



2024
Annual **INCOSE**
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HYBRID EVENT
Torrance, CA, USA
January 27 - 30, 2024

LOTAR for MBSE

NAS9300-500 Overview

Mark Williams - PDES Inc., LOTAR, INCOSE TIMLM

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LOTAR for MBSE: Part 500

Fundamentals and Concepts for Long Term Archiving and Retrieval of digital technical product documentation such as architecture, analytical and requirements data



WHY LOTAR for MBSE?

- Per Tom McDermott (SERC): the DoD regrets not having an MBSE model preservation process
- 50% of each company's Intellectual Capital is being lost (the time employees spend searching for previous information)



Industry Challenges

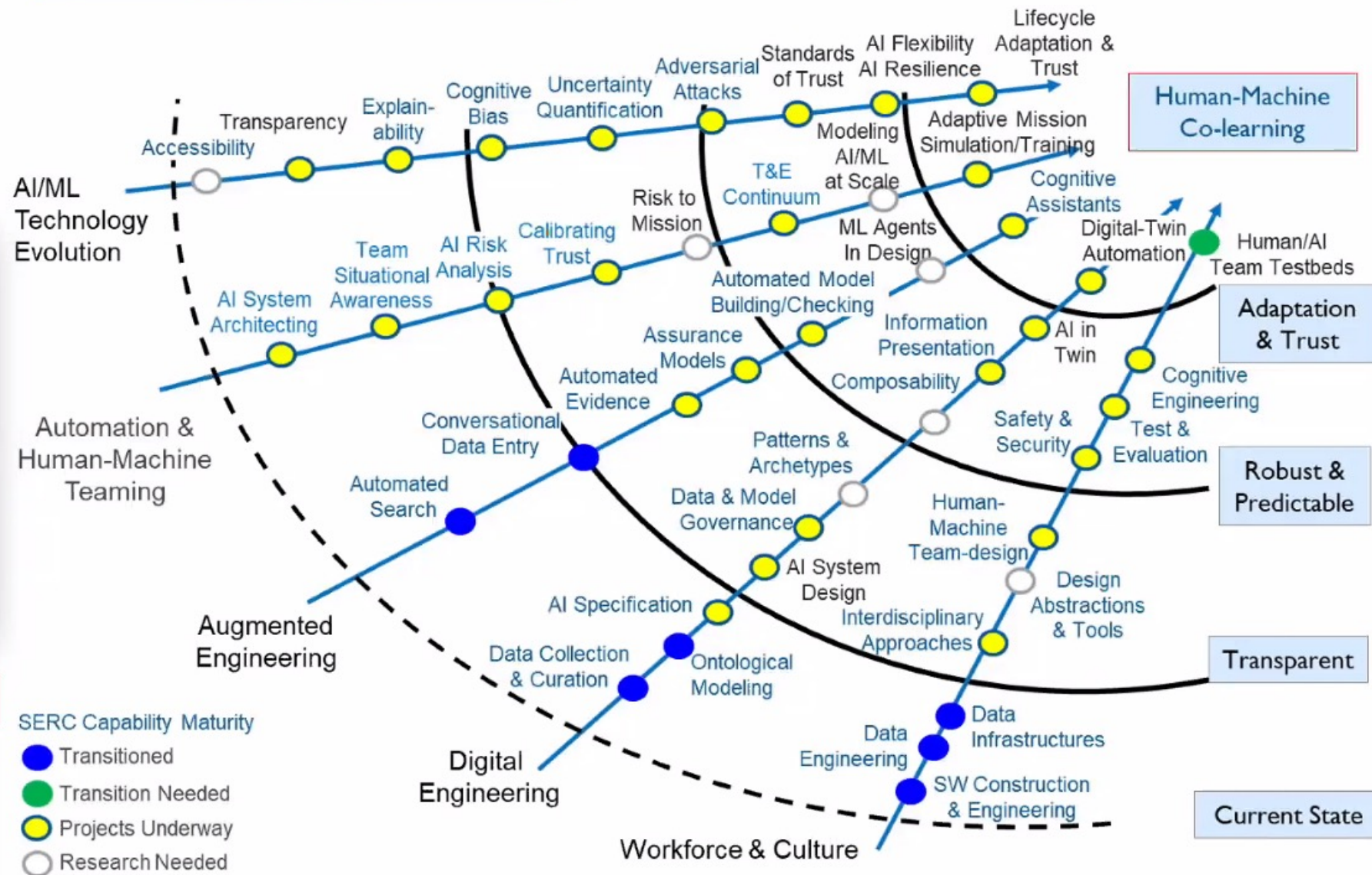
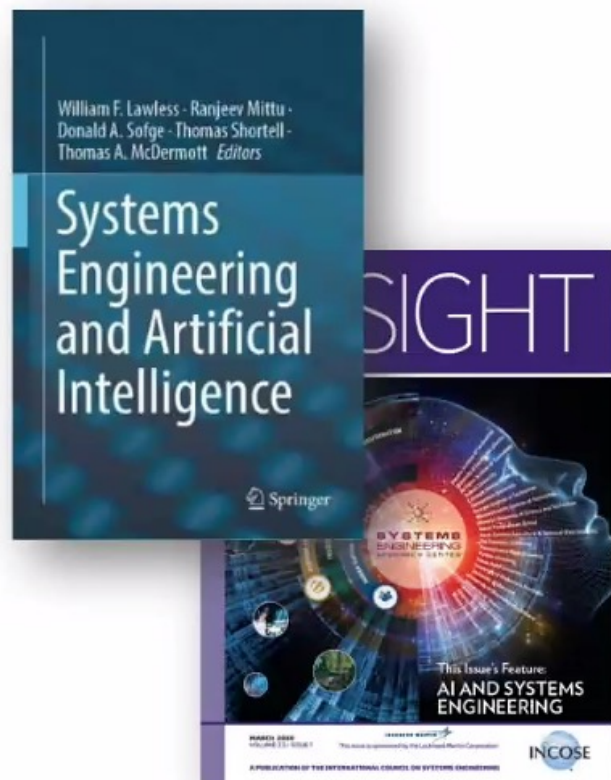
- No Measurement Systems for MBSE and benefits (too hard, no tools, no data)
- Limited knowledge of Data Standards
- The limitations of PLM systems (too generic, domain specific, no prioritized model/requirements traceability)



