# TABLE OF CONTENTS

## TRAINING COURSES DESCRIPTION

- BASIC TRAINING COURSES ................................................................. 7
  - MODEL-BASED DESIGN WITH SCADE SUITE ........................................... 7
  - MODEL-BASED DESIGN WITH SCADE DISPLAY ......................................... 10
  - MODEL-BASED SYSTEMS ENGINEERING WITH SCADE SYSTEM ................... 13
  - MODEL-BASED VIRTUAL PROTOTYPING WITH SCADE LIFECYCLE RAPID PROTOTYPER 15

## ADVANCED TRAINING COURSES .......................................................... 17
  - MODEL-BASED VERIFICATION AND VALIDATION WITH SCADE SUITE .............. 17
  - OPTIMIZE YOUR SCADE SUITE MODELS AND CODE PERFORMANCE ................... 19
  - EXTEND SCADE SUITE CAPABILITIES USING TCL SCRIPTS .......................... 20
  - SCADE SUITE MODELING WITH IMPORT OF SIMULINK / STATEFLOW MODELS .......... 21
  - MODEL-BASED FORMAL VERIFICATION WITH SCADE SUITE DESIGN VERIFIER .......... 22
  - SCADE SOLUTIONS FOR ARINC 661 COMPLIANT APPLICATIONS ...................... 23
  - MODEL-BASED DESIGN OF ARINC 661-COMPLIANT COCKPIT DISPLAY SYSTEMS WITH SCADE SOLUTIONS ... 24
  - MODEL-BASED DESIGN OF ARINC 661-COMPLIANT USER APPLICATIONS WITH SCADE SOLUTIONS ........ 25

## PROCESS TRAINING COURSES .............................................................. 26
  - EFFECTIVELY MANAGE A DO-178C CERTIFIED MODEL-BASED PROJECT LIFECYCLE WITH SCADE SUITE AND SCADE LIFECYCLE ................................................................. 27
  - EFFECTIVELY MANAGE A DO-178B CERTIFIED MODEL-BASED PROJECT LIFECYCLE WITH SCADE SUITE AND SCADE LIFECYCLE ................................................................. 28
  - OPTIMIZE VERIFICATION AND VALIDATION STRATEGIES FOR DO-178B OR DO-178C COMPLIANT APPLICATIONS USING SCADE SUITE AND SCADE LIFECYCLE ................................. 29
  - DO-178C: HOW TO MOVE TO THE NEW STANDARD WITH SCADE .......................... 30
  - SCADE MODEL-BASED SYSTEMS ENGINEERING OF ARP-4754A COMPLIANT AERONAUTICS SYSTEMS ........ 31
  - REALIZATION OF A RAILWAY APPLICATION COMPLIANT WITH THE EN 50128:2011 STANDARD WITH SCADE ................................................................. 32
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 Esterel 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.

The SCADE product family includes:
- SCADE System® for System Architecture Design
- SIMPLORER® for EE dominant multi-domain systems simulation
- SCADE Suite® for Control and Logic Application Development
- SCADE Display® for Display and HMI Development
- SCADE LifeCycle® for Application LifeCycle Management
- 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 Certifer
- **IEC 60880 demonstrated compliance** - Nuclear Applications by nuclear safety authorities
- **ISO 26262** for Automotive

SCADE users report the following development and verification cost improvements:

- Aligns the design process according to safety standard objectives
- Reduces development costs by 50 percent, on average
- Speeds certification so that is achieved two times faster
PROFESSIONAL SERVICES

As a solution provider in the critical systems and software industry, Esterel Technologies offers professional services expertise, providing SCADE-usage ramp-up services, including product training, over-the-shoulder support, SCADE modelling optimization, and methodology guidelines.

Project support services like tool integration and test strategy optimization services are also available, along with certification expertise services.

SCADE TRAININGS OVERVIEW

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

All of our trainers are very experienced in fundamental computer science, have practical experience through the development of SCADE projects, and are highly experienced in training.

We offer two levels of training: Basic Training and Advanced Training that address specific phases of your SCADE development 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 her or his SCADE project workflow and will secure the performance, the V&V strategy, and finally the certification of the application developed using SCADE tools.

