Esterel Technologies' SCADE Suite is a model-based development environment for critical software.

With native integration of the Scade language and its formal notation, SCADE Suite is the only integrated design environment for critical applications spanning requirements management, model-based design, simulation, verification, qualifiable/certified code generation, and interoperability with other development tools and platforms.

SCADE Suite is tightly integrated with SCADE System®, enabling integration of system and software development activities, and SCADE Display®, enabling the joint model-based design of control laws and logic with the design of graphics display applications.

Tailored for Critical Applications

SCADE Suite KCG Certification Kits provide all material required by the respective standard guidelines for the certification authorities:
- Tool Qualification Plan (TQP)
- Tool Operational Requirements (TOR)
- Tool Requirements (TR)
- Tool Accomplishment Summary (TAS) or Safety Case (SC)
- Compliance Analysis to certification standard
- Software Installation Procedure (SIP)
- Tool Configuration Index (TCI)
- and standard-specific documents

For more information, see the SCADE Suite KCG Certification Kits technical data sheets.

SCADE LifeCycle® DO-178B and DO-178C Certification Plans for SCADE Suite Applications provide a set of generic plans supporting the certification of applications developed with SCADE Suite at level A and B.

SCADE Suite’s design environment facilitates the tight combination of software engineering development and management activities, down to code integration on target, into a seamless workflow.

Read more about SCADE Suite:
- Software Prototyping and Design
- Verification and Validation
- Automatic Code Generation
- SCADE Tools Integration

Software Prototyping and Design

Advanced Model-Based Design
- Graphical editing of flexible/nested dataflows and hierarchical SCADE State Machines (SSM)
- Graphical decision diagrams
- Array iterators to facilitate operator multi-instantiation and perform complex data processing
- Model completeness and determinism guaranteed
- Strongly-typed language
- Static consistency checking
- Intuitive and familiar visual representation
- Easy reuse and readability of design
- Efficient editing features, such as multiple connection drawing, navigation in model, search, unlimited undo
- Semantic comparison of various versions of models, packages, operators, or state machines with location and reporting features
Interactive Simulation with Rapid Prototyper
- Build interactive graphical panels for SCADE Suite simulation sessions
  - Library of predefined widgets (controls and indicators) for rapid prototyping
  - Extensible library and customizable widgets
  - Variables dictionary management
  - Generation of Windows/PC standalone executables from interactive graphical panels

Timing and Stack Size Optimization with Timing and Stack Optimizer¹
- Estimation of relative worst-case execution time (WCET) and stack size on a generic target for profiling and debugging SCADE Suite models
- Comparison of results between timing or stack optimization sessions
- Automatic and customizable detailed reporting on optimization results at SCADE Suite model level
- Easy comparison of code performance by fine-tuning KCG options

Interoperability with Existing Environments
- Import of legacy code into designs
- Ability to handle large-scale projects
- Customizable user-defined methodology rules enforcement (naming, maximum depth, etc.)
- SCADE Suite library components: integrators, hysteresis, quantizers, filters, flip-flops, truth tables, look-up tables, matrix operators, etc.

TCL API and Java-Based Eclipse API
- Wizard assistance for quick and easy creation of TCL scripts
- Read/write access to SCADE Suite project and model files from Eclipse Modeling Framework (EMF)
- Interactive use of SCADE Suite projects from Eclipse via basic Project and Model Explorers

Configuration Management
- Built-in integration with Configuration Management Tools through SCADE Suite Configuration Management Gateway
- Granularity at operator and package levels based on multi-file storage

System Specification Capture
- Refinement of software components based on structural system modeling in SCADE System (more in Synchronization with System Design)
- Reconciliation between interface changes in SCADE System models and software subsystem components in SCADE Suite

Legacy Algorithm Design Capture
- Translation of discrete controllers prototyped with MathWorks® Simulink® and Stateflow® charts into SCADE Suite models

Verification and Validation

Debugging and Simulation with SCADE Suite Simulator
- Executable SCADE Suite designs
- Detailed simulation of actual production code
- Scenario recording and play back
- Early detection of specification errors
- Automatic non-regression tests
- Interactive and batch modes
- Clean and easy data tracking (access to variables and probes for debugging, values displayed in the graphical model)
- Breakpoints on control, data, and time criteria
- Co-simulation with FMI-compliant tools (Modelica®)
- Co-simulation with ANSYS® Simplorer®
- Co-simulation with MathWorks® Simulink® and MATLAB®

Where can SCADE Suite be used?
SCADE Suite is already used to design critical software, such as flight control systems, engine control systems, landing gear systems, automatic pilots, power and fuel management, cockpit displays, rail interlocking systems and signaling, automatic train operation, computer-based train control, emergency braking systems, overspeed protection, train vacancy detection, nuclear power plant controls, and many other aerospace, railway, energy, automotive, or industrial applications.

