INTERLOCKS® is a modeling and simulation tool that can represent any system as a simple network of binary events whose relationships are expressed by AND and OR logic. This logic is used to describe a system and to simulate operation for analysis and demonstration. Using INTERLOCKS software, a system developer, trainer, or maintainer can gain understanding of the system, test proposed changes before they are implemented (rapid prototype), and insert faults to see how the system reacts.

The INTERLOCKS tool is not your typical Computer Aided-Design (CAD) or simulation tool. INTERLOCKS is:

- Focused on events and their logical relationship;
- Applicable to diverse components (e.g. hardware, software, or operator events);
- Graphical (employing symbols and color to represent event relationships, event types, and event states); and
- Requires no programming knowledge to use.

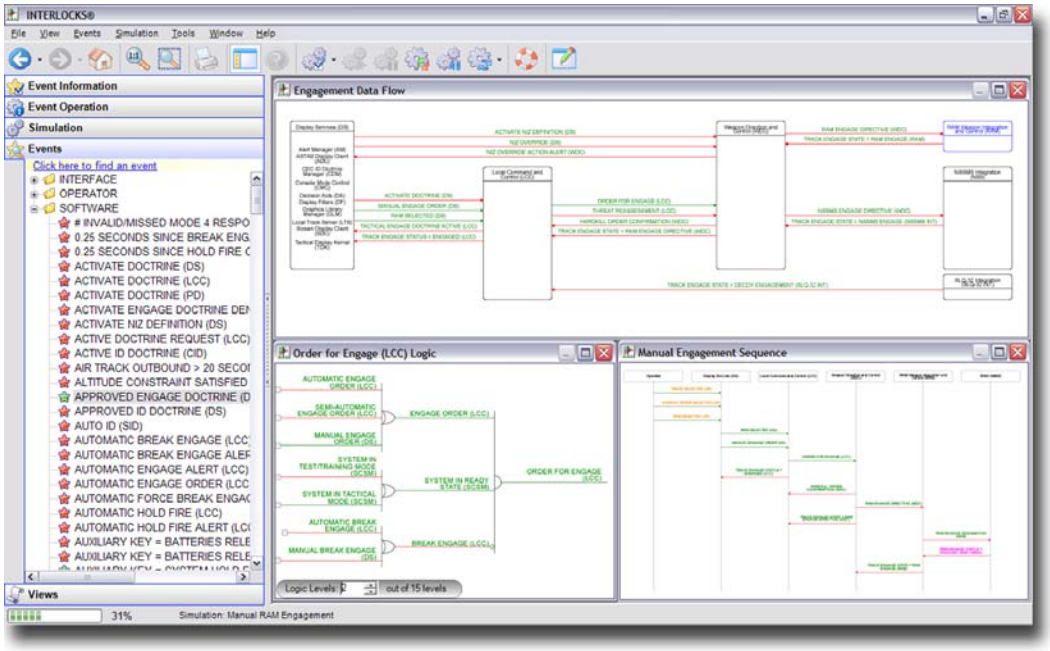
INTERLOCKS was initially developed in the 1980s to perform nuclear system and software safety analysis to demonstrate that critical sequences of events could only occur in a safe and deliberate manner. Since then, INTERLOCKS has expanded into a system lifecycle support tool and has been used for:

- System definition
- Concept demonstration
- Interface management
- Trade-off analysis
- Hardware analysis
- Software analysis
- Requirements analysis
- Requirements specification
- Requirements tracing
- Hazard analysis
- Fault analysis
- Root cause analysis
- Maintainability analysis
- Ambiguity analysis
- Prototype development and testing
- Software development
- Verification and validation
- System certification
- Developer, analyst, and operator training
- Fault Isolation and Troubleshooting
- Distance Support

INTERLOCKS for Systems Engineering and Safety Analysis

INTERLOCKS is a complete engineering tool maintaining a relational database and interactive graphics of the defined system. The tool uses on-the-fly drawing technology to create diagrams for input–process–output, logic and data flow, functional and physical component hierarchies, and operational sequence. These graphics are automatically updated as system inputs change and provide the basis for interface management, consistency checks, trade-off analysis, and links to other documentation

INTERLOCKS modeling and simulation tool focuses analysis on events. System critical processes are modeled as sequences of binary events that have either occurred or not occurred. The model of these events demonstrates the defined safety system and the positive measures for hazard prevention. Using discrete event simulation and simple graphics, INTERLOCKS provides a prototype of the developing system and understanding of how the safety controls are used at the time of critical processing.