At Esterel Technologies, we value the close interaction that we have with our customers and their application development process.

Customer feedback has allowed us to develop a training curriculum that is relevant to our customers’ needs and the challenges that they may face when developing a critical application.

We invite you to join our next training session to discover the powerful capabilities of our product.
TRAINING LOCATIONS

Training courses are usually held onsite at our customers' locations, but we can also deliver training courses at our worldwide Esterel Technologies offices.

When training is delivered at a customer site, the training room must be fitted with:
- one video projector
- one computer for two persons (minimum)

The minimal configuration for trainee’s computer is the following:

- Processor: 1,5 Ghz
- RAM: 1 Gb
- Disk space: 2 Gb recommended
- Peripherals: CD driver, USB port
- System: Windows XP, Vista, 7
- Screen: 17"
- Keyboard, mouse

Esterel Technologies Delivers

Esterel Technologies supplies course-related materials, including:
- Training Manuals
- Reference Cards
- Exercises and Labs Solutions
- Training certificates
SCADE Training presents the methodology, language and tools usage according to the steps of a software development process.

Training is composed of different modules presenting the modeling activity using SCADE Suite, SCADE Display, SCADE System, or specific SCADE LifeCycle engineering tools and processes:

- Model-based Design with SCADE Suite
- Model-based Design with SCADE Display
- Model-based Systems Engineering with SCADE System
- Model-Based Virtual Prototyping with SCADE LifeCycle Rapid Prototyper

Advanced Training

Advanced trainings focus on SCADE Solutions and best practices often experienced in the course of the development of your application with SCADE products. Advanced training courses are ideal for SCADE users currently developing critical systems or software application.

- Model-based Verification and Validation with SCADE Suite
- 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 Cockpit Display Systems with SCADE Solutions
- Model-based Design of ARINC 6661 Compliant User Applications with SCADE Solutions

Process Training

- Effectively Manage a DO-178C Certified Model-based Project with SCADE Suite and SCADE LifeCycle
- Effectively Manage a DO-178B Certified Model-based Project with SCADE Suite and SCADE LifeCycle
- Optimize Verification and Validation Strategies for DO-178C or DO-178B compliant applications using SCADE Suite and SCADE LifeCycle
- 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
Objectives

This module contains the courses related to the capture of the system requirements allocated to software in a SCADE Suite model, ensuring the full traceability to requirements, verification of the SCADE model, and generation of the code with the SCADE Suite KCG code generator, and integration in the final application.

An important place is made for the SCADE Suite methodology and features that help in the management of a SCADE Suite project.
### Prerequisites: no prerequisite

### Training Introduction
- Esterel Technologies
- Real-Time Embedded Software
- SCADE Overview

### SCADE Suite Model-Based Design
- Scade Language Introduction
- Integrated Design Environment
- Data Modeling
- SCADE Suite Data Flow Operators
- Simulator Overview
- Combinational Activation Constructs
- SCADE Suite Libraries
- Integrated Design Environment

### SCADE Suite Safe State Machines (SSM)
- Introduction
- SSM Definition
- SSM States
- SSM Transitions
- States Activities
- SSM Advanced

### Traceability Management
- Using comments and annotations
- SCADE Suite Model Difference Analysis
- Using SCADE LifeCycle Requirements Management Gateway

### Advanced SCADE Suite Designing
- SCADE Suite Arrays
- Iterators
- Miscellaneous

### SCADE LifeCycle Reporter
- SCADE LifeCycle Reporter For SCADE Suite
- Qualified Reporter

### SCADE Suite Simulation
- Simulation Interface
- Scenario Files
- Breakpoints & Stop Conditions
- Batch Mode
- Miscellaneous
SCADE products and modules handled:


On request, the following training modules can be added:

SCADE Suite Compiler Verification Kit (CVK), SCADE Suite / SIMPLORER Co-simulation, SCADE Suite / LabView Co-simulation, SCADE LifeCycle Dashboard

People who took this course also took:

- Model-Based Verification and Validation with SCADE Suite
- Optimize your SCADE Suite Models and Code Performance

SCADE Suite KCG Code Generator and Module Integration sections have a version for Ada code.

