



International Council on Systems Engineering
A better world through a systems approach

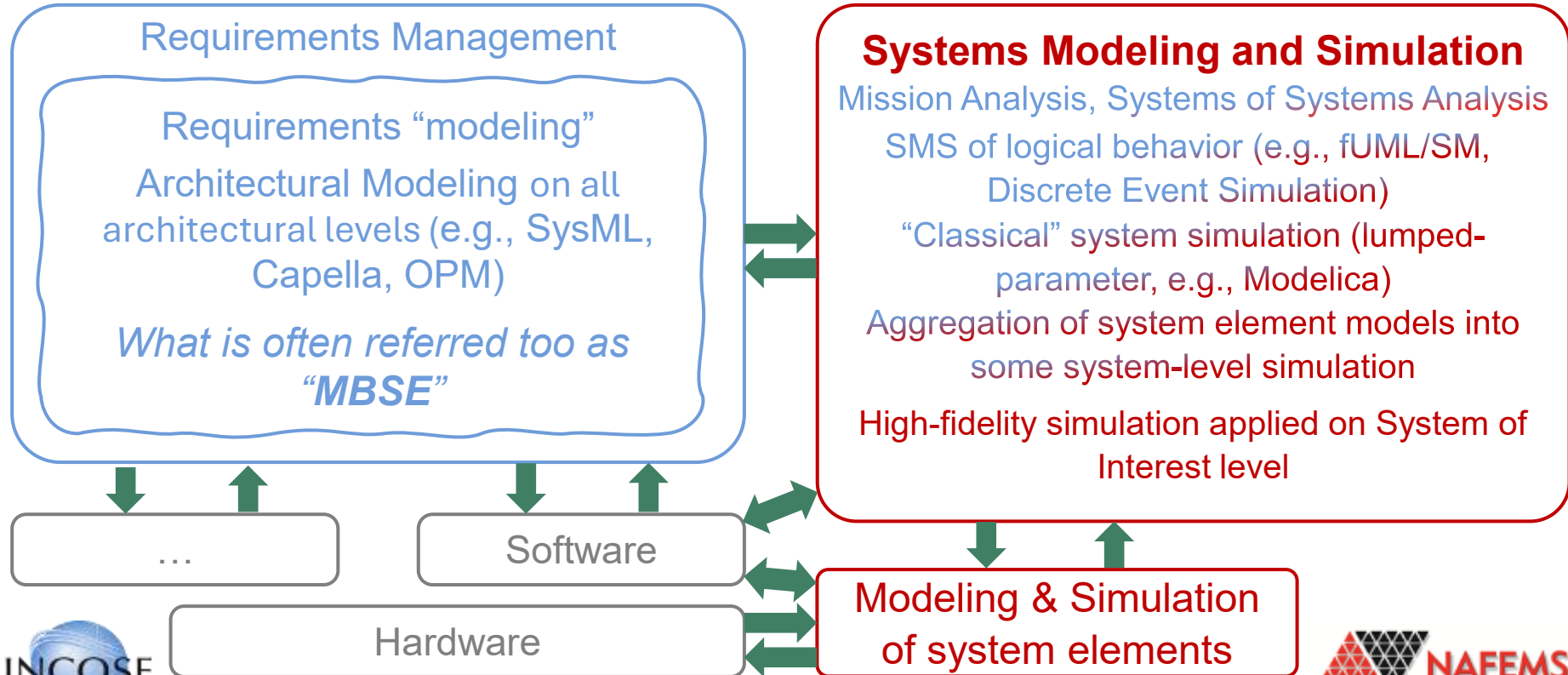
*Panel: Bridging the Divide:
Linking Architectural Specification
and Verification by System Simulation*

