MODEL-BASED DEVELOPMENT OF AUTOMOTIVE EMBEDDED SOFTWARE IN COMPLIANCE WITH ISO 26262: CHALLENGES & EFFECTIVE SOLUTIONS
31 MARCH - 1 APRIL 2014

Highlights

- Developing safety-critical software in compliance with ISO 26262
- Impact of ISO 26262 on embedded software development with Simulink®
- Tool qualification
- Model architectures for safety-critical software
- Ensuring MISRA® and ISO 26262 compliant models with modelling guidelines and complexity metrics
- ISO26262 compliant testing for model-based SW development
- Prioritization of ISO26262 requirements for process adaptation

Overview

This 2-day intensive workshop describes how to develop and safeguard safety-critical, embedded software in serial projects with Simulink® in compliance with ISO 26262 (part 6). Beginning with a general overview of the ISO standard, we proceed by focusing on those requirements of the ISO 26262 that are specifically relevant to model-based development. We address the impact the standard has had on model-based development with Simulink®, as well as the requirements for model and software architecture in safety-critical software. We wrap up the workshop by assessing ISO 26262 readiness of controller functions. All theoretical knowledge is illustrated by means of many practical examples, which you can take straight back to your desk.

Target group

The workshop is designed for developers, testers, quality managers, project managers and team leaders, whose focus is the model-based development of safety-critical embedded software using MATLAB®/Simulink® in combination with Embedded Coder® or dSPACE TargetLink®. Only basic modelling knowledge with Simulink® and Stateflow® is assumed.
## Workshop agenda: Day 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>10 am</td>
<td>Welcome and introduction round</td>
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<tr>
<td>10.30 am</td>
<td><strong>Overview: Model-based software development with Simulink®</strong></td>
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<td>- Overview of the development process</td>
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<td>- Characteristics of model-based development</td>
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<td>- Integrated quality assurance measures</td>
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<td>- Overview of AUTOSAR-compliant development</td>
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<td>11 am</td>
<td><strong>Safety-related software development according to ISO 26262</strong></td>
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<td>- Impact on the development process</td>
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<td>- Hazard analysis and risk assessment, ASIL determination</td>
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<td>- Strategies for safety concepts</td>
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<td>- Real-life experiences of a safety manager, lessons learned</td>
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<td>- ASIL decomposition (example)</td>
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<td>12.30 pm</td>
<td>Lunch break and open dialogue</td>
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<td>1.30 pm</td>
<td><strong>ISO 26262-compliant development process</strong></td>
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<td>- Reference workflow</td>
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<td>- Process phases and work products</td>
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<td>- Process adaptation: available methods and tools for model-based development</td>
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<td>- Process manuals and developer guides</td>
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<td>2.30 pm</td>
<td><strong>Design of model and software architecture</strong></td>
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<td>- Introduction: model architecture v. software architecture</td>
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<td>- Design of ISO 26262-compliant software architectures</td>
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<td>- Simulink®/TargetLink® design patterns for safety-critical software</td>
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<td>- Model partitioning and encapsulation of safety-critical modules</td>
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<td>- Established software architectures for Simulink® and TargetLink®</td>
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<td>- Reusability concepts: model referencing and (company-specific) model libraries</td>
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<td>4 pm</td>
<td><strong>Analysis and evaluation of model architecture</strong></td>
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<td>- Analysis of the model structure</td>
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<td>- Introduction to complexity metrics</td>
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<td>- Calculation of model complexity</td>
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<td>- Case studies</td>
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<td>5 pm</td>
<td><strong>End of day</strong></td>
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# Workshop agenda: Day 2

## 9 am
**Ensuring model quality with modelling guidelines**
- Overview of modelling guidelines
- Modelling guidelines for ISO 26262-compliant modelling
- Automatic checking of modelling guidelines

## 11 am
**Tool qualification**
- Foundations of tool qualification
- Determination of the tool confidence level
- Qualification methods

## 12 pm
**Lunch break and open dialogue**

## 1 pm
**Ensuring model quality with model testing**
- ISO 26262 requirements in the testing process
- Safeguarding safety requirements
- Test goals on different testing levels
- Safeguarding functional properties of model and code
- Regression testing and back-to-back testing, MiL – SiL – PiL
- Model and code coverage
- Automatic test evaluation with test assessments

## 3 pm
**Priorities for ISO gap analysis and process improvement**
- Prioritizing ISO 26262 requirements for SW development
- Assessing costs and benefits of ISO 26262 requirements
- ISO 26262 requirements for the documentation of safeguarding
- Consistent quality management throughout the project

## 4 pm
**Concluding words and feedback**

## 5 pm
**End of day**
About MES
Model Engineering Solutions GmbH (MES) is a software development and consultancy company, specialised in software in the car. Our customers include the major German automotive manufacturers such as AUDI, Daimler and Volkswagen. We provide consultancy services and market-leading software tools to support our customers in the quality assurance of automotive software.

One of our core competences is running specialised workshops in automotive software development. Our workshops are geared around real-life examples from your field of work and are tailored to address different levels in your company hierarchy: from absolute beginners to experienced developers and project managers. Our many years’ independent experience in series projects means we know what really works – and what doesn’t. This is the knowledge we share with you in our specialised workshops.

Speakers

Dr. Hartmut Pohlheim
Hartmut Pohlheim is the strong backbone of our technology development. He is CTO out of a firm conviction and manages customer projects as well as our in-house software development team under tremendous time and quality pressure. Our customers value his inexhaustible technical knowledge and his pragmatic, hands-on approach to challenging technology questions. Testers fear him for his zero tolerance policy when it comes to errors.

Dr. Elke Salecker
Elke is a senior software consultant for automotive software at Model Engineering Solutions. She specialises in model-based software development in compliance with the ISO 26262 standard, and supports our customers in defining and implementing their software development processes and tool chains.

Dates & location
31 March – 01 April 2014, Friedrichstraße 55, 6th Floor, 10117 Berlin, Germany

Cost of workshop
€ 1,150,00 plus VAT. The price for the workshop includes training materials, refreshments and lunch.

Discounts
We offer an early bird discount of 5% for registrations received by 14 March 2014. An additional 5% discount is available for companies registering more than one participant.

How to register
Julia Goslar
Please send Julia your completed registration form by fax or email. Please note that advance registration is mandatory.
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F: +49 30 2091 6463 33
Who attends our workshops?
Engineers and managers from the following companies have already taken part in our training workshops:


What others say about us…
Here is a selection of feedback we have received from workshop participants in recent years:

“A resounding thumbs up for this workshop! The speakers displayed a high level of specialist knowledge and presented the subject in a clearly comprehensible and methodical way.”
Participant from Continental Automotive AG

“Thanks for the excellent workshop, which was noticeably enriched with a wealth of practical experience.”
Participant from Porsche AG

“The workshop prompted me to reconsider our company’s internal development process. I was particularly taken by the style of the presentations, the lucid portrayal and realistic assessment of problems. The speakers remained consistently impartial and impressed me with their depth of knowledge of current projects.”
Participant from Audi Electronic Ventures GmbH

“This was the first time that I have come across a consultant who understood how to portray requirements engineering and requirements management so well and with such relevance to the automotive domain.”
Participant from FEV GmbH

“This is how a workshop should be. All the examples went straight to the point and were perfectly selected to reflect my field of work.”
Participant from Daimler AG

“A definite must for anyone in model-based development working with ISO 26262.”
Participant from Jaguar Land Rover Ltd.

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