Model-Based Design

Embedded Software

Certified/Qualified Code Generation

Critical Systems

Systems Engineering

Skills

Expertise

Software Life Cycle Management
Introduction

"Today, in all domains, everything goes fast. Being proactive and using up-to-date tools and processes are key success factors. Being trained is the same. It brings us up-to-date!

Training is for us more than sharing knowledge: it is sharing competence. This is why, at ANSYS Esterel Technologies, we have invested a lot in the training of our trainers and in our training curriculum, which goes from e-learning discovery to extensive classroom sessions.

The program presented in this catalog covers basic training courses on the SCADE product line as well as advanced training courses and process courses that are focused on the standardized processes and best practices that come with our tools.

Our aim is to accompany you on your way to stay competitive."

ANSYS Esterel Technologies

Publication Date: February 2016
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# Requisites Overview

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<th>Length</th>
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<tr>
<td>Model-based Systems Engineering with SCADE System</td>
<td>2 days</td>
<td>System Engineers, Software Architects</td>
<td>None</td>
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<tr>
<td>Model-based Design with SCADE Suite</td>
<td>4 days</td>
<td>Software Engineers</td>
<td>None</td>
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<tr>
<td>Model-based Design with SCADE Display</td>
<td>2 days</td>
<td>Software Engineers</td>
<td>None</td>
</tr>
<tr>
<td>Testing SCADE Suite applications with SCADE Test</td>
<td>2 days</td>
<td>Software Engineers, Test Engineers</td>
<td>SCADE Suite Basic knowledge would be a plus</td>
</tr>
<tr>
<td>Model-based Virtual Prototyping with SCADE Test Rapid Prototyper</td>
<td>2 days</td>
<td>Software Engineers, Test Engineers</td>
<td>None</td>
</tr>
<tr>
<td>Model-based Design of ARINC 661 compliant cockpit display systems with SCADE Solutions: User Application</td>
<td>1 day</td>
<td>System Engineers, Software Engineers</td>
<td>SCADE Suite and SCADE Display Basic knowledge would be a plus Basic knowledge of the ARINC 661 standard</td>
</tr>
</tbody>
</table>

| ADVANCED TRAININGS                                                            |        |                                         |                                                                               |
| Optimize your SCADE Suite Models and Code Performance                          | 2 days | Software Engineers, Software architects, Algorithm experts | SCADE Suite Basic knowledge                                                   |
| Extend the SCADE Suite Capabilities using TCL Scripts                          | 2 days | Software Engineers, Tools Engineers, Methods Engineers | SCADE Suite Basic knowledge                                                   |
| SCADE Suite Modeling with Import of Simulink/Stateflow® Models                 | 1 day  | Software Engineers                      | SCADE Suite Basic knowledge, Simulink® and Stateflow® basic knowledge         |
| Model-based Formal Verification with SCADE Suite Design Verifier               | 1 day  | Software Engineers                      | SCADE Suite Basic knowledge                                                   |
| Model-based Design of ARINC 661 compliant cockpit display systems with SCADE Solutions: Server and Widgets | 3 days | System Engineers                        | Model-based Design of ARINC 661 compliant cockpit display systems with SCADE Solutions: Server and Widgets |
| SCADE System Configurator                                                      | 1 day  | System Engineers, Software Architects   | SCADE System Basic knowledge                                                  |

| PROCESS TRAININGS                                                             |        |                                         |                                                                               |
| Effectively Manage a DO-178C Certified Model-based Project with SCADE         | 2 days | Software Engineers, Project Managers, Safety Engineers | SCADE Suite and DO-178B/C standard basic knowledge would be a plus |
| Optimize Verification and Validation Strategies for DO-178C (or DO-178B) compliant applications using SCADE | 2 days | Software Engineers, Project Managers, Safety Engineers | SCADE Suite and DO-178B/C standard basic knowledge would be a plus |
| DO-178C: How to move to the new standard with SCADE                            | 1 day  | Software Engineers, Project Managers, Safety Engineers | Basic knowledge of the DO-178C standard would be a plus                      |
| SCADE Model-Based Systems Engineering of ARP-4754A Compliant Aeronautics Systems | 1 day  | System Engineers, Software Engineers, Project Managers, Safety Managers | SCADE System Basic knowledge would be a plus                                  |
| Realization of a Railway Application Compliant with the EN 50128:2011 Standard with SCADE | 2 days | Software Engineers, Project Managers, Safety Managers | Basic knowledge of SCADE Suite would be a plus                                |
Find the details of the Training Offer at:
www.esterel-technologies.com/services/fast-ramp-up-services/
The SCADE Technology

Esterel Technologies is the leading provider of critical systems and software development solutions for the aerospace, defense, rail transportation, nuclear, and industrial domains.

