**SCADE Suite** is a product line of the ANSYS® Embedded software family of products and solutions that empowers users with a Model-Based Development Environment for critical embedded software.

With native integration of the formally-defined Scade language, SCADE Suite is the 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 ANSYS® SCADE® products and ANSYS® Simplorer® providing a design environment combining system and software engineering development, interactive HMI design, multi-physics simulation, application testing and lifecycle management, down to code integration on target.

**Software Prototyping and Design**

**Advanced Model-Based Design**

- Intuitive and familiar graphical notation based on unlimited nesting of data flows and hierarchical state machines

- 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
- 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
- SCADE Suite library components: integrators, hysteresis, quantizers, filters, flip-flops, truth tables, look-up tables, matrix operators, etc.
- Import of legacy code into designs

**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 Accomplishment Summary (TAS) or Safety Case (SC)
- Compliance Analysis to certification standards
- Software Installation Procedure (SIP)
- Tool Configuration Index (TCI)
- and other standard-specific documents

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

**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.

Read more about SCADE Suite:

- **Software Prototyping and Design**
- **Verification and Validation**
- **Automatic Code Generation**
- **SCADE Tools Integration**

SCADE Suite is used to design critical software, such as flight control and 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.
Timing and Stack Size Optimization with Timing and Stack Optimizer

- Analysis of Worst-Case Execution Time (WCET) and stack usage of a SCADE Suite application independently from the actual target platform
- Iterative process to focus on application parts causing long execution times or unsatisfactory stack usage and to refine the application profiling by optimizing SCADE Suite models
  - Comparison of results between optimization sessions reported in SCADE Suite design environment
  - Automatic and customizable detailed reporting
  - Easy comparison of code performance by fine-tuning KCG options

Java-Based Eclipse API and TCL API

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

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)

Legacy Algorithm Design Capture

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

Verification and Validation

Debugging/Simulation with SCADE Suite Simulator

- Executable SCADE Suite designs
- Detailed simulation of actual SCADE Suite-generated 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
- Support of SCADE Test Environment input formats
- Co-simulation with MathWorks® Simulink® and MATLAB®
- Simulation can be driven by TCL scripts for complex customized scenarios
- Slave mode for connection to your simulation environment and tools (co-simulation)
- Functional Mock-up Unit export (32/64-bits) from SCADE Suite models for connection to ANSYS® Simplorer® and any FMI-compliant system simulation tools

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
- Easy and intuitive use of proof or bug-chasing modes

Coverage Analysis with SCADE Test Model Coverage

- Thorough coverage methodology via SCADE Suite interface to acquire, analyze, and resolve coverage at model and code level based on test suites
- Predefined (MC/DC, DC, etc.) or user-defined coverage and integration criteria
- Support of SCADE Test Environment input formats
- Production of customizable and qualifiable reports for certification authorities
- SCADE Test Model Coverage is qualified as verification tool under DO-178B, as DO-330 TQL-5 tool under DO-178C (SCADE Suite KCG 6.4 compatible)
- Certification data available from Esterel Technologies

For more information on Test Model Coverage, see the SCADE Test technical data sheet.

Model-in-the-Loop and Hardware-in-the-Loop Simulation with VeriStand Gateway

- Interactive simulation of SCADE Suite models in National Instruments VeriStand™ environment

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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.
Worst-Case Execution Time (WCET) and Stack Size Analysis with Timing and Stack Verifiers

- Computation of WCET and stack usage of a SCADE Suite application for a specific target
  - Aggregation of results from different code generation settings and comparison at model level
  - Fully automated process
  - Fully customizable from SCADE Suite or by TCL scripts
  - Supported processor targets for WCET analysis: PowerPC e200 family, PowerPC MPC 5xx family, PowerPC e300, PowerPC MPC 755s, and ARM Cortex.
  - Supported processor targets for stack analysis: all PowerPC and ARM Cortex-R4
  - Available on request: LEON2, LEON3, NEC V850E1/PHO3, TriCores 1766/1796/1797

Automatic Code Generation

- 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
- Qualifiable/certified SCADE Suite KCG 6.4
  - qualifiable as DO-330 TQL-1 tool under DO-178C
  - Qualifiable as development tool under DO-178B
  - Qualified under ISO 26262:2011 at ASIL D and C
  - Certified under IEC 61508:2010 at SIL 3
  - Certified under EN 50128:2011 at SIL 3/4
- SCADE Suite KCG 6.5
  - C and Ada code generation
  - Language and typing extensions (new iterators, bitwise operators, 8/16/32/64-bits numeric types (signed/unsigned), and 32/64-bits floats

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
  - Customizable RTOS Adaptors for generated code
  - ASAM MCD-2 MC code calibration capability linked to model

