FinPSA - tool for professional living PSA

FinPSA is a comprehensive risk and reliability analysis tool intended for full scope PSA/PRA modeling. The tool has been developed and maintained since 1988 by Radiation and Nuclear Safety Authority of Finland (STUK) and since 2012 by VTT Technical Research Centre of Finland. The tool is designed to support the main activities related to PSA/PRA by easy model creation, efficient and versatile analysis, good traceability, flexible reporting and information exchange capabilities. All these features make your work comfortable in living PSA, plant assessment and operational modifications.
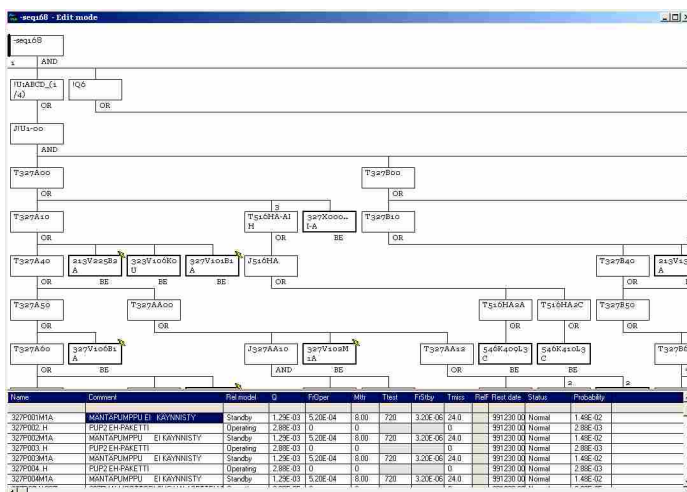
Efficient and flexible model creation

Teamwork

FinPSA is developed for teamwork. PSA models can be shared or private models. Shared models reside on a server, and can be accessed and edited simultaneously by several users. A locking mechanism prevents two users from editing the same part of the PSA model at the same time. PSA models can be copied between shared and private (user's own PC) locations.

Co-operation with other programs

FinPSA works together with common Windows programmes for importing and exporting data base tables, fault trees, events trees, and almost every item in the model. Results are available in several formats for Windows clipboard. These features support the creation of models, analysis and reporting of risk information.

New features increase productivity

FinPSA contains new features like **Hazard table**. It lists external events and their dependencies and automatically maps them to fault trees during cut set search. Conditional failure probabilities with uncertainty can be defined for each dependency. There is no need to modify system fault trees or use house events.

Asymmetric CCF models

FinPSA allows new flexibility in modeling partial diversity. For example, subgroups of similar batteries, whose lifetimes differ significantly, can be treated as asymmetrical CCF.

Task-oriented model for control systems

Complex I&C system models can be isolated from the system fault trees by a clear interface. Fault trees can refer to control tasks and control tasks can be linked to fault trees, e.g. for support functions like electric power or cooling. The I&C modelling language is based on communication vector representation, which is suitable for the modeling of distributed control systems. The modelling is compact and allows convenient expression of large systems.
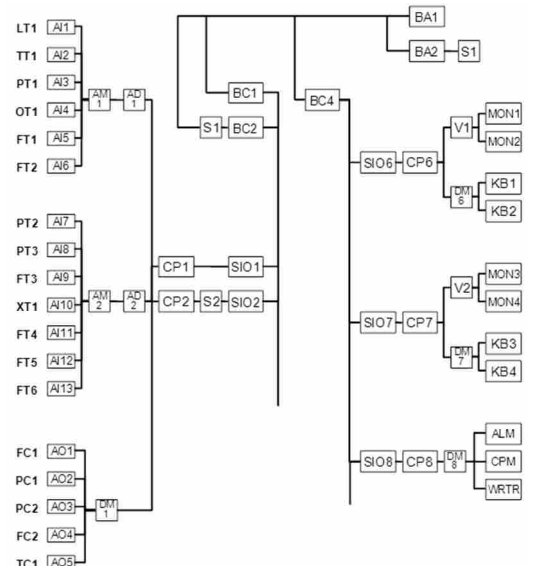
Dynamical containment event trees

The level 2 tool with a special modeling language allows dynamic modeling of a severe accident, where time dependencies are important.

