General Approach to Integration of RELAP5 with Other Codes and Remote Web Based Execution

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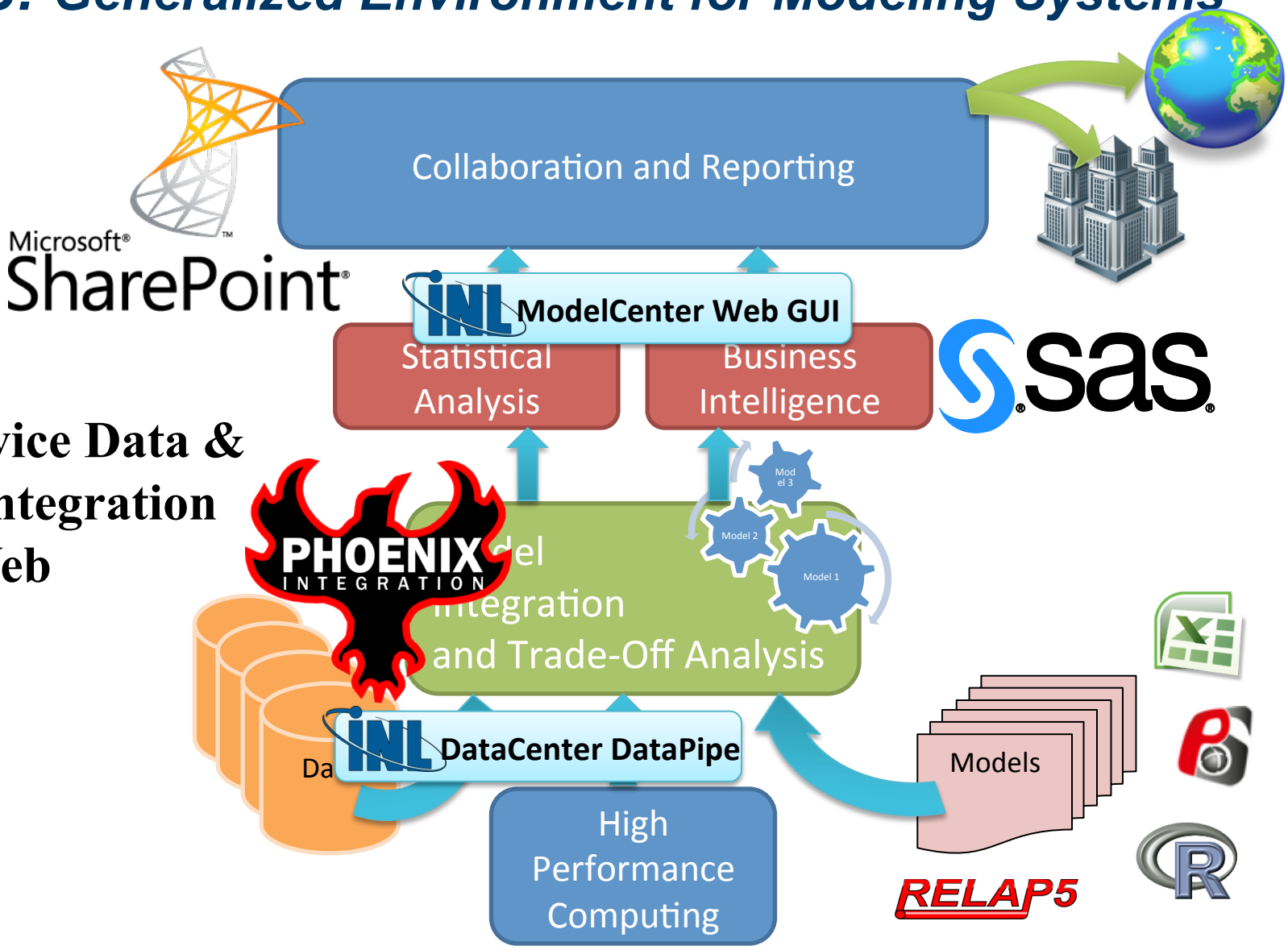
Objectives

