

um
2025

Requirements Verification with Physics-Driven Simulations in VOLTA

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Agenda

Importance of Requirements
Verification

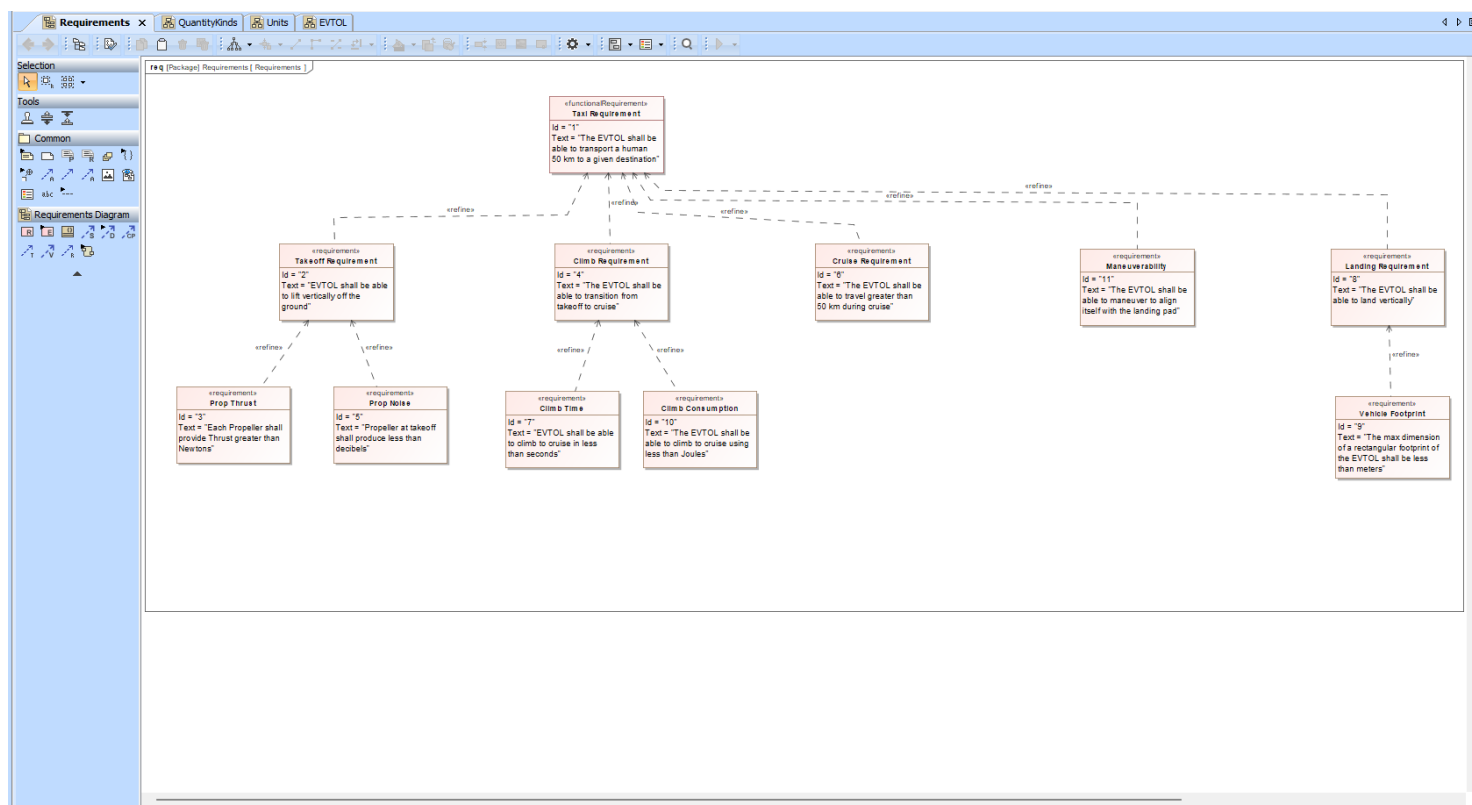
Five Perspectives on Uniting
Requirement and Simulation
Ecosystems

Demonstration of new
“MBSE Plugin for VOLTA”