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Powerful model solving and analysis for risk informed applications

Efficient and versatile cut set handler

Calculations with already searched minimal cut sets are quick and versatile. They can be performed for one cut set file, or automatically for all accident sequences in one event tree or the whole PSA model. The results are always up-to-date. **FinPSA** automatically detects the modified parts of model and performs the related update calculations.
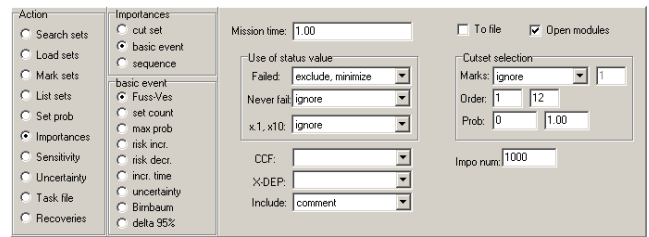

Multithreading and parallel computation

FinPSA uses multithreading to fully utilize multicore processors and ubiquity of network connections. When a minimal cut set search for a PSA project is started, each core performs its own cut set search. Shared PSA projects can be solved on several multi-core computers in a network.

Dynamic computation environment for PSA team

While resolving a shared project, users can control how their computers are used in the parallel computation. A new computer can be added in the computation on the fly with a single click. The user can also leave the parallel computation at any time and the remaining resources complete the task.
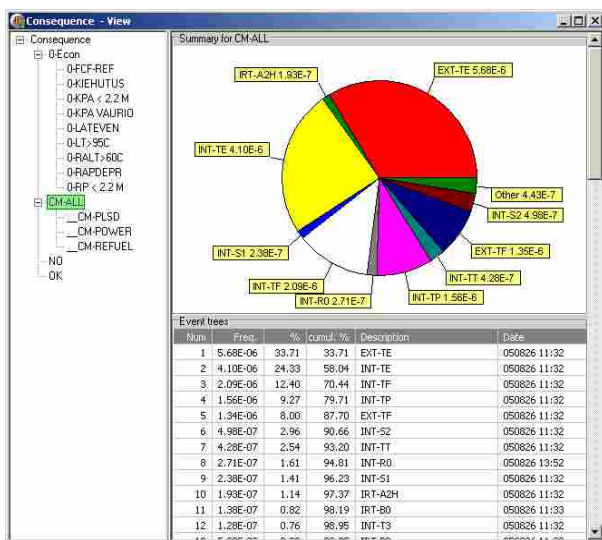
If the user is not active, he may define his workstation as a computation resource in the network. Idle resources are automatically utilized in a parallel computation.

Calculations are fail-safe: an interrupted calculation can be resumed later. The already calculated parts are available for analysis even before restart.

The history file is continuously updated during the calculation and is visible for the whole PSA team.

Hierarchical results

FinPSA searches for cut sets for each event tree sequence. After the search, the cut sets of individual sequences are automatically combined and grouped according to the user-defined hierarchy of consequences. On the top level, **FinPSA** produces cut set files classified by consequence only. Any number of intermediate levels can be defined.

New level of traceability

Each minimal cut set can be traced back to the event tree and accident sequence, and visualized in the automatically generated sequence fault tree — with one mouse click.

Interface trees

For level 1 and level 2 analysis tool integration **FinPSA** uses interface trees. The interface trees link event tree sequences to plant damage states. Each cut set resulting from interface tree computation can be traced back to the event tree accident sequence and interface tree accident sequence, and visualized in two automatically generated sequence fault trees. One fault tree shows the event tree part and the other the interface tree part.
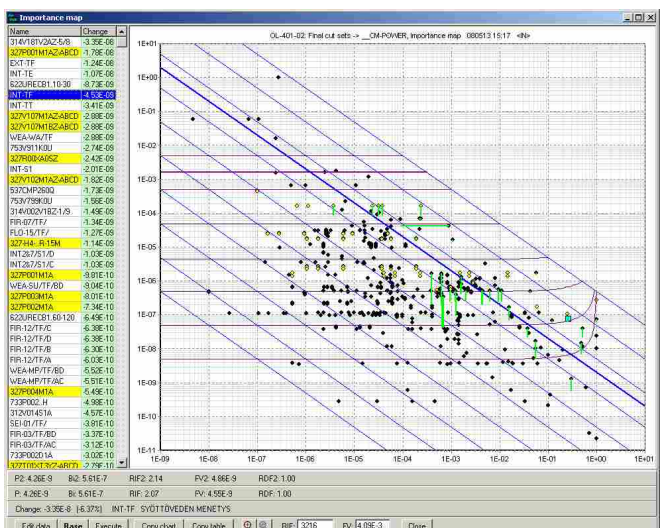
Importance map

For risk-informed applications **FinPSA** has an interactive importance map. It displays the basic event probabilities, safety margins as well as F-V and RIF importance measures for all or selected basic events.

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