Empowering Systems Engineers: Bridging MBSE and Simulation for Enhanced Analysis

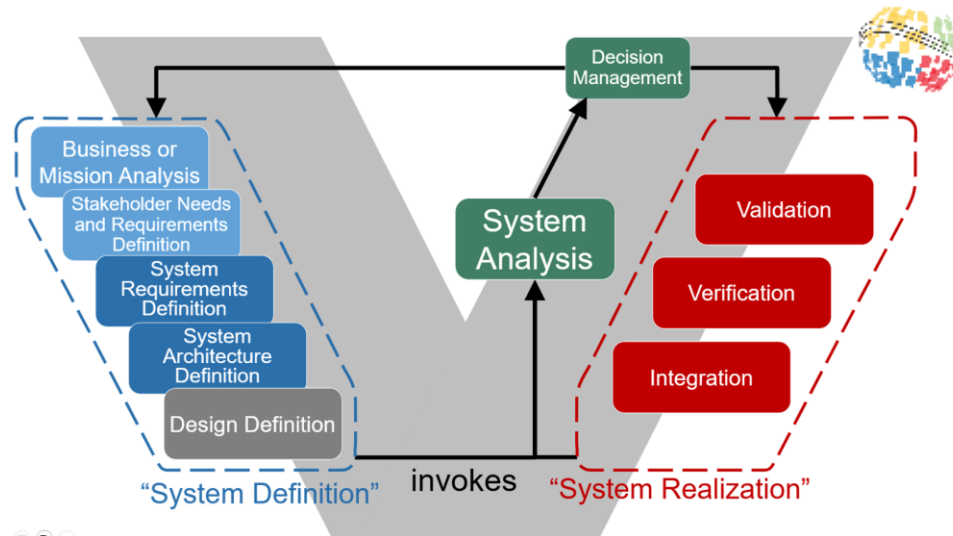
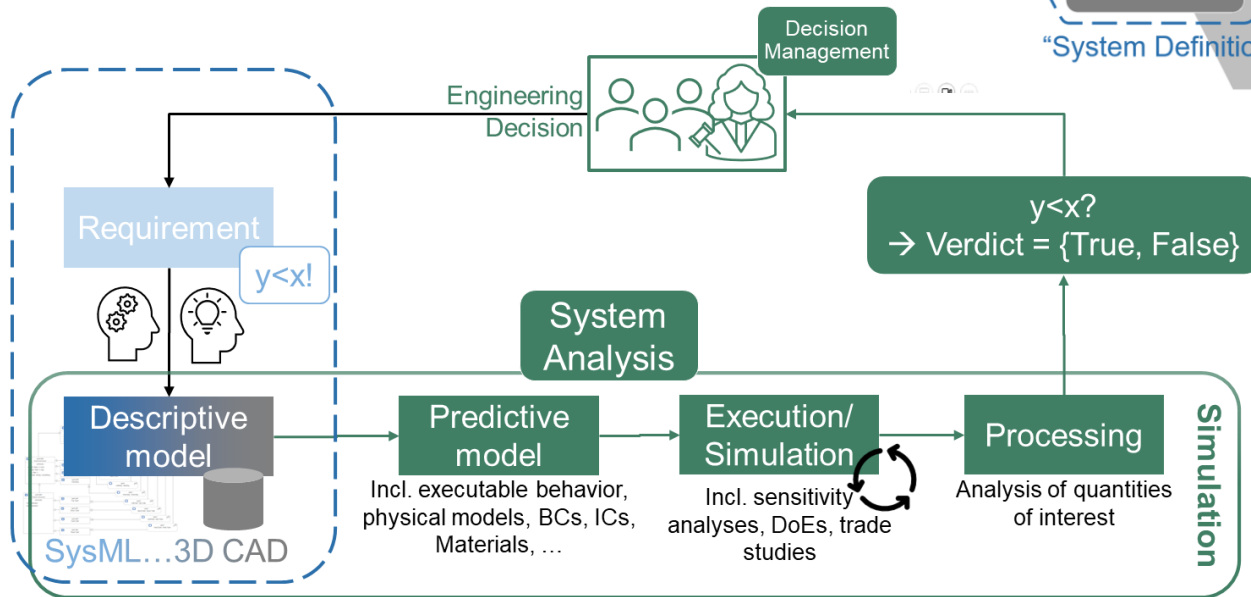
Alexander Busch, Ph.D., CSEP
Ansys/Synopsys, SMSWG



What is Systems Modeling & Simulation?



