

Model Based Enterprise

It is not only about technology

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Agenda Presenter

- Introduction MBD _ MBE
- The Model Based Enterprise
- Change management



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ASML:

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LAM Research (CA):

MBE program support & Supply Chain rollout

Mikrocentrum MBD meet & learn community:

Chairman Program Board

The Digital Enterprise

PMI = Product and Manufacturing Information

Product information that defines a part or assembly for manufacturing

MBD = Model Based Definition

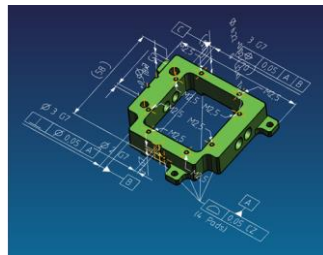
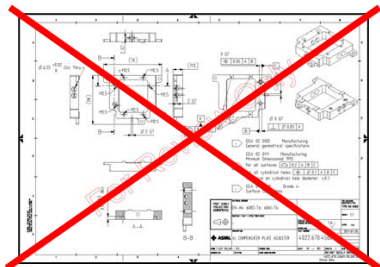
Geometric and non geometric information that fully defines a part or assembly (parts:2018, assemblies:2019)

MBE = Model Based Enterprise

Company wide strategy where an annotated digital 3D model of a product serves as the authoritative information source for all activities in its lifecycle

MBSE = Model Based Systems Engineering

System engineering initiative to create a digital model of a system that is used by all engineering disciplines and other functional organizations within a company.



There are two prerequisites to implementing MBE:

- 1. Creation of necessarily annotated 3D models, known as a Model-based Definition*
- 2. Transformation of CAD data into forms usable by downstream lifecycle activities (i.e. production)*



Figure 1. An overview of the MBE Maturity Capability Index.

The Model Based Enterprise

Industry & MBE

Defense
Aerospace
Automotive
Semiconductor
Etc.



Realization of complex machines or processes with high performances needs a digital enterprise for product/process management, requirements management, data management, design by simulation and/or Digital Twin and realization of the Digital Factory

Some companies that introduced MBE:

Boeing
Dassault
CISCO
Raytheon
Schneider Electronics
LAM research
Paccar (DAF)
Airbus
ASML



Life Is On



Raytheon

- 2D drawings:
 - 2D view on 3D reality
 - Intended for humans
 - Can lead to misinterpretations
 - and inconsistency with the 3D model
 - Blocks downstream re-use
- MBD is one of the fundamentals of the digital enterprise
 - Machine / software readable
 - One source one truth (model centric)
 - System integration
 -
 - **Digital data fabric**



Benefits for design

- Reduce lead-time
- Reduce design cost
- Improve design quality
 - Automation
 - GD&T
 - Variation analysis
 - Should costing
 - 3D reviews (incl. VR)
 - TDP quality control
 - Design re-use
 - Simulation Driven Design Analysis
 - First time right
 - Digital Twin
 - Design for SPC

Benefits for manufacturing

- Design quality
 - TDP
 - Manufacturability & design for SPC
- Automation for FAI/inspection
 - all info in 3D model (one source)
 - ballooning or bubbling
 - inspection plan and report
 - feedback loop to customer SOE
- Automatic CMM programming
 - Zeiss, Mitutoyo, Hexagon etc.
- Automatic CAM programming
 - Feature based machining
 - Color coding
 - NX CAM, Hypermill, Topsolid, etc.
- Robotics

