PHOENIX
INTEGRATION

INTEGRATE**EXPLORE**ORGANIZE

1950
67 Seconds Pit stop

1950
67 Seconds Pit stop

2013
2 Seconds Pit stop

MBE, MBSE and MaaS to *Unleash* Your Supply Chain

Phoenix Integration

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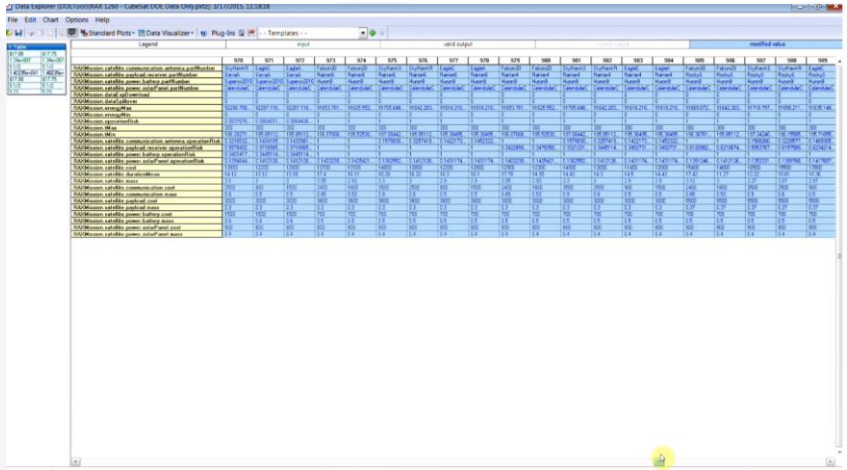
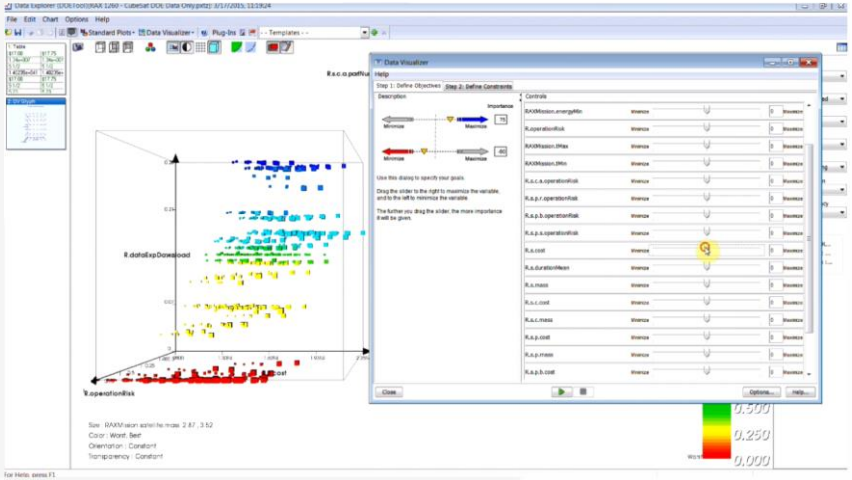
Shopping by Performance

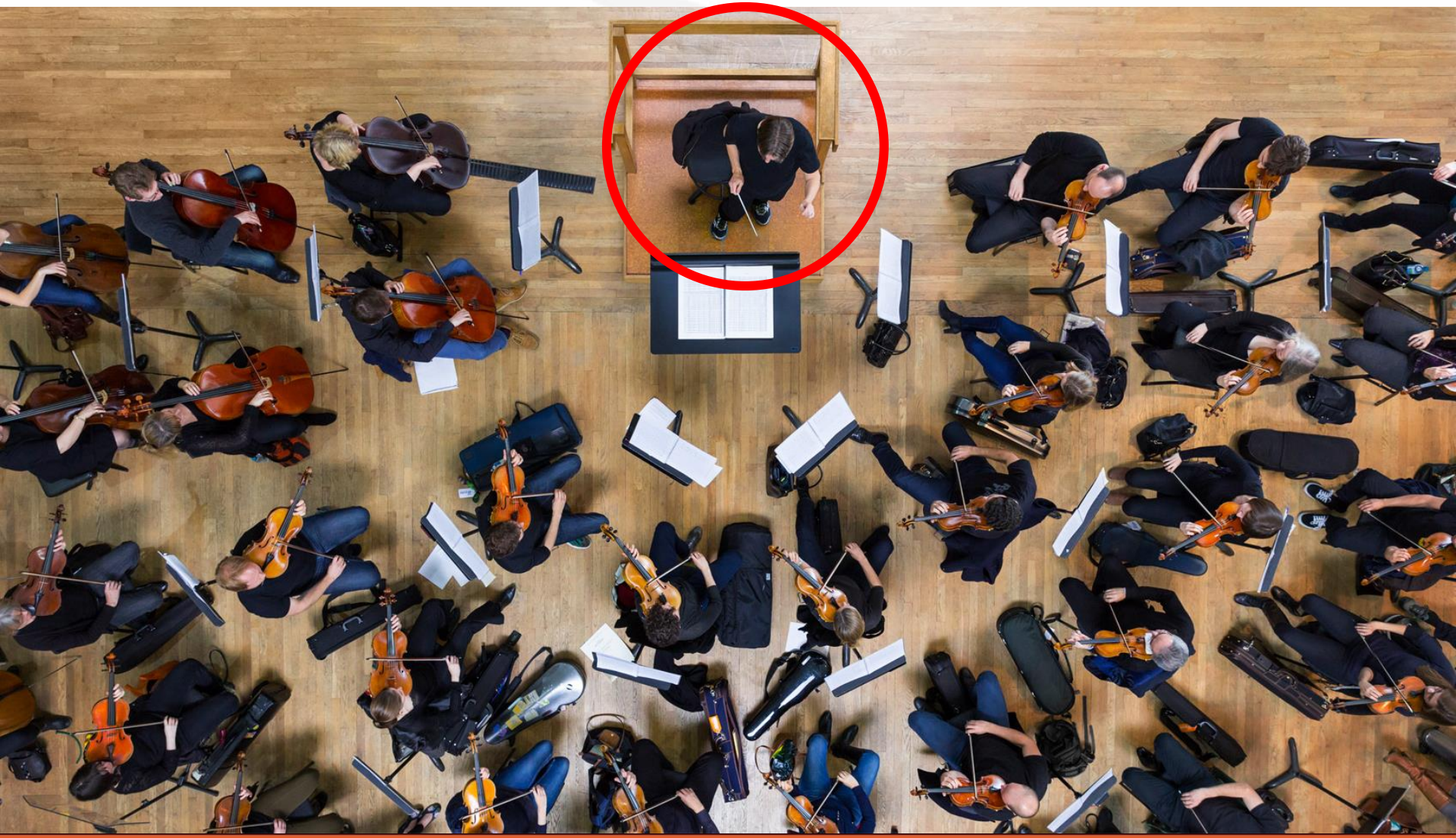
- Practically unlimited data records can be captured from variation of inputs in the Workflow