¹ Powered by aiT, a product of AbsInt.
• Simulation can be driven by TCL scripts for complex customized scenarios
• Slave mode for connection to your simulation environment and tools (co-simulation)

**Formal Verification with Design Verifier**
• Verification of safety properties expressed in SCADE Suite
• Automatic counter-example production in case of property failure
• Early detection of division-by-zero errors
• Transparent combination of most recent proof techniques for model checking without strong theoretical background from users

**Model Coverage Analysis with MTC**
• Thorough Model Test Coverage methodology via SCADE Suite interface to acquire, analyze and resolve coverage at model level
• Model coverage based on test suite, predefined (Masking MC/DC, DC, etc.), or user-defined coverage and integration criteria
• Modular methodology: Coverage acquisition on parts of the model and merging of coverage results from all operator instances across multiple analysis sessions
• Production of customizable and qualifiable reports for certification authorities
• Qualified as a verification tool (Criteria 2 / TQL-4) under DO-178C with certification data available from Esterel Technologies

**Model-in-the-Loop and Hardware-in-the-Loop Simulation with LabVIEW™ Gateway**
• Interactive simulation of SCADE Suite models in National Instruments LabVIEW environment through National Instruments VeriStand™
• Automated embedding of SCADE Suite-generated code onto National Instruments target running LabVIEW RT for HiL (Hardware-in-the-Loop) testing

**Worst-Case Execution Time and Stack Size Analysis with Timing and Stack Verifiers**
• Verification of the WCET and maximum stack size of SCADE Suite models for a specific hardware target
• Comparison of results between timing analysis sessions or stack analysis sessions

• Automatic and customizable detailed reporting on analysis results at SCADE Suite model level
• Easy comparison of code performance by fine-tuning the cross compiler and/or SCADE Suite KCG options
• Supported processor targets for WCET analysis including MPC 55xx, MPC 555, MPC 565, MPC 603e, MPC 755s. Following processors: LEON2, LEON3, TriCores 1766/1796/1797, NEC V850Ei/PHO3 supported shortly upon request.
• Supported processor targets for stack analysis including all PowerPC

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**Automatic Code Generation**

**Qualifiable/Certified Code Generator (KCG)**
• Generated Code Properties
  • Fulfills embeddable code constraints: static memory allocation, static bounded loops, no recursion
  • High quality and safe C and Ada production code: optimized, customizable, readable, and traceable
  • No dead code introduced by KCG
  • Portable code
• Available Certification Kits and Certifications
  • SCADE Suite KCG 6.4 C code generation with Certification Kits for DO-178C Levels A and B (Criteria 1 / TQL-1 for DO-330), IEC 61508 at SIL 3, or EN 50128 at SIL 3/4
  • SCADE Suite KCG 6.1.3 C code generation with Certification Kits for DO-178B Level A, IEC 61508 at SIL 3, IEC 60880, or EN 50128 at SIL 3/4
  • SCADE Suite KCG 6.3 Ada code generation: SPARK 95 compliant (not certified)

**Code Integration**
• Automatic integration of the generated code to Wind River® VxWorks® 653 and VxWorks® CERT, Green Hills® Software INTEGRITY™-178B, SYSGO PikeOS, and other RTOSes
• C code generation for Safe PLC environments such as KW-Software SafeOS
• Customizable RTOS Adaptors for SCADE Suite generated code

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2. Powered by Prover® Plug-In. Prover, Prover Technology, Prover Plug-In and the Prover logo are trademarks or registered trademarks of Prover Technology AB in Sweden, the United States and in other countries.
3. Powered by aiT, a product of AbsInt.
Object Code Verification with SCADE Suite Compiler Verification Kit (CVK)

- CVK verifies the C compiler correctly compiles the C code generated by SCADE Suite KCG
- CVK provides an exhaustive C sample containing all elementary C constructs generated by KCG from a SCADE Suite model and combinations of these elementary constructs

SCADE Tools Integration

Synchronization with System Design
SCADE Suite allows for the refinement of software components based on structural system modeling in SCADE System environment:

- Quick synchronization between system model in SCADE System and software subsystem components in SCADE Suite
- Consistent and efficient management of I/O definitions
- No duplication of efforts in synchronizing interfaces defined at system level and refined at software level

For information on the SCADE System product line, see the SCADE System technical data sheet.

Development of Graphical Applications
SCADE Suite allows for designing the logic associated with graphics designed in SCADE Display.