DATA CREATION

DATA STORAGE

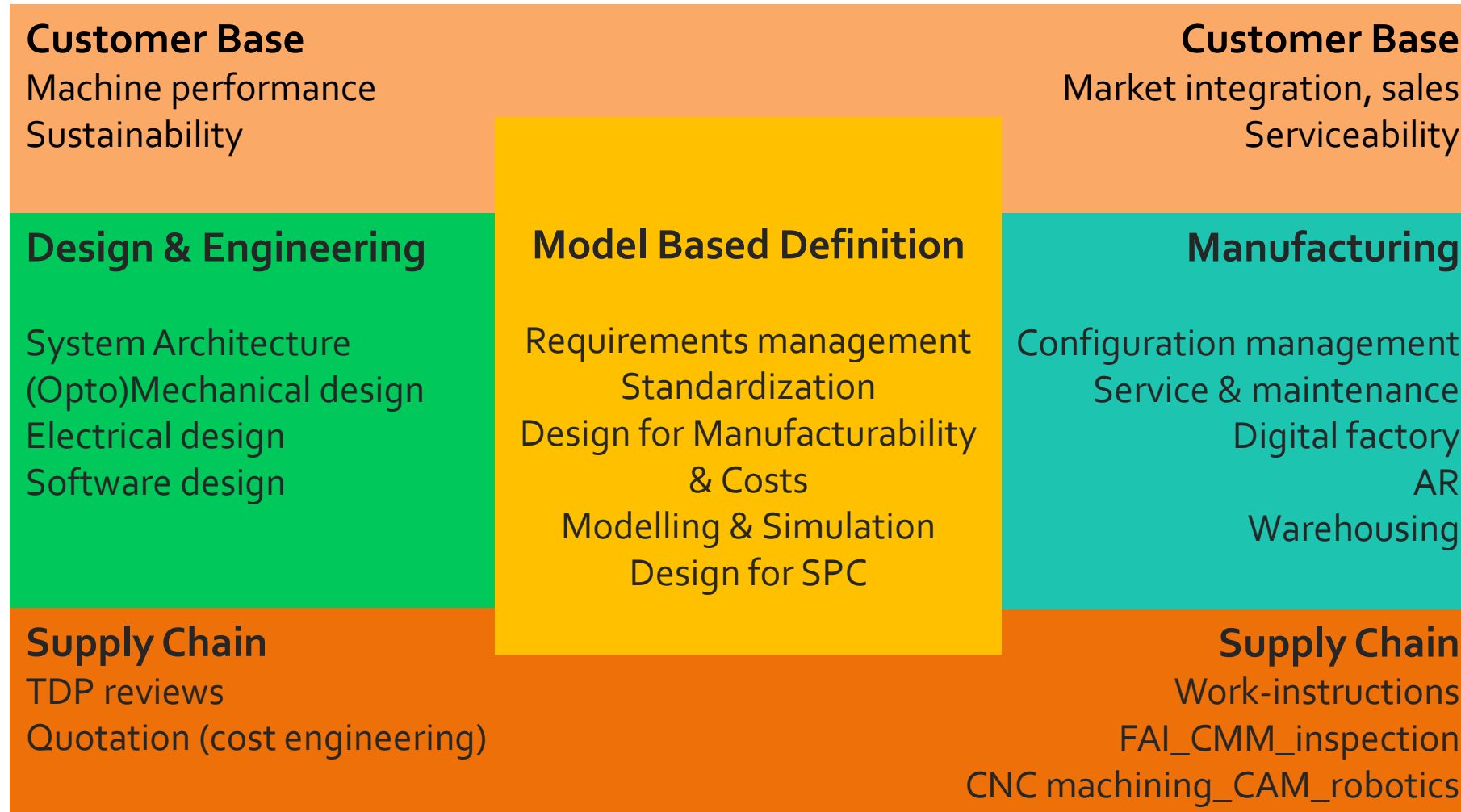
DATA (re)-USE

DATA CONNECTION

DATA EXCHANGE

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The MBE landscape



- ❑ Digital transformation requires rethinking how an organization delivers value. It's not just about adding technology to existing processes. Rather, it requires a radical rethinking of how an enterprise leverages technology along with operations and people to optimize performance.
- ❑ During a digital transformation process, old and new revenue streams will coexist. But resources are constrained by supporting legacy operations while simultaneously implementing an everything-as-a-service (XaaS) value proposition.
- ❑ A successful digital transformation strategy requires organizations to define and articulate their digital goals to create broad organizational alignment. At the start, it is important to assess the organization's digital maturity and readiness for change to then pinpoint the required critical capabilities and competencies.
- ❑ Although the goal of digital transformation is to use digital technology to solve traditional problems, **it's not only about technology**. Rather, the operative word is transformation. It's about using technology to change the way your organization operates, positions itself in the marketplace and delivers benefits to customers.

- ❑ Simply automating or digitizing existing processes and products isn't the only answer. Some 26% of executives identified their company's lack of digital transformation strategy as an organizational challenge. Choosing the optimal path from among the business models is critical to accelerating transformation.

- ❑ Types of Digital Transformation:
 1. Process Transformation. See slide 5
 2. Business Model Transformation. (change the way to deliver value for customers). Switch from a sales and support model to XaaS, where the "X" may be hardware, storage capacity or applications.
 3. Domain Transformation
Redefine products and services. Extend current services to a new customer base or develop entirely new technology-enabled offerings.
 4. Cultural/Organizational Transformation
Embracing a digital-first culture enables organizations to adopt agile workflows, develop a bias toward testing and learning as well as support decentralized decision-making. However, a successful transition to a digital-first culture requires redefining mindsets and processes while also incorporating new talents and capabilities.

End

Thanks!