

ANSYS® SCADE Display® 17.0



ANSYS SCADE Display is a product line of the ANSYS embedded software family of products and solutions that empowers users with a versatile graphics design and development environment for embedded human-machine interfaces (HMI).

With a native support for the OpenGL® SC (safety critical) and ES (embedded system) standards, SCADE Display represents a new generation of graphics software development tools, spanning prototyping, display design, simulation, verification and validation, and certified code generation supporting several safety standards in a certifiable environment. SCADE Display is tightly integrated with ANSYS SCADE Suite® to provide a comprehensive development environment for both embedded HMIs and their behavioral logic.

Tailored for Critical Embedded HMIs

ANSYS SCADE Display drastically reduces project certification costs by simplifying critical control application design and by automating verification, qualifiable/certified code generation and documentation generation. SCADE Display KCG code generator is qualifiable as development tool under DO-178B level A or as DO-330 TQL-1 tool under DO-178C. It is qualified under ISO 26262:2011 at ASIL D and C, and certified under IEC 61508 2010 at T3/SIL 3 and EN 50128:2011 at T3/SIL 3/4.

SCADE Display KCG certification kits provide all the material required by the respective standard guidelines for the certification authorities:

Tool Qualification Plan (TQP)

- Tool Operational Requirements (TOR)
- Interface Requirement Specifications (IRS)
- Tool Accomplishment Summary (TAS) or Safety Case (SC)
- Compliance Analysis to certification standard
- Tool Installation Procedure (TIP)
- Tool Configuration Index (TCI) and other standard-specific documents

Graphical Prototyping and Design

Advanced Modeling

- User-friendly interface
- Rapid learning curve
- Standards-based: OpenGL®, XML, PNG, JPEG, HTML
- Unified project structure across SCADE products for managing project files and resources
- Layering and tree structuring that encourages creation, customization and reuse of specification parts as library objects
- Modular palette for access to all graphical primitives with preview of library objects
- Executable graphical specifications
- Advanced editing features: replication, undo/redo history, efficient search and replace, variables dictionary, plug expressions, live warning and error logs, etc.



High-Quality Editing

- Transparency management at graphical primitive level with real-time visualization
- Texture management: UV mapping, alpha textures control and color modulation
- Haloing, anti-aliasing, multiline text support
- Masks (clip lines/boxes, stencils) support
- Bitmap import/export
- Zoom and navigation manager



Streamlined Design of Interactive HMIs

- Interactive HMI design creation with dedicated primitives for active areas, multiple pointing device (including touch screens) or keyboard events management
- Extensive library of widgets, including domain-specific widgets (gauges, scales, roses, etc.), interactive HMI widgets (buttons, tabs, edit boxes, etc.), and next-generation HMI capabilities (gesture recognition, graphical animations)



Integrated Font Management

- Editing of bitmap and stroke fonts
- TrueType®/OpenType® font import
- Built-in support of regional encodings
- XML font data storage format
- Generation of embeddable font source code either in pure vector or textured formats

Smooth Integration within Existing Environments

- Combine, at model level, all external OpenGL 2-D/3-D graphics (legacy code, 3-D terrain/maps, 3-D objects) with SCADE Display® layers
- Easy automatic migration of Presagis VAPS® formats and ENSCO IData® models into SCADE Display executable specifications

Java-Based Eclipse Model API

- Read/write access to SCADE Display project and model files in Java from eclipse modeling framework (EMF)

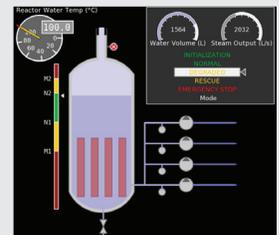
Configuration Management

- Built-in integration with most configuration management tools through SCADE Display configuration management gateway



SCADE Display Sweet Spots

SCADE Display is used as an HMI display software prototyping and development tool by leading companies in the aerospace, rail transportation, automotive, nuclear, and industrial domains. It is ideally suited to support the design of critical embedded-display systems (multi-function displays, head-up displays, digital instrumentation and control panels, etc.) and can also be used also to create schematics (electrical, hydraulic, or plant mimic diagrams), as well as 2-D/3-D simulator displays and trainers for drivers/pilots, crews or maintenance team training.