System and software engineers use SCADE® solutions to graphically design, verify, and automatically generate critical systems and software applications with high dependability requirements. SCADE solutions easily integrate, allowing for development optimization and increased communication among team members.

SCADE is a product family for Embedded System and Software development that comprises five product lines that can be used together or independently:

- **SCADE System®** for complex embedded systems modeling,
- **SCADE Suite®** for embedded control software modeling, verification and generation,
- **SCADE Display®** for HMI modeling, verification and generation,
- **SCADE Test** for embedded control software and HMI verification,
- **SCADE LifeCycle®** for Application LifeCycle Management (ALM),
- **SCADE Solutions for ARINC 661 Compliant Systems** for ARINC 661-compliant Avionics Display Development.

**SCADE Suite and Display Code Generators have been qualified/certified at the highest level of safety** across six market segments by more than ten safety authorities, worldwide, including:

- DO-178B/C up to Level A - **Aerospace and Defense** Applications by FAA, EASA, Transport Canada and ANAC
- IEC 61508 up to SIL 3 - **Transportation and Industrial** Applications by TÜV SÜD
- EN 50128 up to SIL 3/4 - **Rail Transportation** Applications by TÜV SÜD, EBA and Certifier
- IEC 60880 demonstrated compliance - **Nuclear** Applications by nuclear safety authorities
- ISO 26262 for **Automotive**
SCADE trainings

The SCADE training program is designed to rapidly elevate SCADE users’ proficiency by exposing them to a balanced mixture of theory and lab exercises.

The SCADE trainings are tailored to answer your needs. Whether you have basic SCADE knowledge, you are an advanced user, or want to get trained on processes, they all address specific phases of your SCADE development project. Bridges have been built between the different training offers to answer your expectations and tackle different situations and topics.

Our training curriculum is constantly evolving based on our customers’ feedback. We intend to provide you relevant content. Classes take-up the challenges you may face when developing a critical application.

Qualified trainers

Our team of trainers has practical experience through the development of SCADE projects. They are present at our customers’ side every day to accompany them in taking the full advantage of the SCADE products. They are highly experienced both in providing expertise as well as for training pedagogy.

The SCADE trainers all have an extensive background in the domains on which they speech and have occupied positions with similar responsibilities at all levels during their professional careers.

The team of trainers is available to support you in building your teams’ training programs, tailor it to your needs and offer optimized learning paths. They bring their experience in transferring their knowledge and expertise with high quality material.

Trainings tailored to your needs

All our classes can be tailored to your needs. This is why we will always start asking you about your expectations and objectives about a training.

We offer two levels of training: Basic training and Advanced training that answer a particular situation of a project:

- At the conclusion of a Basic training class, the trainee will be able to effectively start the design and development of a project using SCADE tools.
- At the conclusion of an Advanced training class, the trainee will be able to optimize a SCADE project workflow, secure its performance and make one step more in taking full advantage of the SCADE product line.

Certified trainings

You will receive a SCADE Training certificate after the training session. This certificate is the guarantee that you have reached the required level of skills.

By getting certified, you will gain industry recognition for your qualification and bring credibility to the knowledge, skills and experience you possess.
Delivered worldwide...

Onsite or at our worldwide ANSYS offices... Choice is yours.

Trainings can be internal to your company and hosted either at your location or at an ANSYS office. Our main offices are held in the United States, United Kingdom, France, Germany, India, China, Korea and Japan. Other training locations can be discussed with us.

When a training is delivered at your site, the training room must be fitted with a video projector and at least one computer for two people.

We also offer inter-companies trainings to enable knowledge sharing and return on experience between participants.