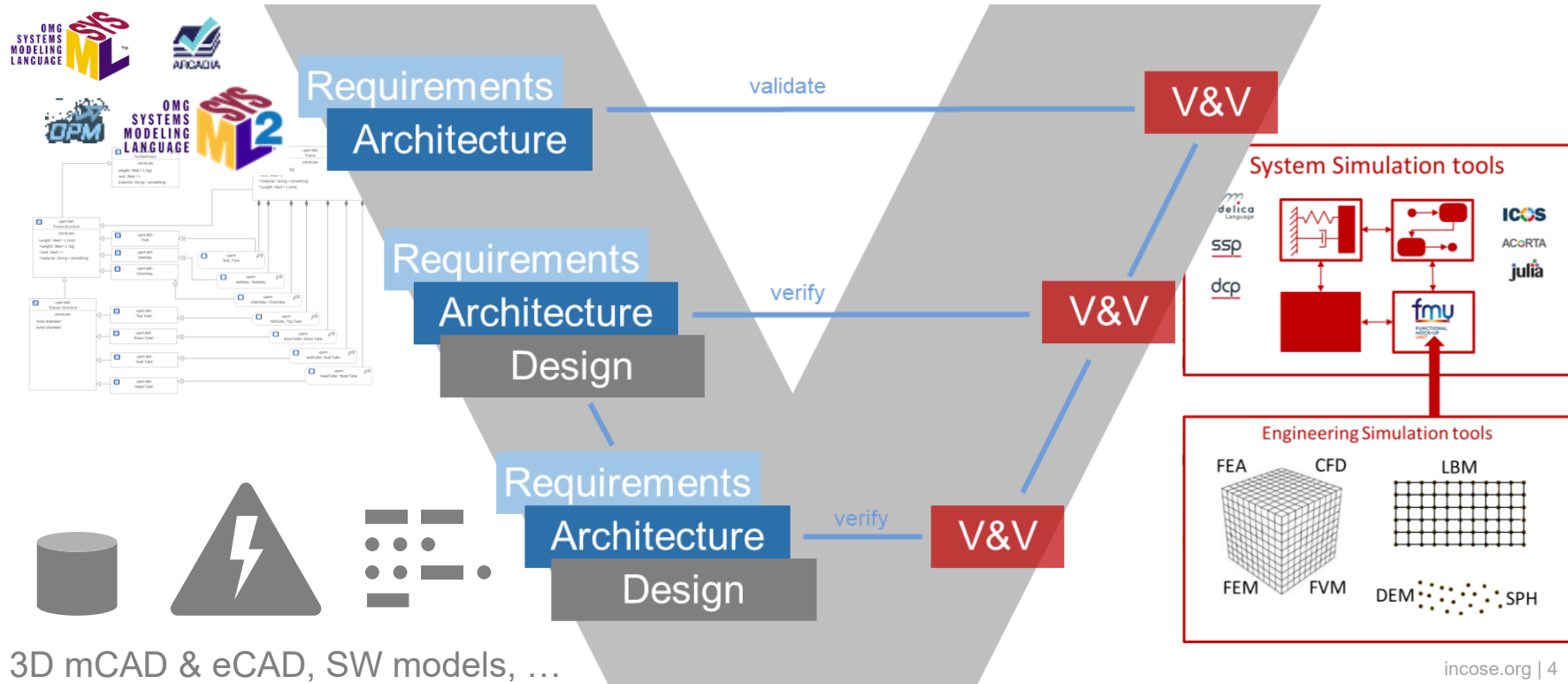
Simulation as an Analysis & V&V method



Generalizing the Systems Engineering Vee Introducing Time as a third Dimension and Refining the Role of Analysis Tools
 Alexander Busch, Greg Garstecki
 IS 2025, Ottawa, Canada.

