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Press Release

New ETAS tools help get a jump start on mastering the complexity of embedded software

- ASCET-SCODE and ASCET-CONGRA ensure full control and visualization of complex relationships right from the start
- Automatic verification of the complete description of the decision paths and mathematical relationships ensures high-quality system design (ISO 26262)
- Use of the Eclipse platform simplifies integration into the existing development process

Stuttgart, March 14, 2017 – How many operating modes does a hybrid powertrain have? A close and careful look finds dozens between idling and full load of the engines involved; ECU software has to control shifts among these modes reliably and seamlessly. Who's keeping an eye on the big picture?

And this isn't even the only area where function developers and software and calibration engineers have to grapple with complexity that is growing at an exponential rate. When developing embedded software, they also have to contend with emission measurements under real driving conditions (Real Driving Emissions, RDE), active assistance systems, partially automated driving, and adaptive chassis and convenience systems, all of which create an increasingly muddled tangle of interlinked functions. ETAS offers two tools that create transparency: ASCET-SCODE and ASCET-CONGRA.

Getting a grip on complex systems at the outset

With ASCET-SCODE (System CO-DEsign), function developers can describe the planned system's partitioning and relevant decision paths in a special text editor. Then they can split up the system into modes and visually map the interdependencies among them. ASCET-SCODE automatically reviews this input for completeness, consistency, possible duplications, or unnecessary descriptions. It also visualizes the resulting decision trees for the planned software. As a result, function developers not only quickly get an overview of the behavior of complex systems, but they can also submit a draft for formal review. Once approved, the results can be translated into program code – MATLAB® M code, Simulink® S-function blocks, FMU, or ESDL or C code – fully automatically with just a click of the mouse. This code is then immediately available for early-stage realistic simulations – and can simply be transferred into real ECU code for production application using the ASCET-DEVELOPER, for example.

Yet ASCET-SCODE offers even more. The clear overview of verified results and system relationships can be used for documenting or even creating software specifications. Automatic test case generation is also an option. In this way, ASCET-SCODE also helps local or distributed teams understand their task and work better together, improving the efficiency and quality of the entire development process.

Teamwork with mathematics

ETAS' second new tool, ASCET-CONGRA (CONstraint GRAph), delivers key services as well. It allows function developers to depict mathematically described relationships in complex systems using interactive graphs. They describe the overall system in CONGRA based on equations, differential equations, and program maps. These formulas come from the technical literature or from the developer's or company's store of experience – from control systems design, say, or domains such as engine control, powertrain, vehicle dynamics, and electric/hybrid drives. This input is also entered using editors, either text or graphic. ASCET-CONGRA checks it all for calculability, automatically carries out the mathematical work in the background, and offers function developers and software engineers various analyses and functions that serve to implement, correctly and efficiently, the system to be developed. What's more, ASCET-CONGRA fully automatically

generates preproduction artifacts for the follow-up processes in the form of MATLAB® M code, Simulink® S-function blocks, FMUs, or ESDL or C code.

In general, ASCET-SCODE and ASCET-CONGRA are used in developing only the “complicated” parts of the overall system. Simpler software blocks can still be written manually; for instance, in C. The integration of the overall system can then follow as usual with the tools and processes that the customer already has in place.

CONGRA, which like SCODE and the entire ASCET product family is based on the Eclipse platform, can easily be integrated into the customer’s existing development environment. As a result, all engineers involved have access to the system, can describe it correctly in mathematical terms, and then visualize it and run simulations. This offers major advantages, including when making changes and expansions.

For the first time ever, function developers have tools in hand that put the model-centered development process for embedded software entirely on the basis of mathematical descriptions. The advantages are obvious: Conducting realistic simulations early on in the process uncovers any flaws before they become expensive. Unnecessary steps and effort are avoided right from the start. Calibration engineers can familiarize themselves with the system’s sensitivity and relevant parameters prior to the test drives. And on top of that, mathematical descriptions created for one project can efficiently be repurposed for follow-up work.

Consistent overview leads to success

With their clear visualization, their analyses, control functions, and automated code generation, the new tools in the ASCET family combine to boost efficiency in the increasingly complex world of ECU software development. The advantages trickle down along the whole process chain: function developers benefit from a clear overview and reliable results, calibration engineers gain a deeper understanding of the system, while the advanced maturity level of the code and overall system lightens the load for software developers and test engineers. Both tools have already clearly proven this in use at Bosch. Also the automatic verification of the system’s decision paths and mathematical relationships is a key building block with regard to ISO 26262.

