**medini™ analyze**

**Quality, Safety and Reliability Engineering**

**Main Features**

- Model-based and integrated toolset supporting hazard analysis, risk assessment, Hazard and Operability Studies (HAZOP), Fault Tree Analysis (FTA), Failure Mode and Effect Analysis (FMEA, FMEDA, FMECA), and reliability analysis
- Safety analysis and design according to ISO 26262, IEC 61508, ARP4761, etc., for safety related functions
- Quality analysis for product design and related processes according to SAE J1739, VDA quality handbook, AIAG, etc.
- Integration of architectural/functional design models with quality, reliability and functional safety analysis methods
- Capture and management of functional and technical safety requirements
- Support of complete end-to-end traceability
- Customizable work product/documentation generation
- Teamwork with detailed compare and merge
- Fully integrated with ANSYS tools for embedded systems development, analysis and simulation – ANSYS SCADE Architect and ANSYS RedHawk
- Integration with IBM Rational DOORS, PTC Integrity, Jama, MS Office, Optima, SVN, and others
**Hazard Analysis and Risk Assessment**

- Hazard and Operability Analysis (HAZOP) for determination of malfunctions/system failures
- Hazard Analysis and Risk Assessment (HARA) and Functional Hazard Assessment (FHA) connected to system models
- Risk graph support according to ISO 26262, ARP4754 and others
- Operational situation analysis based on catalogs for consistent derivation of hazardous events/failure conditions
- Matrix for easy combination of malfunctions and operational situations
- Multiple views and customization options with user attributes and validation rules
- Comprehensive traceability and connection to safety requirements

**Requirement Analysis and Management**

- Graphical and table editors for safety requirements
- Visualization of requirement hierarchies and traceability using diagrams
- Allocation of requirements to system architecture, HW and SW models and function models
- Support for safety standard specific concepts (e.g., ASIL decomposition for ISO 26262)
- Validation rules to check compliance with safety standards and corporate rules
- Import, export and round-trip from/to requirements management systems (e.g., IBM® Rational® DOORS®, IBM® Rational® DOORS® Next Generation, PTC Integrity, Jama) including custom attribute mapping
- Support for general requirements exchange via ReqIF/RIF
**Reliability Engineering**

- Failure rate and failure mode prediction embedded in SysML design models for system and hardware components
- Multiple prediction models to aggregate or distribute failure rates (e.g., over components, ports, using die area, etc.)
- Application of mission profiles and custom scaling for failure rates (e.g., for confidence levels, acceleration factors)
- Support for part libraries to manage failure rates/modes for fast and consistent application across projects
- Transient and permanent failure mode modeling
- Import and round-trip of BOM (bill of material) from CSV/Excel and IP Design (chip models)
- Consistent usage of failure rate and mode data in quantitative analyses (FTA, FMEDA)
- Available default libraries for failure modes according to IEC TR 62380, MIL-HDBK-338B, A.Birolini Reliability Engineering Handbook
- Support for full-custom failure rate handbooks

**System, Software and Hardware Modeling**

- Graphical editor for SysML system models
- Structural modeling of system architecture and design using blocks, parts, ports and connections
- Function and process modeling using activities and actions, allocations to design (system/HW/SW)
- Dependency Editor to visualize and edit function nets, allocations and other relations
- Specification of failure modes and failure rates for SysML elements
- Block type and element libraries for re-use with semi-automatic update in case of changes
- Computation, validation and visualization of safety integrity levels at system design
- Import and round-trip of system design models from ANSYS SCADe Architect, IBM® Rational® Rhapsody, Sparx Systems Enterprise Architect, IP Design (chip design)
- Import, update and visualization of MATLAB®/Simulink® and Stateflow® models
- Traceability of system models to requirements and safety analysis such as HARA, FTA and FME(D)A
- Automatic creation of FTA models from MATLAB®/Simulink® models using structural path analysis
Failure Mode and Effect Analysis (FMEA)

