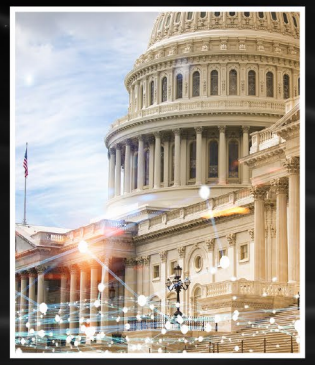
ManTech
Securing the Future





Securing the Future

Utilizing Automation and Ontologies to Design, Deploy, and Sustain an Effective Model Governance Program

Dr. Heidi Davidz, Dr. Douglas Orellana, Tammy Bogart, Wayne Thomasson

Executive Summary

Model Governance Automation

Utilize automation and ontologies to design, deploy, and sustain an effective model governance program. Ensure veracity of artifacts, establish transparency, improve communication, increase trust.

FOUNDATION – Utilize elastic model governance guide for model governance system, digital engineering (DE) infrastructure, individual and composite models

AUTOMATION – Employ widget to scrape constituent models for information

INTEGRATION – Use ontology-first digital thread integration platform

LEVERAGE – Leverage extensive data governance practice

DELIVERY – Apply governance to aid DE to deliver results to fulfill mission needs

Agenda

Why Governance?

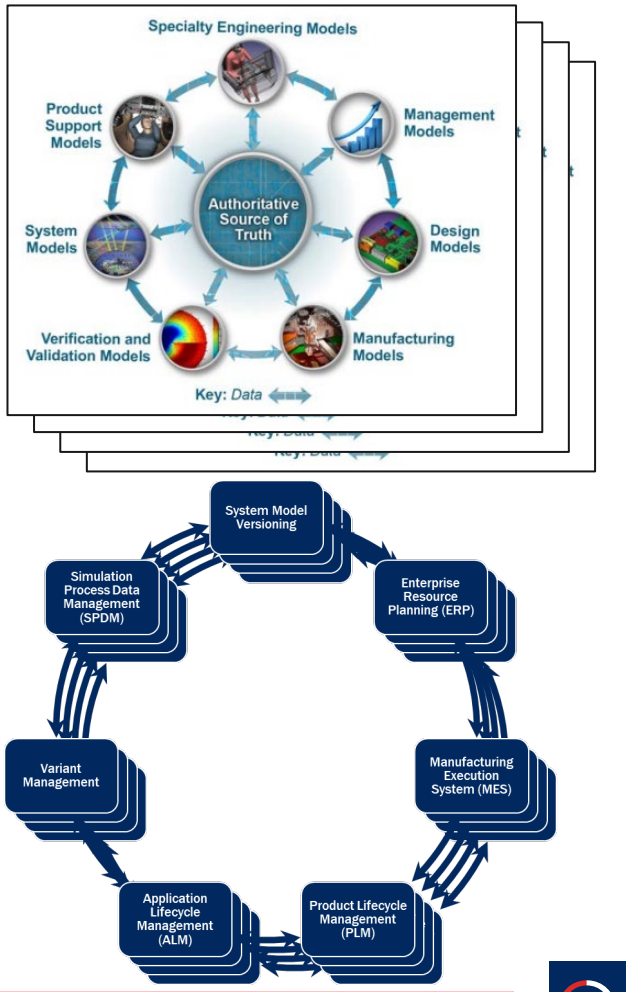
Digital Engineering (DE) is an integrated digital approach that uses authoritative sources of system data and models as a continuum across disciplines to support lifecycle activities from concept through disposal

