Think AUTOSAR,
Think SystemDesk

Modeling and Simulating Production ECU Software

The AUTOSAR standard is becoming increasingly important, and electronic control units (ECUs) based on it are now going into production. As Version 3.0 of the SystemDesk architecture software shows, dSPACE is committed to complying with this standard.

Thinking in Systems

The enhanced handling and performance of the new SystemDesk® version make it ideal for large-scale production projects. SystemDesk 3.0 is clearly separated into a library level and a system level to give users a new, well-structured workflow. The library level contains reusable AUTOSAR elements. The system level contains the software architecture, the hardware topology, and the network communication. The software components and compositions modeled in the library can be directly integrated into a system and edited within it. This helps users keep track of everything, even in complex projects. Also included are extended modeling functionality for the communication on CAN, LIN and FlexRay buses, and features for complete configuration of the run-time environment (RTE) and the operating system (OS). Another plus: SystemDesk 3.0 builds on AUTOSAR Release 3.1 – the version currently in focus in the automotive industry.

Profile
of SystemDesk 3.0

Modeling
- Enhanced interaction between SystemDesk and TargetLink
- Extended modeling of AUTOSAR 3.1 system templates
- New editor for mapping software components and ECUs
- Improved signal mapping editor
- Multiple instantiation of software components

RTE Generation
- Complete RTE and OS configuration
- Enhanced interaction with third-party RTEs and basic software

Simulation
- Processor-in-the-loop (PIL) simulation
- Direct connection of virtual ECUs

Handling
- Structured workflow with the library system concept
- Greater performance
- Filter mechanisms in selection lists
- Improved search

Interacting with TargetLink®

To fully benefit from AUTOSAR throughout the entire development process, users need coordinated tools that can exchange AUTOSAR files (ARXML) and supplementary documents. This is what dSPACE offers, providing closely coupled structural and behavioral modeling with SystemDesk and TargetLink. The system architects export a software component (SWC) container from SystemDesk. The container holds all the files belonging to a modeled software component (ARXML and any other specification documents). TargetLink users import the SWC container and use the defined interfaces to automatically create an AUTOSAR frame model for the components. Then they develop the actual functionality and generate AUTOSAR-compliant code. This code is transferred back to SystemDesk in the SWC container together with any ASAP2 files that were generated, plus the ARXML files with additional implementation information. The SWCs now contain implementation information that can be used to simulate and test the ECU's behavior offline. The SWC containers are handled in the Container Manager, a specialized tool with a graphical user interface.

Finding Errors Sooner

The earlier errors are found in the development process, the easier and less expensive it is to correct them. SystemDesk 3.0 not only offers software-in-the-loop (SIL) simulation, but also the ability to execute AUTOSAR applications in the form of virtual ECUs on evaluation boards, for example, by means of TargetLink. Thus, ECU code can be simulated on the target processor at a very early stage. In addition to direct simulation in SystemDesk, the virtual ECUs that are created can also be connected to Simulink models of the controlled system and tested as an overall system with ControlDesk® Next Generation, dSPACE's experiment software. ■

Exchanging SWC containers between SystemDesk (the architecture and integration tool) and TargetLink (the behavior modeling tool) in an AUTOSAR-compliant development process.