



RIC 2010 Recent Developments in SNAP and SNAP Animations

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Outline

- General Plug-in Improvements
- Drawing Tool Improvements
- Animation Improvements
- Sub-System Integration
- Model Notebooks
- Current & Near Term Activities
 - Job Stream Plug-in
 - Engineering Template Plug-in
 - Parameter Sensitivity Plug-in for TRACE Uncertainty Analysis

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General Plug-in Improvements

- **Initial conditions sets**
 - New "Manage Initial Conditions" Option
 - Retrieve Initial Conditions from Steady State Cases
 - Save and Reload Initial Condition Sets by Name.
 - Currently Supported in TRACE, RELAP5 & MELCOR 2.1 Plug-ins.
- **Numerics Updates**
 - Added Drawn Components for Integer, Boolean and Table Variables
 - SNAP supports certain external applications input via "Numeric Functions"
 - Supports Python, MatLab, and MathCad external application linking
- **Resource Bundle Import/Export**
 - Export an Input Deck for Edit then Re-import without losing Views or Numerics.
 - Import Views Directly from Model Editor files
- **Improved Model Save/Load Performance**
 - Compressed saved models to ~20% of Original Size

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2D Drawing Improvements

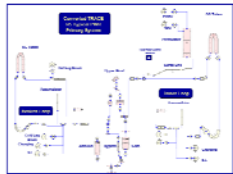
- **Added Drawing Layers**
 - Layer Manager
 - Hide/Show Individual Layers
 - Ability to Lock Individual Layers
- **Polygon Updates**
 - Bezier Curved Segments
 - Pattern Fill
 - Outline Segments (Show, Hide, Solid/Dashed/Dotted)
- **Free-Form Nodalization Diagrams**
 - Associated Component Property
- **Change All of a Component's Connection Types in one Step**
 - Line / Source / Target Markers
- **Mouse Wheel Controls (Zoom & Pan)**

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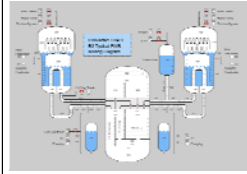


2D Drawing Improvements - example

"Old" style model noding diagram



Same model using new 2D drawing components

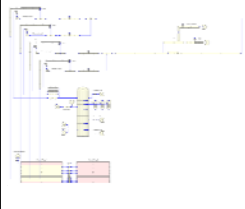


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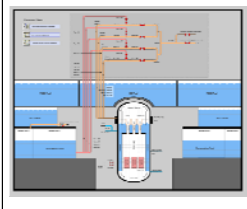


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Same model using new 2D drawing components



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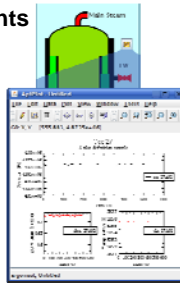
Animation Improvements

New Display Components:

- Pipe Elbow
- Pipe Segment
- Linear Dial
- Circle Pump
- Control Rod
- Command Button
- Check Valve
- H2 Deflagration Tri-Graph
- Core Melt (in beta-testing)
- BWR Power Flow Map (in beta-testing)

Plot Definition Component

- Defines formatting with a parameter files saved from AptPlot.
- Maps channels directly to Graphs and Sets

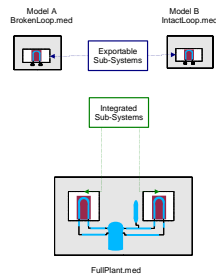


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Sub-System Integrator

- Import sub-systems from one model into another model
- Automatically reconnects components to integrated sub-system when re-imported.
- Build standalone composite-component models (steam generators, pumps, etc.)
- Create exportable sub-systems
- Integrate sub-systems into full plant model
- Supports concurrent development of sub-system models
- Provides foundation for development of a component library
- Currently supported for TRACE and RELAP5



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Electronic Model Notebook

- ODF (Open Document Format) based
- Edit directly in MS word or OpenOffice.
- Model summary data
- Validation report results
- Hyperlinks across connections
- Embedded attribute level documentation
- Model notes are incorporated
- Notes can include external hyperlinks
- Generated plots for select data
- Optional ownership/reviewer data
- Optional classification markings
- Currently supported for TRACE and RELAP5

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7.1 Material ID

Name	Type	Owner	Created	Revised	Approved	Rev
Material ID	Table

Material Density Functional Fit Table

Material ID	Temperature (K)	Density (kg/m ³)
...

Material Density Functional Fit Table

Material ID	Temperature (K)	Density (kg/m ³)
...

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Current & Near Term Activities

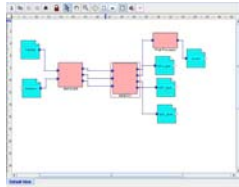
- Job Stream Plug-in
- Engineering Template Plug-in
- Parameter Sensitivity Plug-in for TRACE Uncertainty Analysis

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Job Stream Plug-in / Runtime Improvements

- **Job Stream Plug-in**
 - Provides a UI for graphically constructing a sequence of runs.
 - Applications can define any number of input and output files.
 - File based inputs – local or document management system.
 - Plug-in based inputs – generated from other SNAP plug-ins.
 - Parametric sets of runs
 - Conditional branching logic
 - Fan-In / Fan-Out
 - Post processing
- **Runtime Improvements**
 - Interface with publicly available cloud systems (Amazon, EC2, Google, etc.)



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Engineering Template Plug-in

- Similar to word-processor templates in that certain aspects of a template document are exposed for modification.
- The Engineering Template Plug-in will be used to create input templates to constrain modifications to one or more source models.
- Changes to the model are limited to data exposed by shared numerics variables in the source model.
- The Engineering Template Plug-in generates cases by setting the numerics in the source model and then exporting the model.
- The Engineering Template Plug-in will be able to interact with the Job Stream plug-in to produce sets of parametric runs.
- In early stages of defining requirements.

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Parameter Sensitivity Plug-in

- Purpose is to quantify and understand the sensitivity of code results to input parameter uncertainties.
- Benefits and costs of implementation are being evaluated for several uncertainty methodologies.
- Reviewing other tools being used to quantifying uncertainty.
- Planned to integrate with Job Stream plug-in and Engineering Template plug-in.
- Early prototype is being developed for implementation with TRACE models while development of the Job Stream plug-in and Engineering Template plug-in proceeds in parallel.

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Parameter Sensitivity Plug-in Prototype

Name	Description	Type	Units	Default
h_1000Temp_inlet	Hot Fuel Temperature Inlet	Mass	kg/s	0.0
h_1000Temp_outlet	Hot Fuel Temperature Outlet	Mass	kg/s	0.0
h_1000Temp_inlet	Hot Fuel Temperature Inlet	Mass	kg/s	0.0
h_1000Temp_outlet	Hot Fuel Temperature Outlet	Mass	kg/s	0.0

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