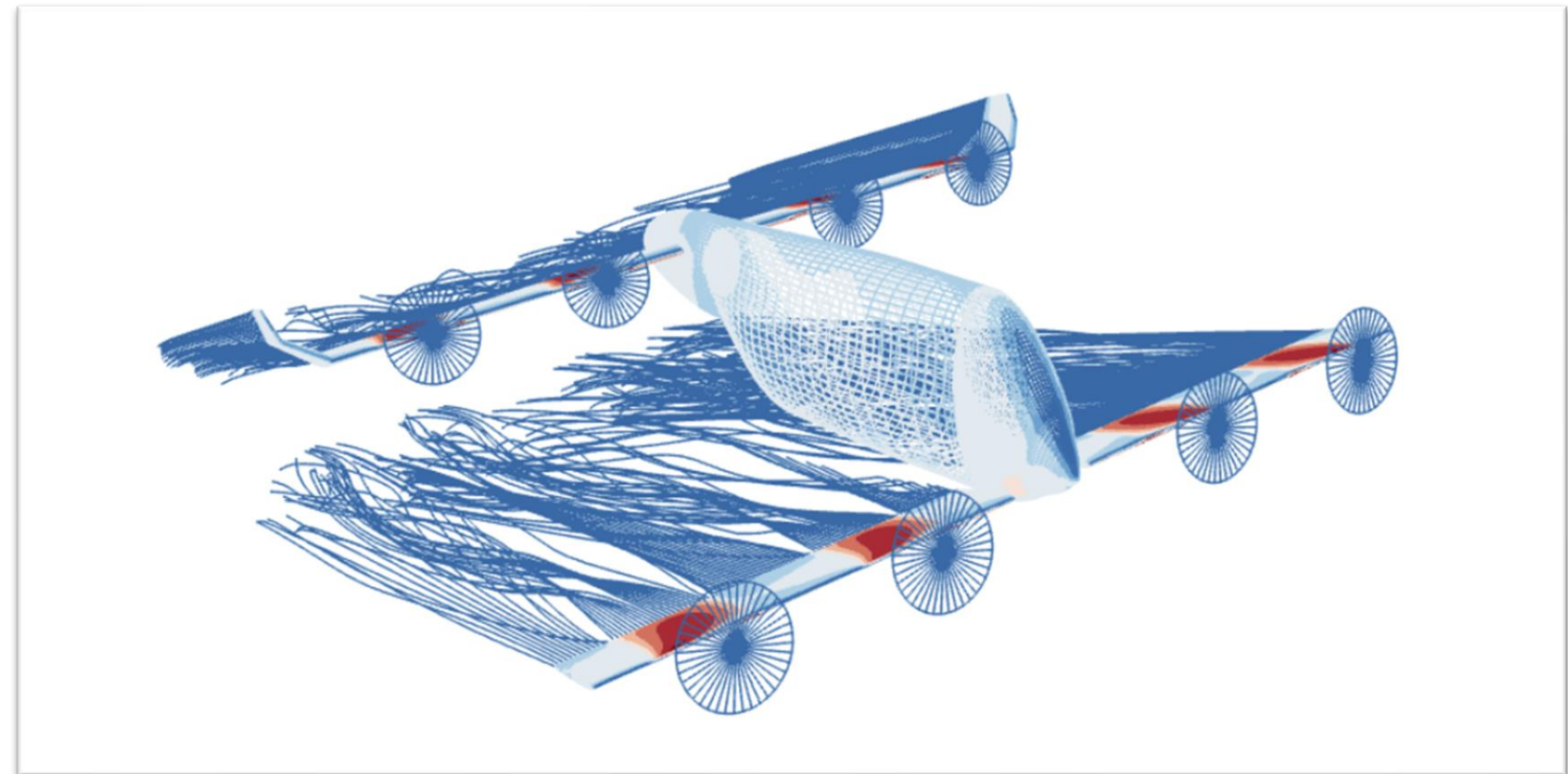


Design Requires Insights from Many Systems

Architecture Models and Physical models must interoperate, because different types of models answer different kinds of questions.



- What the system needs to do
- How the system will perform those functions
- How will those functions be verified



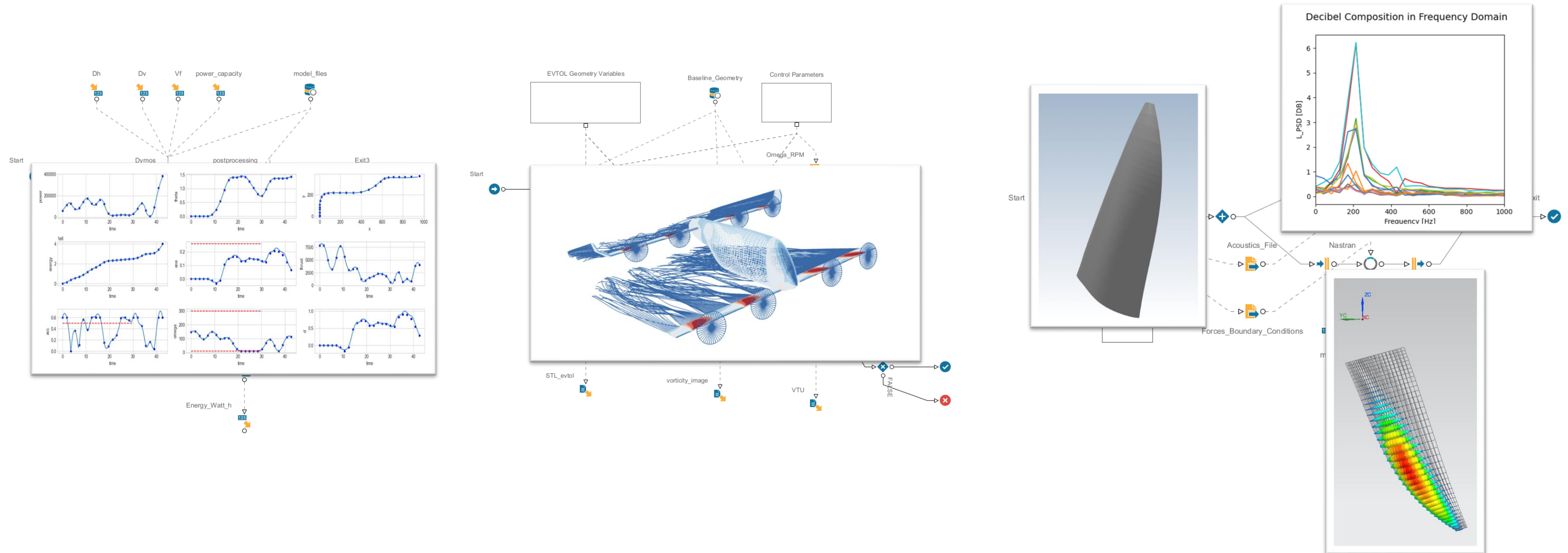
- What a specific system can do
- Whether the system performs a function
- What models and assumptions underly an expected performance