Design

- Tight design-level integration of critical logic and graphic components in embedded applications
- Automated connection between SCADE Suite and SCADE Display designs

Simulation

- Early prototyping and validation in white-box and black-box mode between display application logic and graphic components
- Co-execution of SCADE Suite model and interactive SCADE Display specification as runtime free animated standalone executables

Reporting

- Integration of report generation between SCADE Suite models and SCADE Display graphical specifications

Code Generation

- Integrated deployment of SCADE Suite and SCADE Display generated code

For information on the SCADE Display product line, see the SCADE Display technical data sheet.

Application Life Cycle Management
SCADE Suite integration with SCADE LifeCycle provides the following capabilities:

- Model-based testing activities on host and target with SCADE LifeCycle Qualified Test Environment
- Project monitoring with SCADE LifeCycle Dashboard4 to compute metrics reported on predefined and customizable dashboards
- Requirements management and traceability with SCADE LifeCycle Requirements Management Gateway5
- Automatic documentation generation with SCADE LifeCycle Reporter
- Integration with SCADE LifeCycle Reporter and SCADE LifeCycle Requirements Management Gateway shared with SCADE Display and SCADE System

For information on the SCADE LifeCycle product line, see the SCADE LifeCycle technical data sheet.

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4. Powered by PRELYTIS LiveDashBoard
5. Powered by Reqtify® product, a registered trademark of Dassault Systèmes or its subsidiaries in the USA and/or other countries.
Minimal/Required System Configuration

<table>
<thead>
<tr>
<th>OS Platforms ¹</th>
<th>Microsoft® Windows XP Professional SP3 ² (32-bit) or Windows 7 SP1 (64-bit)</th>
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| C/C++ Compilers| Visual C++® 6.0, 7.0, 7.1  
Visual C++ 2005 and 2008  
GNU C Compiler 3.4.5 |
| CPU processor | 1.5 GHz or faster |
| RAM           | 1 GB minimum (2 GB recommended) |
| Disk Space    | 1 GB minimum |
| Peripherals   | CD-ROM drive for installation |
| Protocol      | Network adapter and TCP/IP installed and configured for license management |
| Display       | 16-bit color, 1280x1024 screen resolution recommended |

¹ SCADE Suite KCG 6.4 is qualifiable on Windows XP Professional SP3 (32-bit) and Windows 7 SP1 (64-bit) platforms whereas SCADE Suite KCG 6.3.1 is qualifiable on Windows XP Professional SP2 and SP3 (32-bit) platforms.

² OS on which SCADE Suite was compiled. Tests performed on other platforms ensure all SCADE Suite tools support them.

SCADE Suite Product Solutions

SCADE Suite Advanced Modeler:
- SCADE Suite Editor
- SCADE Suite Simulator
- SCADE Suite Configuration Management Gateway
- Eclipse Plug-In
- SCADE Suite Code Integration for FMI and Simplorer®
- SCADE Suite Gateway for LabVIEW™
- SCADE Display Integration
- SCADE System Integration
- Simulink® Wrapper (S-functions)
- SCADE Suite RTOS Adaptors (VxWorks 653, VxWorks CERT, INTEGRITY-178B, OSEK, Micro/OS-III) and “user-definable” Adaptors
- SCADE Suite User Documentation and Online Help

SCADE Suite Timing and Stack Optimizer
SCADE Suite Rapid Prototyper
SCADE Suite Model Test Coverage
SCADE Suite Design Verifier
SCADE Suite Timing Verifier and SCADE Suite Stack Verifier
SCADE Suite Gateway for Rhapsody®
SCADE Suite Gateway for Simulink®
SCADE Suite KCG Code Generator

SCADE Suite KCG Certification Kits:
- SCADE Suite KCG 6.4 DO-178C Levels A and B Certification Kit
- SCADE Suite KCG 6.4 IEC 61508 SIL 3 Certification Kit
- SCADE Suite KCG 6.4 EN 50128 SIL 3/4 Certification Kit
- SCADE Suite KCG 6.4 IEC 60880 Certification Kit

SCADE Suite Compiler Verification Kit
SCADE LifeCycle Integration:
- SCADE LifeCycle Qualified Test Environment
- SCADE LifeCycle Dashboard
- SCADE LifeCycle Reporter
- SCADE LifeCycle Requirements Management Gateway
- DO-178C Certification Plans for SCADE Suite Applications Levels A and B
- DO-178B Certification Plans for SCADE Suite Applications Levels A and B

Contact Information

Submit questions to Technical Support at scade-support@esterel-technologies.com
Contact one of our Sales representatives at scade-sales@esterel-technologies.com
Direct general questions about Esterel Technologies to scade-info@esterel-technologies.com
Discover the latest news on our products and technology at http://www.esterel-technologies.com

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