- Overview Full Tool Suite Used to work with RELAP5
  - General Environment for Modeling Systems (GEMS)
  - MS Office/SQL Server/SharePoint - Collaboration, Data Mgnt.
  - SAS Institute - Statistical Modeling, Validation
  - Phoenix Integration - Integration, Simulation Experiments
- Discuss Approach Used to Integrate and Automate RELAP5
  - Goal: Provide Web-Based Access To Sensitive Country Researchers
  - Provide an online web based interface for uploading an input file
  - Run the input file and display results to the researcher
- General Integration of RELAP5 with Other Codes
- Using GEMS for RELAP5 Validation against the HTTF Experimental Data
- Summary

GEMS: Generalized Environment for Modeling Systems

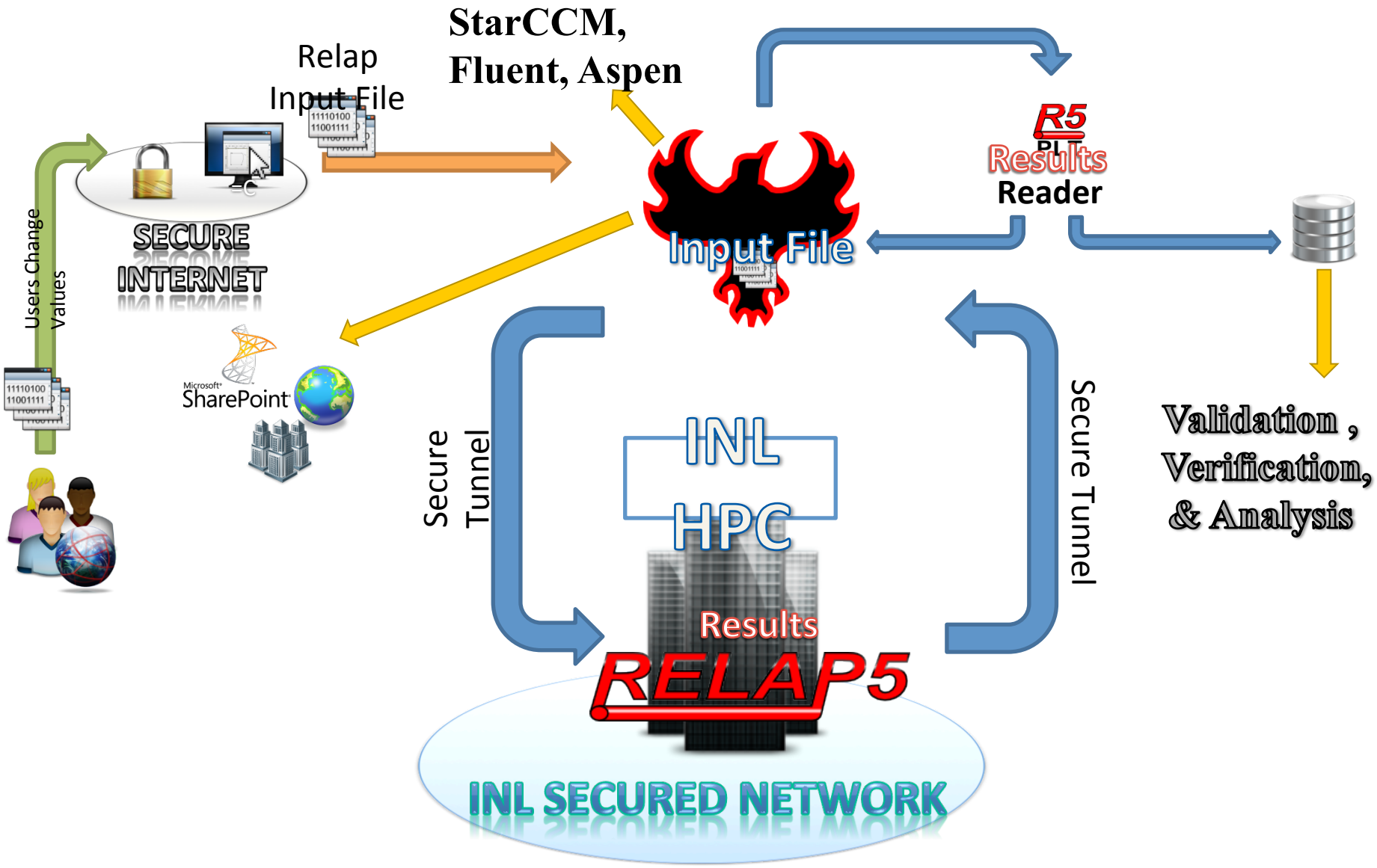
Vision:
Self Service Data & Model Integration to the Web



