PLM Road Map™ & PDT Fall 2021
DISRUPTION—the PLM Professionals' Exploration of Emerging Technologies that Will Reshape the PLM Value Equation
CIMdata November 16&17 Virtual-Live Event eurostep

AEROSPACE & DEFENSE PLM ACTION GROUP

Aerospace & Defense PLM Action Group

The Business Value of Standards-based Information Interoperability for Aerospace & Defense

AIRBUS · BOEING · EMBRAER · GE Aviation · Gulfstream · Pratt & Whitney · Rolls-Royce · SAFRAN

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Speakers

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- CIMdata
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  - Don Tolle, Director, SDSD Practice

Agenda

- Problem Statement
- Business Value
- Role & Value of Interoperability Forums
- Criteria for Interoperability Standards
- Key Recommendations
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Position Paper

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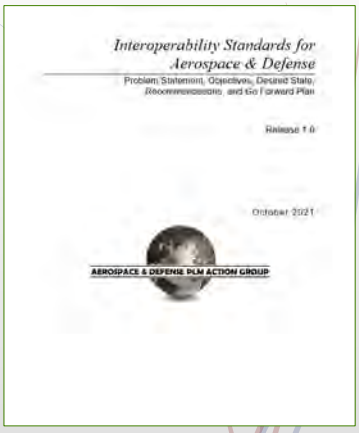
- Objectives for PLM Interoperability
- Business Requirements for PLM Interoperability
- Business Value of Digital Standards to Support Model-Based Enterprise Interoperability
- Role and Value of Interoperability Forums
- Selection Criteria for Interoperability Standards
- Desired State—Importance of Industry Alignment
- Key Standards Recommended by Each Team
- Go Forward Plan

Appendices

A: Classification of Standards to Support Model-Based Enterprise Interoperability

B: Introduction to the Standards Radar Screen



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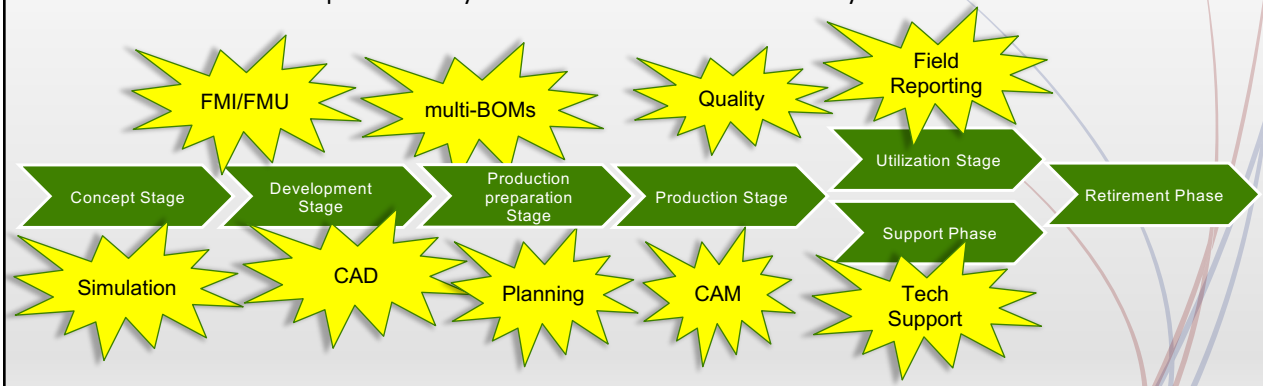
Premise

Your internal operations and supply chain is hopelessly mired in poor data quality, further hindered by business processes and data that are not fit for purpose, resulting in corrective action, data cleansing, and other "human shims" to ensure that the product lifecycle value stream functions correctly.