Esterel Technologies is registered as training provider from the French Government under the registration number 11-78 06 76 478.

...In your language

The SCADE trainers can deliver the trainings worldwide in English, French, Chinese, Korean, Spanish, German, Russian and Japanese.

An operational pedagogy

The SCADE Trainings are based on the long expertise the company has compiled. The trainings alternate both theoretical content, exercises, labs and return on experience. They integrate your specific needs and domain interests.

A basic introduction is available on our YouTube channel: ANSYS How To Videos.

High-quality trainings

Because we are committed to deliver quality services, our training processes make us listen to your feedback and improve our deliveries constantly.

As a result more than 95% of our Customers rated our trainings from good to excellent!

Logistics

We handle the logistics organization. When the training is delivered at your premises we will coordinate with you for the training organization.

When a training is delivered at our premises, our prices do not include hotels nor meals.

“The training was a good chance to understand overall contents of SCADE [...] and sharing knowledge expertise with the trainer.

I recommend taking the trainings, because they do make a big difference.”

Simon Choi, Senior Engineer, Korea Aerospace Industry, LTD
Registration

By Mail
Contact us at scade-services@ansys.com. We will redirect you to your local training entity so that you can discuss all the organization and content details with the local team.

Through the Catalogue
You can also refer to the contact page of this catalogue to interact with us.

Through the Website
Visit our website at www.esterel-technologies.com/services/fast-ramp-up-services.
SCADE Basic Trainings present the methodology, language and tools usage according to the steps of a software development process. They are meant for beginners with no prior, or little experience of the SCADE products and environment.

The Basic Trainings also offer an introduction to Model-Based Design and place the products in the context of system and software engineering processes.

The Basic Trainings are composed of different modules presenting the modeling activity using SCADE System, SCADE Suite, SCADE Display, SCADE Test and SCADE LifeCycle.
How can SCADE System support you in building a complete system from scratch? What are the tool’s capabilities to integrate system design with the complete development process? How can SCADE System help me improve my requirements engineering?

This course provides a comprehensive introduction to the SCADE System technical computing environment. It will provide you the insights to establish and maintain a practical and efficient Systems Engineering Process with SCADE System.

The SCADE System competency is developed in a natural way, with an emphasis on practical applications: operational analysis of a system, functional breakdown, architecture definition and selection, interfaces and data management. A focus on how to create and complete a project with themes of modeling, traceability and report generation allows the thorough assimilation of ideas through hands-on examples and exercises.

Topics include:

- Basic Concepts of SCADE System,
- System Design with the tool,
- SCADE System Environment and Workflow: SCADE System IDE, design of a system model, model capture overview, primitives, functional decomposition, architecture definition, allocations management, data dictionary, notes and comments, tables overview and customization, navigation in models, layout and styles, checking of model design, traceability management and design report generation,
- Structural diagrams: Block Definition and Internal Block Diagrams,
- Behavior diagrams: Use Cases, Sequence diagram, Activity diagram, State machines diagram,
- Requirements traceability management, design report generation, components’ export from your SCADE System model into a new system model,
- Synchronization with SCADE Suite: model export to software design and software model import into SCADE system.
Model-based Design with SCADE Suite

Do you want to get started on SCADE Suite? Are you looking forward to discover the full potential of the tool for developing critical embedded software? How will SCADE Suite support you on your day-to-day job?

This course provides a complete overview of the SCADE Suite environment.

SCADE Suite is introduced gradually, with an emphasis on practical application. A focus on how to create and complete a project with themes of modeling, traceability, simulation, report generation, C or Ada code generation with the code generator SCADE Suite KCG and execution are explored throughout the course. Three different labs are developed during the training course, all based on industrial applications. Theoretical content is tight to practical demonstrations.

