

# SCADE®

## SCADE Display® 2020 R2

SCADE Display is part 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 automatic code generation supporting several safety standards in a certifiable environment.

SCADE Display is tightly integrated with SCADE Suite® to provide a comprehensive development environment for both embedded HMIs and their behavioral logic.

### / Tailored for Critical Embedded HMIs

SCADE Display drastically reduces critical project costs by providing WYSIWYG design entry with automatic qualified code generation technology. SCADE Display KCG Code Generator is qualifiable as a development tool under DO-178B level A, as DO-330 TQL-1 tool under DO-178C, and certified under ISO 26262:2011 at TCL3/ASIL D and C, IEC 61508:2010 at T3/SIL 3, and EN 50128:2011 at T3/SIL 3/4.

SCADE Display KCG Certification Kits provide all material required by the certification authorities, including:

- 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).
- Other standard-specific documents.

More information in the technical data sheets on SCADE Display KCG Certification Kits.



## / Graphical Prototyping and Design

### Advanced Modeling

- User-friendly interface.
- Rapid learning curve.
- Standards-based: OpenGL SC/ES, XML, PNG, JPEG, HTML.
- Unified project structure across SCADE products for managing project files and resources.
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### 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, mask containers) support.
- Bitmap import/export.
- Zoom and navigation manager.
- Radial and Linear gradient support.
- Support of SVG Paths.
- Support of new types as Structures, Enumeration.
- Ability to import an external type. DirectX is used for graphic rendering in editing mode to take advantage from GPU acceleration and optimize performance.



### 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 Information 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® and VAPS XT formats, and ENSCO IData® models into SCADE Display executable specifications.
- Built-in integration with most Configuration Management (CM) Tools through CM Gateway.



## Java-Based Eclipse Model API

- Read/write access to SCADE Display project and model files in Java from Eclipse Modeling Framework (EMF).

## Support for Requirements Traceability

- Traceability to requirements available with integrated SCADE LifeCycle® ALM Gateway.

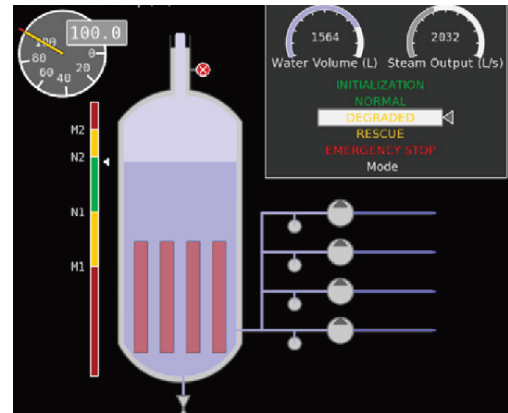
## SVG and Adobe Photoshop importers

- Import SVG format (.SVG) and Photoshop format (.PSD) graphical design into SCADE Display modeler by drag & drop.

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## / SCADE Display Sweet Spots

SCADE Display is used as an HMI display software prototyping and development tool by leading companies in the aerospace, automotive, rail transportation, 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, Dashboards and Control Panels, etc.) but 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 teams.



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## / SCADE Solutions for ARINC Compliant Systems

SCADE Solutions for ARINC 661 Compliant Systems address the needs of aircraft manufacturers and avionics suppliers for efficiently creating 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. These 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 (DF) and widget graphics.

*For more information, see the SCADE Solutions for ARINC 661 Compliant Systems technical data sheet.*

## / 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.
- Multitouch simulation capabilities for simulating Touch application.

### Early Symbolology Verification

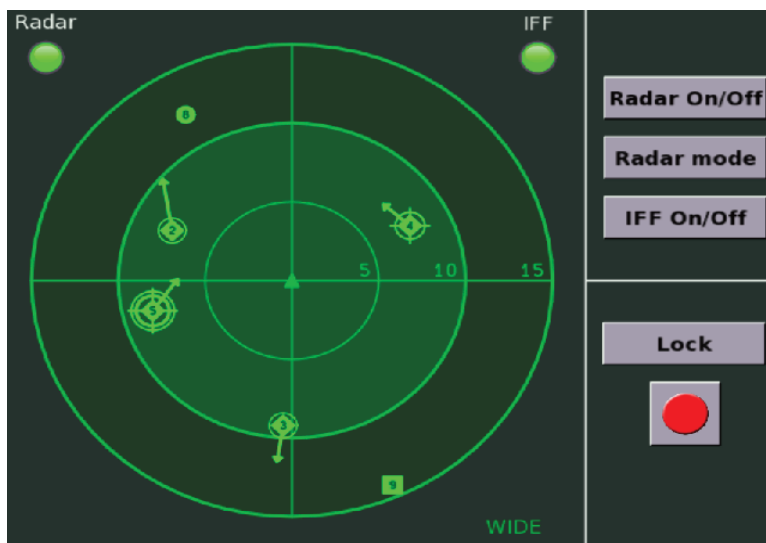
- Rapid animation of the specification through a simple and intuitive GUI.
- Built-in model animation laws (no need to write complex scenarios).

### 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 of all warnings and errors detected by checker verification (textual or CSV format).

### Testing Environment

- Rapid animation of the specification through a simple and intuitive GUI.
- Built-in model animation laws (no need to write complex scenarios).
- For more information on testing environment capabilities, see the SCADE Test technical data sheet.



## **SCADE Tools Integration**

### **Development of HMI Behavioral Logic**

SCADE Display allows for the refinement of HMI software with behavioral logic in the 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.

### **Reporting**

- Integration of automatic report generation between SCADE Suite models and SCADE Display graphical specifications.
- Co-execution of SCADE Suite model and interactive SCADE Display specification as run-time free standalone executables.

### **Code Generation**

- Integrated deployment of SCADE Suite and SCADE Display generated code.

*For information on the SCADE Suite product line, see the SCADE Suite technical data sheet*

### **Connectivity with System Simulation Tools**

SCADE Display integrates seamlessly with Ansys® Twin Builder®, through the FMI/FMU co-simulation standard, to enable interactive E/E and multiphysics simulation sessions.

- Functional Mock-up Unit (FMU) export out of SCADE Display models for connection with Ansys Twin Builder 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**

The life cycle management of HMI software developed in SCADE Display can be supported by SCADE LifeCycle:

- Connecting Application Lifecycle Management (ALM) tools and setting requirements traceability from models.
- Generating documentation automatically from models.

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

## / 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 6.4.7:
  - 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.

#### KCG 6.7 Main features:

- Rendering speed-up and smaller memory footprint.
- Static groups implemented as textures, Display Lists on OpenGL SC1 targets, or as Frame Buffer Objects (FBO) on OpenGL SC2/ES2 targets.

### Code Integration and Deployment

- No dependency with target hardware or RTOS.
- Native support of OpenGL, OpenGL SC 1.0 and 2.0 (Safety Critical) and OpenGL ES 1.1 and 2.0 (Embedded System) standards via OpenGL extension (OGLX).
- Quick target deployment to virtually all target platforms (Windows, Apple iOS, and Android-based mobile devices, embedded target operating systems and platforms, etc.).
- Automatic generation of HMI applications for Windows/PC, Apple iOS, or Android platforms.

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## / SCADE Display Product Line

### SCADE Display Advanced Modeler Seat:

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

### SCADE Display KCG Code Generator (With OGLX Extension)

#### SCADE Display KCG Certification Kits:

- DO-178B&C Levels A and B Certification Kit.
- IEC 61508 SIL 3 Certification Kit.
- EN 50128 SIL 3/4 Certification Kit.
- ISO 26262 ASIL D Certification Kit.

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