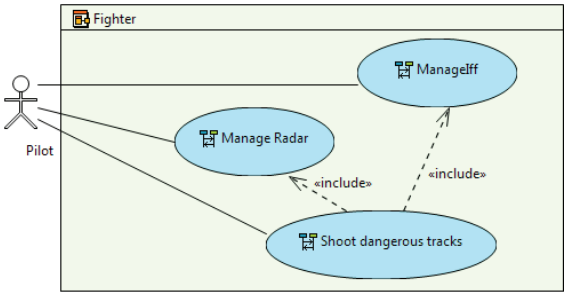
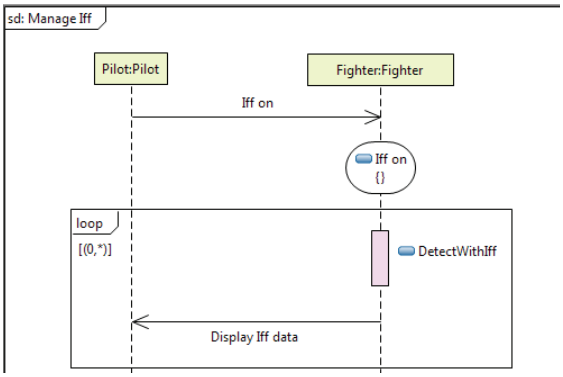
ANSYS® SCADE System® 17.0

ANSYS SCADE System is a product line of the ANSYS embedded software family of products and solutions. This product provides a systems design environment for systems with high dependability requirements and provides full support of industrial systems engineering processes such as ARP 4754A, ISO 26262, and EN 50126.

SCADE System features functional and architectural system modeling and verification in a SysML™ -based environment. It provides a strong foundation to deploy model-based systems engineering (MBSE) processes and best practices. A key feature is the capability to generate consistent and comprehensive interface control documents (ICD) as an important outcome of MBSE.





ANSYS SCADE System 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.

By using SCADE System in conjunction with ANSYS SCADE Suite®, ANSYS SCADE Display® and ANSYS SCADE LifeCycle®, system and software engineers can work within the same framework. Developers can quickly synchronize the system model and the software subsystem components, ensuring consistency and efficiency, for instance for the management of I/O definitions. Delivered with SCADE Suite, SCADE System provides an integrated software engineering solution combining software architecture and software design in a single comprehensive user interface.

System Requirements Analysis

ANSYS SCADE System advanced modeler features:

Analysis of System Use Cases

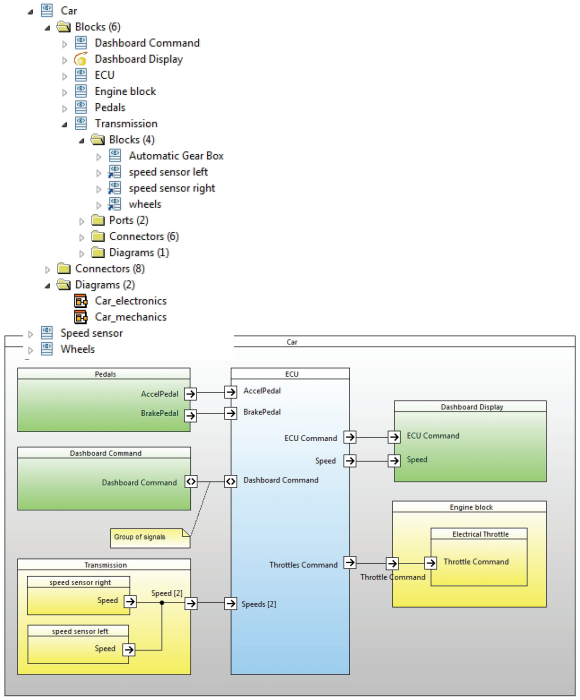
- Representation of system use cases and actors interacting with the system in use case diagrams
- Ability to refine uses cases with sequence, activity or state machine diagrams

Analysis of System Scenario

- Representation of operational system scenario in sequence diagrams
- Allowance for links and navigation 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