2014 Training Session

Request date at scade-services@esterel-technologies.com
Objectives

This module contains the courses related to the capture of the system requirements allocated to software in a SCADE Display model, ensuring 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.
**Prerequisites:** no prerequisite

**Training Introduction**
- Esterel Technologies
- SCADE Overview

**Graphical Editing**
- Introduction
- Graphical Editing
- Advanced Graphical Editing (part1)
- Plugging & Animating Variables
- Advanced Graphical Editing (part2)

**Traceability Management**
- Using comments
- Using SCADE LifeCycle Requirements Management Gateway

**Graphical Verification**
- Introduction & Principles
- Automatically Checked Rules
- Model Checker
- Model Corrector
- Recommendation Check-List

**SCADE Display KCG Code Generator**
- SCADE Display Code Generation
- OGLX Architecture
- Integrate Generated Code on an OpenGL Target
- Miscellaneous External Code

**SCADE Suite & Display Integration**
- Introduction
- Co-Design
- Co-Simulation
- Enhanced Reference Objects
- Co-Reporting
- Co-Generation

**Project Management**
- IDE Settings: Environments, Workspaces & Tools Options
- Automatic Documentation Generation
- Configuration Management
- User Documentation

**Font Management**
- Introduction
- Stroke & Bitmap Font Editing
- TrueType/OpenType Font Import
- Managing Font Tables

**Exercises:** many small exercises are part of the training sessions

**Lab:** a model is developed step-by-step throughout the training course
**SCADE products and modules handled:**

SCADE Display, SCADE LifeCycle Requirements Management Gateway, SCADE LifeCycle Reporter

**On request, the following training modules can be added:**

Optimize your SCADE Display Models and Code

**People who took this course also took:**

- Model-Based Design of ARINC 661-compliant Cockpit Display Systems with SCADE Solutions
- Model-Based Design of ARINC 661-compliant User Applications with SCADE Solutions

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**2014 Training Session**

Request date at scade-services@esterel-technologies.com
Objectives
How to establish and maintain a practical and efficient System Engineering Process with SCADE System

What you will learn
- The Basic Concepts of SCADE System
- How to design your system with SCADE System
- How to export components from your SCADE System model into a new system model to share only subsets, or how you can import any part of the model into a SCADE Suite model to synchronize system design with software design

Suggested attendees
- Systems Engineers
- Software Architects
## Prerequisites: no prerequisite

### Training Introduction
- Training objectives
- Prerequisites & agenda

### SCADE System Modeling
- SCADE System Environment and Workflow
  - Overview of SCADE System IDE
  - Designing a System Model
    - Model Capture Overview
    - SCADE System Tool Primitives
    - Creating Packages, Blocks, IBD
    - Using Actors in IBD
    - Creating Data Flows, Ports, I/O Table and Ports Connectors
    - Defining Model Hierarchy Graphically
    - Creating BDD and Associations
    - Using Actors in BDD
    - Defining Data Types, Signals, Constants and Interfaces
    - Managing Types and Flow Specifications
    - Defining Multi-Level View
    - Defining System architecture & physical interfaces
    - Defining and Managing Allocations
    - Managing a Data Dictionary
    - Adding Notes to Design Elements
    - Customizing Tables
    - Adding Comments to Design Elements
    - Navigating in Models
    - Modifying Model Layout
    - Checking Model Design

### Systems Engineering Life Cycle Management
- Tracing Requirements with Model Design
- Generating Project Documentation

### Managing System Models in Interdisciplinary Projects
- Comparing Model Elements (Model Diff)
- Exporting Subsystem Components
- Synchronizing System and Software Design

### Exercises: many small exercises are part of the training sessions

### Labs:
- Cruise Control system
- Progressive exercises to learn the different graphical language primitives

### SCADE products and modules handled:
- SCADE System, SCADE LifeCycle Requirements Management Gateway, SCADE LifeCycle Reporter

### People who took this course also took:
- Model-Based Systems Engineering of ARP-4754A compliant Aeronautics Systems with SCADE

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**2014 Training Session**

Request date at <scade-services@esterel-technologies.com>
Objective

- Learn how to use SCADE LifeCycle Rapid Prototyper to create interactive panels for virtual simulation with SCADE Suite, ANSYS SIMPLORER or other Simulation tools with Functional Mock-up Interface (FMI)

