34th Annual INCOSE international symposium

hybrid event

Dublin, Ireland
July 2 - 6, 2024

Mission Possible: Deploying MBSE Model Libraries for Optimal Systems Development

Agenda

- Introduction
- Case Study
- 5 Steps for Mastering MBSE Model Library Deployment
- Conclusion

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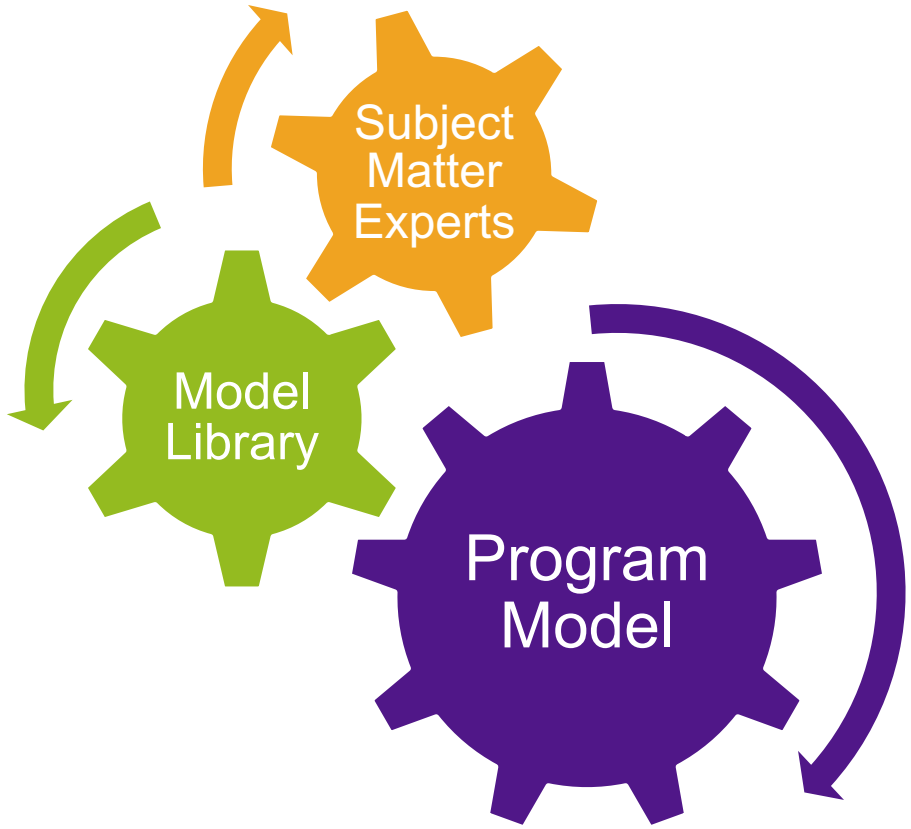
Introduction

- MBSE hasn't eliminated duplicate work
  - Model consistency across platforms remains a challenge
  - Repeating model development across platforms adds unnecessary costs
- Model libraries offer a solution but require careful planning and distribution