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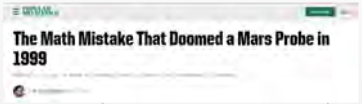
Problem Statement

- Data that forms the basis of product design is authored, vaulted, translated, vaulted again, and streamed via multiple channels internally and externally
- At each point in the journey, data quality suffers
  - Mistakes (human and computer)
  - Terms and definitions (mappings)
  - Change control
- Vendors, consultants, and internal departments advocate for the value of PLM
- Are we addressing the right problem?
- Is it our management of the data? Or is it the data itself?

https://hbr.org/2016/09/bad-data-costs-the-u-s-3-trillion-per-year

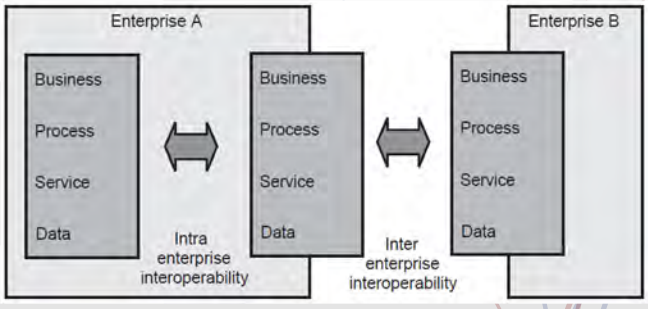


https://www.popularmechanics.com/space/moon-mars/news/a28632/the-dumb-mistake-that-doomed-a-mars-probe-in-1999/

https://www.cimdata.com/en/education/educational-webinars/webinar-plm-benefits-metrics-and-roi

Framework for the Discussion

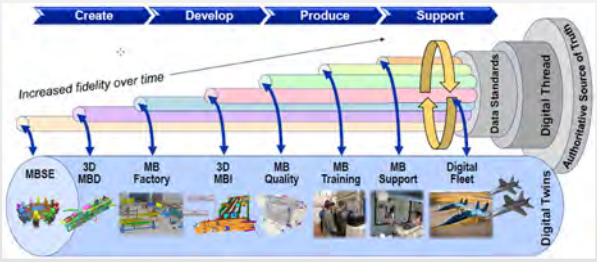
- Interoperability is the ability to communicate and interact effectively
- Interoperability exists internal to a company and between companies or with customers and maintenance organizations
- Interoperability exists within multiple domains
- Interoperability demonstrates interaction and dependency
- Interoperability persists over time



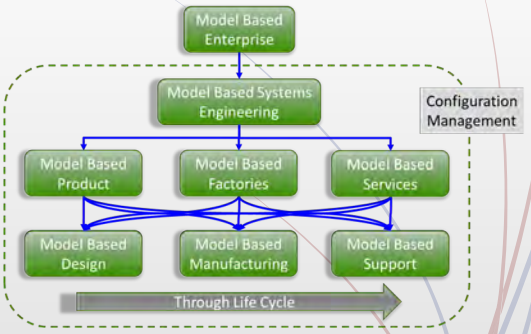
ISO 11354 – Requirements for establishing manufacturing enterprise interoperability

The Value Proposition

The digital product is enhanced over time; value accumulates to the product



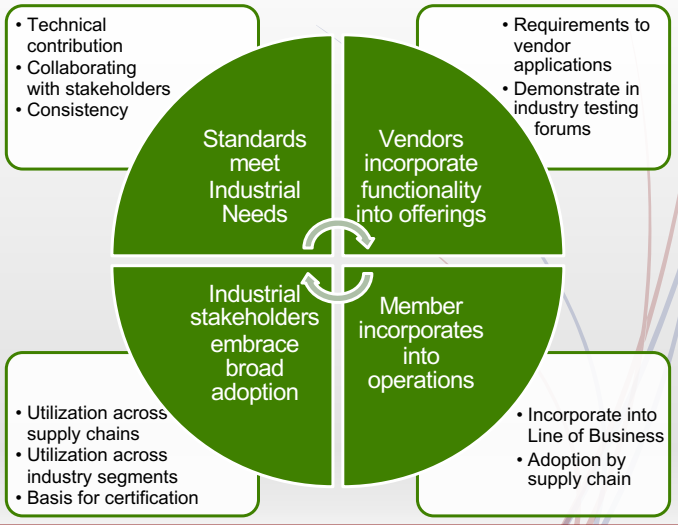
Strategic Value of Standards in Digital Transformation–ISO/TC 184/SC 4
Industry Day – May 15, 2019 The Boeing Company