What you will learn

- How to create panels with the library of widgets
- How to create new widgets

Suggested attendees

- Software designers
- Test engineers
**Prerequisites:** no prerequisites

**Training Introduction**
- Rapid Interactive Simulation
- Standalone Executables
- Widgets library

**Design a Graphical Panel for SCADE Suite**
- Create a New Graphical Panel
- Connect Graphical Panel to SCADE Suite Model
- Rapid Prototyper Tips with SCADE Suite

**Design a Graphical Panel for SIMPLORER**
- Introduction to Functional Mock-up Interface (FMI)
- Connect Graphical Panel to SIMPLORER Model
- Rapid Prototyper Tips with SIMPLORER

**Remote Communication Capabilities**
- Standalone Application Generation for Windows©
- Standalone Application Generation for Android©
- Standalone Application Generation for IOS©

**Design Constructs**
- Graphical elements
- Containers
- Plugs

**Advanced Designing**
- Creating new widgets/Modifying widgets
- SCADE LifeCycle Rapid Prototyper Environment
- Font tables
- Extended character set

**Exercises:** several exercises are part of the training sessions

**SCADE products and modules handled:**

SCADE Rapid Prototyper, SCADE Suite, SIMPLORER

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**2014 Training Session**

Request date at [scade-services@esterel-technologies.com](mailto:scade-services@esterel-technologies.com)
Objectives

- Understand the SCADE Model-based V&V Activities
- Learn how to use SCADE LifeCycle QTE to optimize your Testing Strategy
- Learn how to master your SCADE Model-based Testing with SCADE Suite Model Test Coverage (MTC)

What you will learn

- How to establish a complete test project with SCADE LifeCycle QTE
- How to use SCADE LifeCycle QTE with SCADE Suite Simulator and SCADE Suite MTC
- How to use SCADE LifeCycle QTE with commercial Test-on-Target Tools
- How to use SCADE Suite MTC

Suggested attendees

- Software Designers and Test engineers
- Software Project Managers
- Quality Assurance engineers

<table>
<thead>
<tr>
<th>Prerequisites: Model-Based design with SCADE Suite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Introduction</td>
</tr>
<tr>
<td>• Training objectives</td>
</tr>
<tr>
<td>• Prerequisites &amp; agenda</td>
</tr>
<tr>
<td>• SCADE Combined Testing Process Overview</td>
</tr>
<tr>
<td>Preparing Test Environment with SCADE LifeCycle QTE</td>
</tr>
<tr>
<td>• QTE Introduction</td>
</tr>
<tr>
<td>• Overview of SCADE LifeCycle QTE GUI</td>
</tr>
<tr>
<td>• Create a Test project</td>
</tr>
<tr>
<td>• Test Data Description</td>
</tr>
<tr>
<td>Running Model Testing on Host</td>
</tr>
<tr>
<td>• Introduction</td>
</tr>
<tr>
<td>• Run Simulation Sessions on Host</td>
</tr>
<tr>
<td>• Simulation Session Results</td>
</tr>
<tr>
<td>• Consolidated Test Reports</td>
</tr>
<tr>
<td>• Model Coverage Measurement</td>
</tr>
<tr>
<td>Preparing Software Testing on Target</td>
</tr>
<tr>
<td>• Introduction</td>
</tr>
<tr>
<td>• Generate Test Harness</td>
</tr>
<tr>
<td>SCADE LifeCycle QTE Architecture</td>
</tr>
<tr>
<td>• Overview</td>
</tr>
<tr>
<td>• Test Execution Engine</td>
</tr>
<tr>
<td>• Test Harness Generator</td>
</tr>
<tr>
<td>• Report</td>
</tr>
<tr>
<td>• Convert</td>
</tr>
</tbody>
</table>
### SCADE Suite MTC

<table>
<thead>
<tr>
<th>MTC Batch Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Batch Mode Overview</td>
</tr>
<tr>
<td>• Instrumenter Settings</td>
</tr>
<tr>
<td>• Coverage Acquisition</td>
</tr>
<tr>
<td>• Coverage reporting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MTC Interactive</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Interactive Workflow</td>
</tr>
<tr>
<td>• Instrumentation</td>
</tr>
<tr>
<td>• Acquisition</td>
</tr>
<tr>
<td>• Coverage Analysis</td>
</tr>
<tr>
<td>• Coverage Resolution</td>
</tr>
<tr>
<td>• Coverage Reporting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MTC Customization</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Customization of the Integration Criterion</td>
</tr>
<tr>
<td>• Test Strategies (optional)</td>
</tr>
</tbody>
</table>