Topics include:

- Working with the SCADE Suite user interface
- Basics of the language and tool
- Introduction to the SCADE Suite Modeling style
- Writing programs with logic and flow control
- SCADE State Machines
- Working with data types and creating variables
- Imported code
- Iterators and other advanced SCADE Suite operators
- SCADE Suite Simulation
- Reports generation with SCADE LifeCycle Reporter
- Best practices including architecture, libraries, specialization, parameterization

On the last day, we open the topic to the software life cycle development:

- Model-Based System Engineering with SCADE System, and its connection with SCADE Suite
- Model Debugging with SCADE Suite Design Verifier and SCADE Timing and Stack Optimizer
- Design Rules Checking with API / TCL scripting
- Project Management with SCADE LifeCycle Dashboard
- Testing activities with SCADE Test for Testing Environment on host and target, Model Test Coverage and the Compiler Verification Kit,
- Traceability Management
- Virtual Integration with ANSYS Simplorer®
- Certification benefits with the Certification Kits and Plans
Do you want to get started with SCADE Display? Are you eager to discover the new generation of graphics development tools for designing critical embedded Human Machine Interfaces (HMI)? How can SCADE Display help you reach your objectives?

This course provides all the keys to become a proficient SCADE Display user. This module contains the courses related to the capture of the system requirements allocated to software in a SCADE Display model. It shows how to ensure the full traceability to requirements, verification of graphical rules on the SCADE Display model, generation of the code with the SCADE Display KCG code generator and integration in the final application with OpenGL®.

An important place is made for the SCADE Display methodology and features that help in the management of a SCADE Display project. Modeling, traceability, simulation, report generation, code generation with the qualified code generator SCADE Display KCG and execution are explored throughout the course. It is structured to allow thorough assimilation of ideas through hands-on examples and exercises, with a specific lab per day.

Topics include:

- Basics of the tool
- SCADE Display user interface, modeling style and graphical Editing
- Graphical Verification: Principles, Automatically Checked Rules, Model Checker, Model Corrector, Recommendation Check-List SCADE Display KCG Code Generator
- Code Generation: OGLX Architecture, Integrate Generated Code on an OpenGL Target, External Code
- Project Management: IDE Settings, Environments, Workspaces & Tools Options, Automatic Documentation Generation, Configuration Management, User Documentation
- Font Management: Stroke & Bitmap Font Editing, TrueType/OpenType Font Import, Managing Font Tables
- Traceability Management with the SCADE LifeCycle Requirements Management Gateway
What does SCADE Test offer? Which steps are through the use of the tool? How to efficiently build a test strategy with SCADE Test?

This course is a comprehensive introduction to the SCADE Test environment. It will help you understand the SCADE Suite Model-based V&V Activities, from your testing strategy to the test execution using SCADE Test Environment, and including the mastering of your testing sessions using SCADE Test Model Coverage. All topics introduced are coupled with exercises to get hands-on the concepts presented.

Topics include:
- Establish a complete test project with SCADE Suite and SCADE Test,
- Preparing your Test Environment: Overview of the tools, creation of a Test project and Data Description,
- Running Model Testing on Host: Run Simulation Sessions on Host, Simulation Session Results, Consolidated Test Reports, Model Coverage Measurement,
- Preparing Software Testing on Target: Generate Test Harness,
- SCADE Test Architecture: Test Execution Engine, Test Harness Generator, Report, Convert,
- Model and code coverage: Batch Mode, Interactivity and Customization.

Complementary course recommended (can be customized to fit in the 2-day course of SCADE Test): Model Coverage Criteria

SCADE Test Model Coverage is a module that extends SCADE Test environment within SCADE Suite with the coverage measurement of models and generated code relying on a high-level requirements-based test suite. This training details the different criteria definitions and demonstrates these concepts with exercises.

Topics include:
- Model Coverage criteria definitions:
  - Basic Flow Coverage (BC),
  - Decision Coverage (DC),
  - Modified Condition/Decision Coverage (MC/DC),
- Coverage Cases Definition,
- Integration Criteria:
  - Control Activation,
  - Control and Data Activation.
How can I simulate my design with rapidly created interactive panels? How easily can I build a SCADE Test Rapid Prototyper panel? What are the options I have to test my design? How is it integrated with the SCADE environment?

This course provides all keys to use SCADE Test Rapid Prototyper environment. It teaches how to use SCADE Test Rapid Prototyper to create interactive panels for virtual simulation and test creation with SCADE Suite, ANSYS SIMPLORER or other Simulation tools compliant with the Functional Mock-up Interface (FMI) standard. It shows how the tool facilitates the elaboration of a test strategy according to your needs.

