a few of the Car Data Recorder's wide range of applications to simplify test drives and recordings, and make them more cost-effective. If the Car Data Recorder's standard functions are not sufficient, specific modules can be created with the EB Assist ADTF development environment. For example, you can create a module for pre-processing sensor data in order to reduce the volume

of data to be stored. Finished functions or libraries that have been translated for Windows or Linux can also be incorporated in ADTF filters. A brand new Traffic Sign Fusion version can then be directly compared with the existing version during a test drive. Thanks to their open concept, the Car Data Recorder and the ADTF development environment can be continuously adapted to the challenges of innovative driver assistance solutions.

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▶ **Test drive with the tablet**

Global presence

Tokyo	Japan
Beijing – Shanghai	China
Brasov	Romania
Vienna	Austria
Boeblingen . Brunswick . Erlangen . Ingolstadt . Radolfzell . Munich . Ulm	Germany
Paris (Carrières-sur-Seine)	France
Bothell (WA) . Farmington Hills (MI)	USA
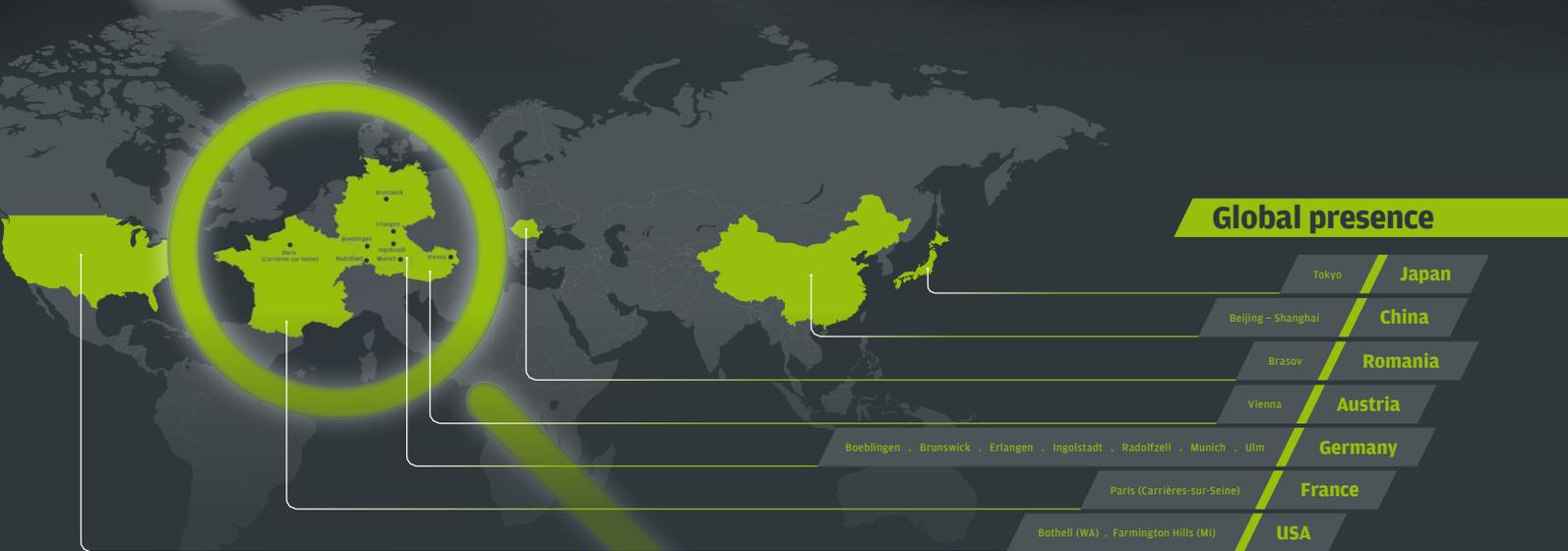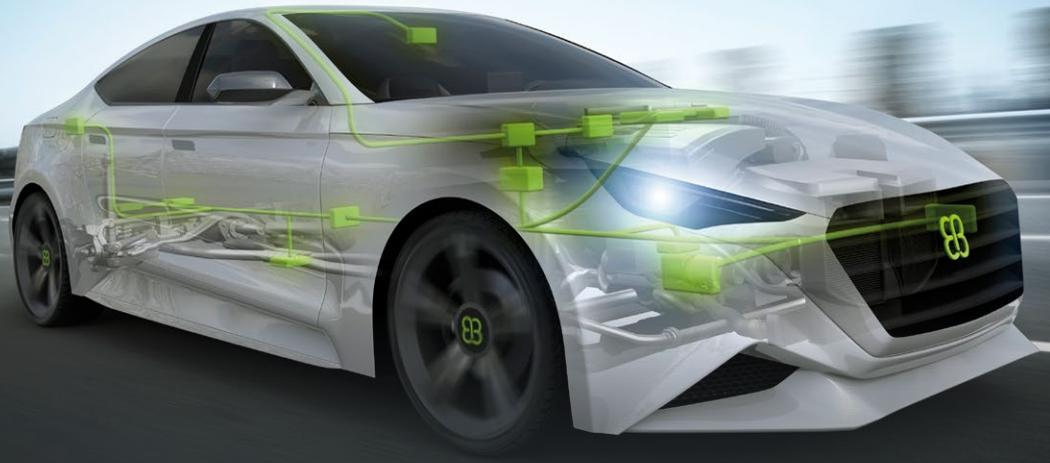
About EB Automotive

EB Automotive is recognized internationally as one of the most important suppliers of embedded software solutions in the automotive industry. In addition to the development of products, EB Automotive also specializes in services and consulting for the automotive industry, supplying implementations of software solutions for a broad range of AUTOSAR ECUs, functional safety, infotainment, navigation, HMI and driver assistance systems. EB continues to invest in feature integration and development tools ensuring in-vehicle devices ship in volume earlier and arrive quickly to market.

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