**Exercises:** several exercises are part of the training sessions

**Lab:** a testing project is developed step-by-step throughout the training course

### SCADE products and modules handled:

SCADE Suite, SCADE LifeCycle QTE, SCADE Suite MTC, SCADE Suite CVK

### People who took this course also took:

- Optimize Verification and Validation Strategies for DO-178C compliant applications using SCADE Suite and SCADE LifeCycle

### 2014 Training Session

Request date at scade-services@esterel-technologies.com
Objectives

Learn how to optimize your SCADE Suite models to reach the best performance for the generated code.

What you will learn

- How the SCADE Suite model architecture influences performance
- How to manage SCADE Suite’s main functions and constructs
- How SCADE Suite KCG code generation options influences runtime performance of the generated code
- How to use efficient modeling patterns
- How to Profile a SCADE Suite application using SCADE Suite Timing and Stack Optimizers

Prerequisites: Model-based Modeling with SCADE Suite Basic

<table>
<thead>
<tr>
<th>Training Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Training Objectives</td>
</tr>
<tr>
<td>- Agenda</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Impact of architecture</td>
</tr>
<tr>
<td>- Identifying the main actors</td>
</tr>
<tr>
<td>- Structure of data</td>
</tr>
<tr>
<td>- Compliance with HLRs</td>
</tr>
<tr>
<td>- Success criteria</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>- About design standards</td>
</tr>
<tr>
<td>- Impact of SCADE Suite KCG</td>
</tr>
<tr>
<td>- Guidelines and patterns</td>
</tr>
<tr>
<td>- Focus on some advanced modeling artifacts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analysts</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Introduction to SCADE Suite Timing and Stack Optimizers</td>
</tr>
<tr>
<td>- Basic procedure for model optimization</td>
</tr>
</tbody>
</table>

Exercises: several exercises are part of the training sessions

SCADE products and modules handled:

SCADE Suite, SCADE Suite Timing and Stack Optimizer (TSO)

2014 Training Session

Request date at scade-services@esterel-technologies.com
Objectives

Learn how to use TCL scripting on SCADE Suite models in order to extend its automation capabilities, such as specific automated checks or reporting functions. Learn how to use TCL scripting to extend the SCADE IDE Graphical User Interface capabilities.

What you will learn

- How to program with Tool Command Language (TCL)
- The SCADE project UML meta-models: Scade, project, annotations, etc.
- How to access to the SCADE Suite model instances with TCL scripts
- How to use the SCADE Suite Script Wizard
- How to create menu commands, toolbars and dialogs

Prerequisites:

- Model-based Modeling with SCADE Suite Basic
- Programming languages such as C, Java, VB, etc.

Training Introduction

- TCL Language and Environment
  - TCL Environments
  - Language basics
  - Debugging

UML Meta-models Conventions

- Modeling conventions
- Project UML Meta-model
- Mapping UML - TCL

Studio TCL Environment

- Commands
- Script wizards

UML SCADE Meta-model

- Storage
- Semantics
- Graphics
- Shortcuts

UML Annotations and Meta-model / TCL Visitors / Studio Customization

- Studio TCL Plug-in
- Commands
- Standard Dialogs

Exercises: Many exercises are part of the training sessions

2014 Training Session

Request date at scade-services@esterel-technologies.com
**Prerequisites:**
- Model-based Modeling with SCADE Suite Basic
- Basic knowledge of Simulink/Stateflow

**Simulink Import**
- Principles of the Simulink Gateway
- From Simulink to SCADE Suite
- From SCADE Suite to Simulink
- Advanced usage

**Exercises:** Many exercises are part of the training sessions

**SCADE products and modules handled:**
- SCADE Suite, SCADE Suite Simulink Gateway

**2014 Training Session**
Request date at [scade-services@esterel-technologies.com](mailto:scade-services@esterel-technologies.com)
# Model-Based Formal Verification with SCADE Suite Design Verifier