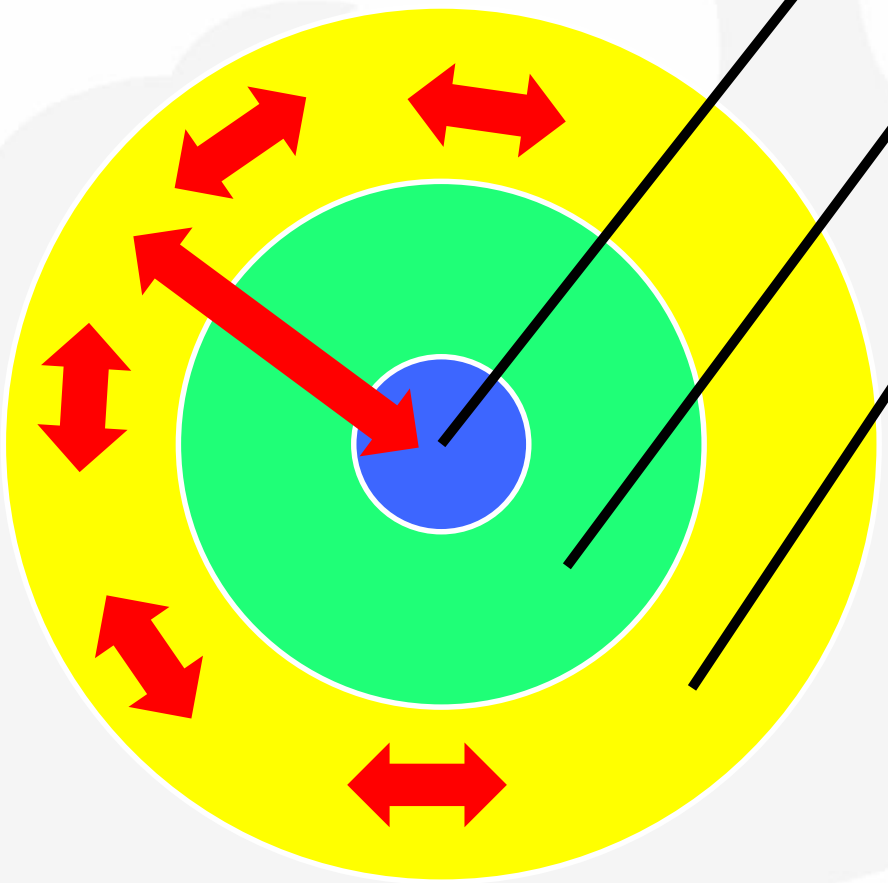


- The Trade Space Visualization Tool allows the User to quickly slice through the data to find the most relative data points to find the best performance.