Not only the course provides insights on the SCADE Test Rapid Prototyper, but also provides a broader overview of project management with themes of modeling, traceability, test strategy elaboration, simulation and report generation. Theory, hands-on examples and exercises are mixed throughout the course.

Topics include:
- Rapid Interactive Simulation,
- Design of a Graphical Panel for SCADE Suite: creation, connection to SCADE Suite, tips and tricks,
- Design of a Graphical Panel for SIMPLORER: Introduction to the Functional Mock-up Interface (FMI), connection to SIMPLORER, tips and tricks,
- Remote Communication Capabilities: Standalone Application Generation for Windows©, Android© and iOS©,
- Design Constructs: Graphical elements, Containers, Plugs,
How do you rapidly create complete User Applications compliant with the ARINC 661 standard? How can I clearly separate UA graphics, UA logic and UA communication?

This course details how to build ARINC 661 user applications, which are autonomous systems requiring pilot interactions, with the SCADE Solutions for ARINC 661. It focuses on how to create a User Application (UA) with SCADE UA Page Creator and SCADE Suite, particularly focusing on how to create UA Definition File (DF), models, generate Definition Files, and generate UA Communication Code with the UA logic created with SCADE Suite.

Learn how to use SCADE Solutions for ARINC 661 compliant systems, including:

- How to create a user application with SCADE UA Page Creator,
- How to generate Definition files,
- How to generate UA communication code.
SCADE Advanced Training focus on SCADE solutions and best practices often experienced in the course of the development of your application with SCADE products. They combine your experience to ours to make you become an expert. Trainers share their tips and tricks as well as lessons learnt from their experience.

Advanced training courses are ideal for SCADE users who already have an understanding and some experience in using the SCADE tools. They elevate them to an expert level of the SCADE tools and the tools’ environment.

Advanced trainings are also useful when coupled with a basic training to provide a deeper insight on a specific topic.
You already have implemented your SCADE Suite models and need to get to improve them? How would your models and code generation reach the best performance?

This course provides SCADE Suite users with a comprehensive view on how to optimize your SCADE Suite models to reach the best performance for the generated code.

The training presents how the SCADE Suite model architecture influences performance, particularly the impact of SCADE Suite’s main functions and constructs. It provides recommendations on efficient modeling patterns as well as on KCG code generation options for optimal runtime performance of the generated code. The training encompasses how to profile a SCADE Suite application using SCADE Suite Timing and Stack Verifier.

Details of architectures, tips and tricks, return on experience and first keys to improve your design are tackled during the course. A balanced mix between theory and exercises allow thorough assimilation of ideas.

Topics include:

- **Architecture**: Impact of architecture, identifying the main actors, main functions and constructs, structure of data, compliance with HLRs, success criteria,
- **Design**: standards, Impact of SCADE Suite KCG, guidelines and patterns, advanced modeling artifacts,
- **Analysis**: introduction to SCADE Suite Timing and Stack Optimizers, basic procedure for model optimization.
Do you need to extend the SCADE Suite capabilities? Do you want to learn how the SCADE Suite tool integrates TCL scripts to ease your work?

This course empowers you on how to use TCL scripting on SCADE Suite models. It shows how to extend script automation capabilities, such as specific automated checks, reporting functions or SCADE IDE Graphical User Interface capabilities.

The SCADE TCL Areas particularly include model scripting with checks, IDE customization for the menus, toolbars, browsers, properties, the SCADE Suite Reporter customization and the Generated code wrappers for interfaces and mappings.

Topics include:

- Programming with Tool Command Language (TCL): TCL environments and language basics, debugging,
- The SCADE project UML meta-models: UML meta-models conventions, modeling conventions, project UML meta-model, mapping UML - SCADE Suite model instances with TCL scripts,
- UML SCADE meta-model, storage, semantics, graphics, shortcuts,
- UML annotations and meta-model: TCL visitors, studio customization, commands, standard dialogs,
- SCADE Suite Script Wizard: TCL Studio TCL environment, commands, script wizards,
- Menu commands, toolbars and dialogs.
You are working on Simulink® and Stateflow® Models and would like to pass them along to the SCADE formal environment? You are looking forward to know more about the Simulink import of models to SCADE Suite, then check out this training!