Use models

Different domains

Distributed data management

Many organizations



Reality

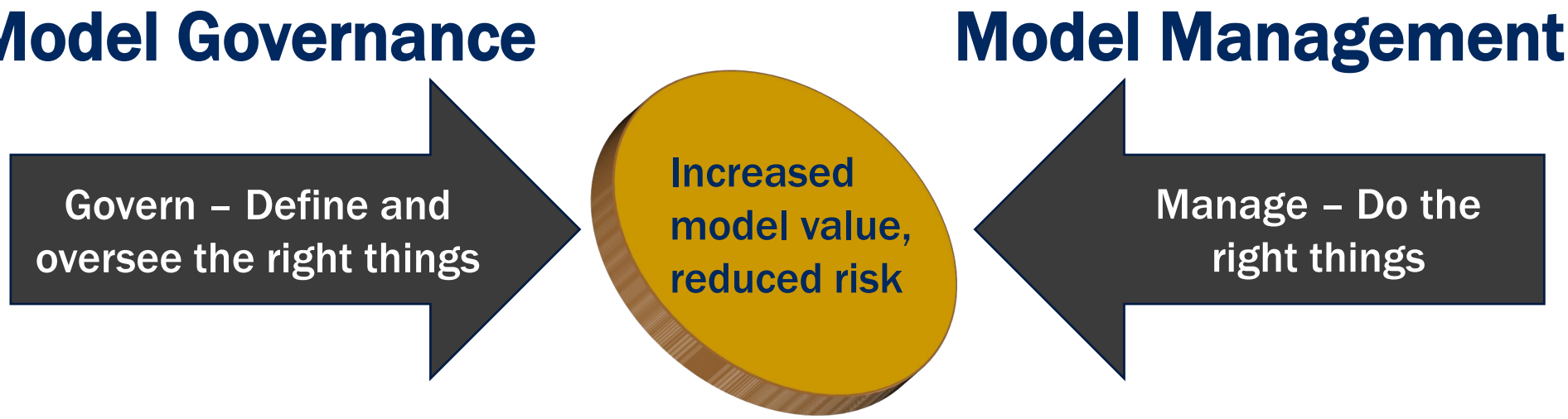
Governance across a digital thread must address a set of data management tools to ensure quality for decision making

What is Model Governance?

- Documented decisions, rights, and accountabilities
- for model related processes,
- executed according to an agreed upon set of rules
- which describe:
  - who can take
  - what actions with
  - what models,
  - when, under
  - what circumstances, using
  - what methods.

Adapted from Pak, Rebekah, "A3 Data Governance: Data Governance Introduction and General Process," May 2021

Governance vs. Management



Model Governance ensures Model Management is happening

Adapted from Ladley, John, "Data Governance: How to Design, Deploy, and Sustain an Effective Data Governance Program, 2nd Edition, Academic Press, 2020.

Two Sides of the Same Coin

Primary Responsibilities

- Define accountability
- Enact policy into procedure
- Provide model and infrastructure transparency
- Monitor quality and compliance
- Report results

Transparent

Collaborative

Measurable

Adapted from Pak, Rebekah, “A3 Data Governance: Data Governance Introduction and General Process,” May 2021

Governance Guide Provides Structure to Organize DE Execution

Earlier Work

Model Governance Guide

As Digital Engineering (DE) employs a digital thread with a broad range of interconnected models, it can be difficult to govern linked models across disciplines and contractual boundaries. This approach includes:

GUIDANCE – Model-based guidance with in-model work instructions,

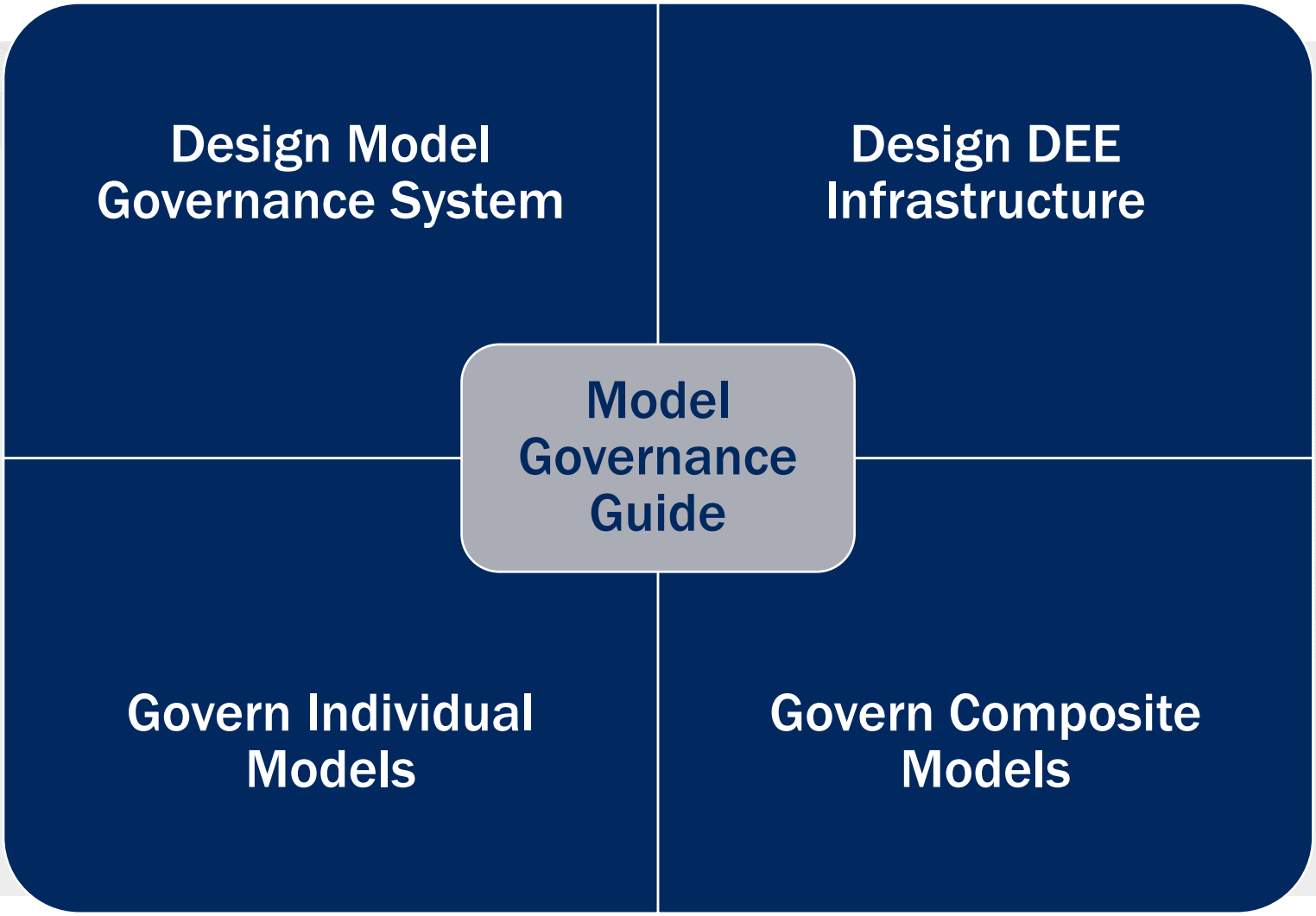
INTEGRATION – Integration of the overall model governance system, DE Ecosystem (DEE) infrastructure, individual models, and composite models,

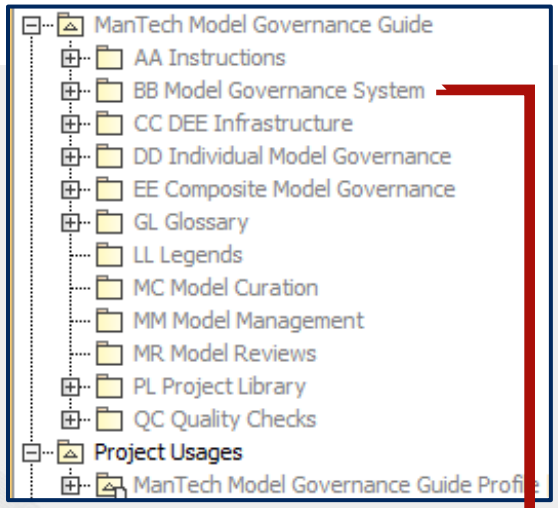
PURPOSE – Traceability of model purpose and resolution of technical debt,