ModelCenter is an Integration Conductor for both MBE and MBSE

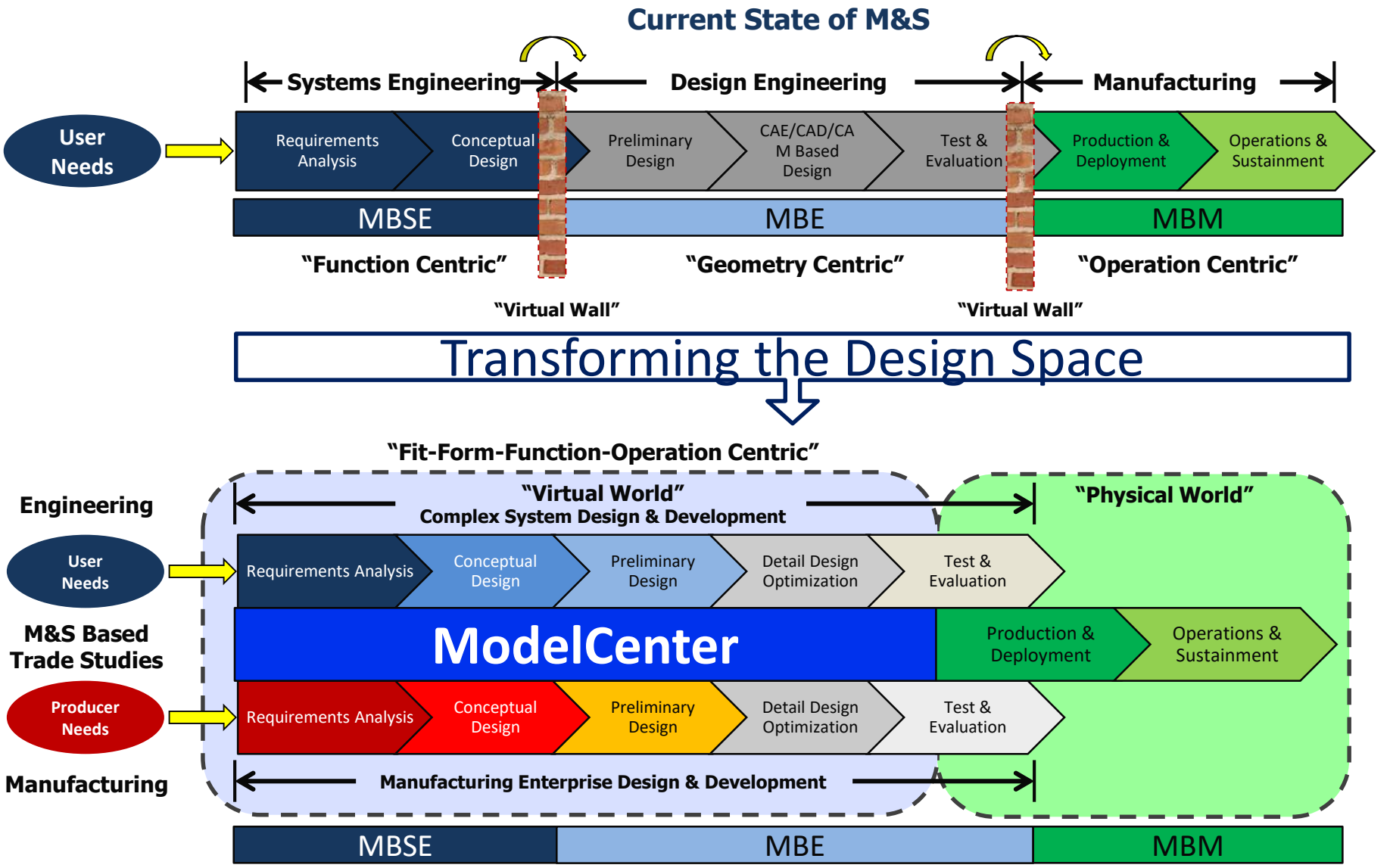




MBSE Sys Engineering (SysML) Tools

MBSE-MBE "Integration Layer" ModelCenter

MBE Engineering, Manufacturing & Finance Tools



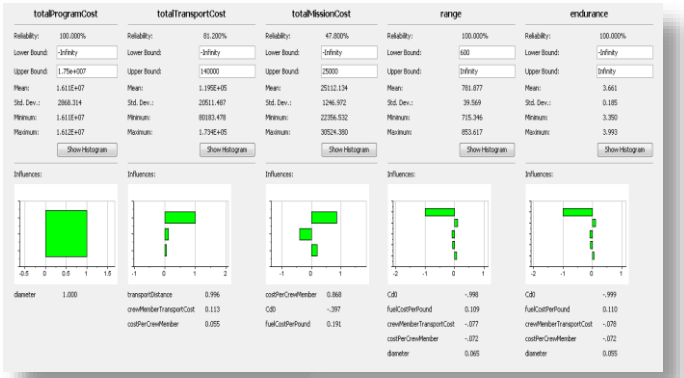
"Re-Engineering" Design and Manufacturing"

Adapted from NDIA presentation "21st Century Aerospace and Defense M&S Needs and the Virtual Manufacturing Frontier by Dr. Al Sanders Presented to NDIA SE M&S Committee, Washington, DC, June 19, 2012

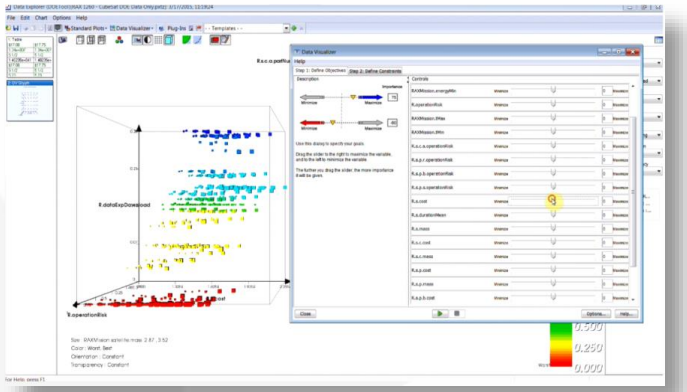
Integrate Any Software Tool

- Integrate and Automate any software tool
- Outputs from Tool A, become Inputs for Tool B
- Vendor neutral

What Can MBE Do for You?