Five Perspectives on Bridging these two Ecosystems



Verification could come from Many Sources

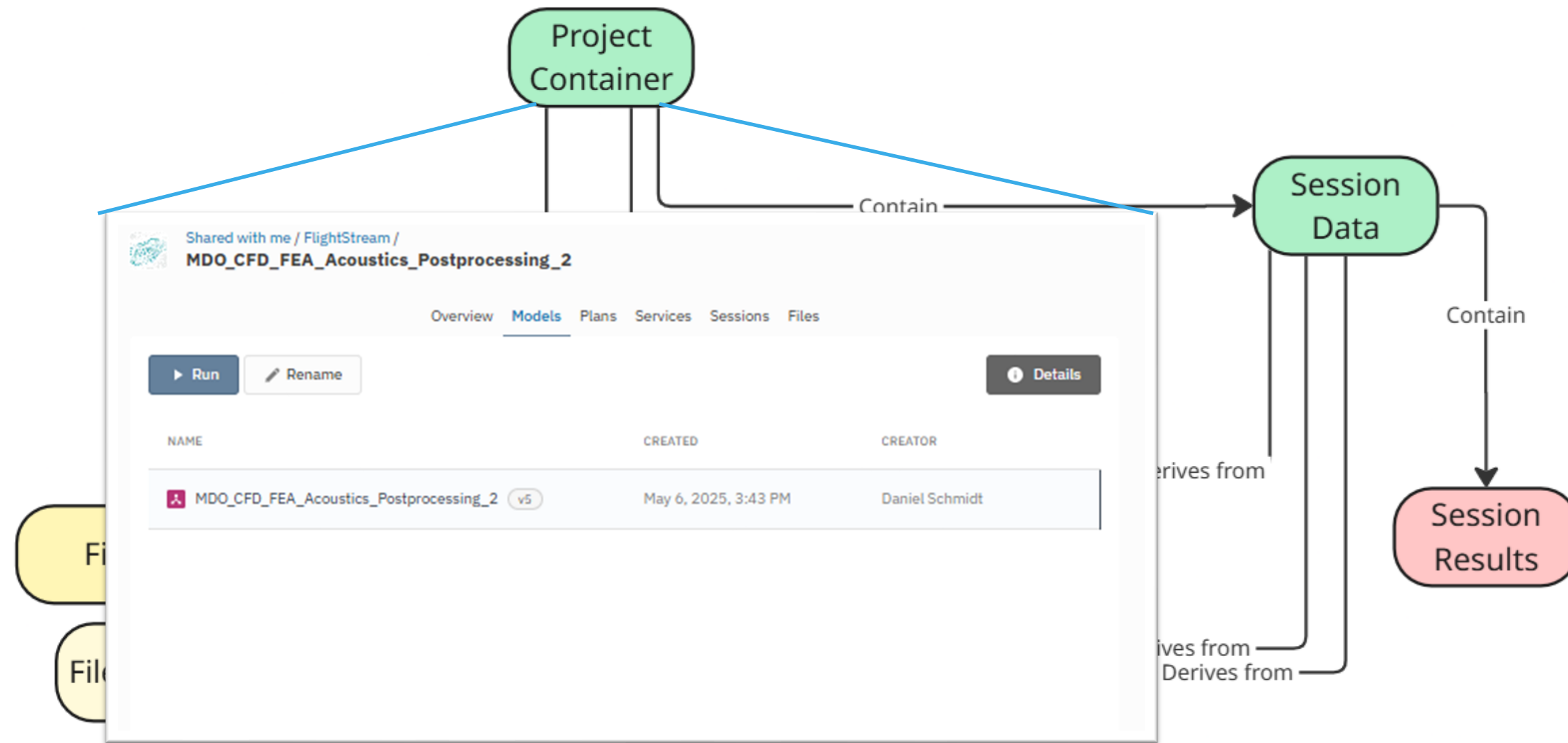
Many different simulation tools which could be used to verify. The tools used to analyze your system are also changing and dynamic in time.



