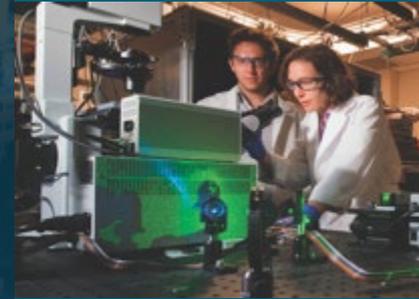


SNAP Post Processing

SAND2019-13336 PE



PRESENTED BY

Larry Humphries llhumph@sandia.gov



Provide a review of the SNAP GUI for post-processing data

- Working with Animations and View Ports
- Data Connections
- Color Maps

Working with Drawing Tools

- Indicators
- Plant Components
- Interactive Controls

SNAP Demonstration

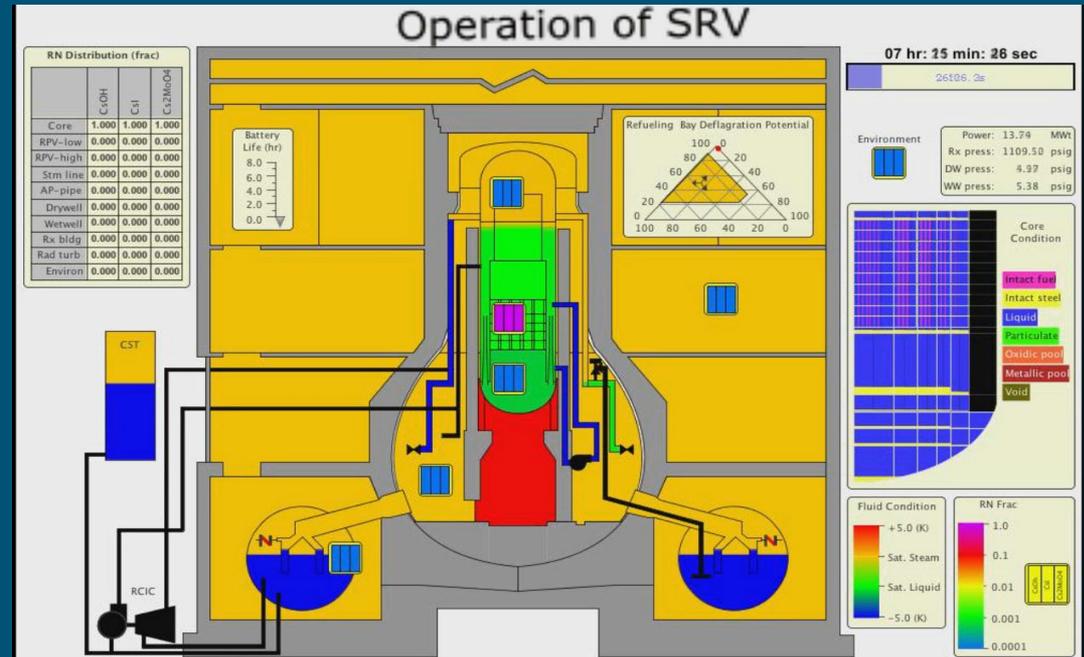
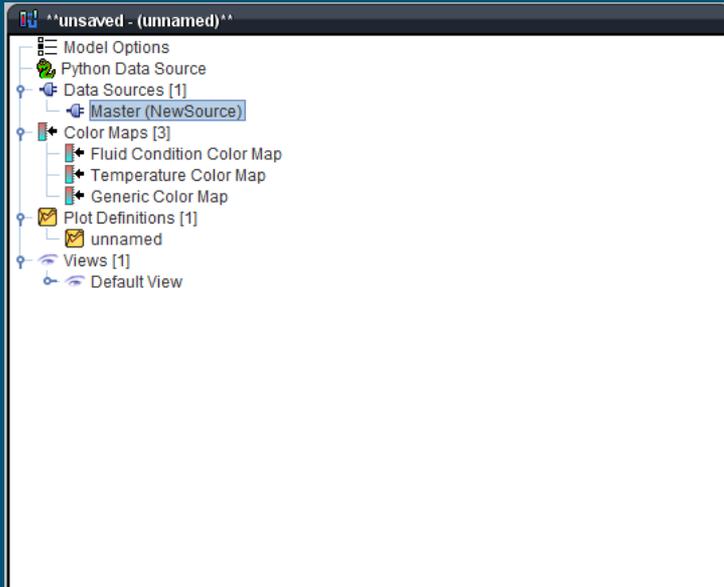
- Creating an axial plot
- Creating a deflagration bean
- Stacked elements