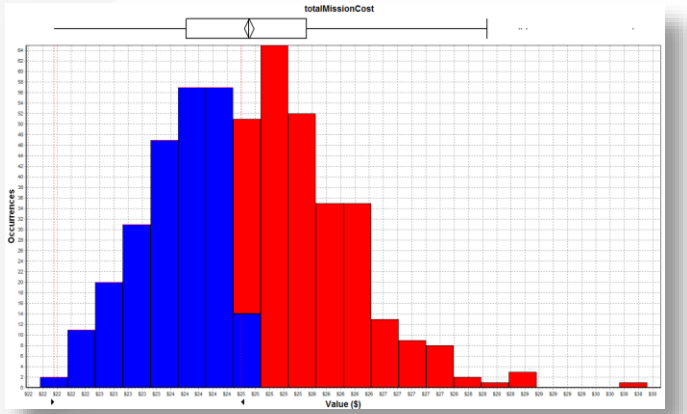


Sensitivity Analysis



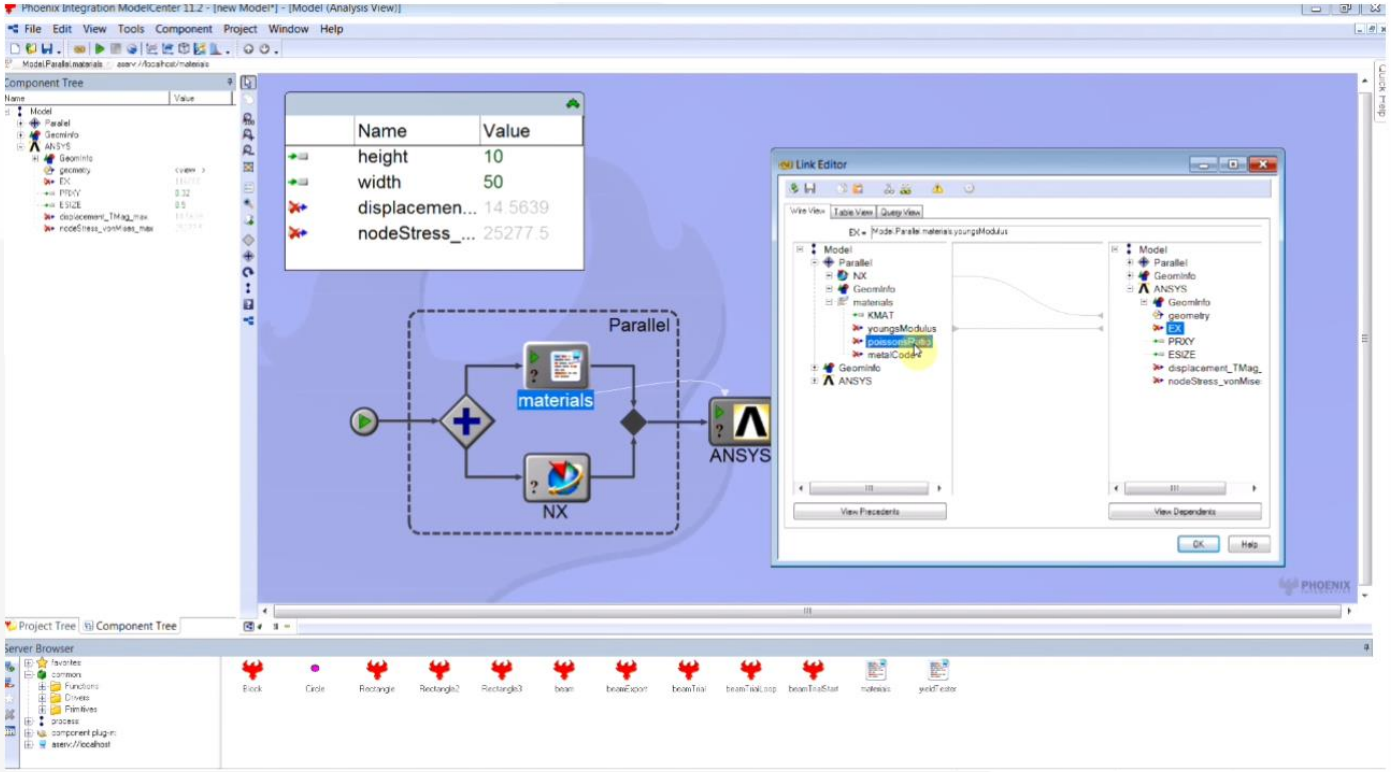
Trade Space Visualization

Optimization



Probabilistic Analysis

How Does MBE Integration Work?



- Integrated Workflows are created through the ModelCenter graphical environment.
- Models and Workflows can be integrated from any location world-wide.
- Inputs and Outputs of a Software Solution are easily stitched together.
- Workflows can then be “Played” with new inputs through the click of a button.