Industry Issues

- Save models and throw away data
- Ad hoc use of Data Standards
- Tools strategy by cost versus needs
- Search models versus Query Data
- Inhibit Change Management of all data
- Siloed Organizations

2019: SERC AI & AUTONOMY ROADMAP





LOTAR Use Cases

- **BASIC**

- How to archive the relevant product data for preservation.
- How to retrieve, verify and reuse the archived information

- **EXTENDED**

- The ability to maintain the data used for certification.
- The ability to support regulatory agency requirements, and investigations.
- The ability to reuse/migrate design information
- The ability to serve other aspects of the business lifecycle. This generally includes legal, product support, future product modifications, and part/design obsolescence



LOTAR for MBSE Use Cases

- The ability to exchange model and context data between departments in an organization or in an enterprise.
- The ability to exchange model and context data across a supply chain.
- The ability to support Verification and Validation throughout the design lifecycle.
- Identify the allocation of design requirements
- Identify what system elements are applicable to a set of models



LOTAR MBSE Domain Parts

- **Part 500**: Fundamentals and Concepts for long term archiving and retrieval of Model-Based Systems Engineering information.
- **Part 510**: Archive and retrieve Requirements; text, graphics, tables, models, and “parameter based” information.
- **Part 515**: Archive and retrieve Validation and Verification (V&V) models and data.
- **Part 520**: Archive and retrieve system or component level analytical behaviour models described by specification or executable code, containing differential, algebraic and discrete equations.

LOTAR MBSE Domain Parts (continued)