General Purpose Framework for Simulation Automation

Verification must be Reproducible

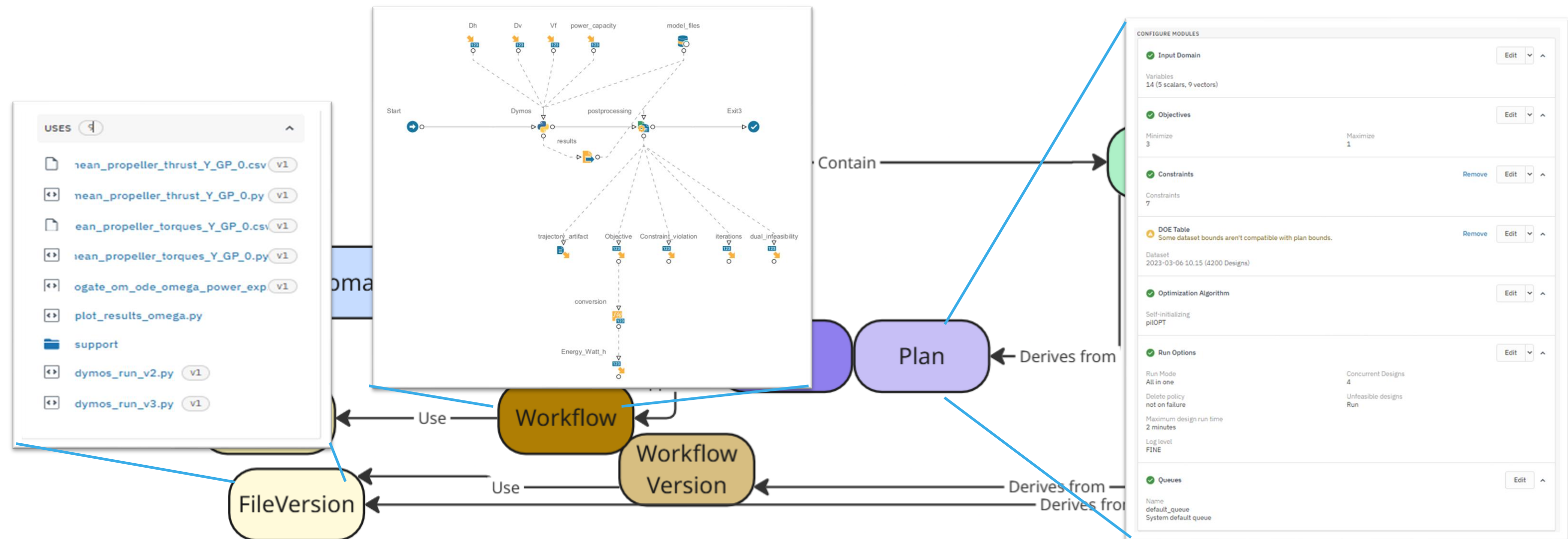
Simulation results could be invalid based on solver settings or outdated models. Thus, results should be reproducible and interrogatable.