## Prerequisites:
- Model-based Modeling with SCADE Suite Basic

## Model Design Formal Verification
- Formal Verification in the SCADE Suite process
- Getting started with SCADE Suite Design Verifier
- Writing properties
- Verification with data
- Methodology

**Exercises:** Many exercises are part of the training sessions

## SCADE products and modules handled:
- SCADE Suite, SCADE Suite Design Verifier

## 2014 Training Session

Request date at [scade-services@esterel-technologies.com](mailto:scade-services@esterel-technologies.com)
Objectives
Learn how to use SCADE Solutions for ARINC 661 Compliant Systems, including:
  o An overview of the ARINC 661 Standard
  o Creating a Cockpit Display System server with the SCADE Solutions for ARINC 661 Compliant Applications
  o Customizing the SCADE Widgets Library for ARINC 661
  o Creating a User Application (UA)

Two complementary training courses are proposed:
  o Model-Based Design of ARINC 661-compliant Cockpit Display Systems with SCADE Solutions
  o Model-Based Design of ARINC 661-compliant User Applications with SCADE Solutions

What you will learn
- How to configure SCADE Solutions for ARINC 661 Compliant Systems
- The key concepts of the ARINC 661 server and the ARINC 661 Widget Library architecture
- How to customize the library of widgets with SCADE Widget Creator
- How to create new widgets with SCADE Widget Creator
- How to create a user application with SCADE UA Page Creator
- How to simulate a Cockpit Display System application (CDS)
Prerequisites:
- Model-Based design with SCADE Suite
- Model-Based design with SCADE Display
- ARINC 661 standard

Introduction
- Training Objectives
- Prerequisites and Agenda
- ARINC 661 Standard Overview
- SCADE Solutions for ARINC 661 Compliant Applications

Architecture and Configuration of the SCADE Solutions for ARINC 661
- Server Architecture
- Widgets Library Architecture
- Configuration Data
- Server Integration

Widgets Library
- Overview of the widgets library concepts
- Create and modify the graphics
- Create and modify the behaviors

Exercises: Many exercises are part of the training sessions

2014 Training Session
Request date at scade-services@esterel-technologies.com
### Prerequisites:
- Model-Based design with SCADE Suite
- Model-Based design with SCADE Display
- ARINC 661 standard

### Introduction
- Training Objectives
- Prerequisites and Agenda
- ARINC 661 Standard Overview
- SCADE Solutions for ARINC 661 Compliant Applications

### SCADE User Application Page Creator
- Create UA Models (UA)
- Generate Definition Files (DF)
- Generate UA Communication Code

### Exercises:
Many small exercises are part of the training sessions

### Lab:
A model is developed step-by-step throughout the training course

### SCADE products and modules handled:
SCADE Suite, SCADE Display, SCADE Solutions for ARINC 661

**Note**
These two ARINC 661–oriented training courses can be merged into one single ARINC 661–oriented 4 days training course.

### 2014 Training Session
Request date at scade-services@esterel-technologies.com
Objectives
Learn how to estimate, start and manage a SCADE Suite Model-Based Software Project to meet DO-178B or DO-178C objectives
Learn how to establish, optimize and roll out a comprehensive and efficient testing strategy to achieve the DO-178B/C objectives with SCADE Suite and SCADE LifeCycle

What you will learn
- How to succeed a DO-178B/C project with a model-based approach
- How to prepare the SCADE Suite based tools infrastructure
- How to start your project with a secure engagement process
- How to establish project plans
- How to implement the iteration(s) that will facilitate the software development and certification
- How to manage requirements, design, and V&V activities
- How to structure optimized testing operations to deliver a dependable software
- How to determine the key drivers of V&V activities in a Model-Based approach
- How to establish your Combined Testing Process on host and on target
- How to monitor and achieve project objectives according to the DO-178B/C tables A1 to A10
### Prerequisites:
- SCADE Suite Basic training, Basic knowledge of DO-178B / C

### Introduction
- DO-178C Overview: Structure and Compliant Process
- Purpose of DO-178C: Why Changing?
- What's New in DO-178C?
- Model-Based Development and Verification in DO-178C