Post Processing with SNAP

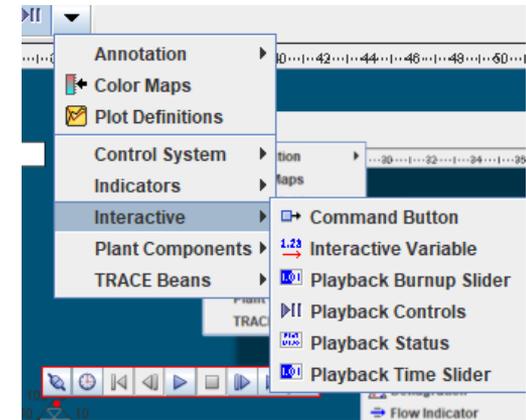
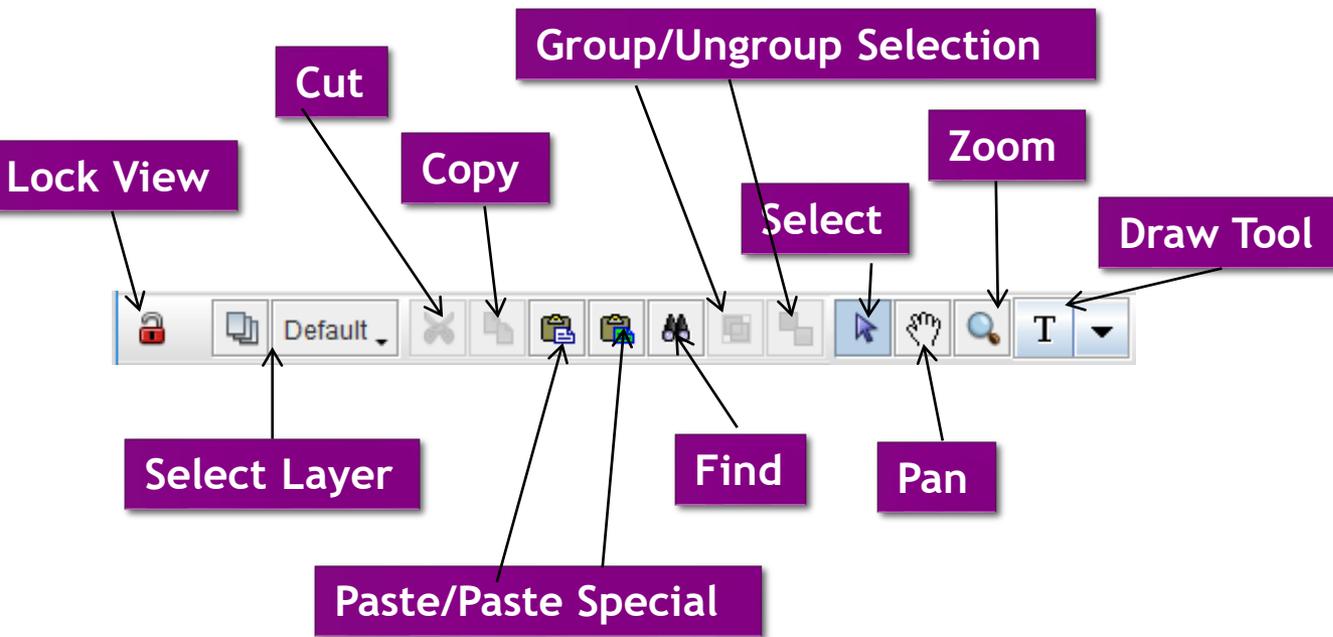
Animation Model is a separate model from the MELCOR model

- File>New select Animation model
- Data connection to the plotfile(s) must be established
- Animations are displayed in View Port





View Port



Draw Tool is used to access all drawing components

Graphics can be assigned to layers for better organization and control

- Individual layers can be locked to prevent editing certain components

Interactive elements on View Port can only be activated if the view is locked

- This is to prevent accidental interactions while editing the view components

If the screen is locked you cannot edit any of the components



Data Sources

Attaching a plotfile

- Data Sources
 - Plot file data
 - Python Data Sources
- Multiple data sources can be specified
 - One source is designated master and used to determine Tstart, Tend, and time steps
 - Other sources are interpolated between time steps
- Selecting Data Source
 - Click on Master in the Data Source Tree in the Navigator and set the Source Run URL in the Properties to a completed Job
 - Click the Data Connector Icon
- Number of Source Runs
 - Data Source can span multiple plot files assuming they are from sequential restart runs.
- Patterns for variables can be specified for data sources
 - i.e., MELCOR, TRACE, RELAP5 have different patterns



Click Data Connection to make connection to the data source.

