

LabView based test systems with ASAM MCD-3D

“I recommend the use of standardized software components, such as ASAM MCD and ODX, because standardization is essential for us for today and more and more for the future.”

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I Summary

Challenge: ASAM AE defines interfaces and data structures for automotive electronics development and test processes. Within this set of definitions, ASAM MCD-3D specifies the Application Programming Interface (API). NI LabVIEW, from National Instruments™, is a widely used graphical programming language for applications in automation and measurement. This case study shows how development engineers, who use NI LabVIEW for their applications, can get access to the diagnostic functions of the ECU.

Solution: The solution is a combination of ASAM MCD-3D API with the programming environment of LabVIEW.

Key Benefits: With the availability of a runtime system with ASAM MCD-3D API (such as the Communication Server COS by Softing) as a standard software product, the integration of diagnostic communication in existing LabVIEW-based solutions significantly saves time and money. The test system developer is able to reuse his applications by easily adding an off-the-shelf component.

II Description of the System

More and more functions of systems under test are accessible only by sending diagnostic service requests to the ECUs, e.g. to start system internal routines, such as open or close valves, ... etc.)

Secondly, a lot of data is accessible only if the test system is able to “talk” to an ECU, which already knows the data. Talking to an ECU requires the implementation of a diagnostic protocol, such as KWP 2000 or UDS (Unified Diagnostic Services), on both the test system’s and the ECU’s side. Developers of test systems normally are not familiar with diagnostic communication technologies.

Behr GmbH & Co. KG, Stuttgart, is a systems partner for the international automobile industry. As a specialist for automotive air conditioning and engine cooling systems, the Behr Group is one of the world’s leading manufacturers and suppliers of original equipment for passenger and commercial vehicles. Currently Behr employs some 19,000 staff at 17 development locations, 30 production sites and 13 joint ventures worldwide.

Behr develops and produces air conditioning systems, which are controlled by ECUs. To test the system within the production line, access to the diagnostic functions of the system is necessary. Behr uses NI LabVIEW based applications for testing the systems. To get access to the diagnostic functions, the test systems are equipped with the D-Server “COS” from Softing. COS provides an ASAM MCD-3D API (see Figure 1).

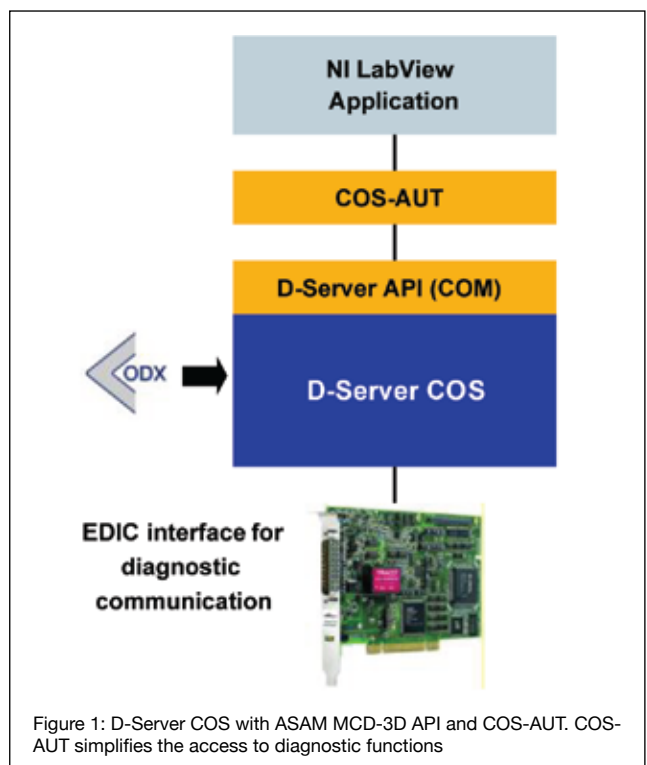


Figure 1: D-Server COS with ASAM MCD-3D API and COS-AUT. COS-AUT simplifies the access to diagnostic functions

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Not all the specified function groups, data types, interfaces and methods of ASAM MCD-3 are necessary for LabVIEW developers, who only need access to diagnostic services. Thus, a reasonable reduction of the API functions has been created by SOFTING: COS-AUT is an Automation API between the MCD-3D API and LabVIEW. It comes with a configurator and a LabVIEW VI library.

The D-Server COS works with data in ODX format. The diagnostic protocols, such as KWP2000 on K-Line or Unified Diagnostic Services on CAN are delivered as templates in ASAM MCD-2D (ODX) format.

technologies results in a much more powerful system and new opportunities by simply adding standardized software components This saves both, time and money.

The user may also keep his PC-ECU interface hardware (such as EDICs, CAN-Interfaces, FlexRay-Interfaces) which is normally used for collecting data from the bus systems for in-vehicle communication.

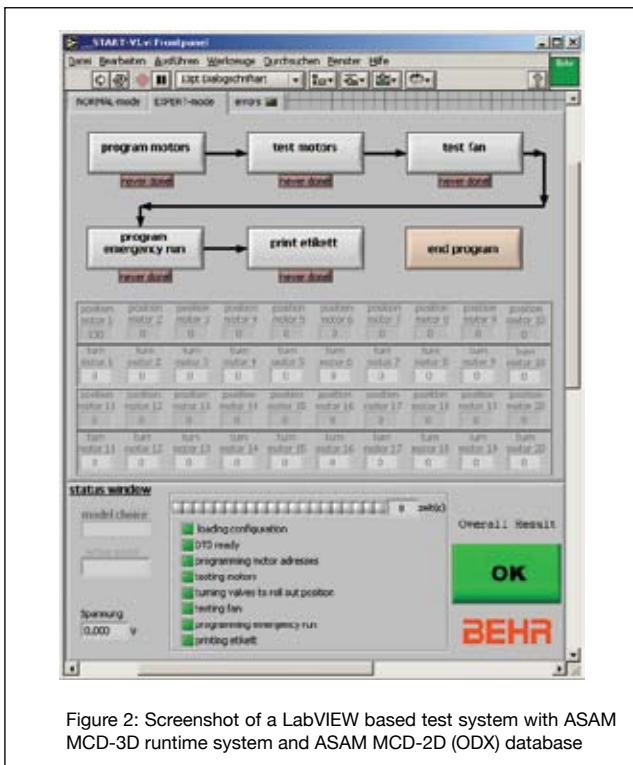


Figure 2: Screenshot of a LabVIEW based test system with ASAM MCD-3D runtime system and ASAM MCD-2D (ODX) database

III Business benefits

With the combination of NI LabVIEW and the ASAM MCD-3D compatible D-Server COS and ASAM MCD-2D (ODX) templates from Softing the test system developer can reuse his already existing LabVIEW based solutions. The combination of two successful