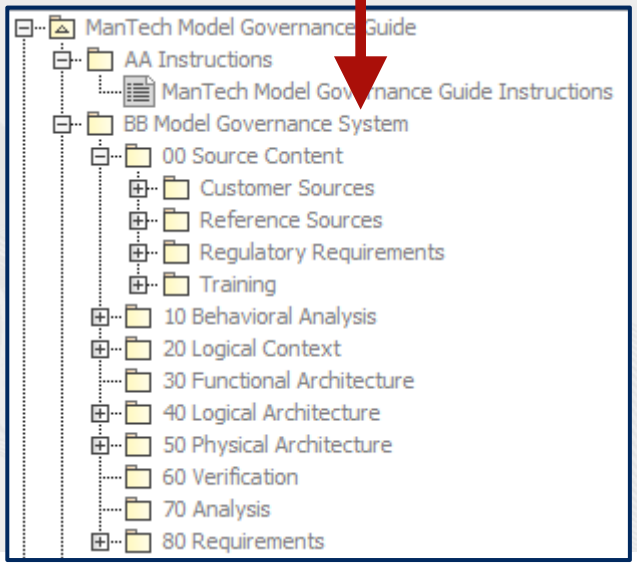
VALIDATION – Automated validation for insight on compliance,

FLEXIBILITY – Customization for flexibility and tailoring (fleX-engineering™).