The screenshot shows a software window titled 'FPT3 (New_Undefined_Job)'. It has a 'General' tab and a 'Show Disabled' checkbox. The 'General' section contains the following fields:

Name	FPT3	File icon	Help icon
Include in Animation	<input checked="" type="radio"/> True <input type="radio"/> False	File icon	Help icon
Master Source	<input type="radio"/> True <input checked="" type="radio"/> False	File icon	Help icon
Begin Time Offset	0.0	File icon	Help icon
Number of Source Runs	A Single Source Run	File icon	Help icon
Source Run URL	calcserv://Local/FPT3/fpt3v2.x/New...	File icon	Help icon

Below the 'General' section is a section titled 'EXTDATA Channel Name Patterns MELCOR Patterns'. It contains the following fields:

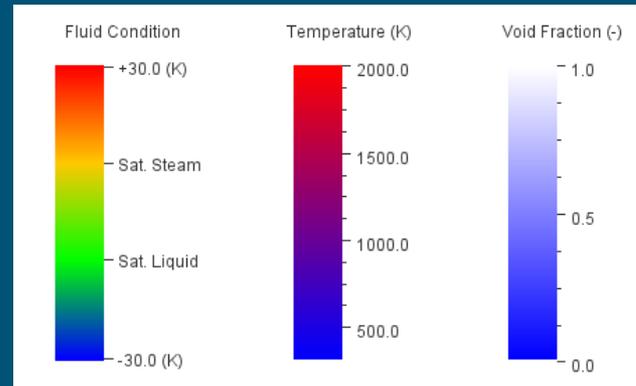
Liquid Temperature	CVH-TLIQ_%V	File icon	Help icon
Pressure	CVH-P_%V	File icon	Help icon
Quality	CVH-QUALITY_%V	File icon	Help icon
Saturation Temperature	CVH-TSAT(P)_%V	File icon	Help icon
Vapor Temperature	CVH-TLIQ_%V	File icon	Help icon
Void Fraction	CVH-VOID-P_%V	File icon	Help icon



Color Maps

Built-in Color Map Options

- Fluid Condition Color Map
- Temperature Color Map
- Void Fraction Color Map
- Generic Color Maps



Creating a Generic Color Map

1. Right Click Color Maps in the Navigator>New
2. Right Click the new Generic Color Map>Add To View
3. Adjust some Properties
 - Set Color Map Type to Generic
 - Specify Dynamic as True
 - To create a pressure color map, set Channel Name Pattern to MELCOR “CVH-P_%V”
 - Review the MELCOR User’s Guide to see all the available plot channels
 - %V is a place holder for the components Control Volume number (see notes for a detailed description on its use)

Generic Color Map

General Show Disabled

Name: unnamed

Color Map Type: Generic

Paint Background: True False

Minor Ticks Per Major: 4

Number of Major Ticks: 10

Dynamic: True False

Segmentation Style: Gradient

Color Display Width: 35

Show Title: True False

Use Custom Title Font: True False

Use Custom Legend Font: True False

Range Segments: [1] Segments

Channel Name Patterns: < none >

Engineering Units: No Units

Use Out of Range Low Color: True False

Use Out of Range High Color: True False

Use Non-Linear Scaling: True False

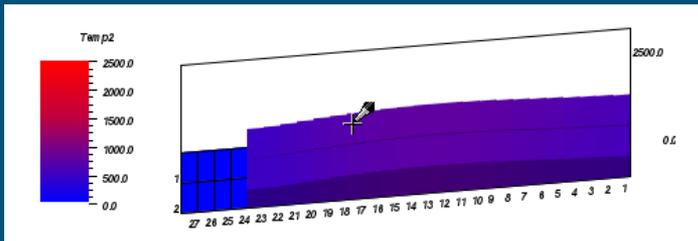
Generic Color Map - Define Range Segments

Segment Index	Start Value	End Value	Start Color	End Color
1	300.0	1000.0	Blue	Red
2	1000.0	2000.0	Blue	Red
3	2000.0	3000.0	Blue	Red

