



MATTI KOSKIPÄÄ

Dassault Systemés
Industry Process Consultant

Dassault Systemés 2010 –
Specialist in Model Based Systems Engineering, Multi Discipline
Engineering, Product -, Project and Portfolio Management.

IBM 2006 – 2010
Technical Account Manager

Tooltech Europe Oy 2005 – 2006
Project Manager and responsible for coordinating engineering projects

Metso Paper Oy 1999 – 2004
Engineering process development
Project manager for development of hydraulic design



PEKKA LÄHTEINEN

Dassault Systemés

Director, Industry Consulting and Technical Sales

Dassault Systemés

2016-

Several global customer cases; Valmet, Nokia, Ericsson, Wärtsilä, MetsäBoard, etc.

Nokia/Microsoft

2000-2015

Nokia PDM, Product Creation Renewal, Enterprise Architecting, UX/Consumer Intelligence, Nokia/Microsoft PLM Vision

Valmet Tractor Works/Valtra Tractors

1988-2000

3D CATIA, FEA, Proto & testing lab., PDM, Sales Configurator, ERP renewal

Our company

A purpose-driven company

Combining Art, Science & Technology
for a more sustainable world



20,000 passionate people

140 nationalities
195 sites
One global R&D / 69 labs



Long-term driven

Majority shareholder control
Revenue: €4,056 millions*
Operating margin: 32%*

*Figures as of FY 2019 / Non-IFRS



12,600 partners

Software, Technology & Architecture
Content & Online services
Sales
Consulting & System Integrators (C&SI)
Education
Research



270,000 customers

11 industries in 140 countries
25 million users
Game-changing
3DEXPERIENCE platform

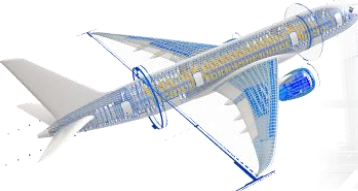


Our legacy

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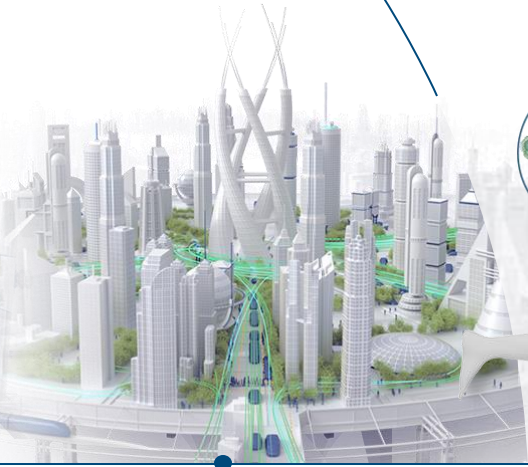
1981
**3D
Design**



1989
**3D DMU
Digital
Mock-up**



1999
**3D PLM
Product Lifecycle
Management**



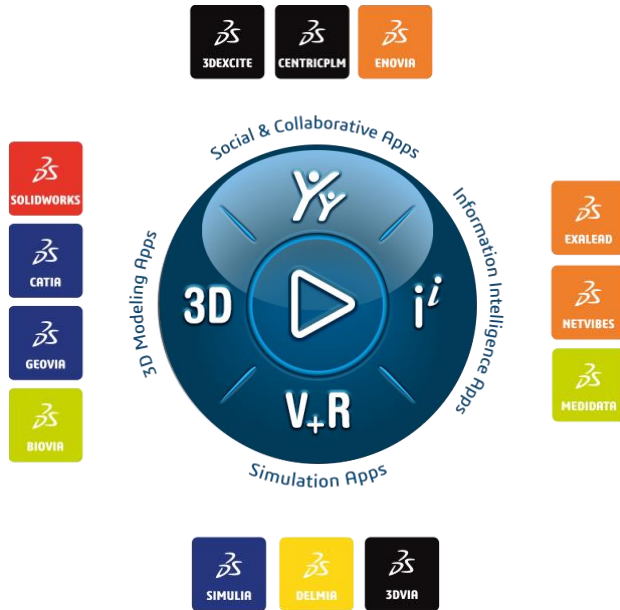
2012
**3DEXPERIENCE®
platform**



2020
**Virtual Twin
Experience
of Humans**

3DEXPERIENCE® powers our brand applications...