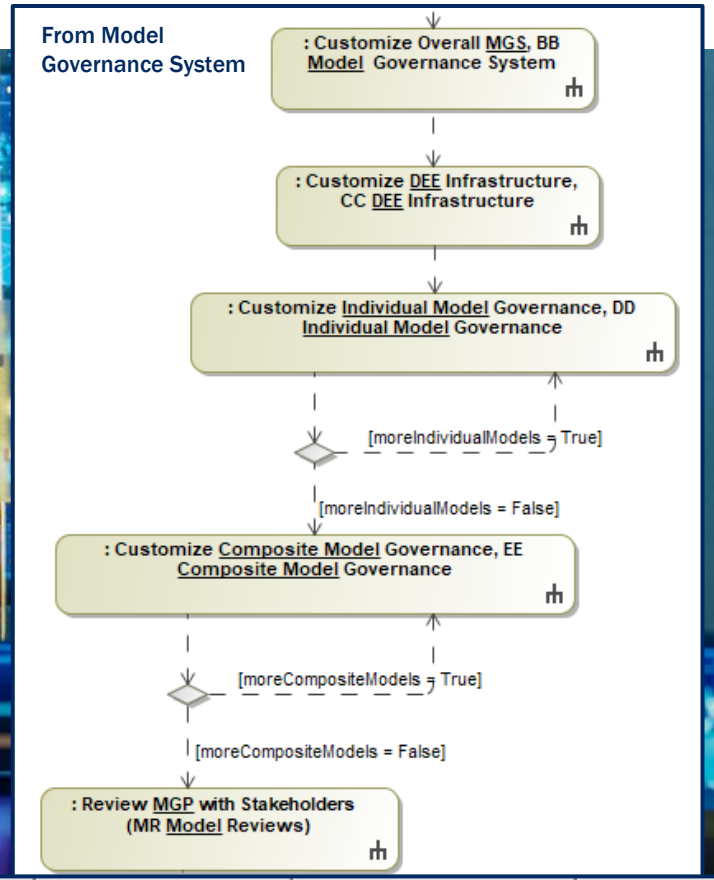
Structure

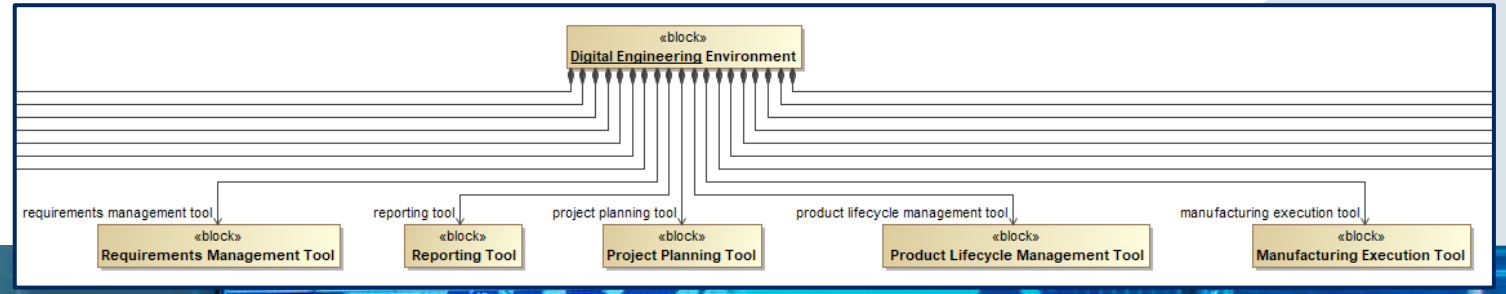

Design Model Governance System
Design DEE Infrastructure
Model Governance Guide
Govern Individual Models
Govern Composite Models