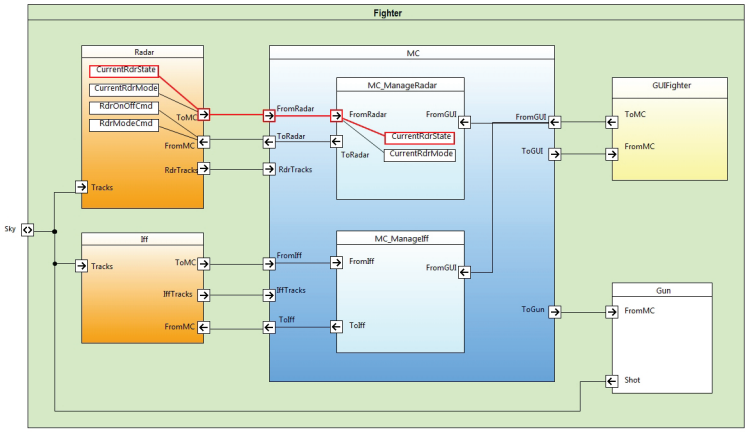
ANSYS SCADE System advanced modeler features:

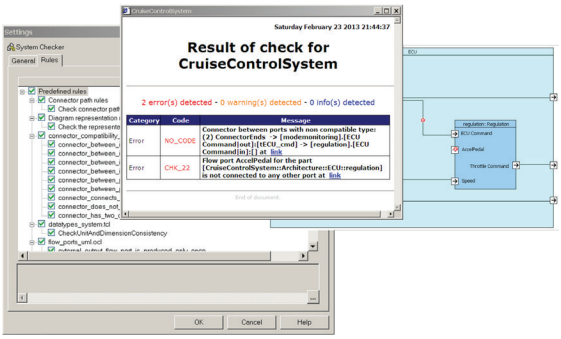
Functional and Architecture Design

- 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 the components, or through drag and drop in allocation tables
- Annotations 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 (input/output ports, connectors, data, allocations) with customizable columns aimed at quickly and efficiently managing long lists of data
- Capability to search in table contents





Model–Based Design Solution

- More user-friendly than plain databases
- Support of 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

- 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
- Multi-file persistence with customizable granularity for packages and blocks allowing fine-grain configuration management
- Read/write access to SCADE System models through an OCL, TCL or Java model API
- Capability to develop specific import/export through the model API

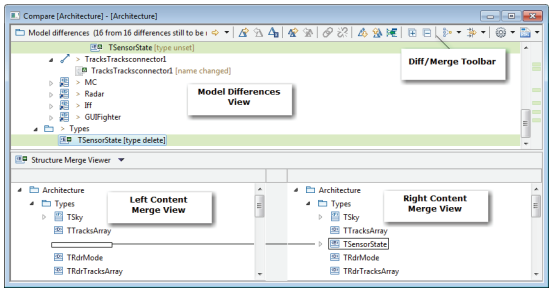
Support for Requirements Traceability

- Traceability to requirements available with 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, ability to quickly fix violated rules
- Live checker mode for on-the-fly rule check
- Addition of custom rules through the API (in 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
- User control on matching strategy applicable to diff analysis
- Tree view of differences allowing for easy understanding of removals, insertions and changes for SCADE System model objects

		A	B	C	D	E
		LabelID	Encoding	Coding_type	Position	Size
51	A429_BCS_COM_L13					
53	L13	13	BNR			
55	GAIN_PRES_2			BCD	0	0
61	A429_BCS_COM_L15					
63	L15	15	BNR			
65	GAIN_PRES_4			BCD	0	0
66	A429_BCS_COM_L16					
68	L16	16	BNR			
75	CONTROL_WHEELSPEED_2			BCD	0	0
76	A429_BCS_COM_L20					
78	L20	20	BNR			
80	CONTROL_WHEELSPEED_3			BCD	0	0
81	A429_BCS_COM_L21					
83	L21	21	BNR			
85	CONTROL_WHEELSPEED_4			BCD	0	0
86	A429_BCS_COM_L22					
88	L22	22	Discrete			
90	B_IN_FLIGHT				0	0
91	B_FIXED_SLIP_CONTROL				0	0
92	B_BRAKING_DEMAND				0	0
97	B_RDC_PTPS				0	0
98	B_LC_PASSIVE_1				0	0
99	B_LC_PASSIVE_2				0	0