...for 11 industries





3DEXPERIENCE®

Model Based System Engineering

What is it?

MBSE Introduction

Aalto University Guest Lecture

12.1.2021

Pekka Lähteinen

Matti Koskipää

Video

What is MBSE?

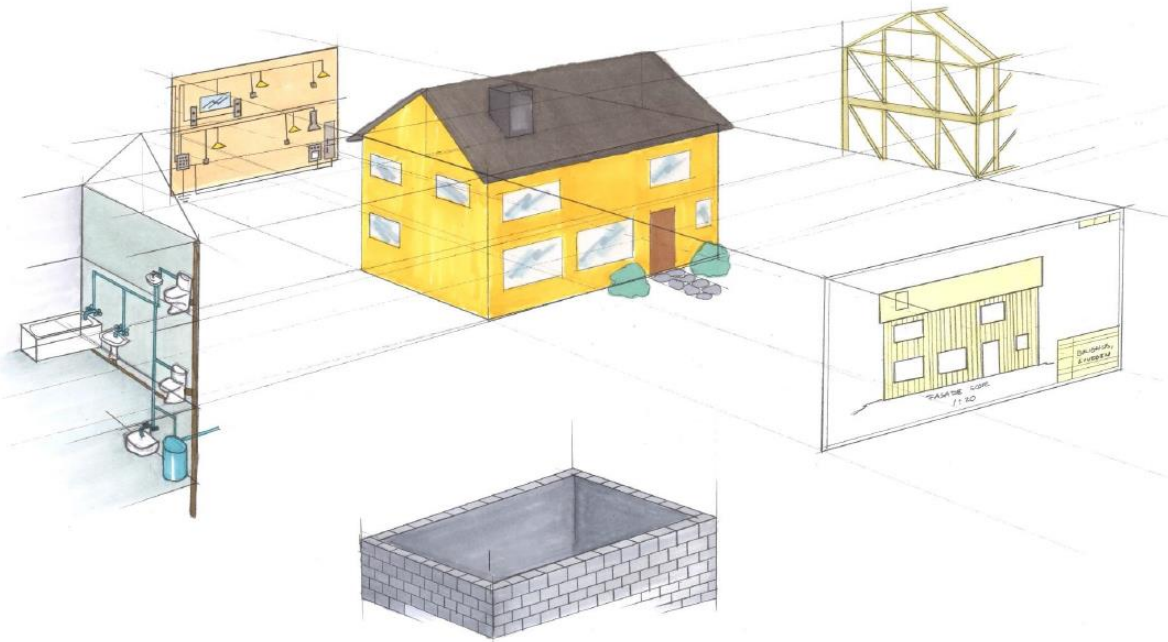
“**Model-based systems engineering (MBSE)** is the formalized methodology of modeling to support system *requirements, design, analysis, verification and validation* activities beginning in the *conceptual design phase and continuing throughout development and later life cycle phases*.”

INCOSE (International Council on Systems Engineering) SE Vision 2020 (INCOSE-TP-2004-004-02, Sep 2007)

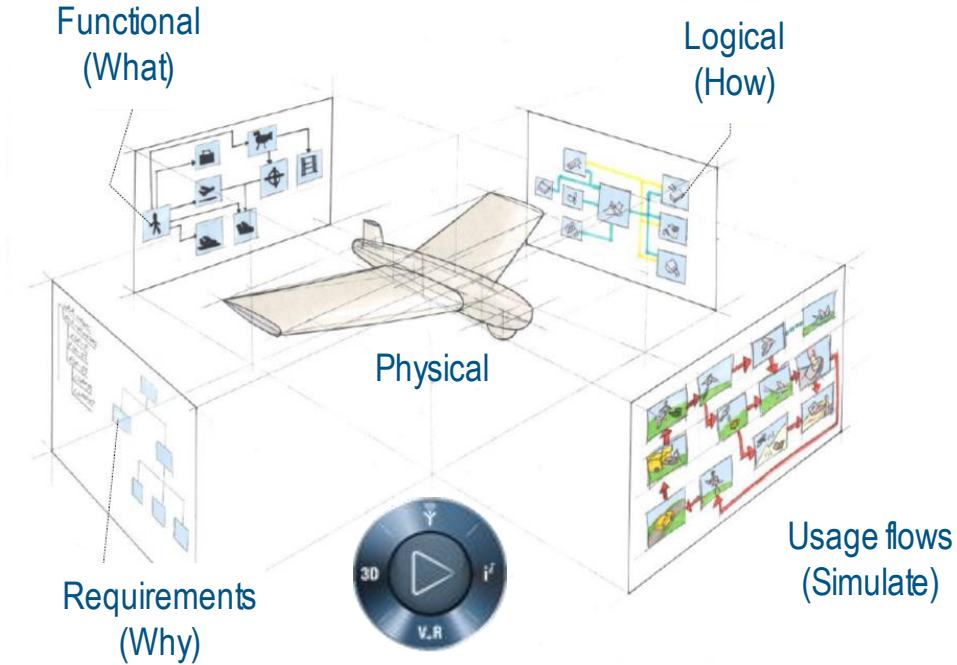
“MBSE is a **systems engineering methodology** that focuses on **creating and exploiting domain models** as the primary means of *information exchange* between engineers, rather than on document-based”