This course details how to integrate Simulink and Stateflow models to your SCADE Suite project. The training details the use of the Simulink Translator, the Stateflow Importer and Simulink Wrapper.

The Simulink Translator translates discrete controllers specified in Simulink models into SCADE and the Stateflow Importer graphically and syntactically translates Stateflow diagrams into SCADE State Machines. The Simulink Wrapper allows simulation of SCADE models by Simulink in black box and white box.

The Training details the bridges between both technologies, and how to proceed when importing Simulink and Stateflow models to a SCADE safety critical process.

Topics include:

- Principles of the Simulink Gateway,
- From Simulink to SCADE Suite: principles, translation of a project, update of the translation, translation of blocks/supported blocks, Simulink model prerequisites, type inference, customization of user configuration files (UCF) and typical use of UCFs,
- From SCADE Suite to Simulink: SCADE in Simulink, S-Function generation for black-box, simulation, black box simulation, SCADE / Simulink co-simulation,
- Advanced usage.
Model-based Formal Verification with SCADE Suite Design Verifier

Do you want to get started on SCADE Suite Design Verifier? And learn how to leverage this tool to support your design activities? How does SCADE Suite Design Verifier deals with formal verification? Does my design model fulfill all of its requirements?

This course is dedicated to SCADE Suite users doing Model-based Formal Verification to get hands-on with SCADE Suite Design Verifier. It presents how to integrate formal verification into your SCADE Suite development process and how to perform formal verification on your SCADE design with Design Verifier.

The Training introduces you to the static formal verification concepts:

- **Aim**: Add mathematical reasoning into the verification processes
- **Goal**: Reduce verification cost increasing system reliability
- **How**: Add completeness to classical testing to detect uncovered bugs
- **Challenge**: smooth and early integration in classical design methodologies

Topics include:

- Formal Verification in the SCADE Suite process
- Getting started with SCADE Suite Design Verifier
- Writing properties
- Verification with data
- Methodology
How does SCADE answer the ARINC 661 standard requirements? What is the potential of the product line to implement ARINC 661 compliant systems?

This course provides you with all the required information to work on your Model-based Design of ARINC 661 compliant Cockpit Display Systems (CDS) with the SCADE Solutions. It particularly covers: the creation of the library of widgets with SCADE Widget Creator, the overview of the server architecture and configuration data, the server integration with the widgets library.

Learn how to use SCADE Solutions for ARINC 661 compliant systems, including:

- Overview of the ARINC 661 Standard,
- Introduction to cockpit display system server with the SCADE Solutions for ARINC 661 compliant applications,
- Description and customization of the SCADE Widgets Library for ARINC 661: creation of the library of widgets with SCADE Widget Creator, server architecture overview, configuration data,
- Server integration with the widgets library,
- Architecture and configuration of SCADE Solutions for ARINC 661,
- Generation and simulation of a Cockpit Display System application.
SCADE System Configurator

This training provides an introduction to the SCADE System Configurator allowing to define new domain specific languages by extending the SCADE System meta-model.

It describes how to create a user-defined configuration and how to use it in a SCADE System design with the help of exercises.

It provides also an independent section to describe the **SCADE System Avionics Package**:

- This Package extends and simplifies system design capabilities for A&D market.

Configurator topics include:

- Implementation of a configuration in a Meta-Model design:
  - Customization of diagram palettes and pop-up menus with a set of new items corresponding to business concepts brought by the configuration profile,
  - Definition of creation commands accessible from contextual pop-up menus,
  - Definition of property pages for each business concepts and their respective properties,

- Verification of the configuration in the Preview model,
- Resources generation and build of the configuration plug-in,
- Use of a configuration in a SCADE System design.

Avionics Package topics include:

- Description of configuration models
  - Avionics: configures the SCADE System Advanced Modeler for a methodology relying on three independent layers: functional, software, platform
  - A429, A664, CAN: independent configurations, allowing one to implement the links between the avionics system layers according to the ARINC 429, ARINC 664-P7 and CAN standard communication protocols
  - A653: specialization of the Avionics configuration to handle dedicated ARINC 653 properties.
- Automatic ARINC 653 table generation and resource usage checks
- ARINC 664-P7 communication bandwidth verification
- Presentation of Aircraft Braking System model
  - Comprehensive industrial example which provides guidance for the usage and deployment of the defined configurations
The SCADE tools not only provide the means to answer a specific situation, they are also the support of critical industries’ processes by providing best practices and a completely integrated environment.