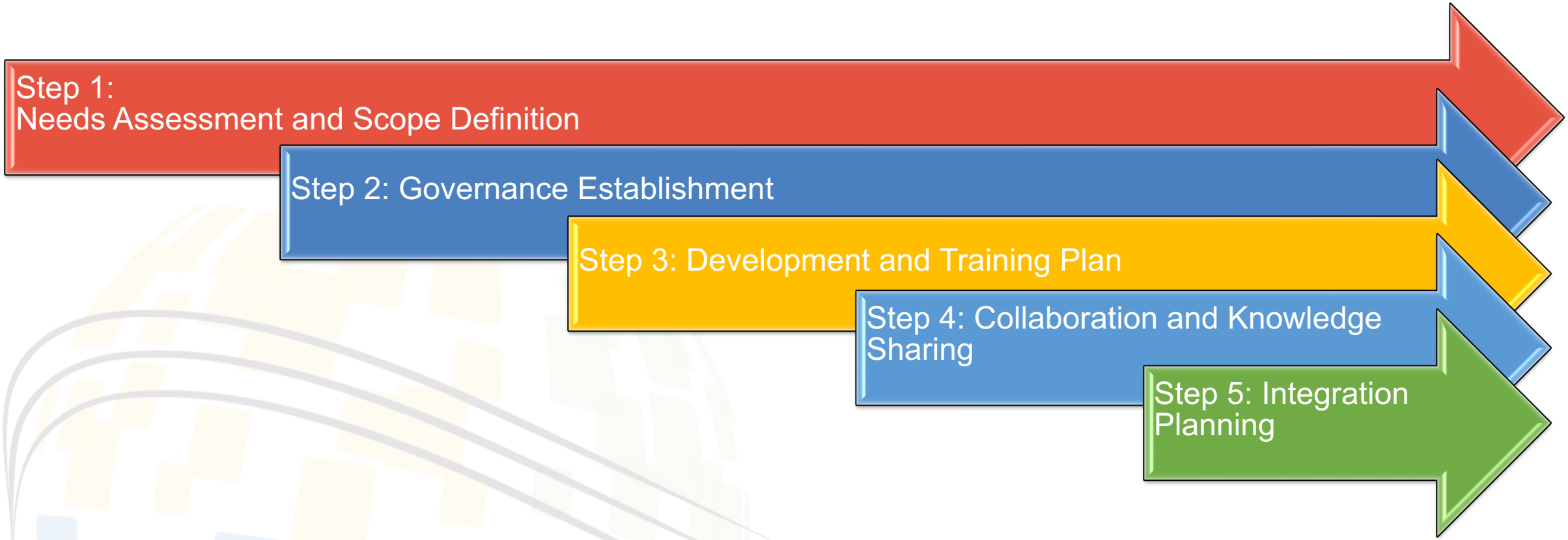


Case Study Regarding Libraries at Boeing

- Initiative launched to minimize rework through creation of MBSE model libraries
  - Aimed to expedite model development for aircraft, rotorcraft, etc.
  - Style guides established for consistency
- Shortcomings:
  - No formal review process beyond modeling group
  - Inadequate communication and knowledge sharing
  - Integration plans and deployment were poorly communicated
  - Maintenance was overlooked

This case study highlights the importance of comprehensive planning and continuous support

5 Steps for Mastering Library Development



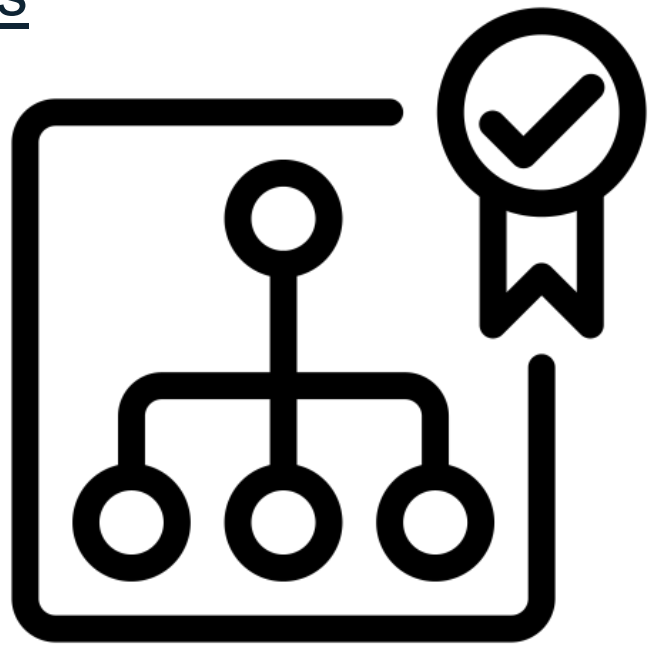
Note: The steps can always be interchanged, as long as everything at the end if fully addressed.

Needs Assessment and Scope Definition

- Identify stakeholder needs
  - **Who:** Identify the team needing the library
  - **What:** Determine what they want to model (scope)
  - **When:** Establish the timeline for implementation
  - **Where:** Identify the domain(s) to cover.
  - **Why:** Understand the purpose or questions they aim to address with the library
- Evaluate the “customer’s” experience level and technical capabilities
- Clearly define scope by specifying deliverables and formats
  - e.g., BDDs, IBDs, and ACTs for each system
  - Ensure alignment with the Systems Architecture Management Plan (SAMP) and execute accordingly