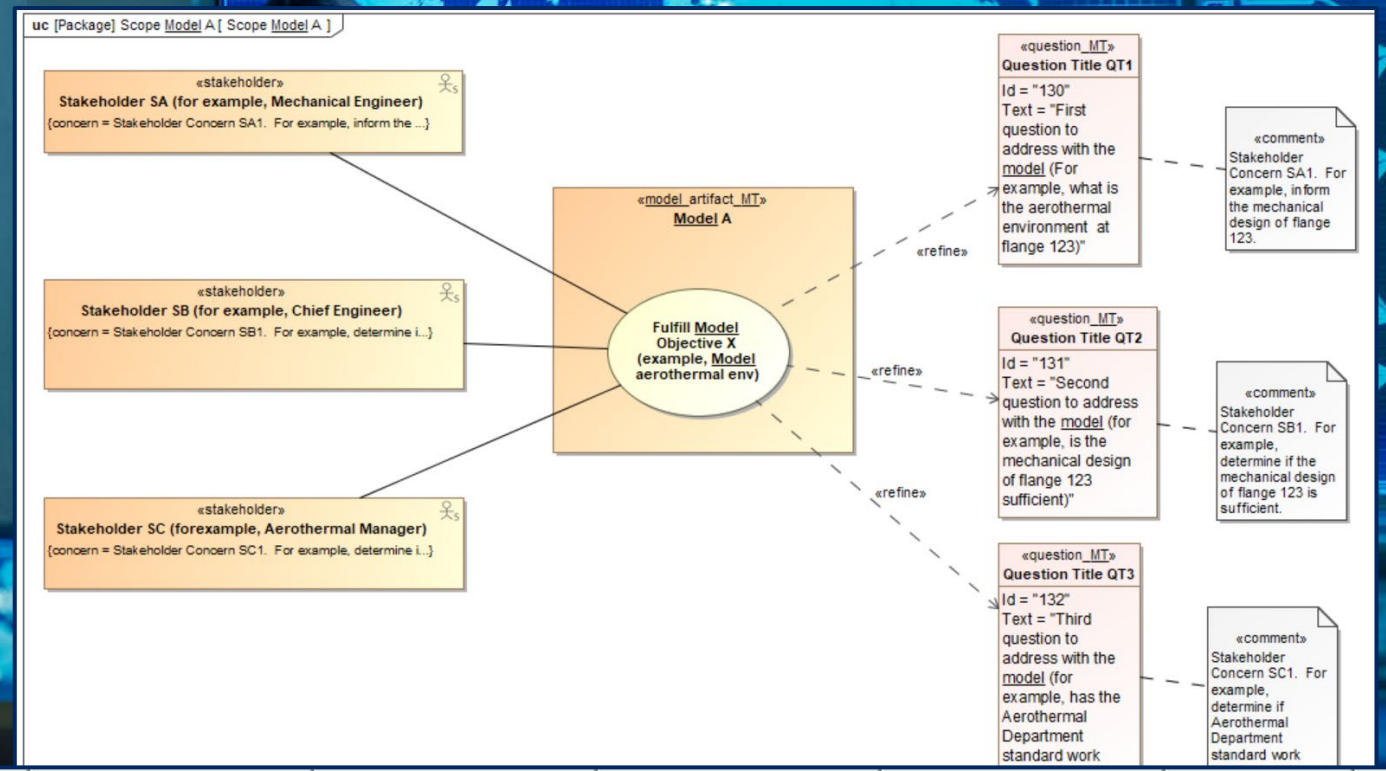

ManTech Model Governance Guide
AA Instructions
BB Model Governance System
CC DEE Infrastructure
DD Individual Model Governance
EE Composite Model Governance
GL Glossary
LL Legends
MC Model Curation
MM Model Management
MR Model Reviews
PL Project Library
QC Quality Checks
Project Usages
ManTech Model Governance Guide Profile


ManTech Model Governance Guide
AA Instructions
ManTech Model Governance Guide Instructions
BB Model Governance System
00 Source Content
Customer Sources
Reference Sources
Regulatory Requirements
Training
10 Behavioral Analysis
20 Logical Context
30 Functional Architecture
40 Logical Architecture
50 Physical Architecture
60 Verification
70 Analysis
80 Requirements

Model Snapshots







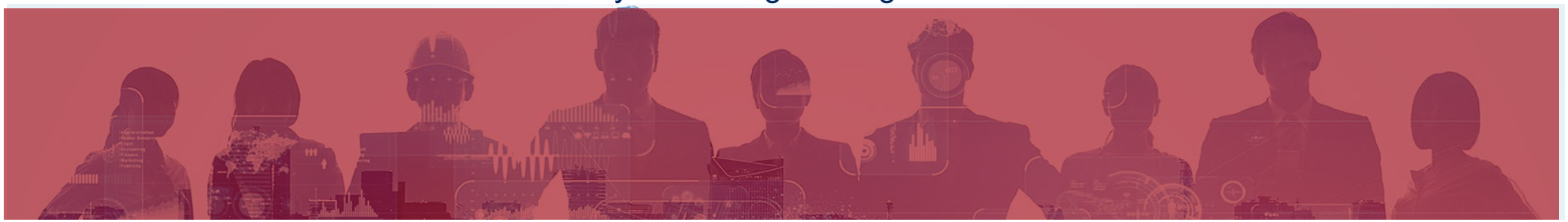
#	Name	Documentation	Associated Assumptions	Associated Risks	Traced to Standards	Use Cases	Questions2	Satisfies	Allocated To	Location
1	Model A	This is the description of Model A...	Assumption B Assumption A	Risk R1	Standard 1 (for example, I Best Practice 3 (for examp Standard 2 (for example, (	Fulfill Model Objective X (e	Question Title QT1 Question Title QT2 Question Title QT3	23 Modeling Questions MGSG-116 Risk MGSG-2 Model Name	ansys : ANSYS	AWS AppStream