They provide key insights on how to comply with the specific requirements of the certification standards and aim at sharing our expertise and experience in system and software engineering processes. They support you in implementing quickly and efficiently your projects and reaching your objectives.

Process trainings have been designed to support you in building your solution based on your specific industry needs.
How to comply with the DO-178C standard using the SCADE product line?

With this training, you will learn how to manage a SCADE Suite Model-Based Software Project to meet DO-178C objectives. You will see how to establish, optimize and roll out a comprehensive and efficient development and testing plan to achieve the DO-178C objectives with SCADE Suite, SCADE Test, and SCADE LifeCycle.

The course follows the Software Development Plan provided in the SCADE LifeCycle DO-178C Certification Plans for SCADE Suite Applications Levels A and B.

- An overview of DO-178C, DO-330 and DO-331
- An introduction to the SCADE Suite Model-based approach: project lifecycle (certification milestones, entry and exit criteria for each phase) and major best-practices to reach DO-178C objectives
- An introduction to typical project organization (team organization, roles, independence rules, staffing plan and staffing skills) to satisfy DO-178C requirements
- The basis of the DO-178C certification utilizing SCADE Suite auto-coding qualification credits
- Based on an example of the domain, what benefits the SCADE Suite Model-Based approach for:
  - System and Software Requirements,
  - Software Architecture,
  - Software Detailed Design,
  - Simulation/Testing Preparation,
  - Software Coding,
  - Target testing.

At each step, references are provided on how the objectives of the tables MB.A4 to MB.A7 are achieved.
What are the V & V challenges of a DO-178C (or DO-178B) compliant project? How does SCADE bring support for verification activities in building an optimized V & V strategy?

With this training, you will learn how to establish, optimize and roll out a comprehensive and efficient verification strategy to achieve the DO-178B/C objectives with SCADE Suite, SCADE Test and SCADE LifeCycle.

The course follows the Software Verification Plan provided in the SCADE LifeCycle DO-178C Certification Plans for SCADE Suite Applications Levels A and B:

- An overview of DO-178C, DO-330 and DO-331
- An introduction to the SCADE Suite Model-based approach: project lifecycle and major best practices to reach DO-178C objectives
- The basis of the DO-178C certification utilizing SCADE Suite auto-coding qualification credits
- Establishment of the V&V strategy – Activities are:
  - Determine the key drivers of V&V activities in a Model-Based approach
  - Structure the verification operations to deliver a dependable software
  - Establish your Combined Testing Process on host and on target
  - Monitor and achieve project objectives according to the DO-178B/C tables MB.A-4, MB.A-5, MB.A-6, MB.A-7
What's New in DO-178C? Which SCADE functions ease the transition to DO-178C for your future projects? How is the Tool Qualification Process changing and what are the impacts for high-end SCADE users?

This training presents the key concepts of DO-178C and highlights how SCADE will help you transition to DO-178C. It goes through the DO-178C documents (core document and supplements) and key concepts.

You will see how model-based development and verification processes fit the DO-178C objectives and which SCADE functions ease the transition to DO-178C for your future projects.

You will learn about the Tool Qualification Process changes and what the impacts for high-end SCADE users' prerequisites are.

Topics include:

- Overview of DO-178C: objectives and schedule, organization/structure of DO-178C documents, the supplements, key concepts, what is changing in the DO-178C core documents, a few words on the OORT supplement (DO-332),
- Software Tool Qualification Considerations (STQC; DO-330): objectives of STQC, STQC document structure, tool qualification principles: criteria, tool qualification levels (TQL), TQLs and SCADE modules, responsibilities of tool provider and tool user, STQC tables,
- DO-178C: impacts on Model-Based Development and Verification with SCADE (MBDV; DO-331): MBDV DO-331 supplement, planning process, development process, verification process (including verification and validation),
- Status of the transition to DO-178C,
- Status of the DO-178C material.
What is the SCADE Model-based Systems Engineering approach compliant with the ARP-4754A objectives? How to use SCADE System and its eco-system to establish an efficient and stable Model-Based Systems Engineering Process?