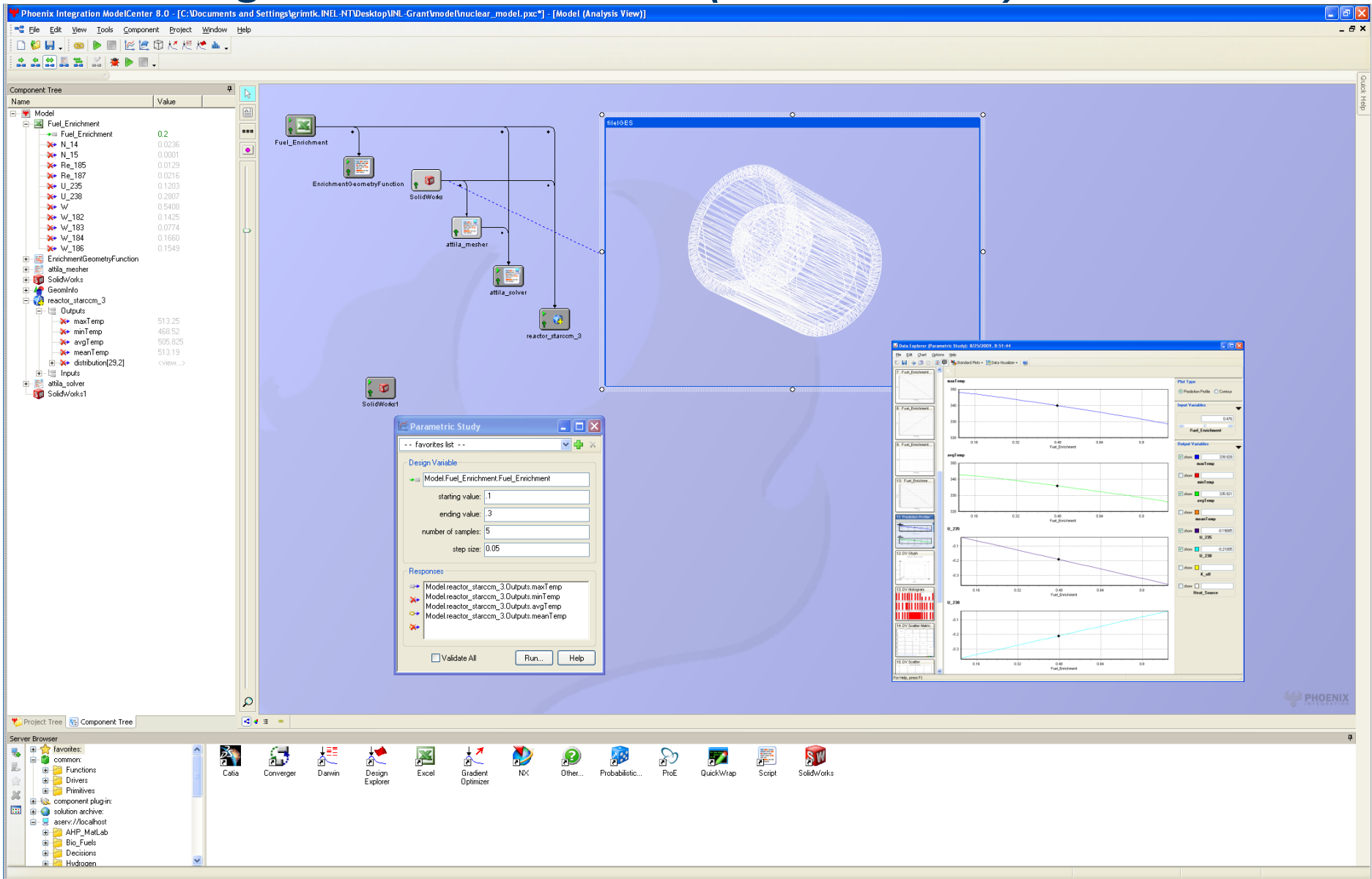
Remote Use and Integration of RELAP5

- User uploads their input file
- ModelCenter:
  - The input file is pushed to the HPC (High performance computing) cluster inside the INL secured network
  - Runs Relap5 3D with the input to create results
  - Stores the results in a database
- Database can have validation verification and further analysis run on the results.
- ModelCenter can continue to push the results into
  - StarCCM
  - Fluent
  - Aspen
  - Almost any current or legacy programs
- Results can become inputs into the same loop for optimization calculations.