Dassault Systemes

Typical Today: Models Disconnected



MBSE: Models Connected



Requirement

Why system is needed?

Functional

What system does?

Logical

How system is constructed?

Physical

How system is designed?

Usage flows

Is system working as expected?

MBSE: Critical for Complex Systems

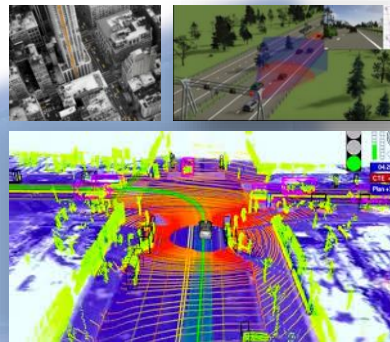


Mechanical system



Mechatronics systems

Multidisciplinary field that includes a combination of mechanical, electrical, control and software



Complex systems

Populations of software-intensive distributed systems interacting together in an unpredictable world

Technology-driven

Service-driven

Need for MBSE

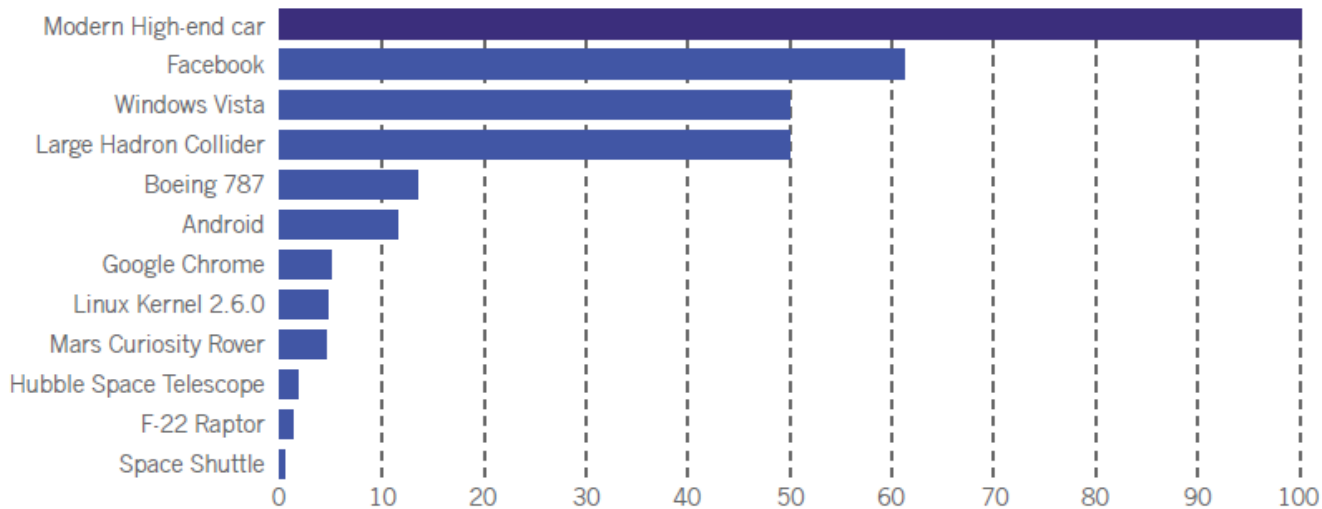
Necessary

 Critical

Amount of software increased

SOFTWARE SIZE (MILLION LINES OF CODE)