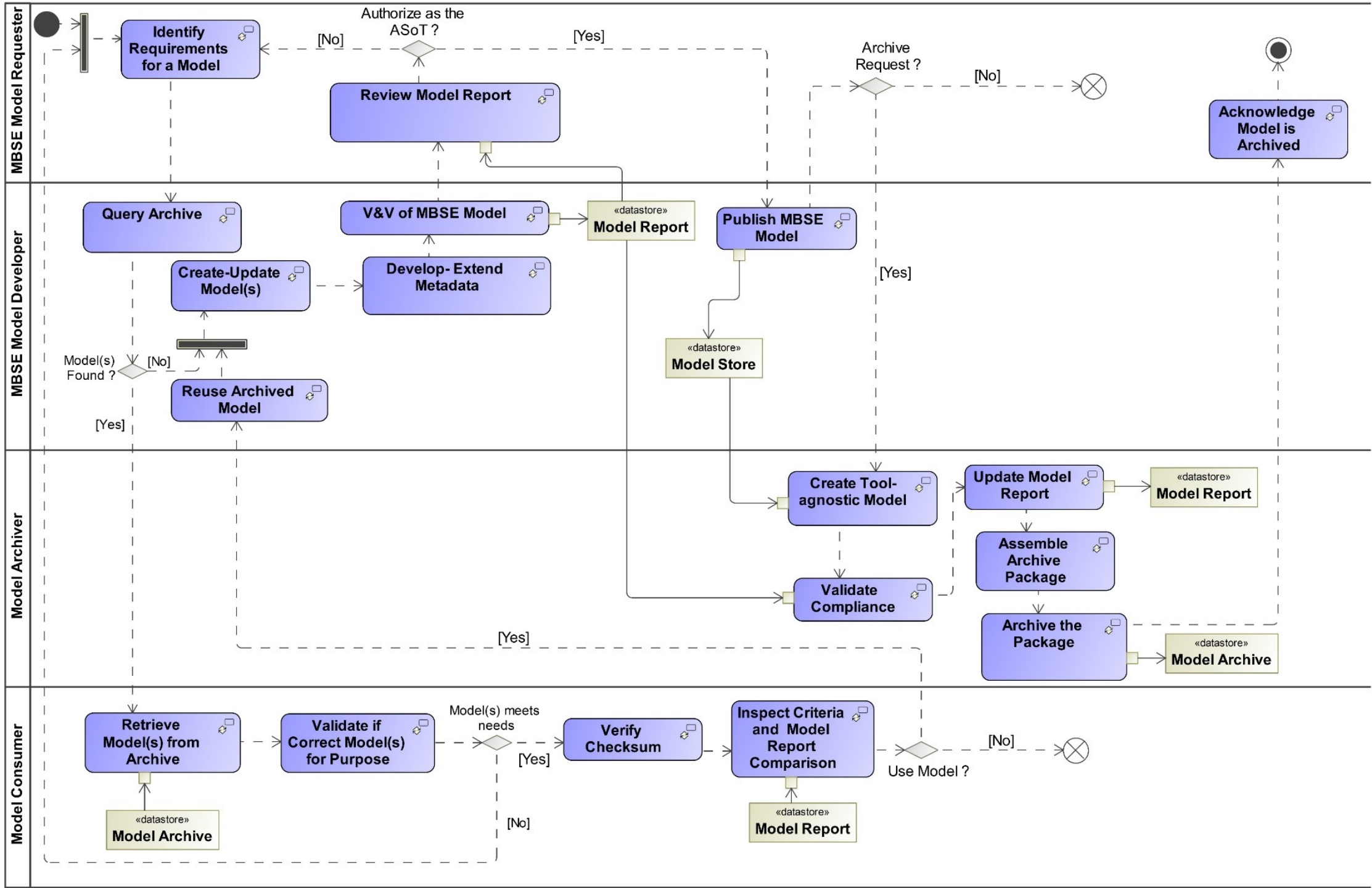
- **Part 530:** Archive and retrieve models defined using architecture description languages (ADLs) defined by ISO 42010/SAE AS5506.
- **Part 540:** Archive and retrieve data and models defining the Logical Bill of Materials (LBOM), and the physical implementation specifications required for Model-based 3D Engineering and Product Manufacturing.
- **Part 550:** Archive and retrieve models or features describing digital or relational links. Methods for specifying highly integrated and interrelated models and elements across numerous tools and applications.

MBSE lifecycle steps - LOTAR process



- Implement an SE process using MBSE
- Establish a plan for data preservation
- Establish a plan for data transformation
- Establish procedures to maximize ReUse







New Dependent Capabilities

- Model Report
 - Summarize input, execution and output
 - Expose the V&V rules
- Model Manifest (or AP243, MoSSEC)
 - Metadata: Content, intent, Methods
- Model2Model and Element Links
 - Relationships, dependencies, parent-child







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