Simulation Data Traceability and Model Version Control

Verification must be Reproducible

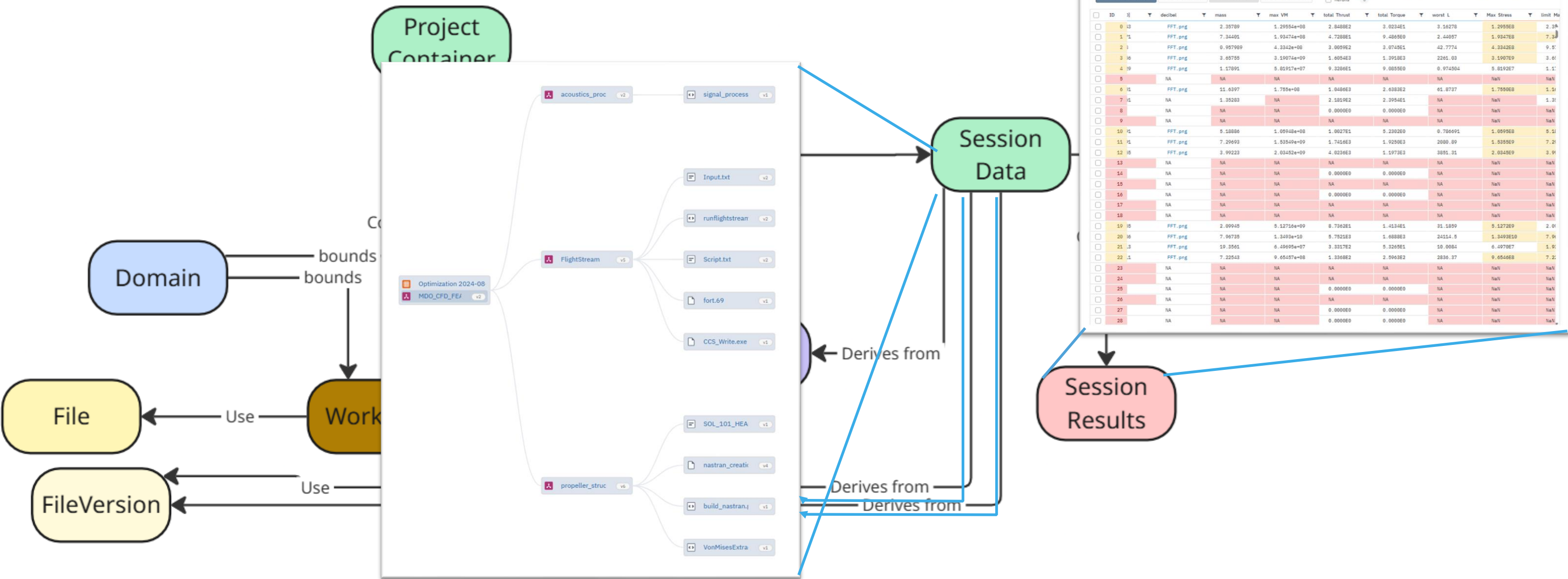
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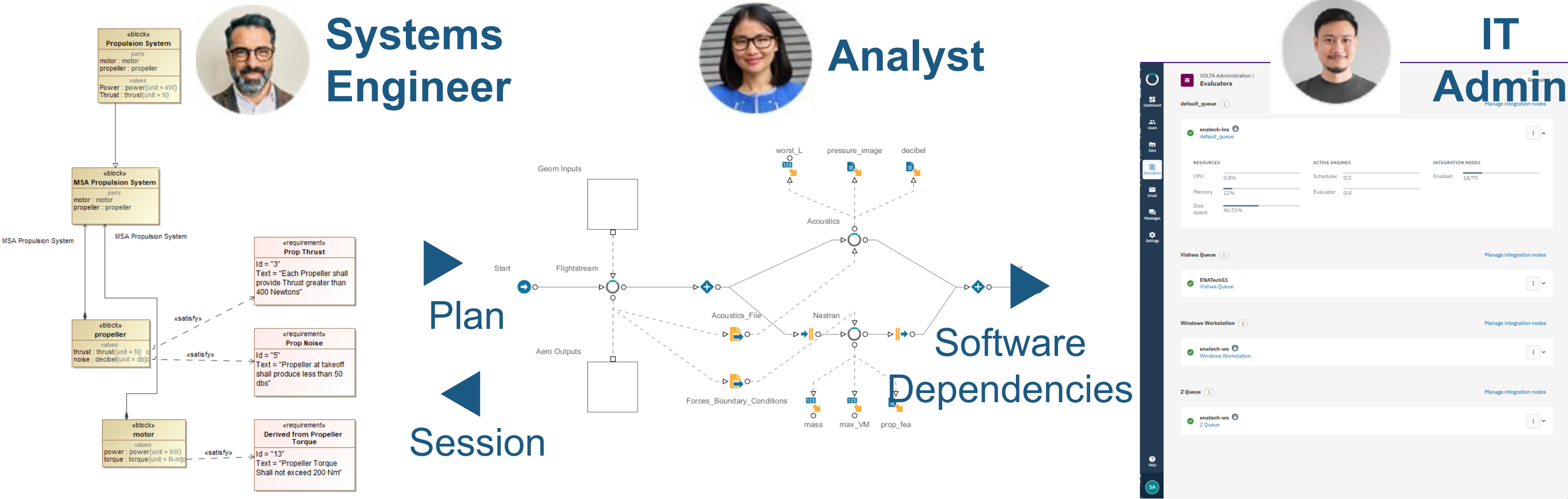


Simulation Data Traceability and Model Version Control



Verification must Coordinate across Many Parties

Simulation-based verification is complex. Thus, it must coordinate between systems engineers, analysts and compute resources.