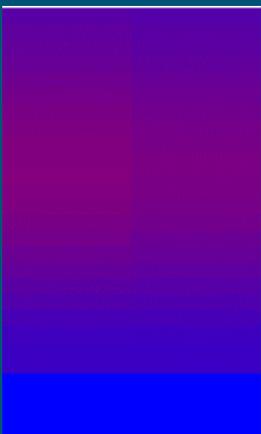
Buttons: Add, Remove, OK, Cancel

Indicators

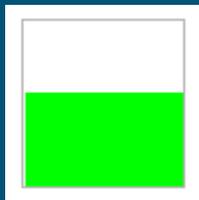
3D Graph



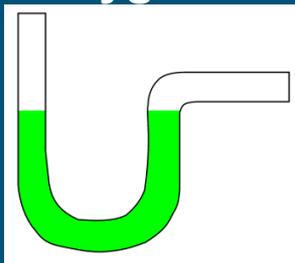
Axial Map



Fluid Level



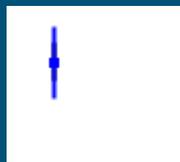
Polygon



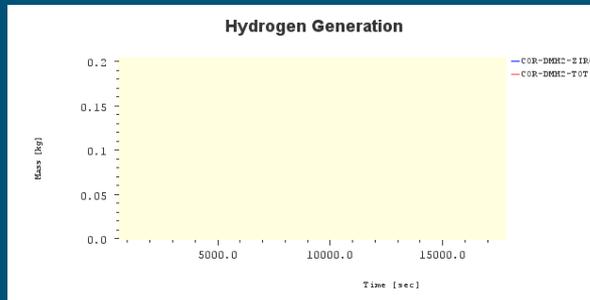
Data Value

100000.65 Pa

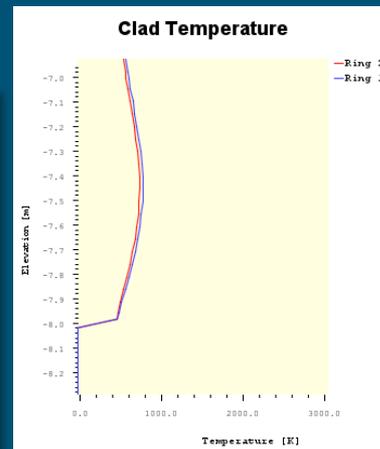
Flow Indicator



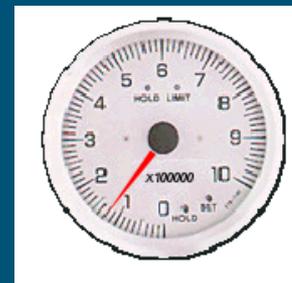
Strip Plot



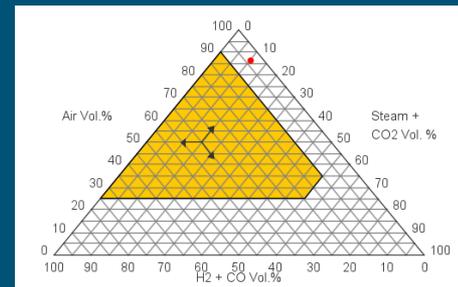
AxialPlot



Analog Dial



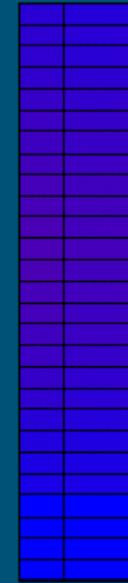
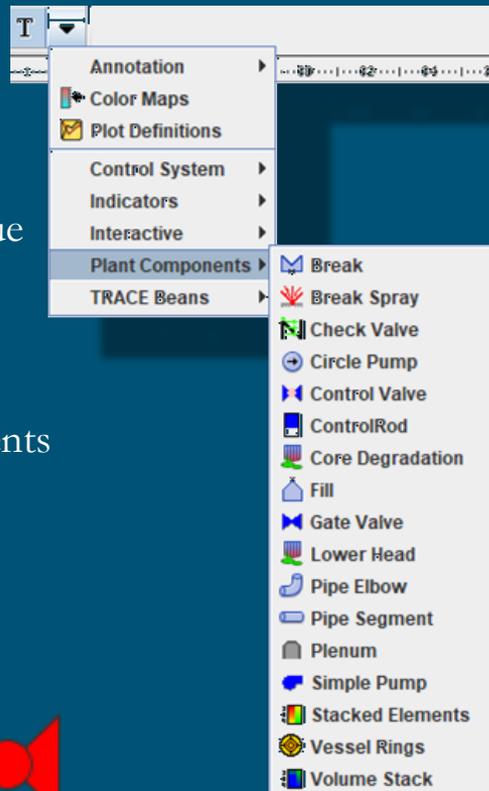
Deflagration



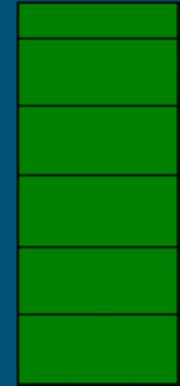

Plant Components

Represents a component

- Some of these components are unique to TRACE or other code.
- Simple Components
 - Sprays, valves, break, pumps
- Simplification of Complex Components
 - Core Degradation component
 - Lower Head component
 - Stacked Elements
 - Volume Stack