INCOSE International Council on Systems Engineering

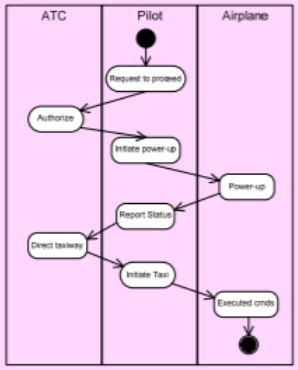
OMG SYSTEMS MODELING LANGUAGE SysML™

SE Practices for Describing Systems

Past

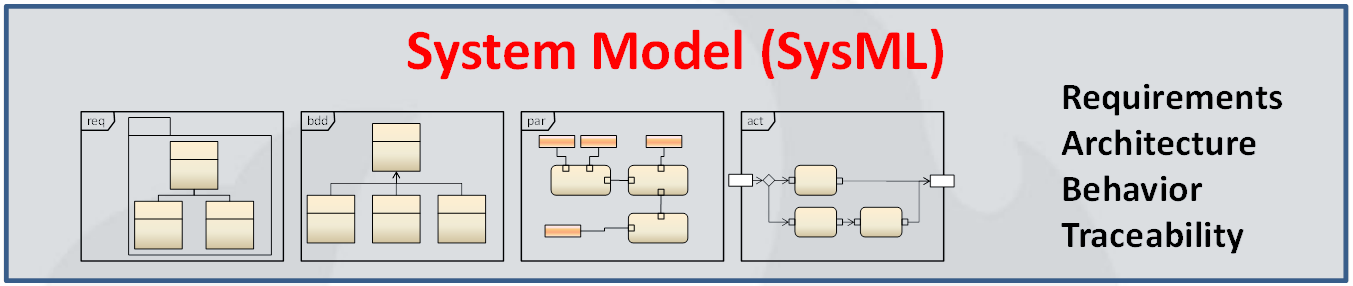
- **Specifications**
- **Interface requirements**
- **System design**
- **Analysis & Trade-off**
- **Test plans**

Future



Moving from Document centric to Model centric

Today: Connect SysML with Engineering Analysis



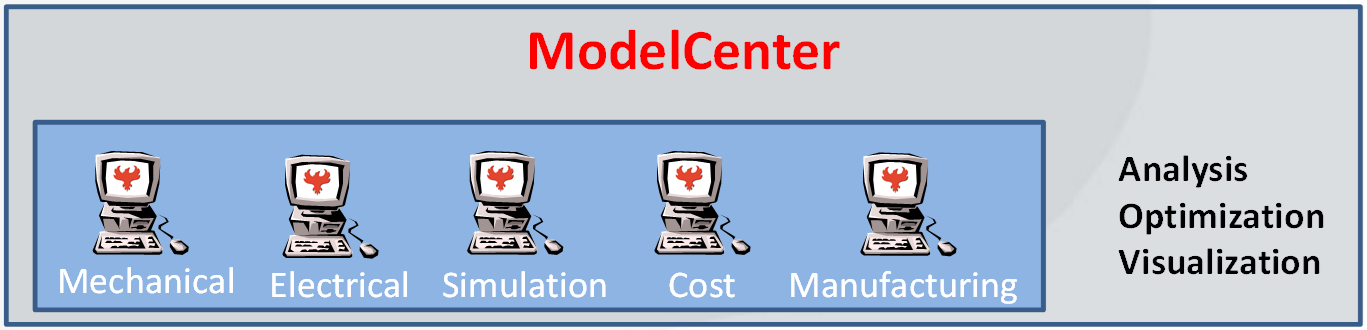
Systems Engineering Model

- Analysis requests
- Analysis specifications

Bridge the Gap

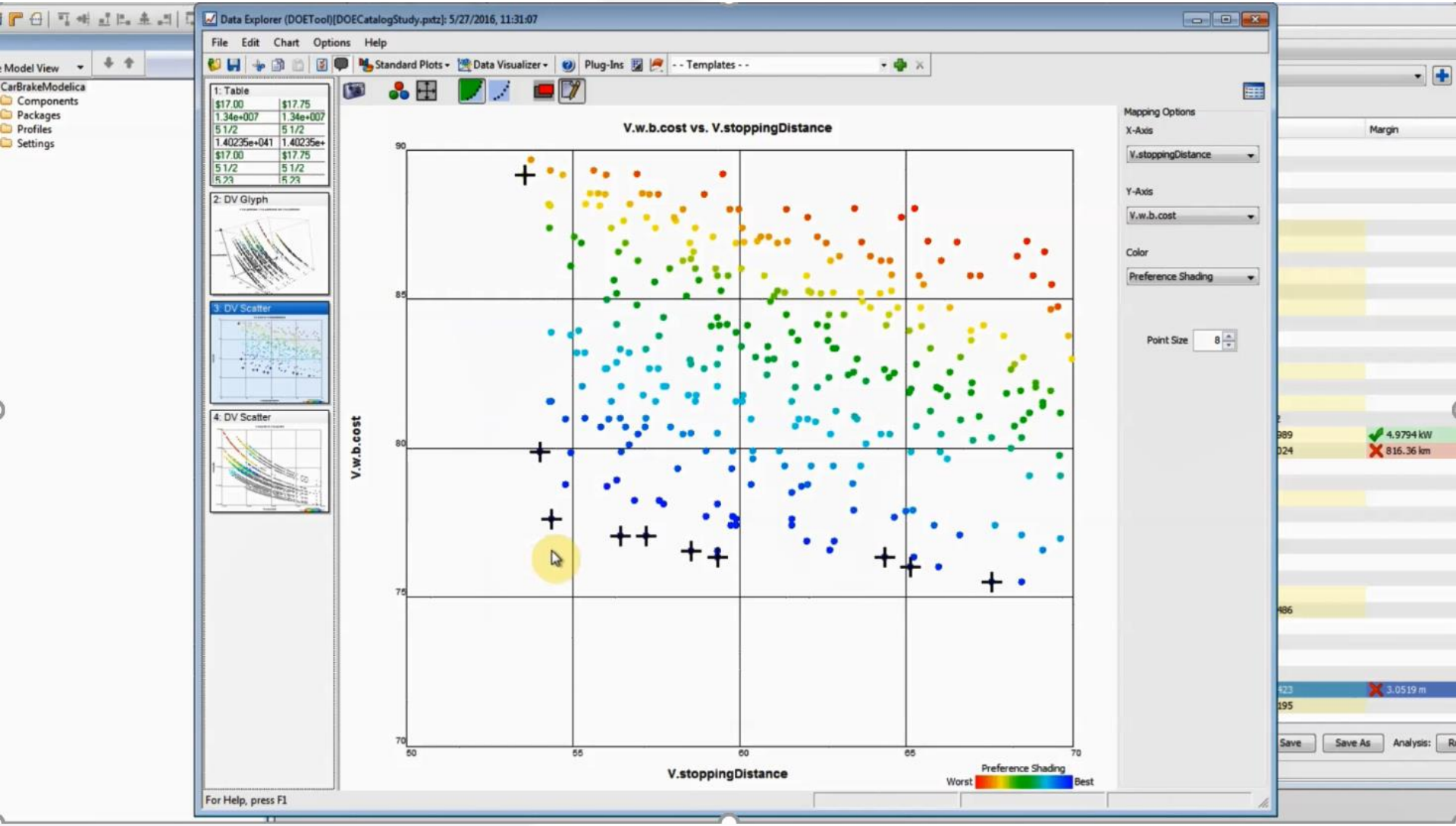
Bidirectional Integration via ModelCenter