Remote Use of RELAP5

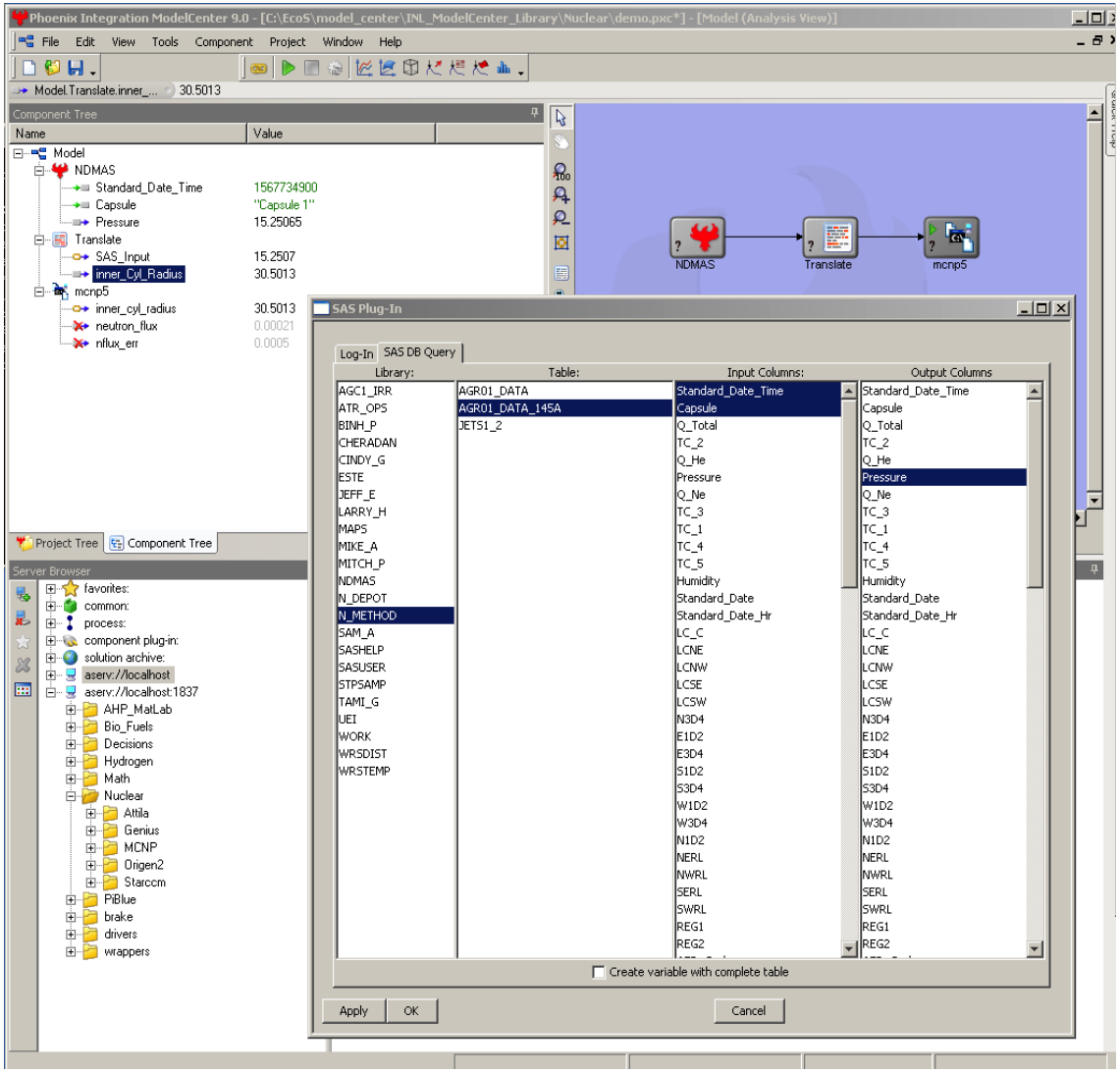