Well Defined Interfaces and Modular Responsibilities



Demonstration of MBSE Plugin for VOLTA

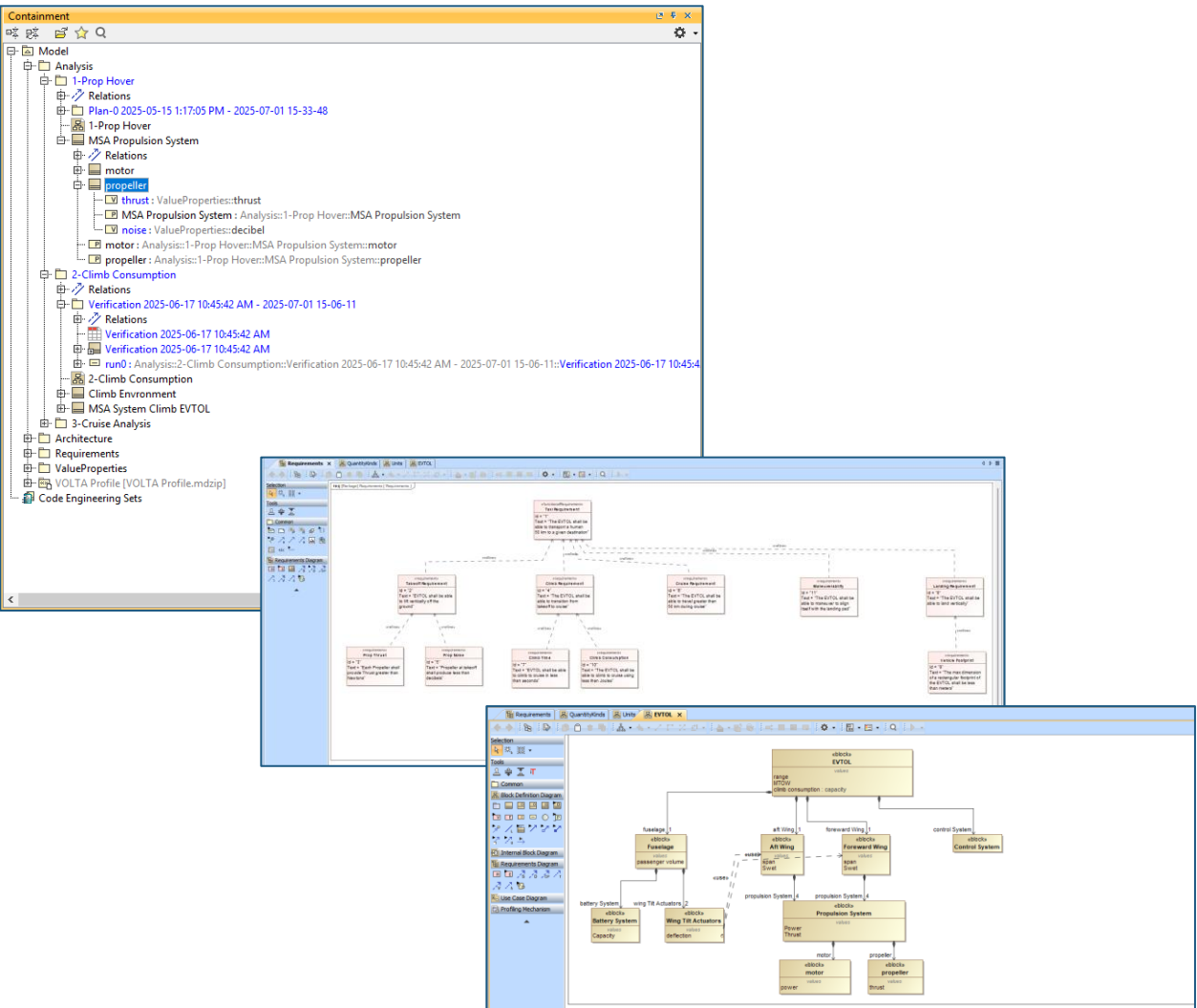
Bidirectional data transfer between Cameo model and VOLTA data