The digital product propagates across the enterprise; value proliferates as experience with digitalization grows

The Criteria for Recommendations

- High value of the standard in practice
- Alignment to the vision of the group
- Consistency among the selected standards
- Federated with other standards
- Consistent with A&D trade associations' recommendations
- Tested by interoperability forums, when relevant
- Utilized by other industries, when relevant



Recommendations

List of selected standards per working groups

Project	Category	Standard
MBSE	Process	ISO/IEC 19514 – System modeling language (SysML)
MBSE	Process	ISO/IEC 15288 – System life cycle processes
MBSE	Data	Modelica FMI – Functional mock-up interface
MBSE	Data	ReqIF – Requirements interchange format
MBSE	Data	ISO 10303-243 – Modeling and simulation information in a collaborative systems engineering context
MBD	Data	ISO 14306 ed 2 – JT file format specification for 3D visualization
MBD	Data	ISO 14739 – 3D use of Product Representation Compact (PRC)
MBD	Data	ISO 32000 – Portable Document Format (PDF)
MBD & Multi-view BOM	Data	ISO 10303-242 ed 2 – Managed model-based 3D engineering
Multi-View BOM	Data	ISO 10303-239 ed 2 – Product Lifecycle Support (PLCS)
Collaboration	Process	ISO 37500 – Guidance on outsourcing
Collaboration	Process	ISO 11354 – Requirements for establish manufacturing enterprise process interoperability
Collaboration	Process	ISO 44001 – Collaborative business relationship management
Collaboration	Process	Mil Standard 31000 – Technical Data Packages

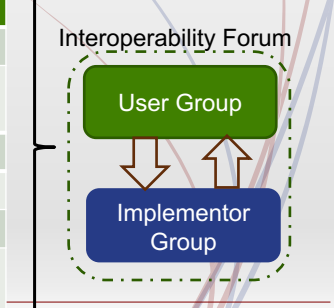
Recommendations

Participation to associated Interoperability Forums

PLM interoperability standards are implemented through COTS solutions and tested via regular interoperability test rounds

- Interoperability testing accelerates the deployment of interoperable COTS solutions from multiple PLM providers and integrators, driven by priorities agreed to by the manufacturers
- Total cost of ownership of standards-based PLM interoperability solutions is minimized

Association	Standard	Interoperability Forum (IF)
prostep ivip	OMG ReqIF	ReqIF IF
PDES, Inc., AFNeT, & prostep ivip	ISO 10303 AP242	CAx IF
PDES, Inc. & AFNeT	ISO 10303-242	EWIS IF
PDES, Inc.	ISO 14739	3D PDF IF
prostep ivip	ISO 14306	JT IF
AFNeT & prostep ivip	ISO 10303 AP242 / AP239	PDM IF



Next Steps

- This project will update recommendations on a periodic basis to include:
  - Extension of this position paper's scope,
  - Implementation of PLM software,
  - Deployment by the A&D industry,
  - Requirements to standardization bodies,
  - Requirements to interoperability forums, and
  - Recommendations to aerospace trade associations.
- AD PAG members will view PLM solution providers who provide implementation and support of the PLM interoperability standards listed above as demonstrating an advantage in compliance with A&D business requirements.

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Aerospace & Defense PLM Action Group

Founded in February 2014

Mission

An association of aerospace & defense companies within CIMdata's globally recognized PLM Community Program, which functions as a ***PLM advocacy group*** to:

- Set the direction for the aerospace & defense industry on PLM-related topics that matter to members
- Promote common industry PLM processes and practices
- Define requirements for common interest PLM-related capabilities
- Communicate with a unified voice to PLM solution providers
- Sponsor collaborative PLM research on member-prioritized industry and technology topics

Website: www.ad-pag.com

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