Ansys SCADE Architect

SCADE Architect is part of the Ansys® Embedded Software family of products and solutions, which gives you a design environment for systems with high dependability requirements. It provides full support of industrial systems engineering processes, such as ARP 4754A, ISO 26262 and EN 50126.

This product features functional and architectural system modeling and verification in a SysML-based environment. A key feature is the capability to generate consistent and comprehensive Interface Control Documents (ICD).

SCADE Architect has been specifically developed for system engineers; the underlying SysML™ technology is hidden, making modeling more user-friendly and intuitive than standard SysML tools or plain databases. SCADE Architect also complies with the OMG XMI storage format.

By using SCADE Architect in conjunction with other Ansys SCADE® tools, system and software engineers can work within the same framework. Developers can quickly synchronize the system model and the software subsystem components, ensuring consistency of the software architecture and modeling efficiency, for instance for the management of I/O definitions. Bundled with SCADE Suite, SCADE Architect provides an integrated software engineering solution combining software architecture and software design in a single comprehensive user interface. Extended with SCADE Avionics Package, SCADE Architect provides AADL, FACE™, and IMA solutions. Extended with SCADE Automotive Package, SCADE Architect provides an AUTOSAR solution for the development of AUTOSAR Software Components.

System Requirements Analysis

Analysis of System Use Cases

- Representation of system use cases and actors interacting with the system in Use Case Diagrams.
- Ability to refine uses cases with Sequence, Activity or State Machine Diagrams.

Analysis of System Scenario

- Representation of operational system scenario in Sequence Diagrams.
- Ability to link and navigate to actions in Activity Diagrams and states in State Machine Diagrams.

Analysis of System States

- Representation of system states and transitions at any level of system decomposition in State Machine Diagrams.
- Refinement of any state with referenced State Machine Diagrams.
- Free text or signal usage on transitions.

Analysis of System Activity

- Representation of the actions control flow within a subsystem at any level of system decomposition in Activity Diagrams.
- Refinement of any action with referenced Activity or State Machine Diagrams.
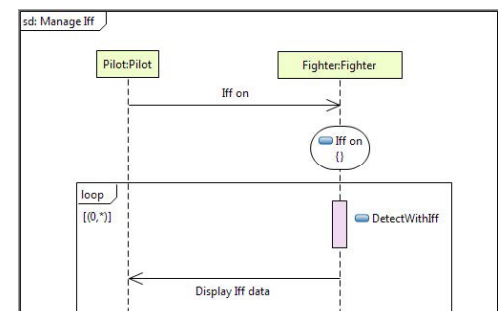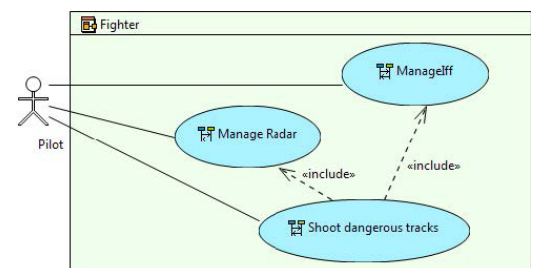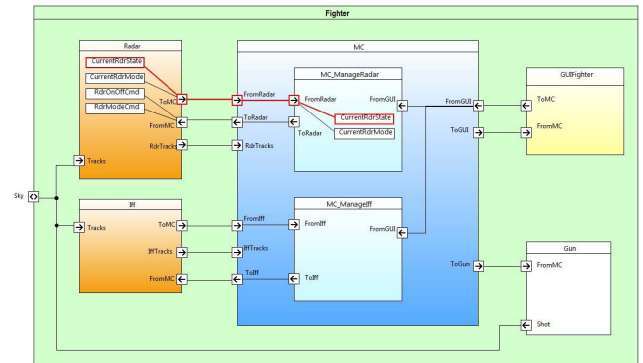
/ System Design