- Performance estimates
- Trade study results



Domain Engineering Models

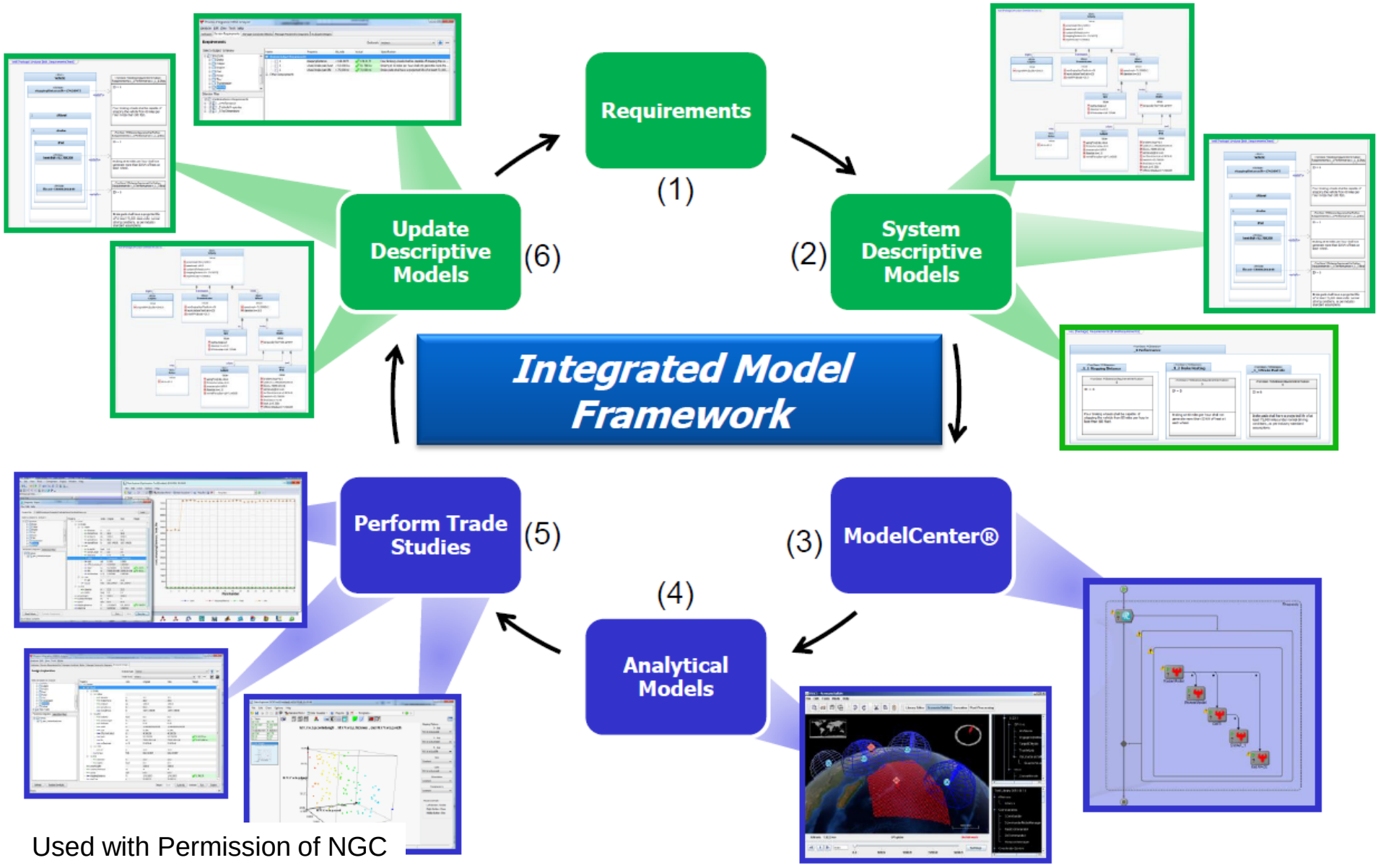
Design Exploration in MBSE



Integrated Model Framework Example

Descriptive to Analytical and Back

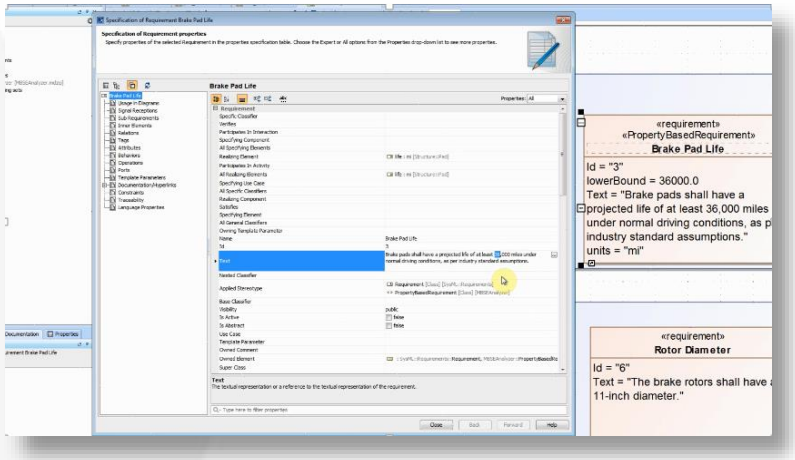
