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MES MODEL ENGINEERING SOLUTIONS

MES Supports ISO 26262 Deployment for Model-based Software Development

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OEMs and suppliers are today facing the challenge of implementing the ISO 26262 standard into all of their model-based development process activities.

The major goal of the process deployment services offered by Model Engineering Solutions (MES) is the complete coverage of the ISO 26262 standard in model-based development. Achieving this goal requires a well-defined and cost-effective development and V&V process that relies on the best practices from the automotive industry.

MES Academy consultants are highly specialized in model-based development processes for safety-critical software development.
They are experienced in company-wide introduction and implementation of ISO 26262-compliant development processes for any code generation tool, be it Embedded Coder or TargetLink. The definition and introduction of an ISO 26262 process is carried out worldwide by senior consultants from the MES Academy.

MES' objective is to further customer competencies in model-based development, regardless of where they currently stand.
The MES *ISO 26262 Process Deployment Service* creates or adds to existing process and development documentation, and is adapted to customer requirements.
MES consulting clients include major OEMs and suppliers to the automotive industry like Audi, Bosch, Continental, Daimler, EvoBus, Hella, Siemens, Takata, Volkswagen, WABCO, and ZF.

ISO 26262 Compliance

ISO 26262 provides important recommendations for software development. MES supports its customers in efficiently implementing these recommendations in all relevant phases of software development.
Significant development phases are:

- Deriving safety requirements
- Designing software architecture
- Designing and implementing safety functions in models
- Guideline compliance testing and managing model complexity
- Quality assurance of models for safety-relevant applications

The 5 stages of the MES *ISO 26262 Deployment Service*

The MES Academy process deployment services consist of five levels, each one building on the last:

1. *Analysis of existing processes, methods, and tools*

In the analysis stage, MES works closely together with the customer in order to identify missing or insufficient activities and work products.
Examples of tasks carried out in the analysis stage are:

- Reviewing the current development process and tool chain
- Conducting a structured *ISO 26262 Gap Analysis* to identify missing development or safeguarding activities
- Developing and prioritizing a roadmap for defining and implementing an ISO 26262-compliant development process

2. *Development of a process manual*

In this stage, processes and methods are developed together with the team and other stakeholders on the customer side. The process documentation describes the required activities and work products that are

to be used in detail. Clear definitions state (1) what to do, (2) when to do it, and (3) what the expected result of each individual process step is (e.g. criteria for success and quality goals). A process manual documents the determined process and typically consists of the following descriptions:

- Graphical process maps that provide an overview of the activities to be carried out
- Comprehensive definition including goals, prerequisites, and inputs for each process step
- Definition of *work products*
- Definition of roles and tools involved in the individual activities
- Goals and criteria for success for each process step

3. *Creation of developer manuals*

The process manual is supplemented with a developer manual, which explains how to use methods and tools for software development and quality assurance. The developer manuals capture how to design and achieve embedded software of the highest quality. Examples of topics covered in such a manual are:

- General pattern for automotive control function design with Simulink
- Model structures for safety-critical software
- Use of *Data Dictionaries* or parameter libraries
- Model interface design
- Application-specific modeling patterns , also for AUTOSAR software development
- Use of libraries and referenced models
- Development of larger models with software variants
- Best practices for reducing resource usage of the generated code
- Modeling for the traceability of requirements

4. *Implementation of ISO 26262-compliant development*

Using the available process manual as a basis, MES consultants show customers how to use enhanced and customized reference workflows for series production projects.

- Team member training on how to use the new processes on the basis of process and developer manuals
- Support in applying the process manuals in series production projects
- Assessing the successful implementation of the new process
- Assistance in optimizing the new process
- Improvement of the process and development manuals in accordance with new requirements

5. *Development support*

In the last stage, MES assists projects with production relevance via independent development services.

- Ongoing management and developer support in applying the process to existing series production projects
- Service provision, including safety management/analysis, modeling, code generation, etc.

These services are provided in collaboration with the MES Test Center.

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