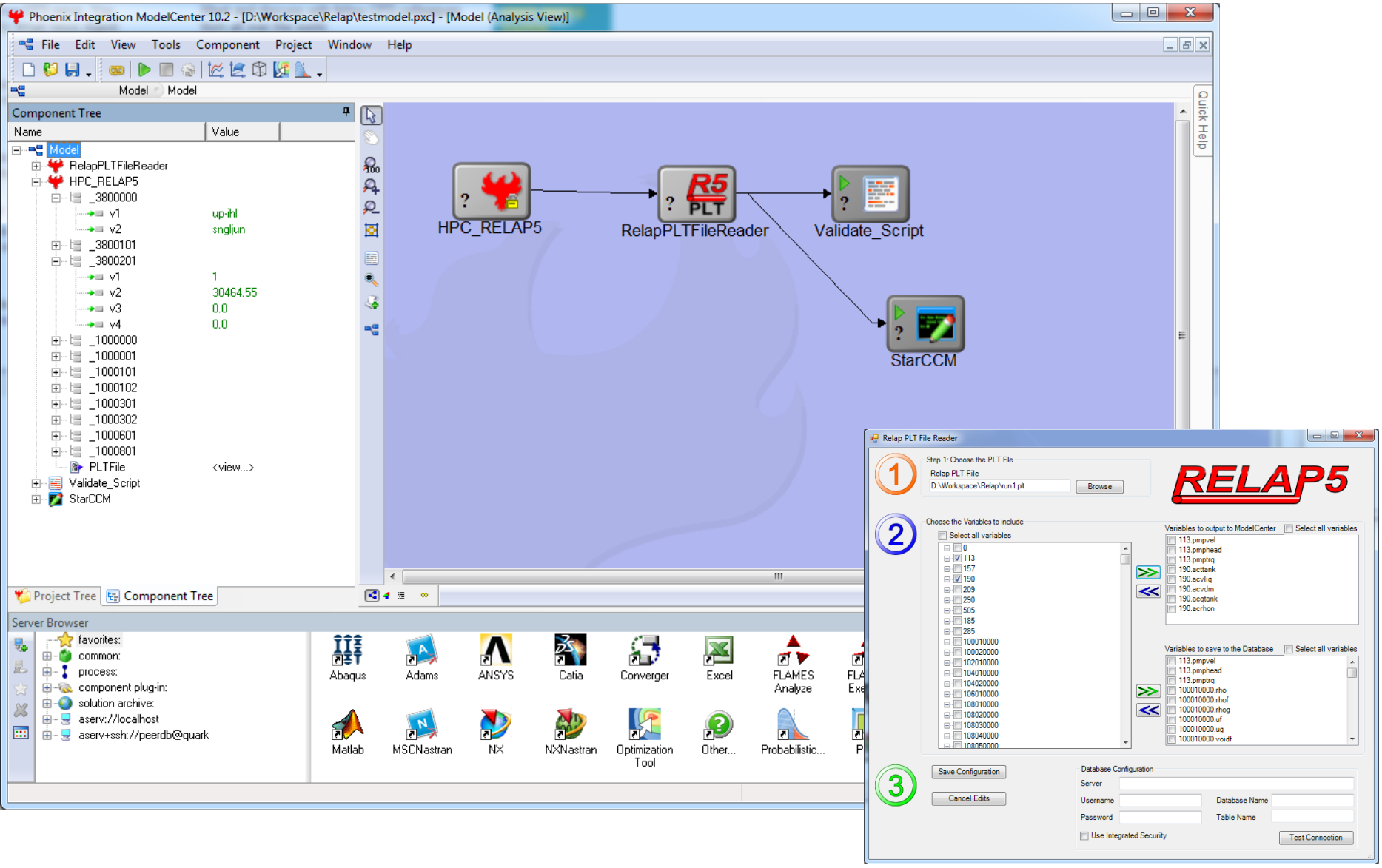
Model Integration Environment (ModelCenter)