NORTHROP GRUMMAN



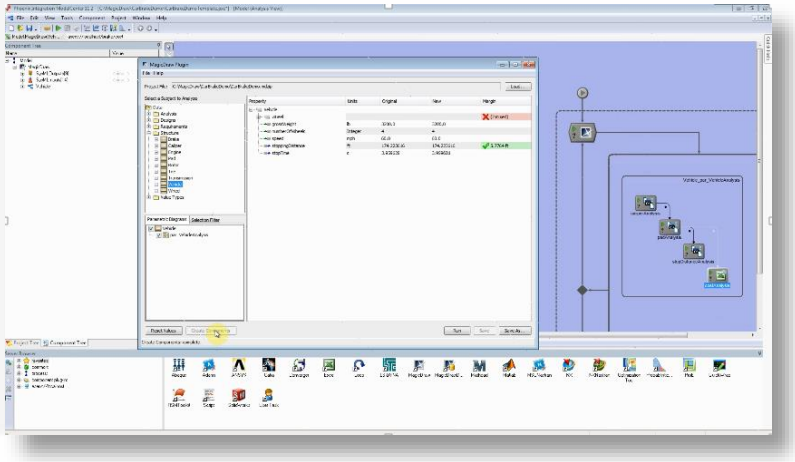
Used with Permission of NGC

Responding to a Requirement Change

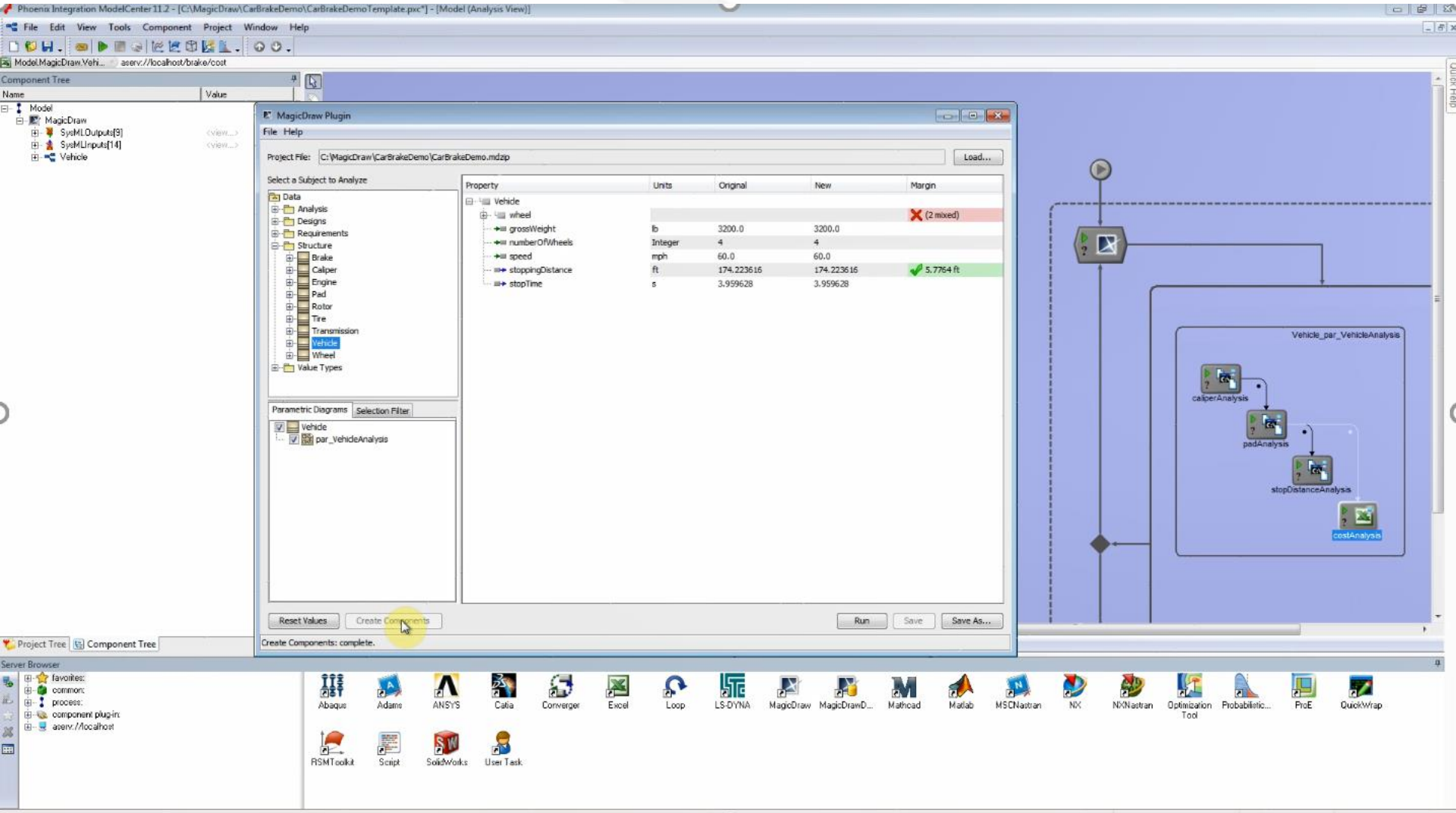
- Share performance requirements from SysML models with domain experts through SysML integration.