- Support for function, system design, and process FMEAs according to VDA/AIAG, SAE J1739, IEC 60812 and related standards
- Model-based FMEA tables synchronizing with the structural elements and functions from design and process models
- Management of measures and design controls
- Failure net editor for end-to-end cause/effect chains across abstraction levels
- Consistent computation of risk priority numbers (RPN) along failure net
- Risk matrices for risk assessment and optimization of measures
- Customizable worksheets with user attributes including formulas and access to reliability data (e.g., failure rates for FMECA)
- Connection to requirements management and task management
- MSR-FMEA import and update (e.g., from APIS IQ-FMEA, PLATO SCIO™)
- MSR-FMEA export

FMEDA and Diagnostic Coverage Metrics

- Failure mode effect and diagnostic analysis (FMEDA) with Safe Failure Fraction (SFF) computation according to IEC 61508
- Hardware Architectural Metrics calculation of Single Point Fault Metric (SPF) and Latent Fault Metric (LF) according to ISO 26262-5 and ISO 26262-11
- DC-Configurator to provide configurable FMEDA data to integrators
- Synchronization of table content, failure modes and failure rate data from hardware models (e.g., BOM, IP Design)
- Combined and individual evaluation of SPF/LF metrics for multiple safety goals
- Extensible catalog of safety mechanisms according to safety standards (e.g., ISO 26262-5, IEC 61508-7)
- Support for transient failure metrics
- Consistent integration with FMEA cause/effect chains based on failure net
- Rich validation and consistency checks for diagnostic coverage of safety mechanisms
- Traceability of safety mechanisms to requirements and SW/HW implementation
**Fault Tree Analysis (FTA)**

- Graphical editor for quantitative and qualitative FTA
- Automatic layout and support to handle large fault trees by multiple diagrams
- Creation of events and subtrees by drag & drop of model elements and failure modes from system design
- Coherent and non-coherent fault trees
- Support for different probability models (fixed, exponential distribution, monitored/repairable, Weibull, custom)
- Evaluation of minimal cut-sets (with customizable size-limit) and path analysis
- Time-dependent calculation of unavailability, unreliability and conditional failure intensity of top and intermediate events
- Importance measures such as Birnbaum, Fussell-Vesely, criticality for primary events and cut sets
- Support for time-at-risk models according to ARP4761
- Automatic recalculation of probabilities after design changes
- Integration with FMEDA for safety mechanisms and failure modes
- Seamless navigation from cut-set events to elements of the system design
- Import of fault trees from Isograph® FaultTree+ and CAFTA

**Rich Traceability**

- Definition of traces between information elements of any type within medini analyze
- Definition of traces using trace-matrix or by quick-trace functionality
- Navigation via traces to related elements in other models
- Visualization of traced elements at any diagram
- Filters and hierarchies to support the usage even of large trace matrices
- Impact analysis by graphical visualization of traces (customizable dependency viewer)
Teamwork and Integrated Task Management

- Project compare with two-way and three-way difference analysis
- Project merge functionality for team collaboration
- Integration with configuration management systems (TortoiseSVN, IBM® Rational® ClearCase, PTC Integrity, etc.)
- Management of model versions, support of team synchronization
- Integration with issue tracking systems (e.g. Bugzilla, Trac, RTC, Redmine, Jira, Mantis, PTC Integrity, Microsoft® Outlook)
- Creation of tasks/comments for arbitrary model elements
- Navigation from tasks to elements and vice versa
- Context visualization for active tasks
- Documentation of all decisions at the tasks
- Scheduling, user assignment, email notification

Reporting and Customization

- Reporting functionality to generate PDF, Word, Excel or HTML documents for all project content
- Default reports for HARA, safety concept, safety requirements, FME(D)A and FTA analyses
- Customizable reporting framework to build corporate reports for safety-related work products
- Profiling mechanism to add custom fields, references and queries to all models and analyses
- Extensible model validation rules to check consistency across all project data
- Scripting API with integrated JavaScript engine for adding automation features and building tool extensions

Licensing

- Attractive product tailoring
- Dongle and network floating licenses
- Trial licenses on request

System Requirements

- Supported platforms: Microsoft® Windows 7/8/10 (64-bit version)
- Required disc space: 500 MB
- Recommended memory size: 4GB