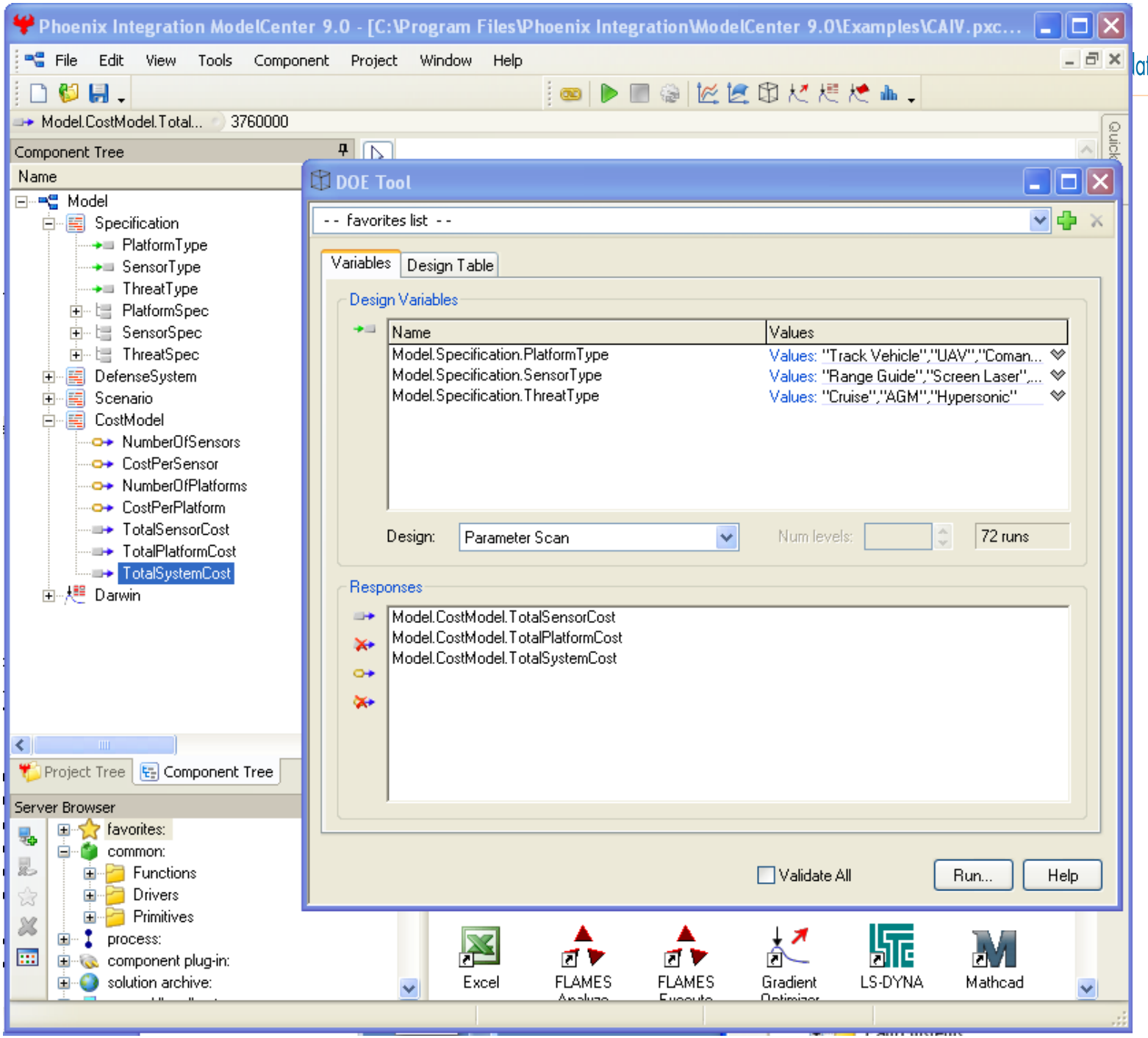


ModelCenter Model-Data Interface

- Models are included without recoding
- Models can be linked by coupling outputs and inputs
- Data queries are automatically driven by the model run
- Models automatically store data into the data repositories