INTERLOCKS reduces cost and time to perform engineering and training tasks throughout the system lifecycle by supporting:

- Improved communication and understanding
- Increased engineering efficiency
- Reduced development time and cost
- Reduced system downtime
- Reduced maintenance costs
- Improved system user confidence

System and Software Safety Analysis

INTERLOCKS® modeling and simulation tool combines the system safety requirements model and the architecture model. This combination provides a complete snapshot of the developing system and the safety positive measures being used for hazard prevention. INTERLOCKS promotes thorough software and system safety analysis by providing:

Analysis framework

INTERLOCKS modeling provides a disciplined approach to analysis. The scrutiny into the system required to simulate critical sequences of events is itself system and software safety analysis. The INTERLOCKS approach uses discrete event modeling to identify the positive measures and system controls being used to prevent a hazard from occurring. This lays the foundation and framework for subsequent safety analysis.

Requirements tracing

A large part of system and software safety analysis is the flow down of safety-critical requirements into the developing system. This includes correct implementation of the requirements into the system architecture. INTERLOCKS modeling and simulation tool captures the design and safety requirements at any phase of the development lifecycle. By combining the system safety model and the architecture model, INTERLOCKS demonstrates how hazard mitigation and the associated controls are being implemented.

Analysis capture and demonstration

System and software safety analysis is successful when the system is certified as meeting the defined safety requirements and ready for use. To achieve this goal, a diverse audience must be convinced that the system implements the necessary safety controls during all modes of operation. INTERLOCKS models the event sequences for each safety critical system process. It uses simple graphics to demonstrate system operation and failure cause and effect. The safety case is captured within a complete system model that has the added benefit of demonstrating how the designed positive measures prevent a mishap from occurring.

Analysis status check

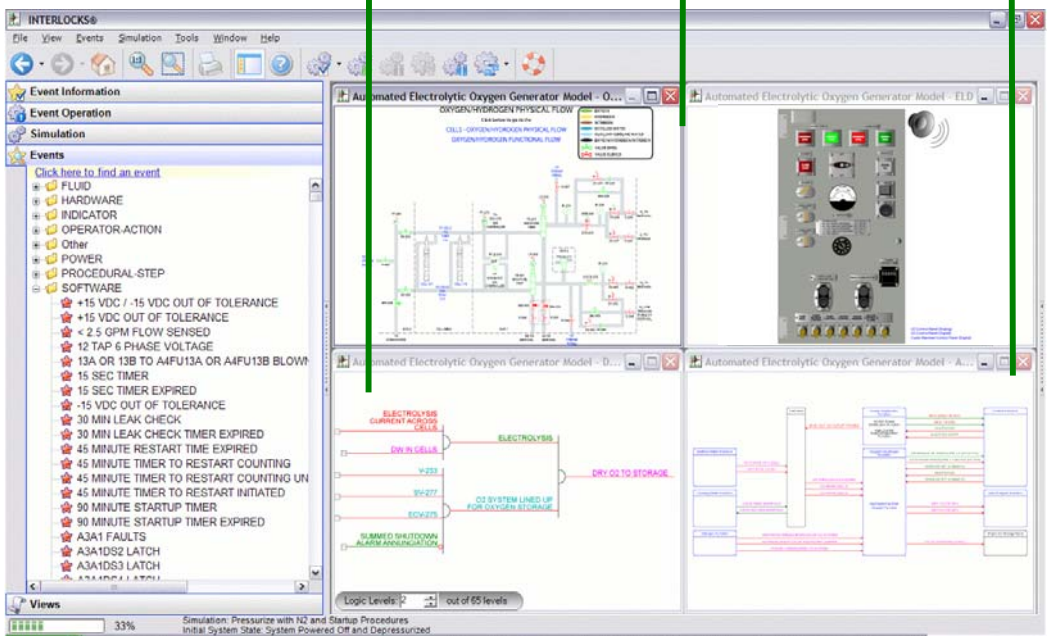
With INTERLOCKS modeling and simulation tool, the system model is your safety analysis. It demonstrates completeness and current findings in a concise and interactive manner. You can depict a defined sequence of events and its safety controls operating as designed or, conversely, failing to perform as required. The fault isolation algorithms demonstrate system vulnerabilities and identify if something is wrong—either with the analysis or with the system itself.

INTERLOCKS
Modeling and Simulation Tool

Observe system operation through interactive panels and diagrams

Understand the system's network of discrete events

Understand the relationship among system components



Get information on system events, components, and operation

Sidebar

View Window

Open and navigate through logic, flow diagrams, and other views

Use Simulations to observe system behavior

Use the Sidebar to obtain additional model information

Isolate faults and troubleshoot the system

Include optional Tutorial on the uses of INTERLOCKS for your application