System Architecture Modelling with SysML and MagicDraw – 5 days
Training agenda

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Objectives

• Understand modeling benefits for SE
  – Feedback from industry

• Learn practical modeling approach for SE
  – Introduction to SysML notation for system architecture/design and understanding of links with other languages for detailed design and analysis models
  – Sample case to illustrate modeling concepts: Automated Teller Machine (ATM)
  – Case study with Magic Draw tool for practice
Training target

• **Target projects**
  – All projects in concept or development stage concerning industrial systems (including safety critical avionic systems)

• **Target people**
  – “System” teams and supporting specialists
    • Safety, Security
    • HW expert
    • SW architect
    • …
Agenda (1/5)

• First day - Morning
  – Introduction
  – Modelling benefits (captured from industry), model and diagrams
  – Creation of first modelling project
  – Overview of MagicDraw
  – SysML overview: Foundations (UML), main diagrams

• First day – Afternoon
  – Scope of SysML in System Engineering development process
  – Overview of suggested modelling approach
  – Exercise: use of package diagram to structure model
  – Choice of case study and presentation: purpose, mission, objectives
  – Use cases and actors with Use case diagram
• **2nd day – Morning**
  – Detailed description of a use case
  – Definition and application of a stereotype to describe a use case
  – Capture of operational scenarios with sequence diagrams
  – Life cycle and operational states with State machine diagram

• **2nd day - Afternoon**
  – Domain modelling with block definition diagram
  – Capture of physical context with Internal Block Diagram
  – Creation of SysML requirements with Requirement diagram
  – Creation of requirement traceability links
• 3rd day – Morning
  – Characterizing of interfaces with state machines and allocations
  – Special focus on HMI
  – System behaviour and scenarios of functions with activity diagram
  – Linking functions with operational states

• 3rd day – Afternoon
  – Allocation of performance requirements on system functions
  – Identification of “system level” requirements + textual translation
  – Model based testing
  – Functional validation with simulation
Agenda (4/5)

• 4th day – Morning
  – Initialization of physical architecture (reuse) with BDD and IBD
  – Refinement of functions and reuse
  – Design of logical architecture with activities, blocs and allocations
  – Description of constraints and equations with parametric diagram

• 4th day - Afternoon
  – Comparison of architecture trades with parametric diagram
  – Complement of physical architecture: blocs and allocations
  – Identification of system elements requirements
  – Identification of structural and behavioural system element IF
Agenda (5/5)

• 5th day - Morning
  – Model verification with OCL rules
  – Model versioning and baselines
  – Concurrent work on models
  – From system to software

• 5th day - Afternoon
  – Document generation
  – From system to safety analysis
  – Incremental modelling strategies with benefits and efforts
  – Summary – remaining questions / answers