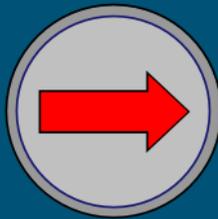
Stacked Elements



Volume Stack



Break Spray



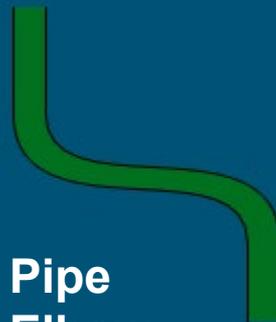
Circle Pump



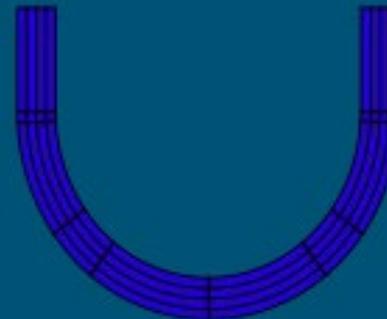
Valve



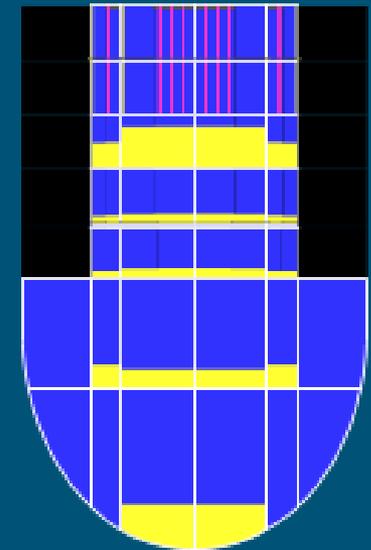
Pump



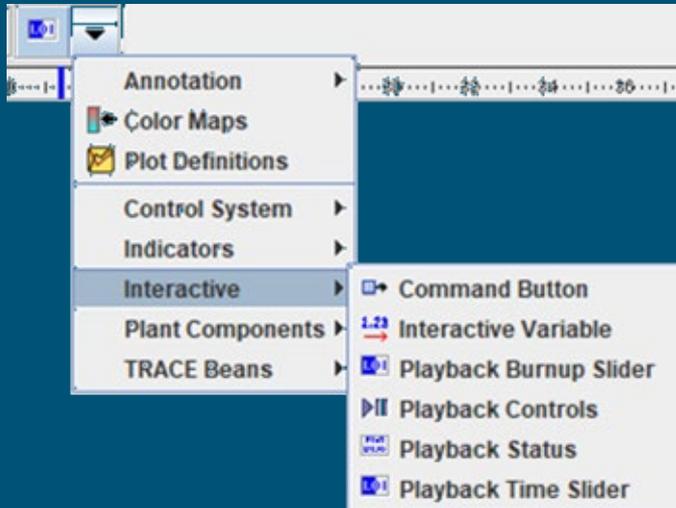
Pipe Elbow



Lower Head



Core Degradation



Playback Controls

Paused
0.0s / 0.0s / 24954.5s

Playback Status

0.0s

Playback Time Slider

Viewing CF Layout in an Animation

Utility

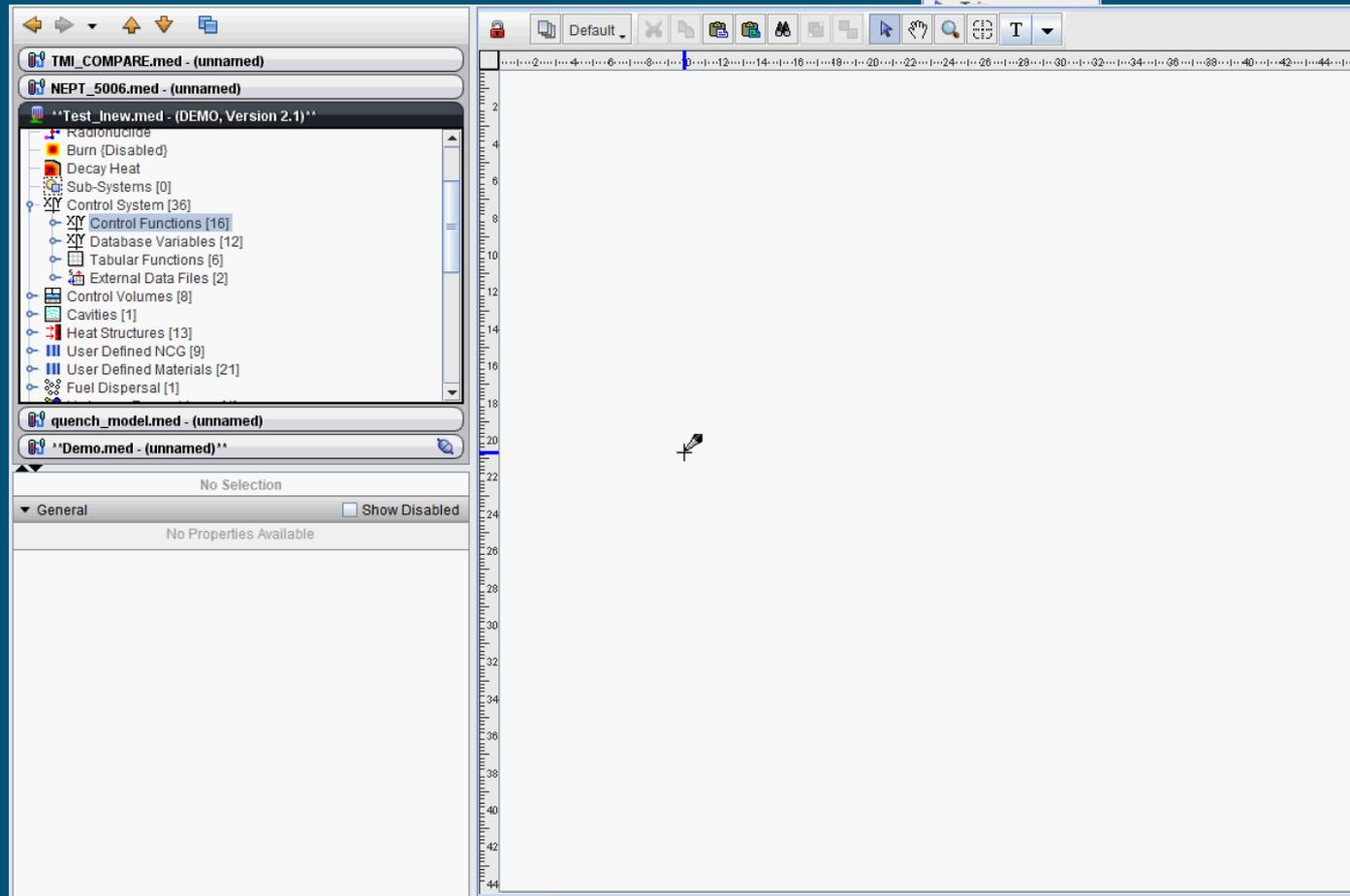
- Debugging complex control function logic
- User can watch (debug) control function values

Model Editor

- Add the control functions to a view within the model editor
- Select those control functions you want to add to your animation and copy

Animation Editor

- Paste directly into a view
- Add any interactive controls
- Modify any formatting
- Lock view and play back

