

# MXAM in Action

## Best Practices for Modeling Guidelines and Architectural Design Principles - 2 days

Date	Location	Language
Upon request		English/German

This training class will introduce you to fundamental aspects of working with modeling guidelines and to the static model analysis of MATLAB Simulink/Stateflow, TargetLink, and Embedded Coder models. Furthermore, you will learn how to create MISRA- and ISO 26262-compliant models using proven modeling standards and best practices. The spotlight will be placed on how you can best integrate the MES Model Examiner (MXAM) into your process. Via several hands-on sessions, you will have the chance to practice reliably deploying guidelines with MXAM and ensure guideline compliance. Participants will discover a good workflow for analyzing and correcting models, justifying deviations in preparation for a review, as well as adapting and integrating MXAM into user-specified development environments. What's more, you will find out how to perform a structure and complexity analysis of a model. The resulting metrics serve as the basis for assessing the architecture, complexity, and size of a model.

### Target Audience

This training class is targeted at anyone who wants to learn how to use the MES Model Examiner (MXAM) professionally. The class is for function developers, testers, test managers, and quality managers who focus on model-based development of embedded software based on MATLAB/Simulink and related to Embedded Coder/TargetLink. Share your experiences and discuss with other tool users.

### Highlights

- Presentation of proven modeling guidelines
- Automated guideline checking and correction with MXAM
- Review of guideline violations and accounting for discrepancies
- Creating custom guideline documents in MXAM
- Toolchain and continuous integration
- Assessing architectural design principles
- Complexity analysis of models

### ????? Participant from Volkswagen

"The trainers are a well-established team with a lot of expertise. It is a pleasure to listen, to participate and the training encourages to improve your own modelling continuously."

### Languages

Available in English and German

### Formats

## Icon On Site Training

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**Open-enrolment Trainings**  
at one of our locations

## Icon Online Training

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**Virtual Classroom Trainings**  
wherever you are

## Icon Inhouse Training

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**In-house Trainings**  
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More Details on Formats and Locations

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## Our Trainers



## Agenda

### Day 1

#### Introduction to modeling guidelines and static model analysis

- Architectural design principles in model-based design
- Model quality through static guideline checking
- The purpose of guidelines and metrics

- Standard guideline documents

### **Guideline analysis with MXAM**

- General workflow
- Structure and use of the user interface
- Reporting: overview, result navigation, model linking, auto repair, re-run, annotations, and export

### **Hands-on: General workflow**

- Performing guideline analyses
- Repairing guideline violations
- Justifying guideline violations
- Saving and exporting reports

### **Analysis and evaluation of model architecture with MXAM**

- Model structure analysis
- Introduction to complexity metrics
- Calculating model complexity
- Measures to reduce model complexity
- Identification of ineffective interfaces and model clones

### **Hands-on: Model architecture analysis**

- Analyzing and evaluating model metrics
- Identifying complex subsystems, ineffective interfaces, and clones
- Refactoring of model structure

### **Presentation of guidelines for key aspects of modeling**

- Selected guidelines for Simulink, Stateflow, and TargetLink with topics such as layout, naming conventions, dataflow, typing, and scaling

### **Hands-on: General workflow**

- Performing analyses of a demo model with the starter set in MXAM
- Evaluating and discussing specific findings

## **Day 2**

### **Basic configuration of an analysis with MXAM**

- Creating a project with all analysis-relevant settings
- Creating a guideline document to define a set of guidelines
- Configuring global and check parameters for a customer specific guideline analysis
- Creating an ignore-list to disregard model elements

### **Hands-on: Configuring a project**

- Creating and configuring MXAM projects, ignore lists, guideline documents

### **Extensive configuration of an MXAM analysis**

- Setting up projects for distributed development: reporting, annotations, artifacts
- Creating a user-defined guideline document: authoring, versioning, and central repository in library

## **Hands-on: Customizing MXAM**

- Creating custom libraries
- Creating custom guidelines

## **Further modeling best practices**

- ISO 26262 requirements that can be covered with modeling guidelines
- Other aspects: observance of ranges, compatibility of interfaces, etc.

## **Hands-on: Applying advanced guidelines**

- Performing analyses of demo or customer models with an extended set
- Evaluating and discussing specific findings

## **Automating an MXAM analysis**

- Exporting the current project settings into a MATLAB batch script
- Executing batch analyses via the MATLAB command line
- Various interfaces for continuous integration
- Performing analyses with the MES Jenkins Plugin
- Hook functions to customize the analysis

## **Hands-on: Creating batch analyses**

- Creating, adjusting, and running MATLAB batch analyses for automated execution
- Integrating hook functions to meet toolchain-specific requirements