Functional and Architecture Design

- Functional and architecture decomposition through block diagrams.
- Simple and intuitive definition of system architectures through the concept of reusable/unique blocks.
- Component reuse managed with block replicas and ability to allocate items independently on each component replica.
- Comprehensive visualization of component hierarchy within project tree.
- Allocation of functions to components made locally to the functions or components, or through drag-and-drop in allocation tables.
- Annotation mechanism to add custom properties on model objects.
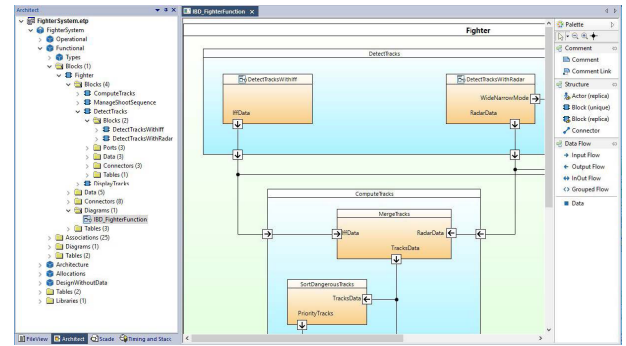
Data Management

- Definition of data dictionaries.
- Import/export of data dictionaries in Microsoft® Excel® or Comma-Separated Value files.
- Data propagation across block hierarchy.
- Data propagation path visualization.
- Data propagation consistency checks.
- Tables of model objects (I/O ports, connectors, data, allocations) with unlimited hierarchical levels and customizable columns aimed at quickly and efficiently managing long lists of data.
- Ability to search table contents.

System Constraints Representation

- Representation of constraints between block data in Parametric Diagrams.
- Refinement of constraints in Parametric Diagrams.
- Free text in constraints expression.

Model-Based Design Solution

- More user-friendly than plain databases.
- Supports all standard drawing features such as alignment, line styles, fonts, etc.
- Styles management for better visual identification of components in diagrams.
- Navigation capabilities within model content and definitions with Find and Browse.

Support of Collaborative Work

- Import SysML models from IBM Rhapsody, NoMagic MagicDraw and Sparx Systems Enterprise Architect.
- Extraction of system parts for third parties, ensuring IP protection of the system model.
- Management of read-only model libraries and support for library re-organization, allowing multi-user collaboration.
- Read/write access to models through a Python OCL, TCL or Java model API.
- Capability to develop specific import/export through the model API.

Support for Requirements Traceability

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

/ System Design Verification

Model Consistency Checking

- Automatic verification of modeling rules applicable to entire model or model parts.
- Set of predefined rules for common usage patterns to quickly fix violated rules.
- Live Checker mode for on-the-fly rule check.
- Addition of custom rules through the API (in Python OCL, TCL, Java).
- Customizable verification configurations to be used for different parts of the model or at different stages of the design.
- Report generation in RTF or HTML with direct hyperlinks on model elements to locate violations.
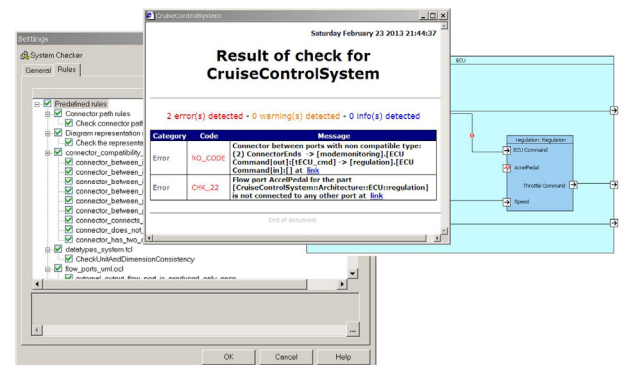
Model Diff/Merge