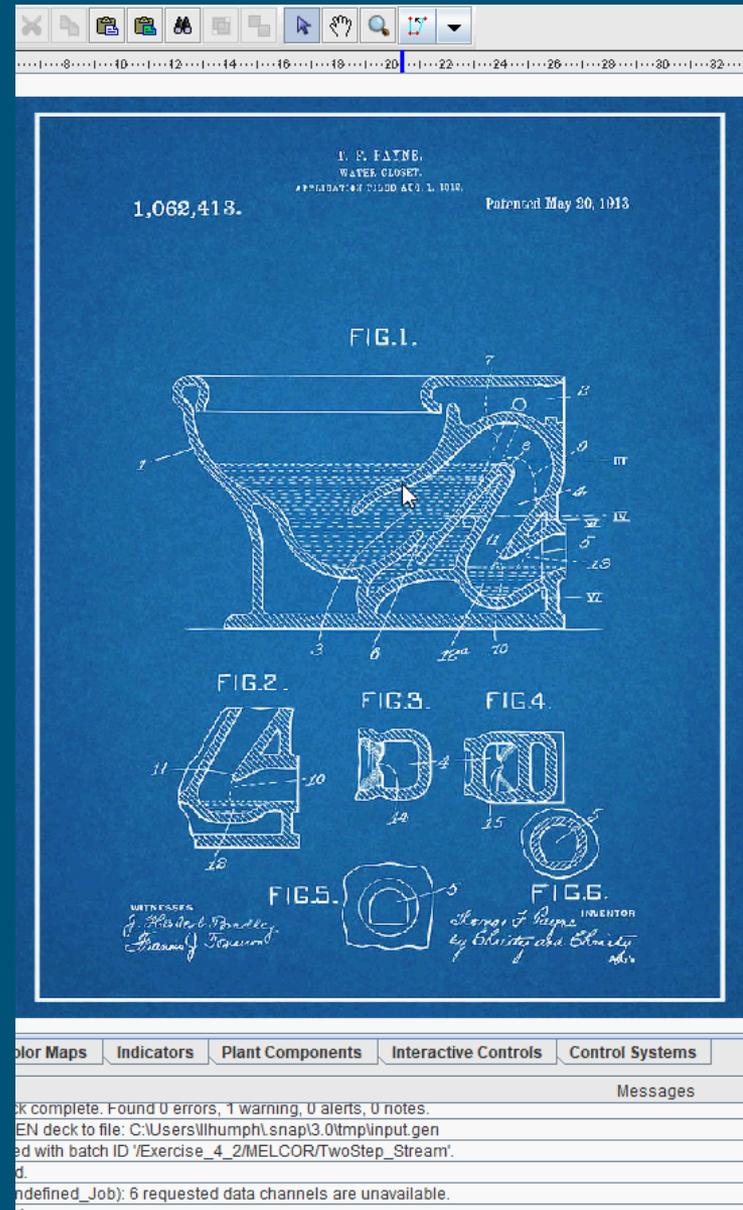




Creating a Basic Animation Element

Creating a Polygon

- Select Polygon from the Annotation section of the View Port Toolbar (review earlier slides if you can't remember what the Toolbar looks like)
- Start clicking in the View port and the drawing logic will become clear (left click to set a point, right click to remove the last point)
- If you click on top of an old point it will close the polygon and the instance will be complete.