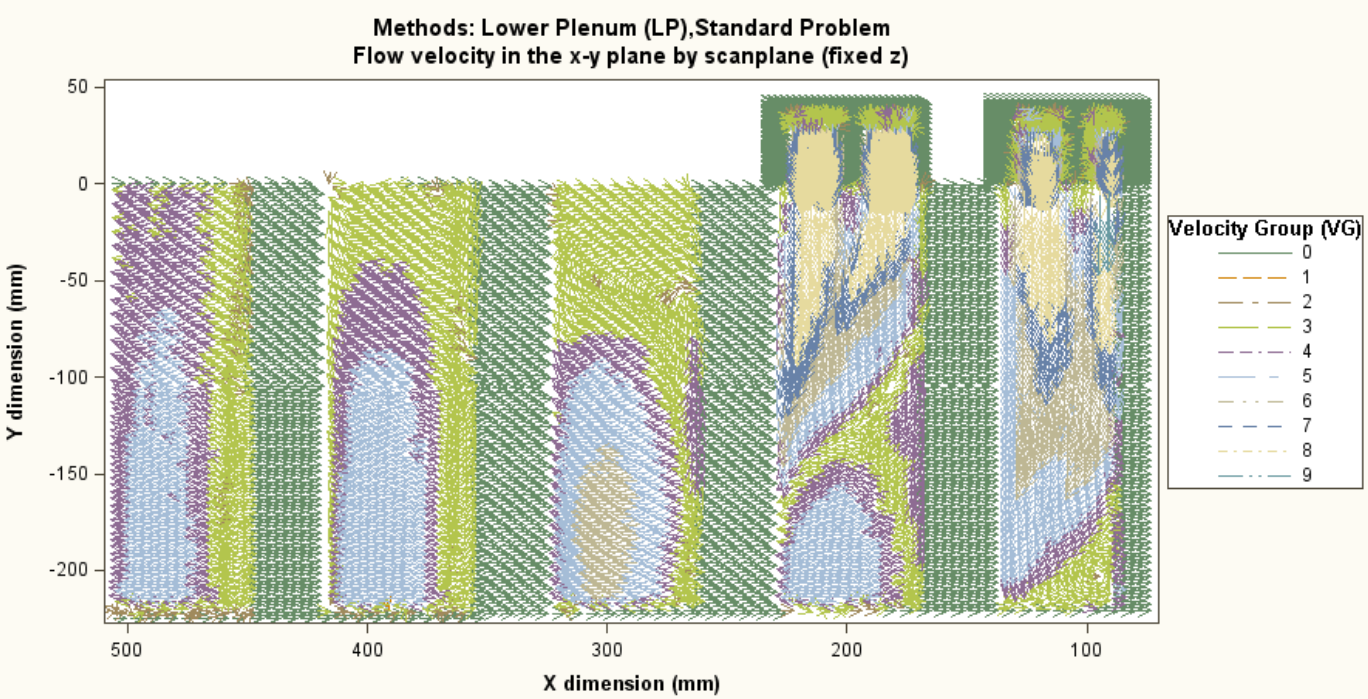

Phoenix Integration ModelCenter 10.2 - [D:\Workspace\Relap\testmodel.pxc] - [Model (Analysis View)]
File Edit View Tools Component Project Window Help
Model Model
Component Tree
Name Value
Model
RelapPLTFileReader
HPC_RELAP5
_3800000
v1 up-ihl
v2 sngljun
_3800101
_3800201
v1 1
v2 30464.55
v3 0.0
v4 0.0
_1000000
_1000001
_1000101
_1000102
_1000301
_1000302
_1000601
_1000801
PLTFile <view...>
Validate_Script
StarCCM
HPC_RELAP5
RelapPLTFileReader
Validate_Script
StarCCM
Quick Help
Project Tree
Component Tree
Server Browser
favorites:
common:
process:
component plug-in:
solution archive:
aserv://localhost
aserv+ssh://peerdb@quark
Abaqus
Adams
ANSYS
Catia
Converger
Excel
FLAMES Analyze
Matlab
MSCNastran
NX
NXNastran
Optimization Tool
Other...
Probabilistic...
Relap PLT File Reader
Step 1: Choose the PLT File
Relap PLT File
D:\Workspace\Relap\run1.plt
Browse
RELAP5
Choose the Variables to include
Select all variables
Variables to output to ModelCenter
Select all variables
113.pmpvel
113.pmphead
113.pmptrq
190.acttank
190.acvliq
190.acvdm
190.acqtank
190.acrhon
Variables to save to the Database
Select all variables
Save Configuration
Cancel Edits
Database Configuration
Server
Username
Database Name
Password
Table Name
Use Integrated Security
Test Connection

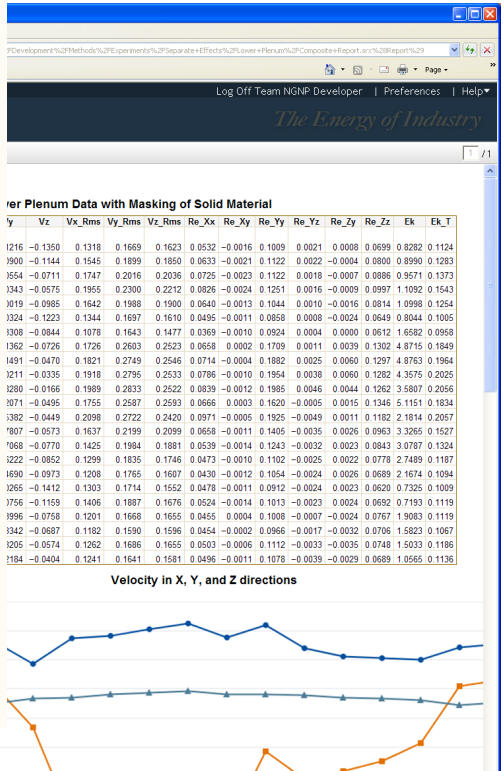

Phoenix Integration ModelCenter 9.0 - [C:\Program Files\Phoenix Integration\ModelCenter 9.0\Examples\CAIV.pxc...
