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), Reliability Block Diagrams (RBD) and reliability analysis.
- Safety analysis and design according to ISO 26262, IEC 61508, ARP4761, MIL-STD-882 etc., for safety related functions.
- Quality analysis for product design and related processes according to SAE J1739, AIAG & VDA FMEA, MIL-STD-1629A, 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.
- Integration with IBM Rational DOORS, PTC Integrity, Jama, Dassault Cameo Systems Modeler, Intland Codebeamer, Siemens Polarion, and others.

Hazard Analysis and Risk Management

- 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, ARP 4754A 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.
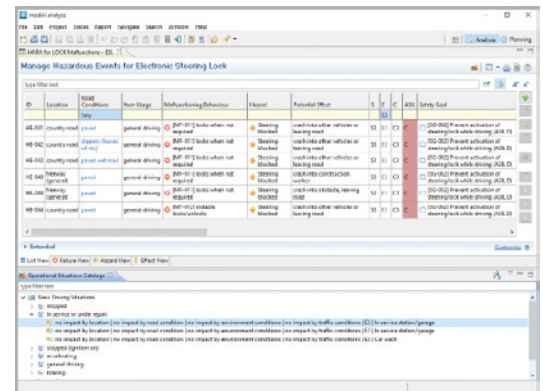
Requirement Analysis and Management

- 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, Intland Codebeamer, Siemens Polarion) including custom attribute mapping.
- Support for general requirements exchange via ReqIF/RIF.
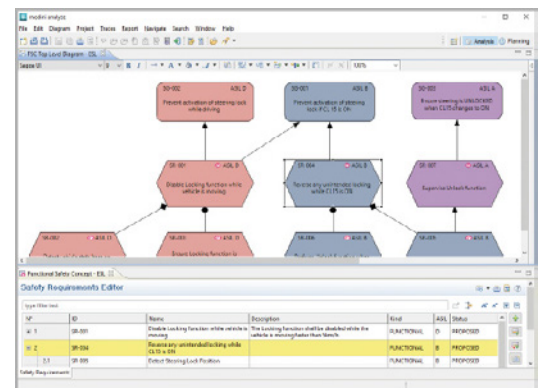
System, Software and Hardware Modeling

- 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, Dassault Cameo Systems Modeler, 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.
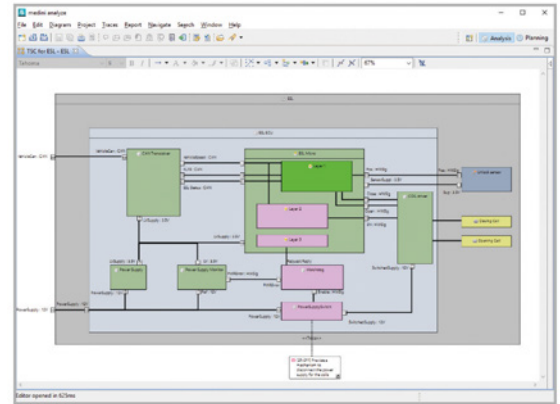

Reliability Engineering

- Failure rate and failure mode prediction embedded in SysML design models for system and hardware components.
- Determination of failure rates using built-in handbooks SN 29500, IEC TR 62380, FIDES Guide, MIL-HDBK-217F, HDBK-217Plus, IEC61709, HDBK-217Plus, NPRD-2016 and EPRD-2014.
- 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).
- Import of BOM-categories from Ansys Sherlock.
- Consistent usage of failure rate and mode data in quantitative analyses (FTA, FMEDA , RBD).
- 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.

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.
- Customizable risk parameters and Risk Matrices for assessment
- Consistent computation of Risk Priority Numbers (RPN) and Action Priorities (AP) along failure net.
- Customizable worksheets with user attributes including formulas and access to reliability data.
- Connection to requirements management and task management.
- MSR-FMEA import and update (e.g., from APIS IQ-FMEA, PLATO SCIO™).
- MSR-FMEA export.
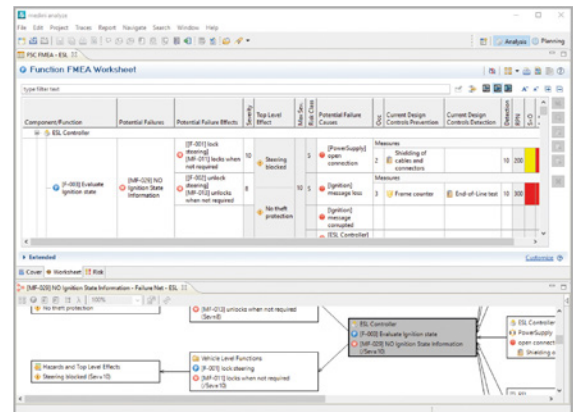
/ Fault Tree Analysis (FTA)