Analysis tools in the Vee

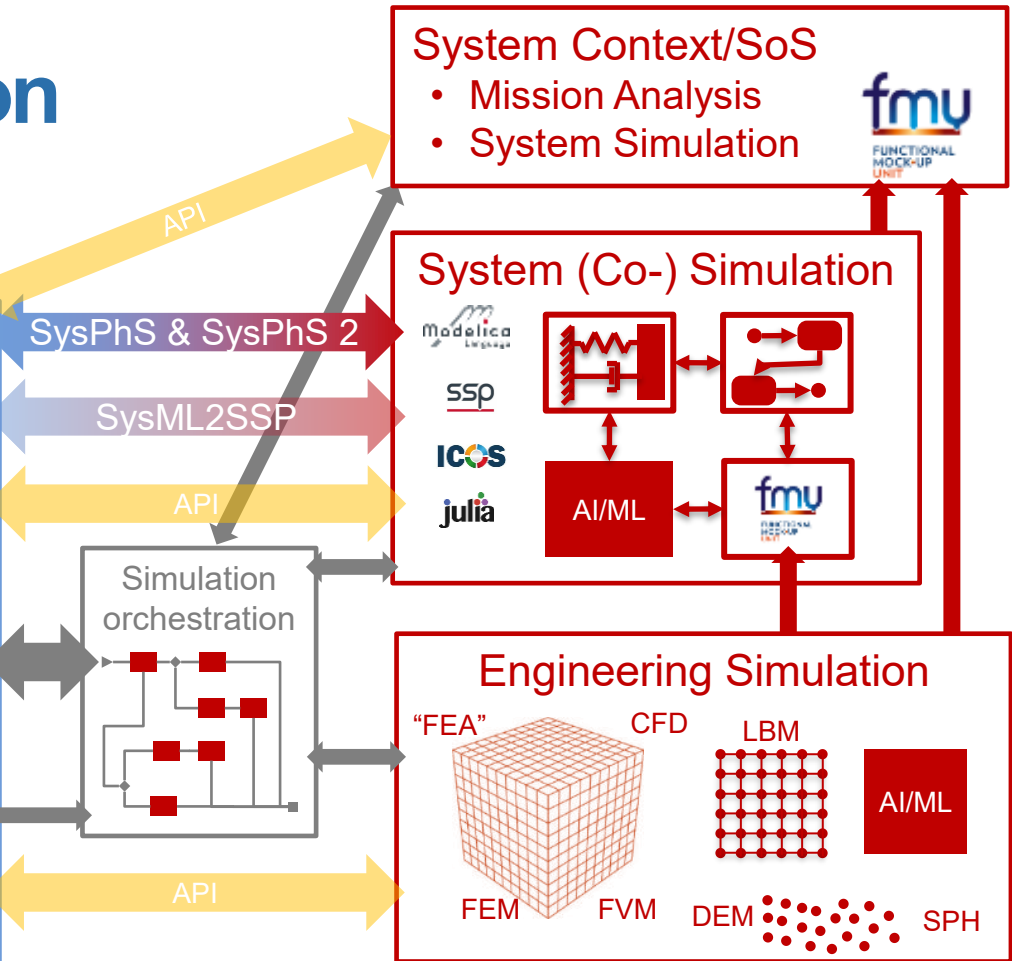
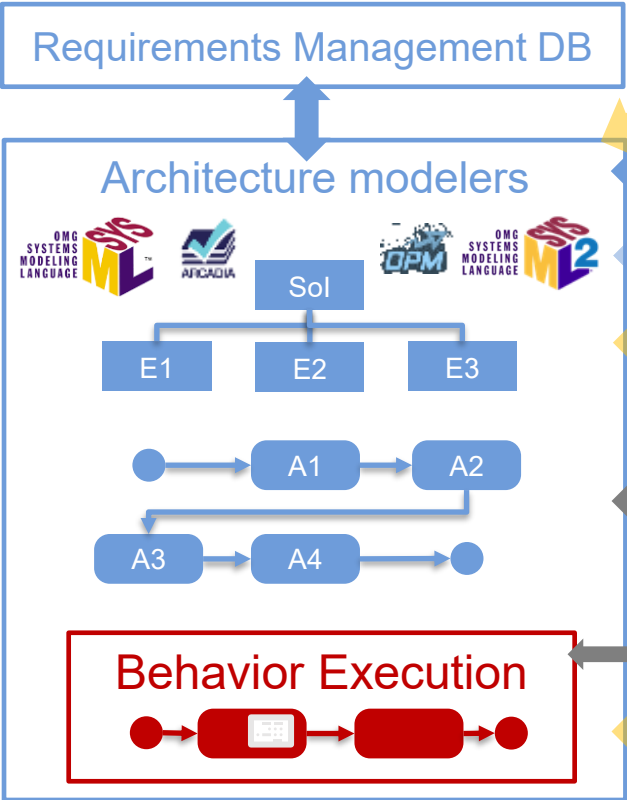
Descriptive & Prescriptive



Predictive

MBSE & Simulation

SE & MBSE (de/prescriptive)



Simulation (predictive)

to answer the question/address the concern/evaluate requirements via

Simulation orchestration

System Context/SoS

- Mission Analysis
- System Simulation

Behavior Execution



System (Co-) Simulation

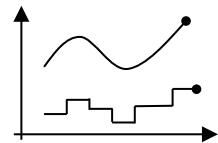


Engineering Simulation

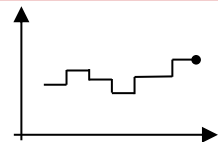


- Analyses across several levels at once, MDAO & Automation

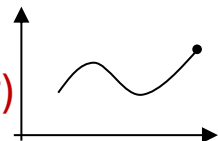
- Emergent SoS logical behavior
- Communication, outcomes, ...