### Key Concepts of SCADE Model-Based Development and Verification
- What is Model-Based Software Engineering?
- The SCADE Suite Model-Based Approach
- The main key to success: The Project LifeCycle

### SCADE-Based Project Life-Cycle Compliant with DO-178C
- Inputs of the Software Project Process
- SCADE Project Planning
- Architecture Design
- Model Simulation Preparation
- SCADE Modeling and Simulation
- Code Generation
- Low-Level Testing Preparation
  - Use of SCADE Compiler Verification Kit (CVK)
- High Level Requirements-Based Testing Preparation
  - Use of SCADE Qualified Testing Environment (QTE)
- Low-Level Testing
  - CVK Results
- HLR-Based Testing
  - HLR-Based Testing Results
  - Use of SCADE Model Test Coverage (MTC) and QTE
  - Structural Coverage
- Acceptance and Deployment

### SCADE products and modules handled:
- SCADE Suite, SCADE DO-178C Certification Plans, SCADE LifeCycle, SCADE Suite MTC, SCADE Suite CVK

### 2014 Training Session
Request date at [scade-services@esterel-technologies.com](mailto:scade-services@esterel-technologies.com)
**Prerequisites:**
- SCADE Suite Basic training
- Basic knowledge of DO-178B / C

**Introduction**
- What is DO-178B?
- What are the challenges and issues of critical software project?
- What is model-based software engineering?
- The SCADE model-based approach
- The main key to success: The Project LifeCycle
- Understanding the objectives and tables that comprise the DO-178B guidelines
- SCADE Model-based Project LifeCycle

**Key Concepts of SCADE Model-Based Development and Verification**
- What is Model-Based Software Engineering?
- The SCADE Suite Model-Based Approach
- The main key to success: The Project LifeCycle

**SCADE-Based Project Life-Cycle Compliant with DO-178B**
- Inception
  - Starting up your project, including the Kick-Off Meeting
  - The Inception of the project
  - Achieving the Input Data Review
- Elaboration
  - Establishing the plans of the project
  - Achieving the Planning Review
  - Validating the requirements allocated to software
  - Achieving the Requirement Acceptance Review
  - Establishing the architecture, a challenging and key item
  - Achieving the Architecture Review
  - Finalizing the test strategy and the corresponding SCADE-centered tooling
  - Achieving the Test Strategy Review
- Construction and Transfer
  - Monitoring your SCADE model-based software design activities
  - Inspecting your SCADE design

**SCADE products and modules handled:**
SCADE Suite, SCADE DO-178B Certification Plans, SCADE LifeCycle, SCADE Suite MTC, SCADE Suite CVK

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### Prerequisites:
- SCADE Suite Basic training
- Basic knowledge of DO-178B/C

### Introduction
- DO-178B Overview: Structure and Compliant Process
- Purpose of DO-178C: Why Changing?
- What's New in DO-178C?
- Model-Based Development and Verification in DO-178C

### Model-based V&V Strategy
- SCADE Suite Model-Based Development Process
- Modeling
- Automatic Code Generation for SCADE Suite Model-Based verification
- Terminology
- Model Reviews and Analyses
- Model Simulation with SCADE Suite Simulator and SCADE Suite Qualified Test Environment (QTE)
- Model Coverage with SCADE SUITE Model Coverage Testing (MTC)
- SCADE Suite Combined Testing Process
- What is Combined Testing Process
- Testing bottom-up approach
- Testing top-down approach
- How to achieve Model Coverage Analysis
- Producing Conformance and Coverage Reports
- How to achieve Data Coupling and Control Coupling
- How to achieve Worst Case Analysis

### Lab: a Model Test Coverage project

### SCADE products and modules handled:
SCADE Suite, SCADE DO-178B / C Certification Plans, SCADE LifeCycle, SCADE Suite MTC, SCADE Suite CVK

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Objectives
Present the key concepts of DO-178C and highlight how SCADE will help you to transition to DO-178C

What you will learn
- How to use DO-178C documents (Core document and supplements)
- The DO-178C key concepts
- How the model-based development and verification processes fit the DO-178C objectives (MBDV supplement)
- 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