- 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.
- Component Fault Tree (CFT) modeling support integrated with SysML
- Coherent and non-coherent fault trees.
- Support for different probability models (fixed, exponential distribution, monitored/repairable, Weibull, custom).
- Evaluation of minimal cut-sets (with adjustable cut set order) and path analysis.
- Multiple path analysis and coloring based on quantitative analysis (heatmap)
- Time-dependent calculation of unavailability, unreliability, conditional failure intensity of top and intermediate events (exact probabilities and Esary-Proschan Upper Bounds).
- Mean Time to Failure (MTTF) and Mean Time Between Failures (MTBF) computations
- Importance measures such as Birnbaum, Fussell-Vesely, criticality for primary events and cut sets.
- Support for time-at-risk models and computation of average/worst-case latency models according to ARP4761.
- Heatmap to identify critical paths and quantitative contributions of cut sets
- 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.
- Generation of auto paginated FTA report
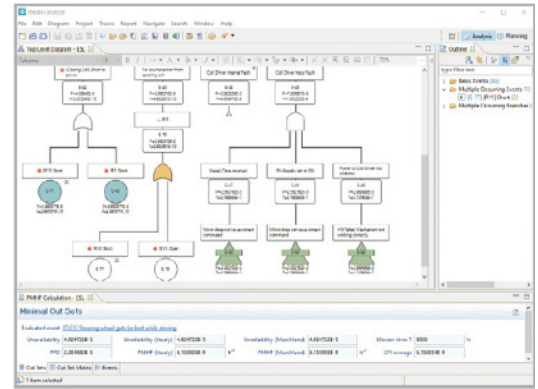
/ Reliability Block Diagrams (RBD)

- Graphical editor for RBDs with support for hierarchical modeling Automatic and semi-automatic layout of diagrams
- Creation of blocks by drag & drop of model elements and failure modes from system design
- Transfer gate support to link fault trees for component failure modeling and reuse
- Calculation of reliability, (un-)availability, and all other quantitative targets (same as for FTA)
- Support for transforming RBDs into fault trees
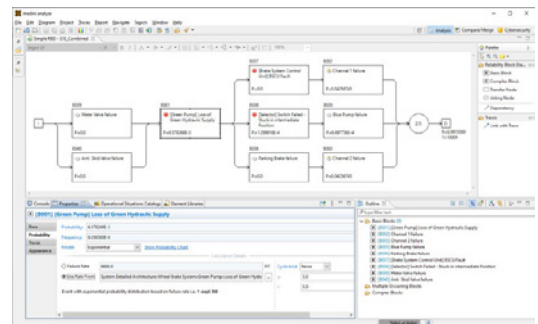
/ Rich Traceability

- 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).
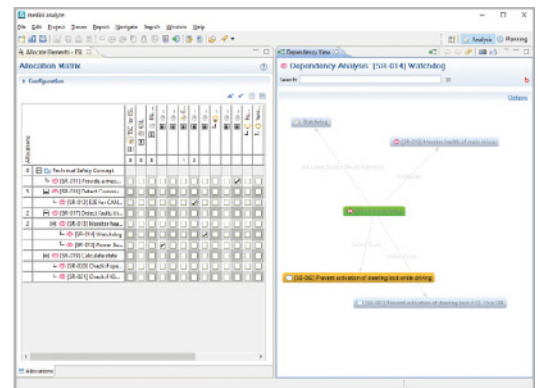
/ Teamwork and Integrated Task Management

- 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.

/\ **Ansys**
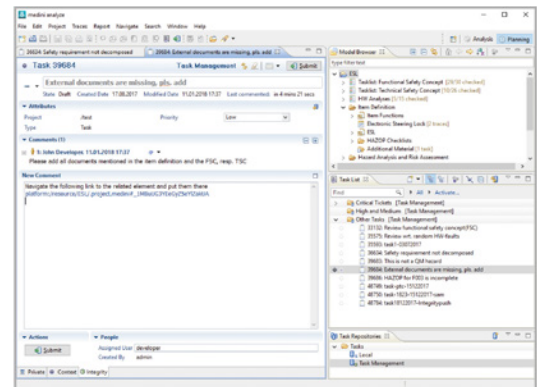
Reporting and Customization

- 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.
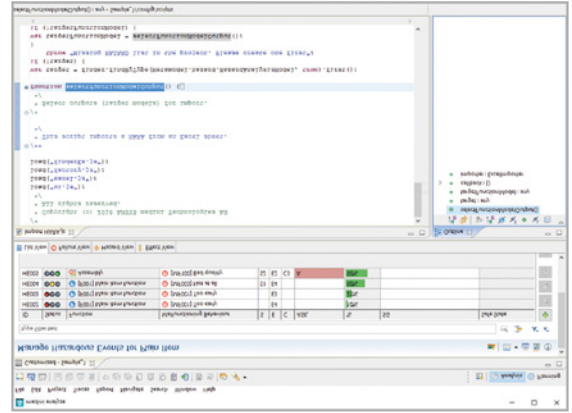
Licensing

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

System Requirements

- Supported platforms: Microsoft® Windows 10/11 (64-bit versions)
- Required disc space: 1 GB
- Recommended memory size: 8GB

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