- Analysis of differences between system model versions.
- Filters for the display of model differences.
- Merge capabilities to copy changes selectively or in bulk, or to ignore changes selectively.
- Tree view of differences allowing for easy understanding of removals, insertions and changes on SCADE Architect model objects.
- Comprehensive report about merge actions and differences before and after merge sessions.
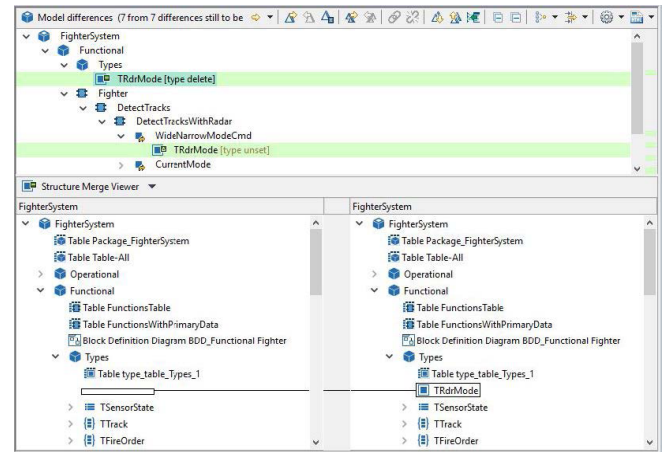
/ ICD Generation and Synchronization with Software Design

Automated Production of Interface Control Documents (ICDs)

- Production of tables from propagated data representing interfaces of blocks.
- Custom query columns (Python OCL, TCL, Java) allowing automated extraction of related information from the model, for example data producer and consumers, properties from the communication data path, etc.
- Import/export of table in Microsoft Excel and Comma-Separated Value files.
- Customization of data to represent messages with dedicated communication protocol properties, allowing tables to represent comprehensive ICDs.
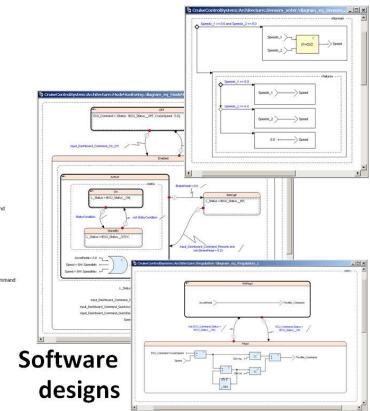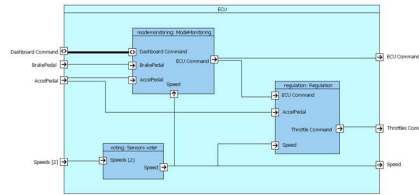
Synchronization with Software Components

SCADE Architect allows for the refinement of software components in the SCADE Suite model-based software development environment through:

- Evolution of system design and software components in parallel and resynchronization upon request at chosen project milestones.
- Bi-directional synchronization between system structural models and software behavioral models.
- Flexible synchronization reuse (modular synchronization) through SCADE Architect and SCADE Suite hierarchy of libraries.
- Consistent and efficient management of I/Os and data definitions and changes.
- Eliminated duplication of efforts in synchronizing interfaces defined at system level and refined at software level.

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

		A	B	C	D	E
		LabelID	Encoding	Coding_type	Position	Size
171	A429_BCS_LGRDC1_L15					
173	L15	15	BNR = 1			
175	I_AS_PB_2			BCD = 0	0	30
176	A429_BCS_LGRDC1_L16					
178	L16	16	BNR = 1			
180	PT_FILTERED_1			BCD = 0	0	30
181	A429_BCS_LGRDC1_L17					
183	L17	17	BNR = 1			
185	PT_FILTERED_2			BCD = 0	0	30
186	A429_BCS_LGRDC1_L27					
188	L27	27	Discrete = 2			
190	B_I_AS_CONDITION_SV_1				0	1
191	B_I_AS_CONDITION_SV_2				1	1
192	B_AS_PASSIVE_1				2	1
193	B_AS_PASSIVE_2				3	1
194	B_PCL_ACTIVE_1				4	1
195	B_PCL_ACTIVE_2				5	1

Interfaces described in SCADE System model

Software designs

/ System Design Environment Configuration

SCADE Architect Configurator

SCADE Architect Configurator allows methods and tools engineers to configure SCADE Architect Advanced Editor to specific needs of a group of users. Domain-specific configuration relates to the use of industry standards like IMA, AADL, FACE and AUTOSAR, or to company or project standards.