This training presents the SCADE Model-based Systems Engineering approach compliant with the ARP-4754A objectives. It will particularly drive you to concepts such as quality and productivity improvement, integrity and reliable communication, systems engineering management and optimization and the SCADE Model-Based Systems Engineering Approach.

Topics include:

- The Systems engineering key concepts,
- The ARP-4754A objectives: Definitions, Aircraft and System Development Process, Integral Process, Table A1,
- How to use SCADE System and its eco-system to establish an efficient and stable Model-Based Systems Engineering Process,
- How to create complete and correct Requirements,
- Best practices to achieve the selection of the system architecture,
- ANSYS Simulation Driven Product Development process (SDPD),
- Risks reduction of Systems Integration,
- How to efficiently achieve System Verification & Validation.
How can the SCADE approach support the compliance of a project to the EN 50128:2011 standard? What is the return on experience from the Trainers? What are their recommendations?

With this training, you will learn how to start and manage a SCADE Model-Based software project compliant with the EN 50128:2011 standard for Rail Transportation software development.

The training goes through:

- Determining the key drivers of your project in a model-based approach,
- Establishing your project lifecycle,
- Preparing your SCADE-centered tooling,
- Starting your project with a secure engagement process, establishing the plans for your project,
- Managing requirements, architecture, design of components, and V&V activities,
- Monitoring and achieving your project according to the targeted Safety Level,
- EN 50126 and 50128:2011 Overview,
- SCADE Model-Based Approach (Basic Principles of EN-50128 and the SCADE Model-Based Design, Certification and Tool Qualification, Safety Case)
- Development phases with SCADE Suite, based on an example of the domain, a simple Interlocking System handling:
  - System Requirements,
  - Software Requirements,
  - Software Architecture,
  - Modeling software components with SCADE,
  - Semantic Checks / Design Rule Checks,
  - Timing and Stack Analysis,
  - Testing Preparation (including Software Testing Strategy),
  - SCADE Code Generation,
  - SCADE Components Testing and SCADE Integration Phases,
  - Software Validation Phase,
  - Software Maintenance Phase.
Online Introduction
Trainings

On the YouTube ANSYS How To channel, you will find introduction videos on the complete SCADE product line. These videos will guide you through your first steps with the tools.

Entry level information for the safety critical industry-related standards is provided, as well as SCADE best-practices to follow them and take the tools as a support on implementing a compliant methodology.

For more advanced users, tips and tricks videos demonstrate the use of the tools on industry-based examples by our experts.

Come follow us on YouTube!
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**SCADE Training Course Registration Form**

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What best describes your industry?

- Civilian Aerospace
- Defense
- Nuclear
- Rail
- Automotive
- Industrial
- Medical
- Academic
- Other

SCADE Training Request

**BASIC TRAININGS**
- Model-based Systems Engineering with SCADE System
- Model-based Design with SCADE Suite
- Model-based Design with SCADE Display
- Model-based Virtual Prototyping with SCADE Test Rapid Prototyper
- SCADE Test basic training for SCADE Suite applications
- Model-based Design of ARINC 661 Compliant Cockpit Display Systems with SCADE Solutions: User Application

**ADVANCED TRAININGS**
- Optimize your SCADE Suite Models and Code Performance
- Extend the SCADE Suite Capabilities using TCL Scripts
- SCADE Suite Modeling with Import of Simulink/Stateflow® Models
- Model-based Formal Verification with SCADE Suite Design Verifier
- Model-based Design of ARINC 6661 Compliant User Applications with SCADE Solutions: Server and Widgets

**PROCESS TRAININGS**
- Effectively Manage a DO-178C (or DO-178B) Certified Model-based Project with SCADE
- Optimize Verification and Validation Strategies for DO-178C (or DO-178B) compliant applications using SCADE
- DO-178C: How to move to the new standard with SCADE
- SCADE Model-Based Systems Engineering of ARP-4754A Compliant Aeronautics Systems
- Realization of a Railway Application Compliant with the EN 50128:2011 Standard with SCADE

SCADE Training Session

- Intra-enterprise
- Inter-enterprise

Comments

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