Cameo



Elements in Cameo

- Requirement Decomposition
- Architecture Decomposition
- MS&A Block Definition

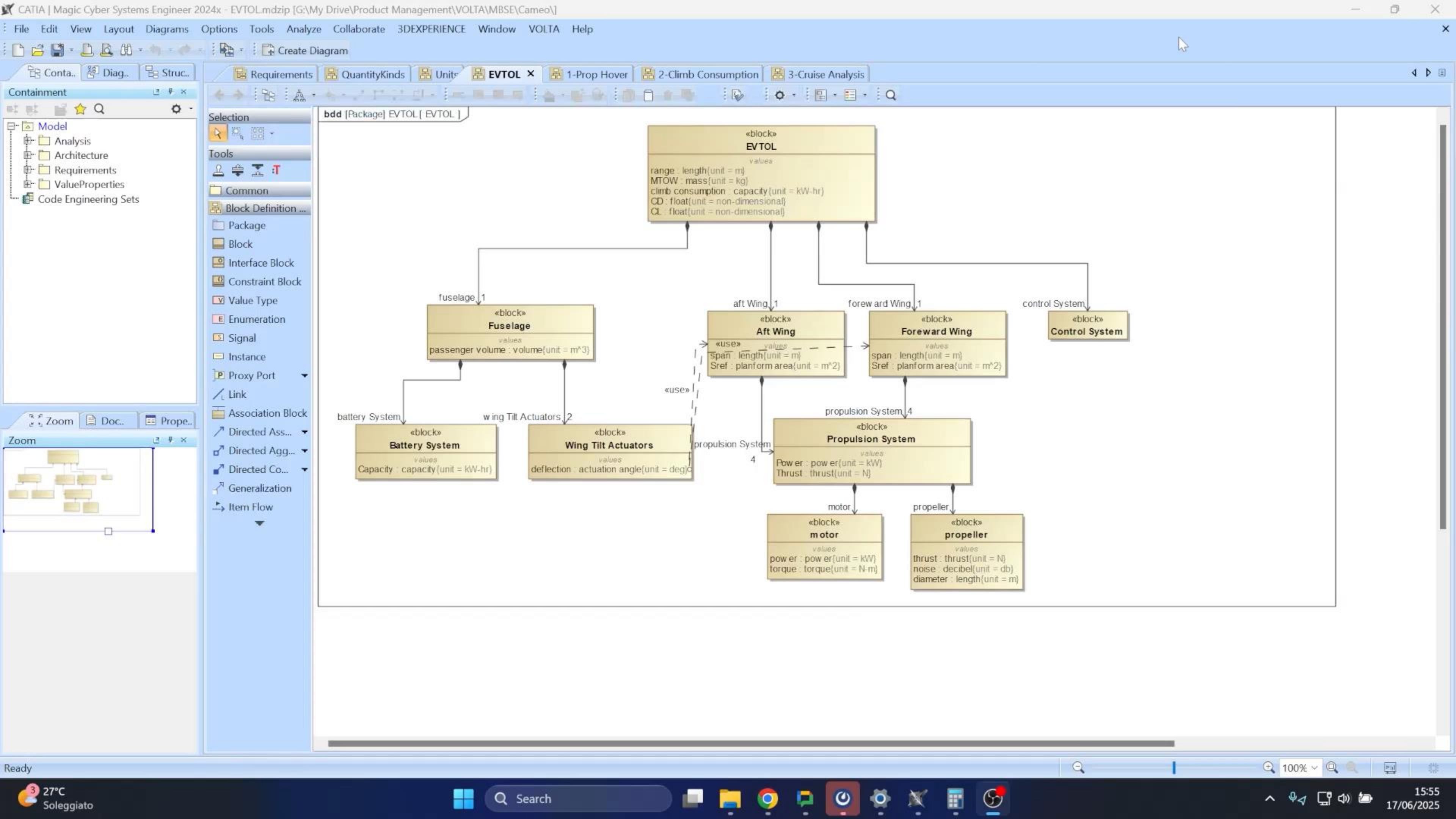


VOLTA

Elements in VOLTA

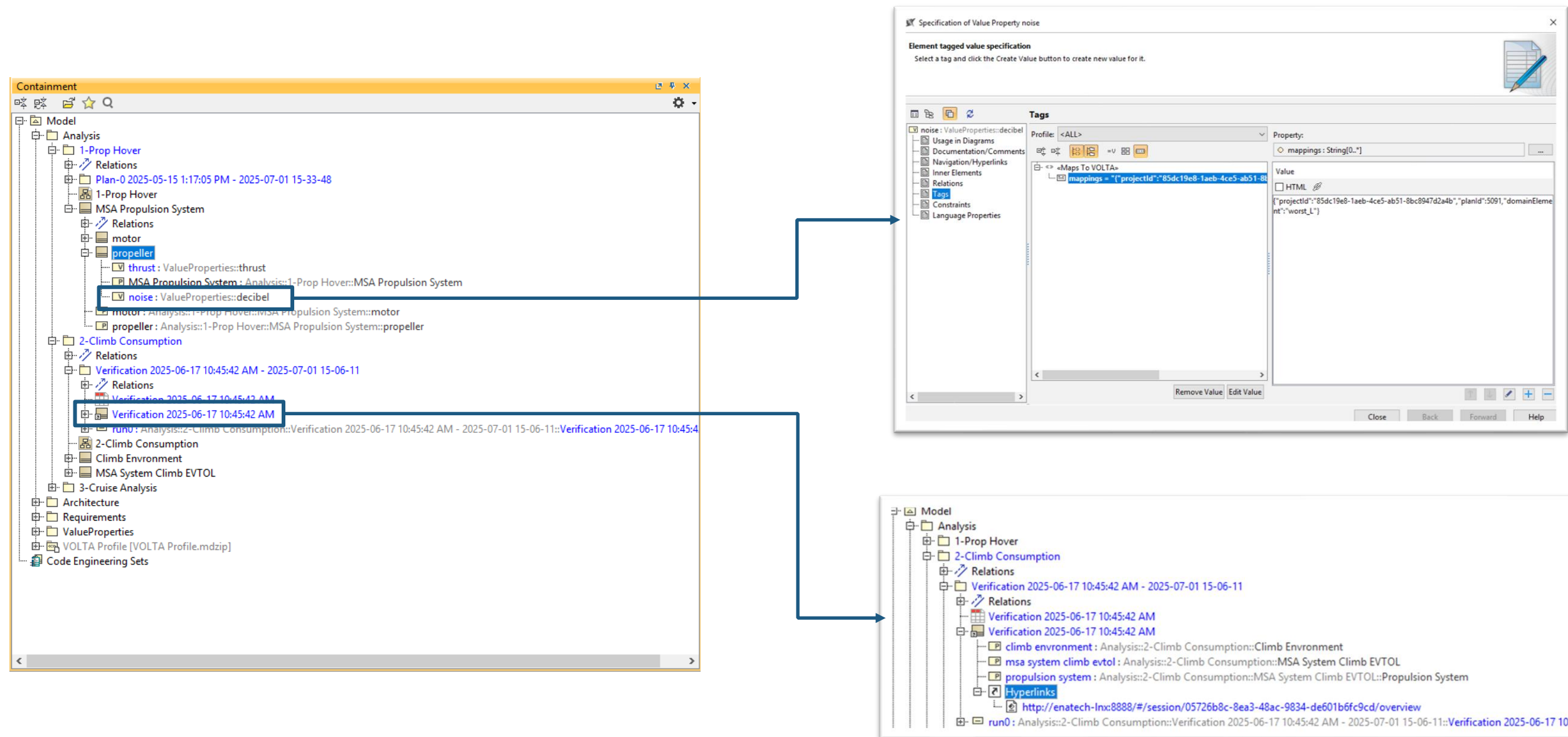
- Climb Trajectory Analysis
- Propeller MDO Optimization
- Validation and Optimization plans
- Session Data