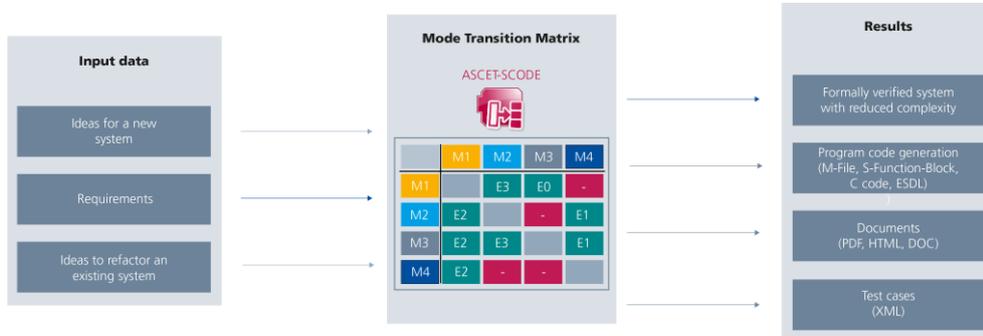
Once again, ETAS GmbH has lived up to its claim: for us it's about mastering complexity with assurance, so that our customers can offer reliable, mature, and affordable vehicles with exciting functions – both today and in the future.

About ETAS

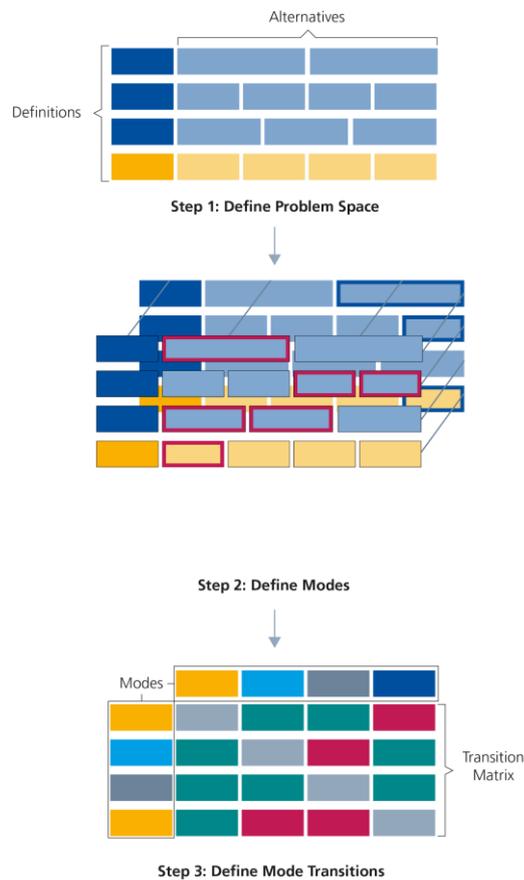
ETAS provides innovative solutions for the development of embedded systems for the automotive industry and other sectors of the embedded industry. As a systems provider, ETAS supplies a multifaceted portfolio that covers the range from integrated tools and tool solutions to engineering services, consulting, training, and support. Security solutions in the area of embedded systems are offered by the ETAS subsidiary ESCRYPT. Established in 1994, ETAS GmbH is a 100-percent subsidiary of the Bosch Group, with international subsidiaries and sales offices in Europe, North and South America, and Asia.

Further information can be found at www.etas.com

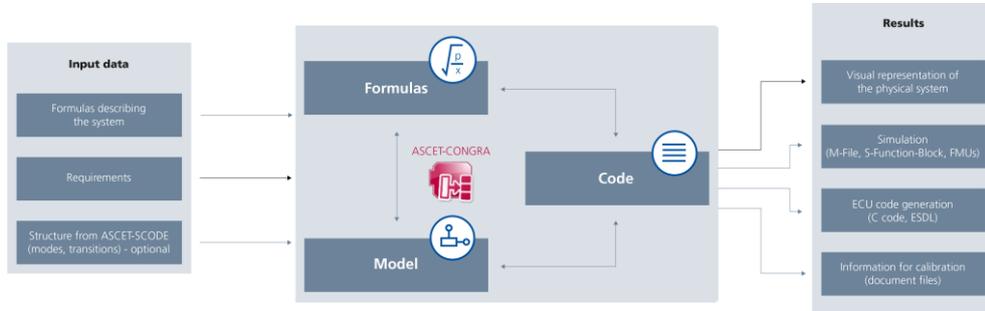
Pictures:



Working with ASCET-SCORE



Work steps in the SCODE method



Working with ASCET-CONGRA