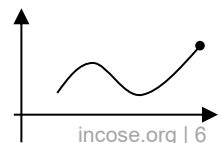
- Emergent system logical behavior
- Outcomes, scheduling, queueing



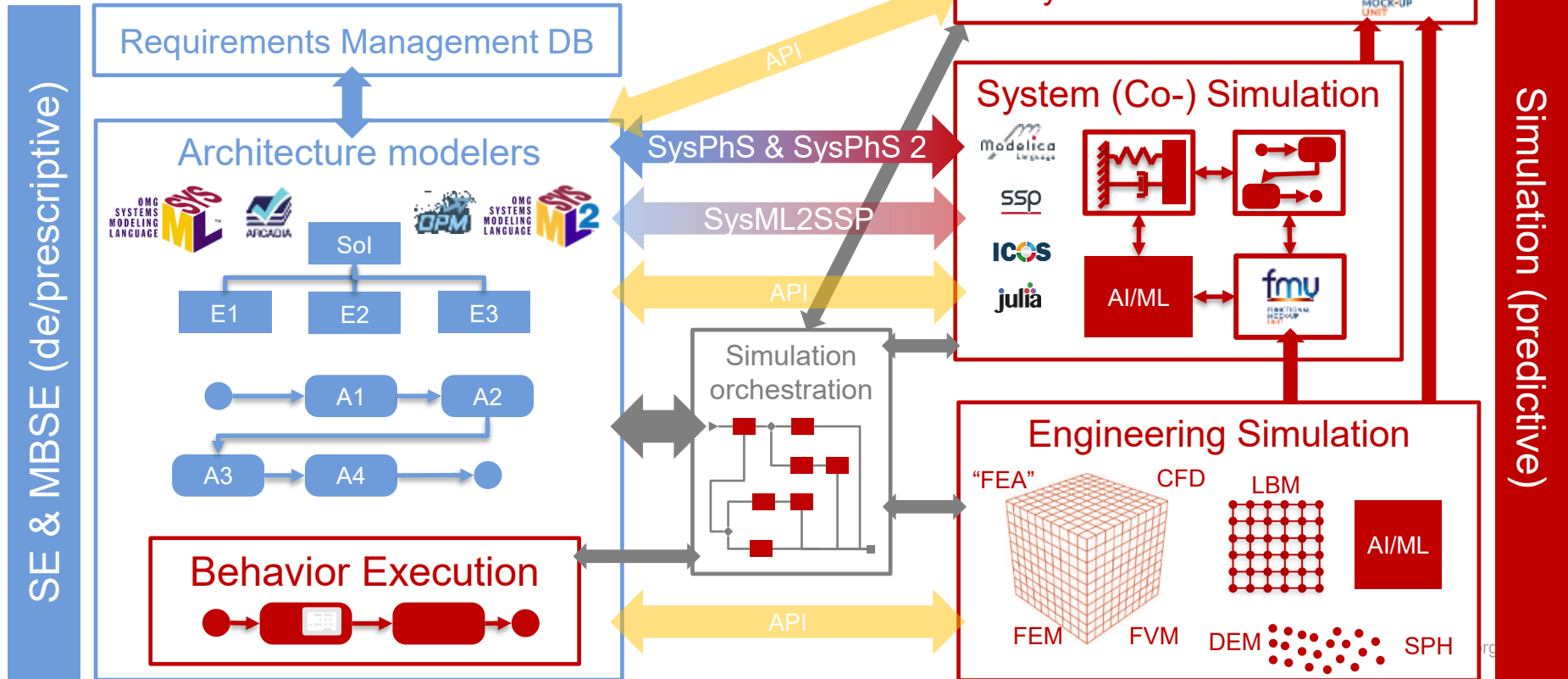
- Emergent system physics behavior
- Integrating several submodels (e.g., supplier)



- Element physics behavior
- 3D design, 3D continua phenomena



Takeaway: Build bridges!



Thank you.



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hybrid event

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