Ensure Models and Infrastructure Address Program Needs

User Statement

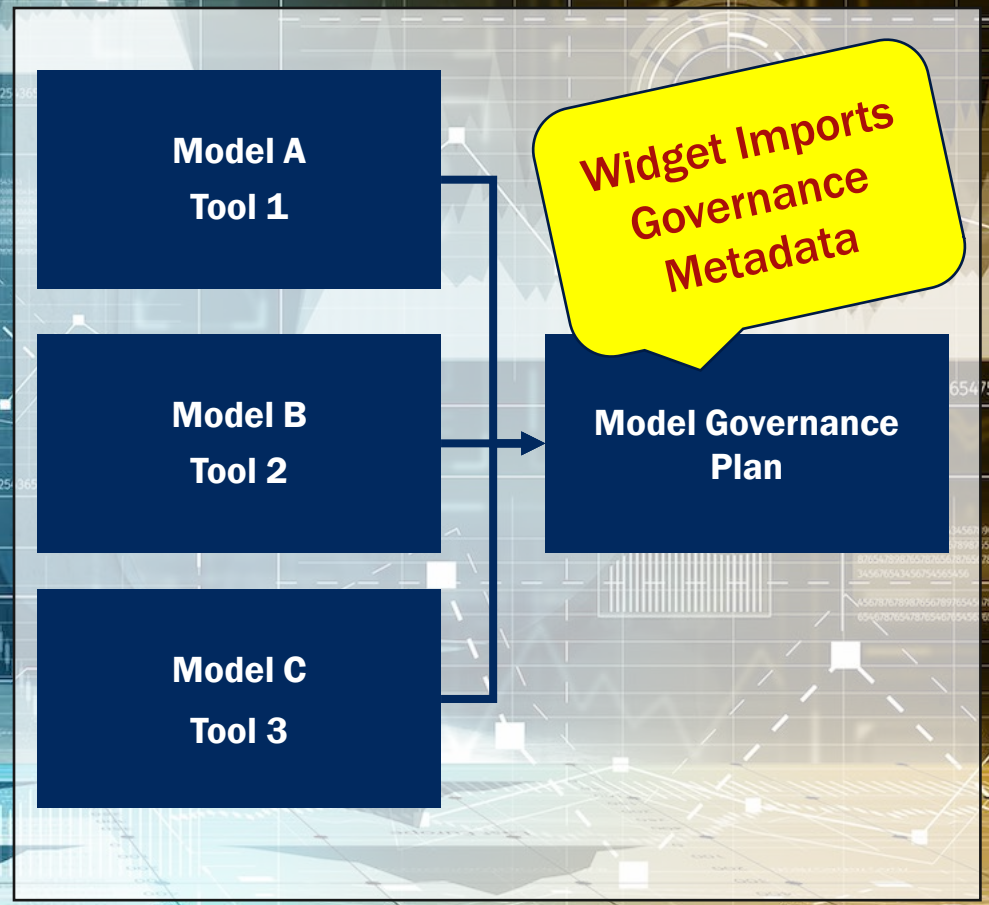
"The Model Governance Guide provided our team with a framework for developing data governance rules and techniques to execute a rigorous enterprise modeling program. Establishing a set of model controls is no different and just as important as establishing Security Controls in the Cybersecurity discipline. With this effort, our customer will improve their business process management, degree of data integrity, and communication and transparency among Stakeholders. Without Model Governance the desired degree of model and data integrity cannot be achieved."

Mark Stimeling and Rebecca Quintero
ManTech Marine Systems Engineering Directorate