Support for Requirements Traceability

- Traceability to requirements available with SCADE LifeCycle ALM Gateway



Verification and Validation

Interactive Simulation

- Simulation of graphical specifications in step-by-step or continuous mode
- Ability to load, play and record scenarios and produce snapshots
- Batch mode available

Early Symbology Verification

- Rapid animation of the specification through a simple and intuitive GUI
- Built-in model animation laws (no need to write complex scenarios)

Automatic Design Checking

- Compliance of display specifications to methodology, naming and graphical design rules
- Automatic checks, suggestions and corrections
- Batch campaigns enabled
- Optimization of executable specification performance
- Report all warnings and errors detected by checker verification (textual or CSV format)

Automatic HMI Generation

Automatic Code Generation

- Automatic generation of compact, efficient, modular, safe and target-independent C code
- Elimination of coding errors, as well as the need for low-level testing
- No run-time fee
- No program usage restriction
- Qualifiable/Certified SCADE Display KCG 6.4.3:
 - 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 Display KCG 6.6:
 - Rendering speed-up and smaller memory footprint
 - Static groups or bitmaps implemented as display lists on OpenGL/SC targets, or as frame buffer objects (FBO) on OpenGL ES2 targets

Code Integration and Deployment

- No dependency with target hardware or RTOS
- Native support of OpenGL, OpenGL SC 1.x (safety critical) and OpenGL ES 1.x and 2.x (embedded system) standards via OpenGL extension (OGLX)
- Quick target deployment to virtually all target platforms (Windows®, Apple iOS®, and Android-based mobile devices, embedded targets, etc.)
- Automatic generation of HMI applications for Windows/ PC, Apple iOS or Android platforms

SCADE Tools Integration

Development of HMI Behavioral Logic

SCADE Display allows for the refinement of HMI software with behavioral logic in SCADE Suite model-based development and verification environment.

Design

- Tight design-level integration of critical behavioral 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 modes between display application logic and graphic components
- Co-execution of SCADE Suite model and interactive SCADE Display specification as run-time free standalone executables

Reporting

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

Code Generation

- Integrated deployment of SCADE Suite and SCADE Display generated code

Connectivity with System Simulation Tools

SCADE Display integrates seamlessly with ANSYS® Simplorer®, through the FMI/FMU co-simulation standard, to enable interactive E/E and multi-physics simulation sessions.

- Functional mock-up unit (FMU) export out of SCADE Display models for connection with ANSYS Simplorer and all FMI-compliant system simulation tools
- FMU proxy generation for distributed/network simulation with FMI-compliant tools
- Support for FMI 2.0 model exchange export

Application Life Cycle Management

ANSYS SCADE Display integration with ANSYS SCADE LifeCycle® allows the following capabilities:

- Connection to application lifecycle management (ALM) tools through SCADE LifeCycle ALM gateway for requirements traceability from models
- Traceability link creation in SCADE Display to perform traceability analysis in ALM tool environments
- Automatic documentation generation with SCADE LifeCycle reporter
- Integration with SCADE LifeCycle reporter and SCADE LifeCycle ALM Gateway shared with ANSYS SCADE Suite, ANSYS SCADE System® and ANSYS SCADE Test®

ANSYS SCADE Solutions for ARINC 661-Compliant Systems

In the aerospace domain, ANSYS SCADE Solutions for ARINC 661 Compliant Systems address the needs of aircraft manufacturers and their suppliers to efficiently create ARINC 661-compliant cockpit display systems (CDS) and user applications (UA) with the highest level of quality and safety.

For projects requiring certification, SCADE Solutions for ARINC 661-Compliant Systems enables a quick start of embedded ARINC 661 projects with DO-178B or DO-178C.

The solutions are built on top of SCADE Suite for developing user applications (UA) and widget logic, and on top of SCADE Display for UA definition files and widget graphics. The following modules for ARINC 661 compliant systems can be acquired independently:

- SCADE widget creator
- SCADE widgets library
- SCADE UA page creator
- SCADE UA definition file generator
- SCADE server creator

Minimal/Required System Configuration

OS Platforms ¹	Microsoft® Windows 7 SP1 (64-bit) ² or Windows 8.1 (64-bit)
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 Display KCG 6.4.3 code generator is qualifiable on Windows XP Professional SP3 (32-bit) and Windows 7 SP1 (64-bit) platforms.
2. SCADE Display application is compiled on Windows 7 SP1 (32-bit). Tests performed on other platforms ensure all SCADE Display modules support them.

ANSYS SCADE Display Product Line

ANSYS SCADE Display Advanced Modeler Seat:

- Editor
- Design Checker
- Simulator
- Animator
- Configuration Management Gateway
- Application Lifecycle Management Gateway
- SCADE Suite Integration
- User documentation and online help

ANSYS SCADE Display KCG Code Generator (with OGLX extension)

ANSYS SCADE Display KCG Certification Kits:

- SCADE Display KCG 6.4.3 DO-178B&C Levels A and B Certification Kit
- SCADE Display KCG 6.4.3 IEC 61508 SIL 3 Certification Kit
- SCADE Display KCG 6.4.3 EN 50128 SIL 3/4 Certification Kit
- SCADE Display KCG 6.4.3 ISO 26262 Certification Kit

ANSYS SCADE LifeCycle Integration:

- SCADE LifeCycle Reporter
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Contact Information

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ansys.com/Products/Embedded-Software

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