Prerequisites:
- DO-178B Standard and V&V Strategies with SCADE

Training Introduction
- Training Objectives
- Prerequisites
- Agenda

Overview of DO-178C
- What is DO-178C: Objectives and Schedule
- The Organization/Structure of DO-178C Documents
- How to Use the Supplements
- DO-178C 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
- Frequently Asked Questions (FAQs) and Discussion Papers

DO-178C: The Impacts on Model-Based Development and Verification with SCADE (MBDV ; DO-331)
- How to Use the MBDV DO-331 Supplement
- The Planning Process
- The Development Process
- The Verification Process (including Verification and Validation)

Conclusion
- Status of the Transition to DO-178C
- Status of the DO-178C material

Exercises: Understanding evaluations through Q/A Forms

SCADE products and modules handled:
SCADE Suite, SCADE DO-178BC Certification Plans, SCADE LifeCycle, SCADE Suite MTC, SCADE Suite CVK

2014 Training Session
Request date at scade-services@esterel-technologies.com
**Objectives**

Present the SCADE Model-based Systems Engineering approach compliant with the ARP-4754A objectives

**What you will learn**

- The Systems Engineering key concepts
- The ARP-4754A objectives
- 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
- How to define the valid System Architecture
- How to implement the ANSYS Simulation Driven Product Development process (SDPD)
- How to reduce the risks of Systems Integration
- How to efficiently achieve System Verification & Validation

**Prerequisites: no prerequisite**

**Training Introduction**

- Training Objectives
- Prerequisites
- Agenda

**Systems Engineering**

- Definitions
- From System Requirements to Architecture Definition
- From Implementation to Validation

**ARP-4754A**

- Definitions
- Aircraft and System Development Process
- Integral Process
- Table A1

**SCADE Model-Based Systems Engineering**

- Definitions
- SCADE MBSE V-Cycle
- From Requirements Analysis to Architecture Definition
- Simulation Driven Product Development
- From System Integration to System Validation
- Table A1 Support

**SCADE products and modules handled:**

SCADE System, SCADE LifeCycle Rapid Prototyper, ANSYS SIMPLORER

**2014 Training Session**

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Objectives

Learn how to start and manage a SCADE Model-Based software project that is compliant with the EN 50128:2011 standard for Rail Transportation software development.

What you will learn

- 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

Suggested attendees

- Project Managers
- Safety Managers
- Software Engineers

Prerequisites:

- SCADE Suite Basics
- Understanding of EN 50128:2011

Training Introduction – Project Lifecycle

- EN 50128:2011 Overview
  - Structure of EN 50128:2011
  - Quality Assurance
  - V-Cycle
- SCADE Model-Based Approach
  - SCADE Model-Based V-Cycle
  - Basic Principles of EN-50128 and the SCADE Model-Based Design
- Certification
  - Tool Qualification
  - Safety Case

Development Phases with SCADE Suite

- The Example: A simple Interlocking System
- System Requirements
- Software Requirements
- Software Architecture
  - Modeling with SCADE
  - Architecture & Components with SCADE
  - Interlocking Software Architecture
- Components Design
  - SCADE Design
  - Semantic Checks / Design Rule Checks
  - Timing and Stack Analysis
- Testing Preparation
  - Testing with SCADE
  - Software Testing Strategy
- Components Coding
  - SCADE Code Generation
  - Compiler Verification Kit
Testing Phases with SCADE Suite MTC and SCADE LifeCycle QTE

- SCADE Component Testing Phase
- SCADE Integration Phase
- Software Validation Phase
- Software Maintenance Phase
- Conclusion

Labs: Exercises based on an Interlocking project mark out the course

SCADE products and modules handled:

- EN 50128 Certification Plans for SCADE Suite SIL 2 and SIL3/4
- SCADE Suite Advanced Modeler, SCADE Suite KCG
- SCADE Suite Model Test Coverage (MTC)
- SCADE Suite Timing and Stack Optimizer (TSO)
- SCADE Suite Compiler Verification Kit (CVK)
- SCADE LifeCycle Configuration Management
- SCADE LifeCycle Dashboard
- SCADE LifeCycle Requirements Management Gateway (RM Gateway)
- SCADE LifeCycle Reporter
- SCADE LifeCycle Qualified Test Environment (QTE)

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