- Automatically generate workflows from SysML models to rapidly respond to requirements changes.

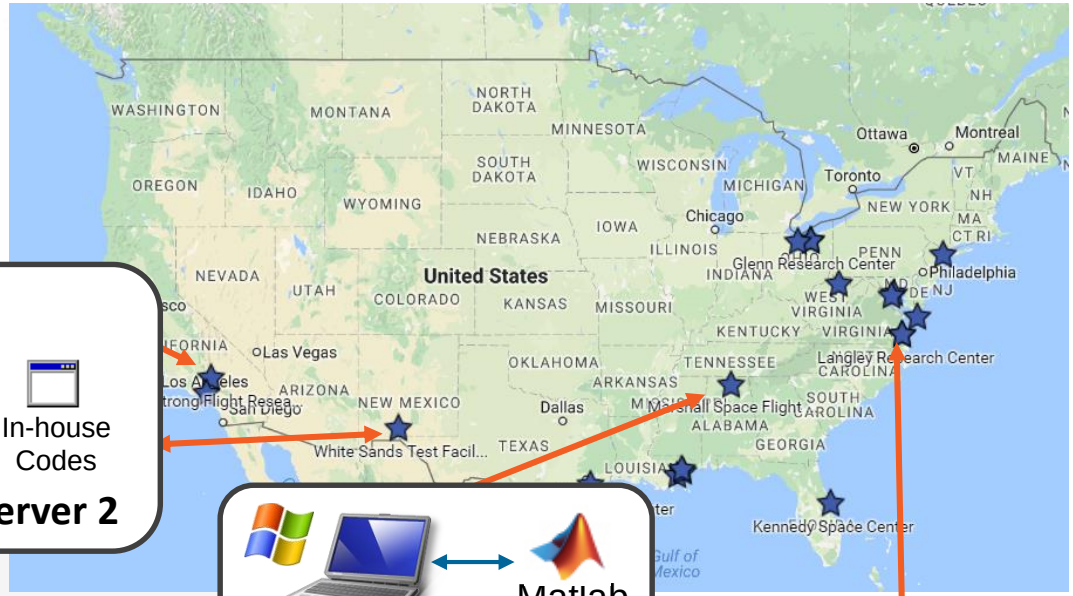


Responding to a Requirement Change




One more thing...

Model as a Service (MaaS)



Finite Element Analysis

Analysis Server 1

In-house Codes

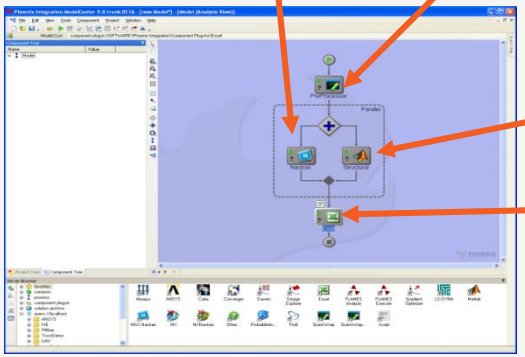
Analysis Server 2

Matlab

Analysis Server 3

Excel

Analysis Server 4



ModelCenter

Network (LAN or WLAN)

Utilize MaaS to share your models your Organization & Supply Chain.

MaaS: Model as a Service

- ***Same Company, Different Computer***: Utilize MaaS to serve models from one computer to another. This occurs when a user who is looking at the whole picture, needs to tap the discipline experts. MaaS can make their models accessible to the workflow.

- ***Different Company, Different Computer***: Utilize this method of MaaS to run your supplier's models without exposing their IP. Parameters are passed through the firewall to the vendor's model. The model runs on the vendors computer (never leaves their network). Once complete, only key parameters are passed back via MaaS to complete your ModelCenter run.

Working with Phoenix Integration We…

- "Reduced a proposed three-month study to two weeks."
  — Computer Science Corporation (CSC)

- "Design point runs were conducted in a 20-hour period whereas using conventional methods, these trades would have taken weeks. The end result was a vehicle whose size was reduced by 33%".
  — Lockheed Martin Aeronautics

- "Completed 100s of UAV trade studies in the time it took to do 10."
  — United States Air Force Research Laboratory

Phoenix Integration Brings A Team of 20+ Years Of MBE Experience With Defense Customers

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