ICD Generation and Synchronization with Software Design

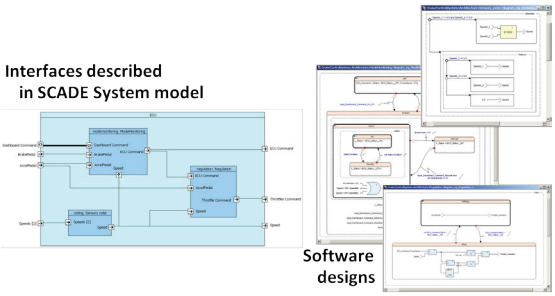
Automated Production of Interface Control Documents (ICDs)

- Production of tables from propagated data representing interfaces of blocks
- Custom query columns (OCL, TCL, Java) allow 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 allows tables to represent comprehensive ICDs

Synchronization with Software Components

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

- 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
- 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



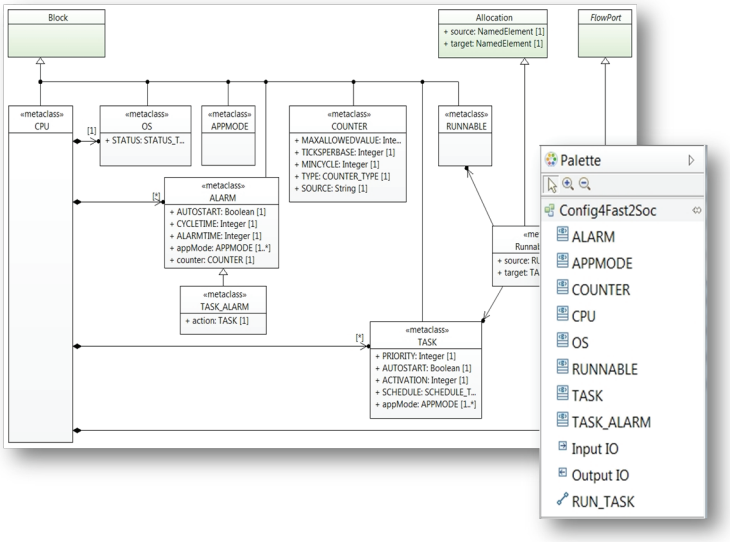
System Design Environment Configuration

ANSYS SCADE System Configurator

SCADE System configurator allows methods and tools engineers to configure SCADE System advanced editor to specific needs of a group of users. Domain-specific configuration relates to the use of industry standards like IMA and AUTOSAR, or to company or project standards.

SCADE System configurator features:

- Definition of domain-specific objects derived from SCADE System 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 graphical styles and tables from configurator preview for immediate reuse in configured SCADE System
- Automatic generation of configuration plug-ins for deployment of domain-specific modelers
- Capability to apply predefined or custom rules on metamodels with SCADE system checker



ANSYS SCADE System Avionics Package

This is a 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 svionics architecture and ARINC 653-specific properties. Verification of AFDX communication bandwidth, and generation of ARINC 653 configuration files are automated. SCADE System configurator is a prerequisite for using the Avionics Package.

ANSYS SCADE Tools Integration

System Life Cycle Management

ANSYS SCADE System integration with ANSYS SCADE LifeCycle provides 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 System 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 SCADE Display, SCADE Suite and SCADE Test™

Standard-Based Solution

ANSYS SCADE System[1] modeling relies on a subset of the SysML standard and compliance with the OMG XMI storage format.

1. Development done in partnership with CEA LIST within the LISTEREL Critical Software Laboratory.

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.

ANSYS SCADE System Product Line

ANSYS SCADE System Advanced Modeler:
- Editor
- Diff/Merge
- Checker
- Model API
- Synchronizer with SCADE Suite
- Application lifecycle management gateway
- User documentation and online help

ANSYS SCADE System Configurator
- Graphical edition of configurations
- Configuration plug-in generation

ANSYS SCADE System Avionics Package

ANSYS SCADE LifeCycle Integration:
- SCADE LifeCycle Reporter

Contact Information

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