Object Code Verification with SCADE Suite Compiler Verification Kit

- Supports early verification of the correctness and consistency between the development tools chain and the target platform
- Demonstrates the C code generated by SCADE Suite KCG is correctly compiled by the C target compiler and resulting code executes correctly on a given target platform
- Consists of a test suite that performs normal low-level testing of code structures generated by SCADE Suite KCG and compiled with user C compiler
- The test suite consists of a C sample containing all elementary C constructs (including combinations) generated by KCG from a SCADE Suite model. Input vectors exercising C sample code and producing 100% MC/DC coverage are also provided.
- Customizable automation execution scripts

3. Powered by aiT, a product of AbsInt.
**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:

- Evolution of system design and software components in parallel and resynchronization upon request at chosen project milestones.
- Bi-directional synchronization between system models and software models.
- Consistent and efficient management of I/Os and data definitions and changes.
- No duplication of efforts in synchronizing interfaces defined at system level and refined at software level.

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

**Rapid Prototyping**
SCADE Suite connection with SCADE Test Rapid Prototyper provides the following capabilities:

- Design and build interactive graphical panels for SCADE Suite simulation sessions.
  - Library of predefined and customizable widgets (controls and indicators).
  - Automatic generation of executable applications for Windows, Apple iOS, or Android platforms.
  - Functional Mock-up Unit (FMU) generation (32/64-bits) for connection to ANSYS® Simpler® and FMI-compliant system simulation tools.

For more information on Rapid Prototyper, see the SCADE Test technical data sheet.

**Development of Embedded Human-Machine Interfaces (HMI)**
SCADE Suite allows for designing the control logic associated with graphical HMIs designed in SCADE Display.

- **Co-design**: Tight design-level integration of critical logic and graphic components in embedded applications.
- **Co-simulation**: Early prototyping and validation in white-box and black-box mode between display application logic and graphic components.
- **Co-reporting**: Integration of report generation between SCADE Suite models and SCADE Display graphical specifications.
- **Co-generation**: Integrated deployment of SCADE Suite and SCADE Display generated code.

For more 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:

- Project monitoring with SCADE LifeCycle Dashboard to compute metrics reported on predefined and customizable dashboards.
- Requirements management and traceability with SCADE LifeCycle Requirements Management Gateway.
- 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 more information on the SCADE LifeCycle product line, see the SCADE LifeCycle technical data sheet.

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4. Powered by PRELYTI’S LiveDashboard
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Minimal/Required System Configuration

| OS Platforms | Microsoft® Windows 7 SP1 (64-bit)² or Windows 8.1 (64-bit) |
| 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 |
| 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 6.1.3 is qualifiable on Windows XP Professional SP2/SP3 (32-bit) and Windows 7 SP1 (64-bit) platforms.
2. SCADE Suite application is compiled on Windows 7 SP1 (32-bit). Tests performed on other platforms ensure all SCADE Suite tools support them.

SCADE Suite Product Line

SCADE Suite Advanced Modeler Seat:
- SCADE Suite Editor
- SCADE Suite Checker
- SCADE Suite Simulator
- SCADE Suite Configuration Management Gateway
- SCADE Suite API and Eclipse Plug-In
- SCADE Suite Code Integration for FMI and Simulink®
- SCADE Display Integration
- SCADE System Integration
- Simulink® Wrapper (S-functions)
- SCADE Suite Gateway for VeriStand™
- SCADE Suite RTOS Adaptors (VxWorks 653, VxWorks CERT, INTEGRITY-178B, OSEK, MicroC/OS-II) and “user-definable” Adaptors
- SCADE Suite user documentation and online help

SCADE Suite Timing and Stack Optimizer

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 or 6.1.3 DO-178B/C Levels A and B Certification Kits
- SCADE Suite KCG 6.4 ISO 26262 ASIL D and C Certification Kit
- SCADE Suite KCG 6.4 or 6.1.3 IEC 61508 SIL 3 Certification Kit
- SCADE Suite KCG 6.4 or 6.1.3 EN 50128 SIL 3/4 Certification Kit
- SCADE Suite KCG 6.4 or 6.1.3 IEC 60880 Certification Kit

SCADE Suite Compiler Verification Kit

SCADE Test Integration:
- SCADE Test Model Coverage
- SCADE Test Rapid Prototyper
- SCADE Test Environment for Host
- SCADE Test Target Execution (LDRA, RTR, VectorCAST, Generic Target)

SCADE LifeCycle Integration:
- SCADE LifeCycle Dashboard
- SCADE LifeCycle Reporter
- SCADE LifeCycle Requirements Management Gateway

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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Revision: SC-TDS-R16 - 16/03/15