Ansys SCADE Display

Ansys 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 native support for the OpenGL SC (safety-critical) and ES (embedded system) standards, SCADE Display represents a new generation of graphics software development tools, which span prototyping, display design, simulation, verification and validation. Additionally, its certified automatic code generation supports several safety standards within 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 DO178C, 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

For more information, see the SCADE Display KCG Certification Kit technical data sheet.

/ 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

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
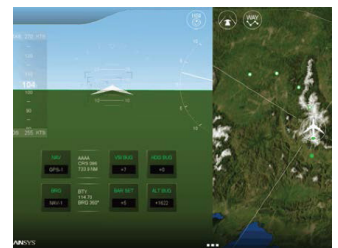
Java-Based Eclipse Model API

- 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

/ 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 (multifunction 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.
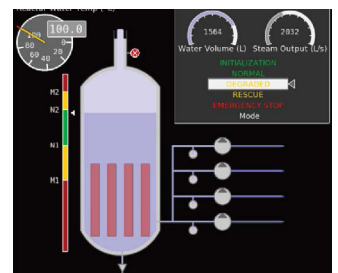
SCADE Solutions for ARINC 661 Compliant Systems

SCADE Solutions for ARINC 661 Compliant Systems addresses 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 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 of all warnings and errors detected by checker verification (textual or CSV format)

Testing Environment

The development of applications in SCADE Display can be extended with testing activities supported by SCADE Test:

- Creating and managing test cases, setting up and launching test execution from SCADE Test Environment for Host
- Producing test scenarios and defining expected results, as pictures with inclusion/exclusion zones, or expected values
- Automating the comparison of actual test results with expected results with built-in or third-party image comparison tools

* Computing Model Coverage enabling Branch, DC and MC/DC coverage criteria of the SCADE Display model and at the generated code level

SCADE Test for SCADE Display applications has been qualified as for DO-178C/DO-330 at TQL-5, ISO 26262 TCL3, EN 50128 T2, IEC 61508 T2.

For information on the SCADE Test product line, see the SCADE Test technical data sheet.
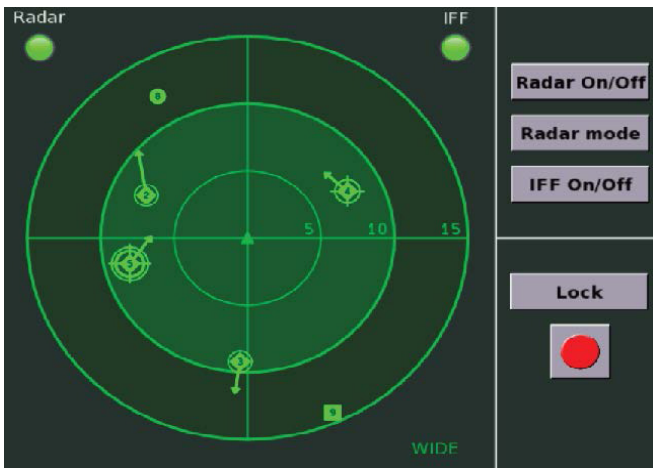
/ SCADE Tools Integration

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 runtime 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, enabling 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 lifecycle 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 runtime 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, Android-based mobile devices, embedded target operating systems and platforms, etc.)
- Automatic generation of HMI applications for Windows/PC or Android platforms

/ 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