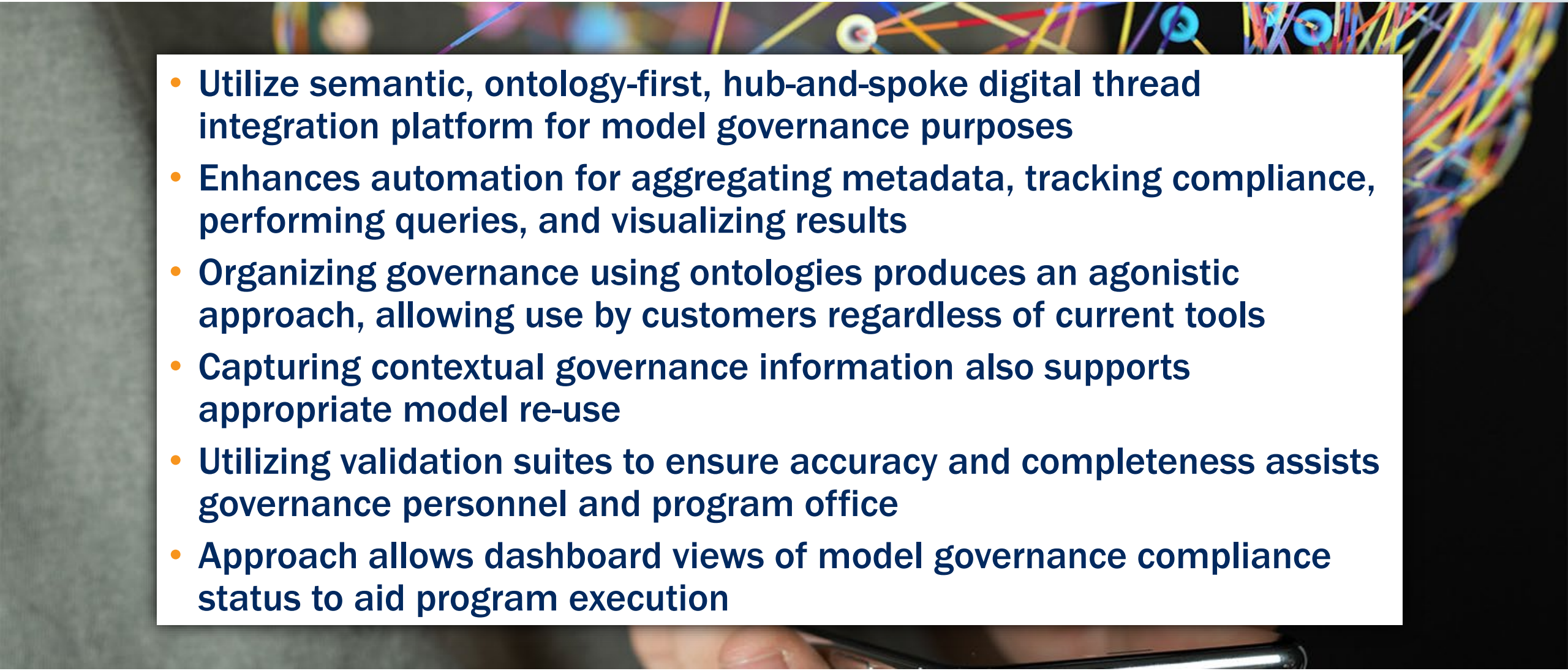
Updates Add Automation

- Automation and ontologies utilized to reduce manual effort
- Widget automatically scrapes constituent models across an ecosystem to report governance information
- Automating ingestion of governance data reduces chance for error
- Where governance metadata are lacking, user interface guides input of missing information



Utilize Automation to Populate Governance Information

Semantic Integration Aids Governance



- Utilize semantic, ontology-first, hub-and-spoke digital thread integration platform for model governance purposes
- Enhances automation for aggregating metadata, tracking compliance, performing queries, and visualizing results
- Organizing governance using ontologies produces an agonistic approach, allowing use by customers regardless of current tools
- Capturing contextual governance information also supports appropriate model re-use
- Utilizing validation suites to ensure accuracy and completeness assists governance personnel and program office
- Approach allows dashboard views of model governance compliance status to aid program execution

Sustain an Effective Model Governance Program

- Tactical strategies to enhance effectiveness
- Sustain an effective program with buy-in and consistent participation from stakeholders
  - Build business case
  - Demonstrate return-on-investment
  - Utilize flexibility and scalability

CRITICAL SUCCESS FACTORS

1. **Require as mandatory**
2. **Show value explicitly**
3. **Manage organizational change**
4. **View as enterprise effort**

Adapted from Ladley, John, "Data Governance: How to Design, Deploy, and Sustain an Effective Data Governance Program, 2nd Edition, Academic Press, 2020.

Demonstration

Next Steps

Evolve Governance Approach to Enhance Digital Fabric Solutions and Services for Customers

Additional Capabilities

- Implement program lessons learned
- Extend digital fabric reach
- Extend metadata scraping
- Evolve governance ontology
- Optimize strategy

References

- Ladley, John, “Data Governance: How to Design, Deploy, and Sustain an Effective Data Governance Program, 2nd Edition, Academic Press, 2020.
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