File Edit View Tools Component Project Window Help
Model.CostModel.Total... 3760000
Component Tree
Name
Model
Specification
PlatformType
SensorType
ThreatType
PlatformSpec
SensorSpec
ThreatSpec
DefenseSystem
Scenario
CostModel
NumberOfSensors
CostPerSensor
NumberOfPlatforms
CostPerPlatform
TotalSensorCost
TotalPlatformCost
TotalSystemCost
Darwin
Project Tree
Component Tree
Server Browser
favorites:
common:
Functions
Drivers
Primitives
process:
component plug-in:
solution archive:
DOE Tool
-- favorites list --
Variables
Design Table
Design Variables
Name
Values
Model.Specification.PlatformType
Values: "Track Vehicle","UAV","Coman...
Model.Specification.SensorType
Values: "Range Guide","Screen Laser",...
Model.Specification.ThreatType
Values: "Cruise","AGM","Hypersonic"
Design:
Parameter Scan
Num levels:
72 runs
Responses
Model.CostModel.TotalSensorCost
Model.CostModel.TotalPlatformCost
Model.CostModel.TotalSystemCost
Validate All
Run...
Help
Excel
FLAMES
FLAMES
Gradient
LS-DYNA
Mathcad

RELAP5 Validation

Working with Dick Schultz, we would like to use GEMS tools to conduct Validation studies of RELAP5 against the High Temperature Test Reactor (HTTF) at Oregon State.

- GEMS will be used to store and secure HTTF data
- Automated RELAP5 execution provides a traceable data pedigree
- SAS statistical & Phoenix Int. tools provide unlimited analytic capability





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