Governance Establishment

- Form a governance board (MAC) of architects and users
- Establishes guidelines such as:
  - Naming conventions
  - Modeling framework
  - Methodology
- As well as:
  - Defines library use cases
  - Provides/develops training
  - Facilitates knowledge-sharing efforts
  - Offers support to implementing stakeholders



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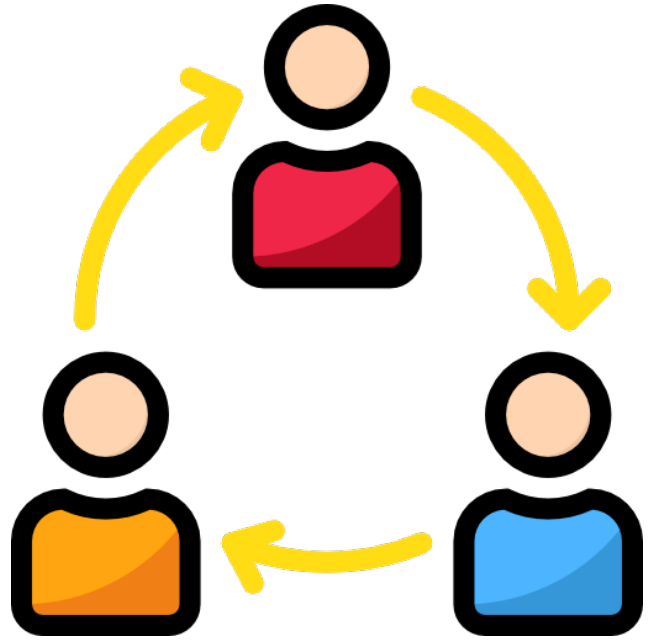
After creating the model library, it's crucial to schedule ongoing maintenance and review processes!

Development, Training Plan

- Development involves feedback loops!
  - Expect revision to use cases, content, implementation plan
- As development ends, craft tailored training plan
  - Adapt to needs of specific stakeholders
- Use various training methods:
  - Hands-on exercises (sample model; process guide)
  - Webinars
  - On-site sessions
- Enhance training by using navigators and comments in the library
  - Ultimate goal is to enable seamless integration into program models

Collaboration and Knowledge Sharing

- Actively promote collaboration amongst different stakeholders
  - Encourage adopters to identify weak areas; provide feedback
- Foster knowledge sharing
  - Company forums, presentations, etc.
- Establish feedback mechanisms
  - Email
  - Mattermost
  - Cameo Collaborator comments
- Create an environment facilitating easy sharing and reuse



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Integration Planning

- Tailor to specific requirements
  - In simple cases, customization may not be necessary
  - Defense projects: migration to & implementation in secure environment adds complexity
- Ensure process is robust enough to support complex systems architecture
- In cases involving both commercial and defense projects, ensure a well-defined action plan for model delivery:
  - Commercial projects can use read-only access on Teamwork Cloud
  - Defense projects should adhere to DFARS compliant access process

Conclusion

- Vital role of MBSE model libraries in modern SE practice
- Reflected on lessons learned
- Discussed 5 Steps for Mastering MBSE Model Library Deployment:
  - Needs Assessment and Scope Definition
  - Governance Establishment
  - Development and Training Plan
  - Collaboration and Knowledge Sharing
  - Integration Planning
- Harnessing model libraries can elevate efficiency, consistency, and innovation in your engineering endeavors

About the Authors

Andrew J. Gabel

Andrew is an experienced Boeing engineer with over 11 years in the industry. His expertise lies in merging Software Engineering with Systems Engineering to gain a holistic grasp of the systems he works on. Currently, he leads efforts to consult on Model Based Systems Engineering (MBSE) with experience in over 10 programs. He earned a Master of Engineering Management from the University of Nebraska – Lincoln in 2023 and holds a Bachelor of Science in Computer Science and Engineering Physics from Kansas Wesleyan University, awarded in 2012.

Ariel Mordoch

Ariel joined Boeing's Enterprise MBSE Capability team in July 2021. Since then, he has supported many MBSE efforts, including requirements management, integrated simulations with external tools, architecture development, integrating AI with Systems Engineering, and integrating specialty engineering disciplines into MBSE models. Ariel has also authored several Cameo/MSOSA plugins and garnered a reputation within Boeing as a Cameo/MSOSA expert. Ariel's background is in Aerospace Engineering, in which he completed his B.S. at the Georgia Institute of Technology in 2020.

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