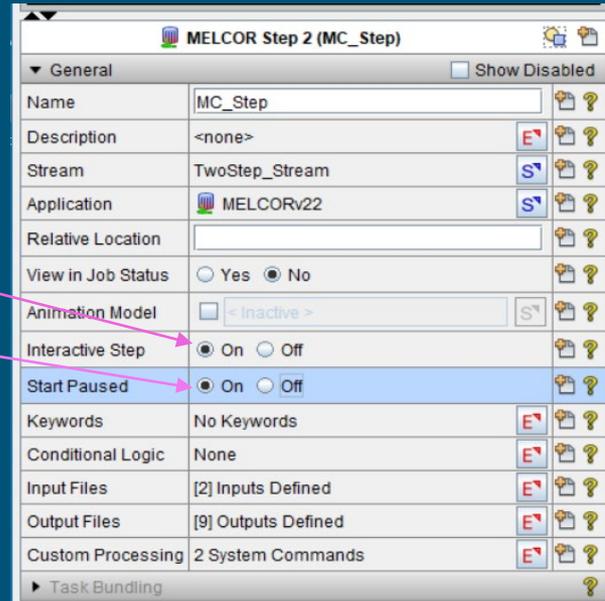




Running an interactive model – Model editor + coupled animation

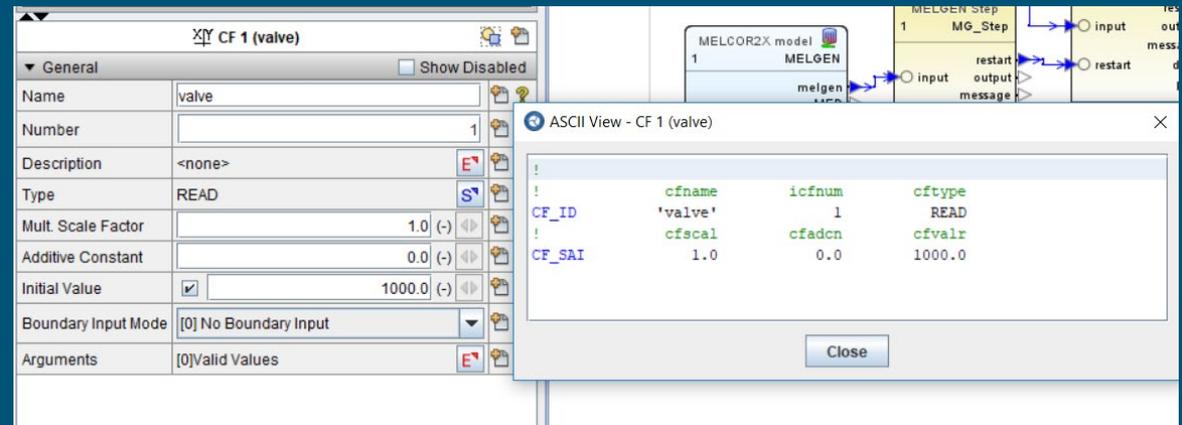
Load Model in the Model Editor

- Modify the MELCOR Step
- Activate interactive step
- Start paused



Interactive variables are defined in the control functions

- READ for a real variable
- L-READ for a logical variable

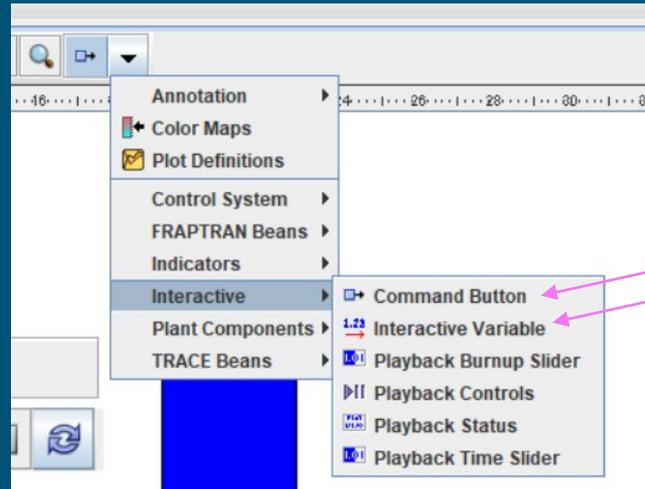




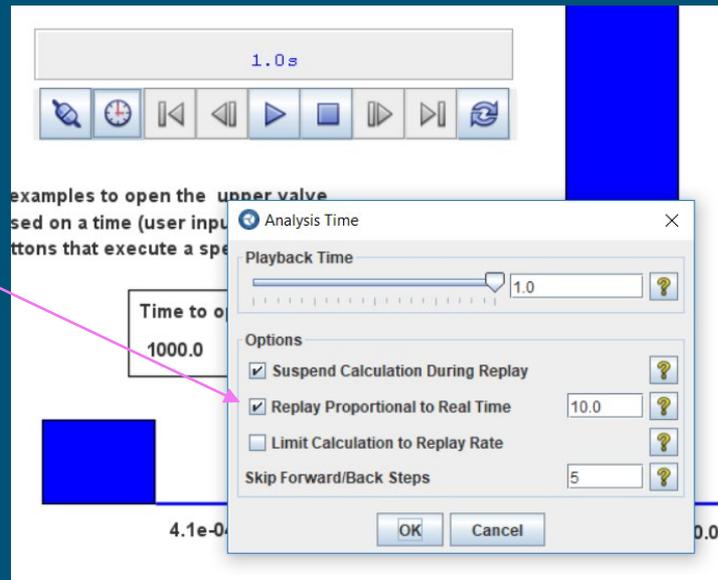
Setting up a coupled interactive animation

Interactive variables are selected using the interactive functions

- Command button for selects pre-specified values
- Interactive variable takes user input (e.g., time to close the valve)



Slowdown the calculation for this example to 10X of real time





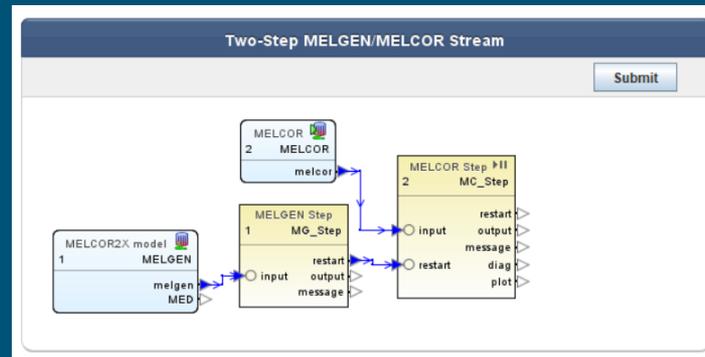
Running an interactive model

Launch the calculation in the Model Editor

- Use the two-step job stream in the Model Editor
- MELCOR will initialize as paused

Open the Animation Display

- Data source is the calculation from the Model Editor (see below)
- Connect the Animation model and start the calculation.



The screenshot shows the Model Editor interface with the 'Master (MC_Step)' configuration panel on the left and the 'Select Data Source' dialog box on the right.

Master (MC_Step) Configuration:

- Name: Master
- Include in Animation: True False
- Master Source: True False
- Number of Source Runs: A Single Source Run
- Source Run URL: calcserv://Local/kcw/MELCOR/Two...
- Minimum Included Time:
- Maximum Included Time:
- EXTDATA Channel Name Patterns: (empty)

Select Data Source Dialog:

Location: calcserv://Local/kcw/MELCOR/TwoStep_Stream/MC_Step

Job	Job Type	Status	Submitted	Completed	Calc Time
MG_Step	MELGEN	Complete	11:15:34	11:15:40	No Data
MC_Step	MELCOR	Paused	11:15:44	n/a	1.0

A pink arrow points from the 'MC_Step' entry in the table to the 'Source Run URL' field in the Master configuration panel.