- Definition of domain-specific objects derived from SCADE Architect design elements.
- Definition of domain-specific objects, properties and inter-objects constraints in simplified class diagram.
- Customization of domain-specific modeler with dedicated user interface palettes, property pages and menus.
- Customization of objects icon, graphical styles and tables from Configurator preview for immediate reuse in configured SCADE Architect.
- Automatic generation of configuration plug-ins for deployment of domain-specific modelers.
- Capability to apply predefined or custom rules on meta-models with SCADE Architect Checker.
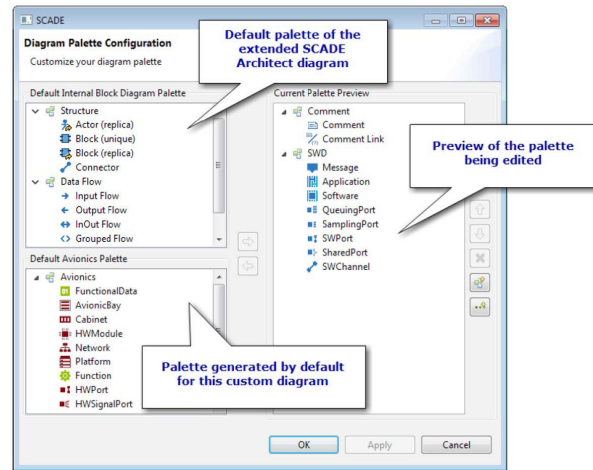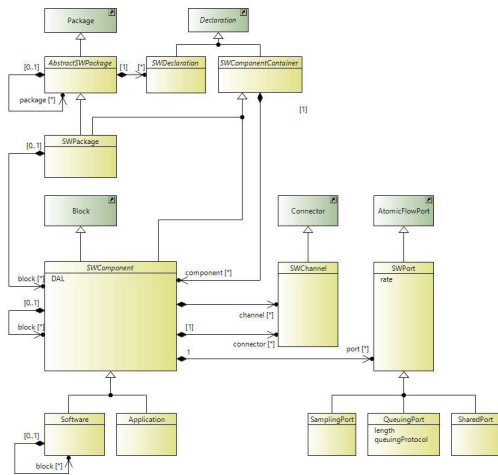
/ SCADE Architect Companion Products

SCADE Avionics Package

Comprehensive solution for designing embedded avionics system with respect to a clean separation of concerns into functional, software and platform levels.

This package allows system engineers to handle ARINC 429, ARINC 664-P7/AFDX or CAN communication protocols, Integrated Modular Avionics architecture, and ARINC 653 specific properties. Verification of AFDX communication bandwidth, and generation of ARINC 653 configuration files are automated. SCADE Architect Configurator is a prerequisite for using the Avionics Package.

The SCADE Avionics Package also includes comprehensive solutions for the AADL standard and the FACE standard.

For information on the package, see the SCADE Avionics Package technical data sheet.

/ Application Lifecycle Management

The life cycle management of systems designed with SCADE Architect can be supported by SCADE LifeCycle® by:

- 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.
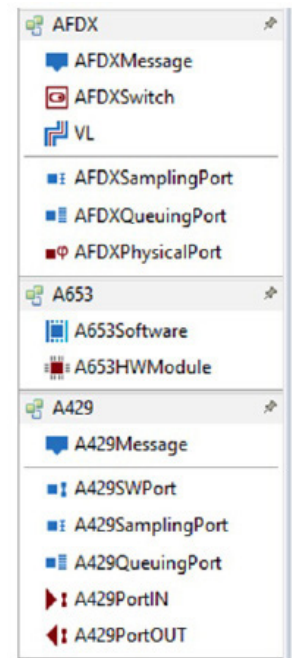
/ SCADE Architect Product Line

SCADE Architect Advanced Modeler:

- SysML Editor
- Import SysML models from IBM Rhapsody, NoMagic MagicDraw and Sparx Systems Enterprise Architect
- Diff/Merge
- Checker
- Model API
- Synchronizer with SCADE Suite
- Application Lifecycle Management Gateway
- User documentation and online help

SCADE Architect Configurator:

- Graphical edition of configurations
- Configuration plug-in generation