Verification must Include Traceability

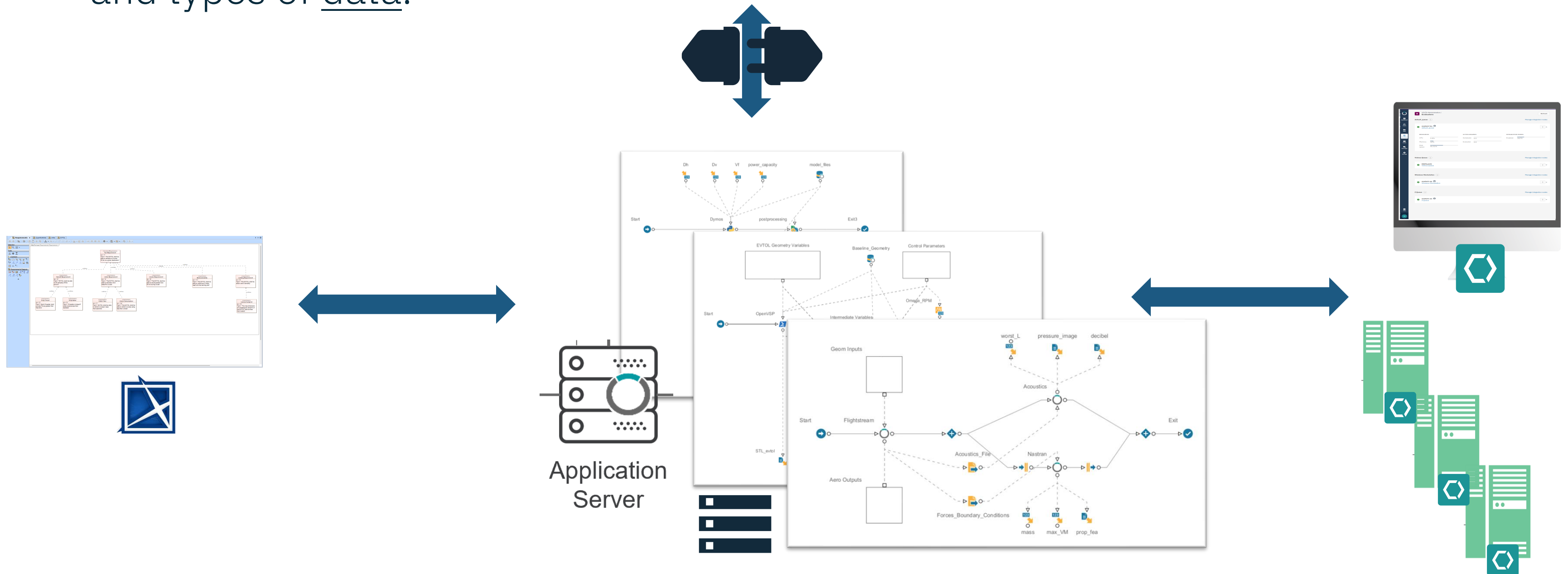
Simulation and SysML offer answers to different questions. One must be able to trace answers from one ecosystem to answers in the other.



Uniform Resource Identifier Tracking During Data Exchange

Verification must be Adaptive to Process Changes

The digital ecosystems of tomorrow could include many more types of tools and types of data.



**Open System with Customizability
and 3rd Party Partnerships**

Thank You!

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