OEMs and suppliers are today facing the challenge to implement the new ISO 26262 standard into their model-based software development activities. The major goal of the ISO 26262 process deployment services offered by Model Engineering Solutions GmbH (MES) is to define and apply a well-defined and cost-effective development and V&V process relying on the best practices from the automotive industry in order to achieve full ISO 26262 standard compliance.

With MES being a dSPACE TargetLink Strategic Partner, its consultants are highly specialized in model-based development processes for safety-critical software development with dSPACE TargetLink. ISO 26262 process deployment is carried out worldwide by senior MES consultants, who are experienced in company-wide adoption and implementation of ISO 26262-compliant model-based development.

Provision of Key Requirements of ISO 26262 Compliancy
ISO 26262 defines key requirements for the software development process in order to achieve standard compliancy. MES supports their customers in achieving this compliancy in all relevant development phases. Examples of such activities are:

- ISO 26262 gap analysis for model-based development processes with dSPACE TargetLink
- Generation of work products needed for ISO 26262 compliance
- Safety management and safety analysis
- Reviews, static analysis, and inspection of software and model architecture
- Modeling and code generation including AUTOSAR with TargetLink
- Guideline checking and model complexity measurement

Transformation of Code-based to Model-based Development Process in Compliance with ISO 26262
Each company has its own processes, tool chains, and culture for embedded software development. Due to these facts, there is no general solution for adapting the ISO 26262 standard to a company. MES takes this into account and provides company-tailored solutions for transforming the existing development process to an ISO 26262-compliant model-based development process - be it on management or developer level.

Major support is carried out by MES experts in the following phases:

Planning and execution
- Assistance in transforming a company’s development process to achieve ISO 26262 compliancy
- Identifying and implementing the correct approach for achieving defined goals
- Development of an ISO 26262 process manual in collaboration with development department(s) and the process team
- Development of ISO 26262 TargetLink developer manuals

Assistance in education and training
- Teaching the fundamentals of the ISO 26262 standard in the context of model-based development with dSPACE TargetLink
- Providing advice on maximizing the benefits of model-based development
- Development of customized process and developer manuals

Four Stages of MES ISO 26262 Process Deployment Services
MES process deployment services are carried out in four different stages:
(1) Analysis of existing processes and tools
In the analysis stage, MES works closely together with the customer to identify missing tasks, tools, and training requirements. Examples of tasks carried out in the analysis stage are:
- Review of current development process and tools
- Conduct an ISO 26262 gap analysis to identify missing activities and tools
- Identify areas where further training and changes are necessary
- Develop a roadmap for an ISO 26262-compliant development process
- Define a tool qualification plan

(2) Development of process manuals and developer manuals
Within this core activity, a process manual is developed in collaboration with the customer’s process team that describes the required activities and use of tools in detail. Clear work instructions are defined which unmistakably state (1) what to do when and (2) what the outcome of a specific process step should be (e.g., success criteria and quality goals). A process manual typically consists of the following descriptions:
- Graphical process maps describing the activities to be carried out in a comprehensive way
- A process overview including prerequisites and inputs for each process step
- Work products that have to be developed
- Roles and tools involved in the individual activities
- Goals to be achieved at the end of a process step
- Success criteria for each process step
- Handover criteria from one process step to the next
The process manual is supplemented with a developer manual, which explains how to use the software development tools, Simulink, Stateflow, and TargetLink in order to design and achieve embedded software of the highest quality. Examples of topics covered in such a manual are:
- General patterns for automotive control function design with Simulink and TargetLink
- Model architecture design for safety-critical software
- Company-specific use of the TargetLink Data Dictionary
- Design of model interfaces
- General design patterns for TargetLink models (control structures, use of functions, etc.)
- Application-specific modeling patterns
- Design patterns for AUTOSAR software development with TargetLink
- Library concept and model referencing
- Modeling of software variants
- Best practices for reducing the resource usage of the generated code
- Modeling for traceability of requirements

(3) Implementation of ISO 26262-compliant TargetLink reference workflow
On the basis of the available process and developer manuals, instructions for implementing an enhanced and customized dSPACE TargetLink reference workflow for series production projects are given.
- Training of team members in the new process manual and developer handbooks
- Support in implementing the process and developer manuals in series production projects
- Assessment of the successful implementation of the new process
- Assistance in optimizing the new process

(4) Process deployment support
In the final stage, MES assists projects in implementing the company-tailored process for series production projects.
- Ongoing management and developer support for applying the process to existing series production projects
- Enhancement of process and developer manuals to new requirements
- Provision of services including safety management/analysis, modeling, code generation, etc.
- Tool qualification support for company-specific tool-chain

MES Process Deployment Services
MES provides ISO 26262 process deployment services as a whole package or as a supplementation to existing processes and manuals - adapted to customer requirements. Consultancy customers of MES include major OEMs and suppliers to the automotive industry such as Audi, Bosch, Continental, Daimler, Elektrobit, EvoBus, Hella, Siemens, Takata, Volkswagen, WABCO, and ZF.

For more information contact
Dr. Ingo Stürmer (stuermer@model-engineers.com)
Model Engineering Solutions GmbH (MES)
Friedrichstraße 55, 10117 Berlin
Tel: +49 30 2091 6463 0
Fax: +49 30 2091 6463 33
http://www.model-engineers.com

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