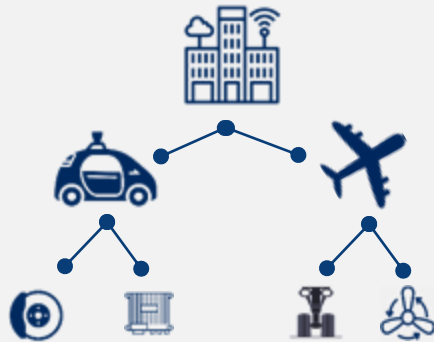
Source: NASA, IEEE, Wired, Boeing, Microsoft, Linux Foundation, Ohio



Key Domains of Systems Engineering

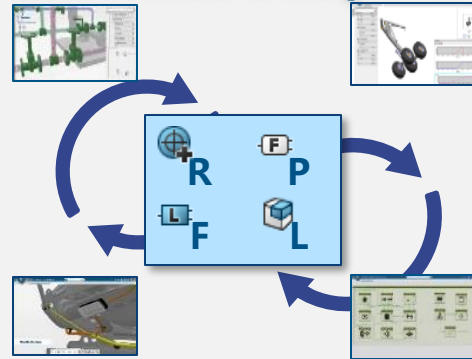
1

Multi-scale Systems



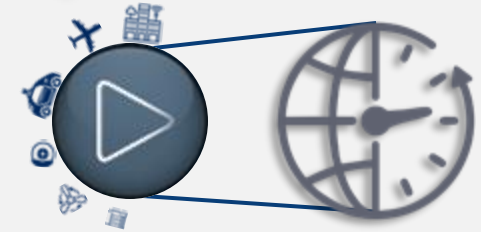
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Connected Disciplines



3

Simulate Anytime In the Process



4 Governance

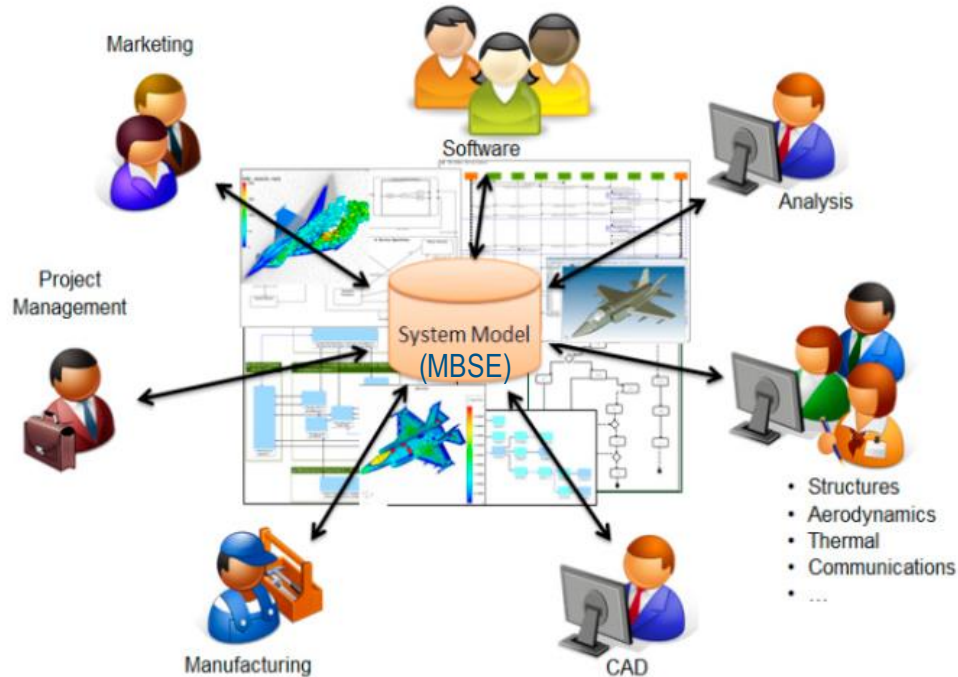
5 Standard Compliance



3DEXPERIENCE



MBSE: Orchestrating Business Roles



Summary

► MBSE

- ▷ Critical for succeeding in complex systems-----Survive or not
- ▷ Methodology ----- Not another IT-tool
- ▷ Models (R – F – L – P) ----- Not documents
- ▷ Enables virtual simulation and validation-----Any time
- ▷ Enables orchestration of engineering disciplines (HW, SW, Mech, ...)

