

Part 01 - why you need

Model Based System Engineering



Matthieu THIBAUT

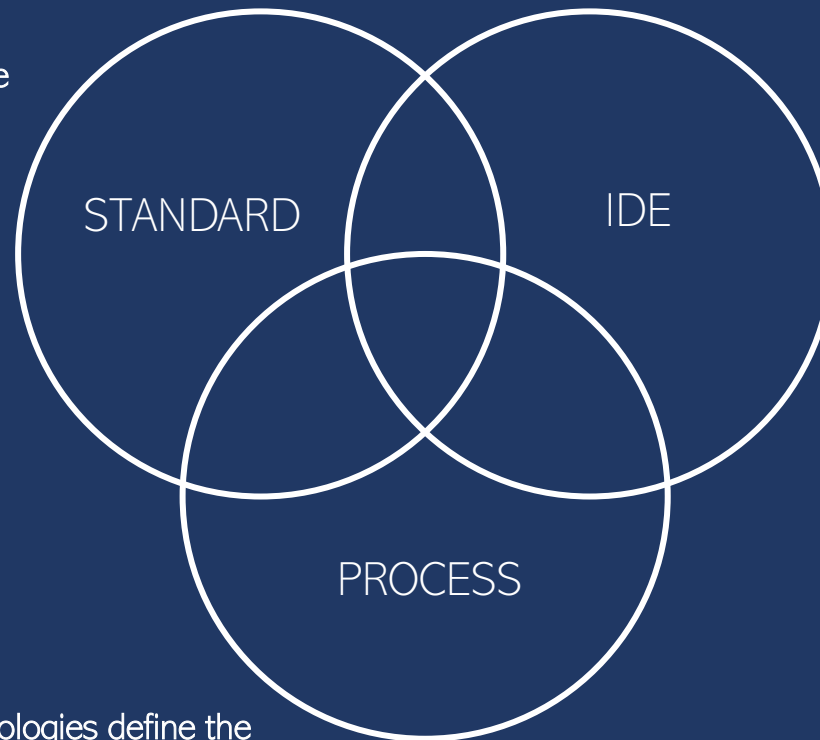
If you...

- ☐ Are responsible for architectural design
- ☐ Handle complex systems (multiple interfaces, multiple stakeholders, time-based dynamics, multiple domains)
- ☐ Have a heterogeneous practice through systems engineering
- ☐ Encounter misunderstandings with customers
- ☐ Engage in multiple iterations with suppliers to converge on quality specifications or product maturity
- ☐ Don't capitalize from one project to another
- ☐ Start from a blank sheet when transitioning from one project to another
- ☐ Don't have standardized practices for architectural design
- ☐ Encounter communication difficulties within teams and/or with project stakeholders
- ☐ Experience difficulty ensuring traceability
- ☐ Identifies specification flaws late in the Verification and Validation Process
- ☐ Manages fragmented requirements across scattered documents with unclear relationships.
- ☐ produced your engineering artefact using a standard office suite

...means you need MBSE

What is MBSE

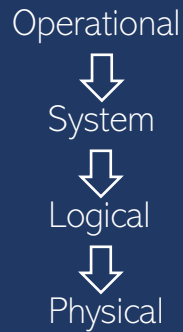
SYSML is the referenced standard that defines the modeling language for describing system structure and behavior.



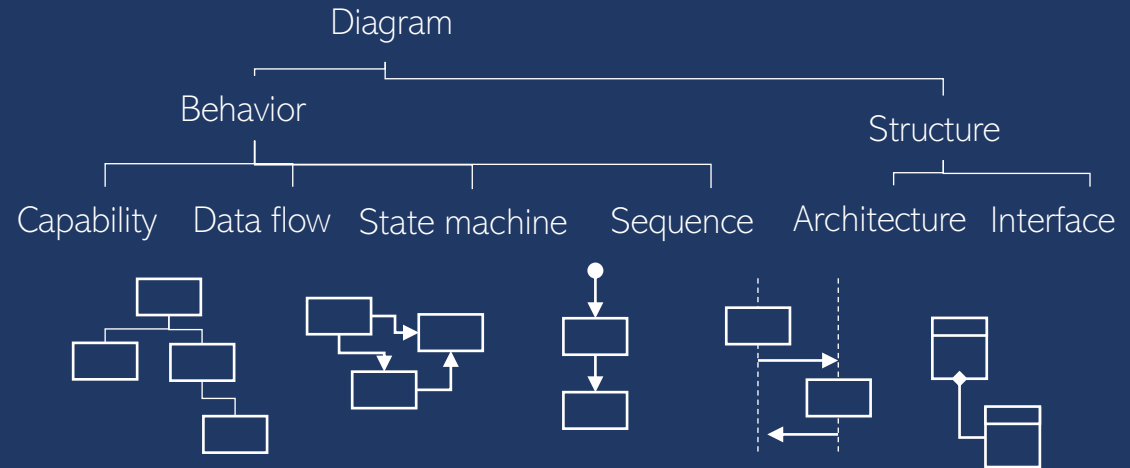
Integrated development environments (IDEs) are editors that enable the digital representation of systems through a graphical user interface (Capella or Magic Draw e.g.)

Methodologies define the stages of modeling throughout the development cycle (ARCADIA or CESAM e.g.)

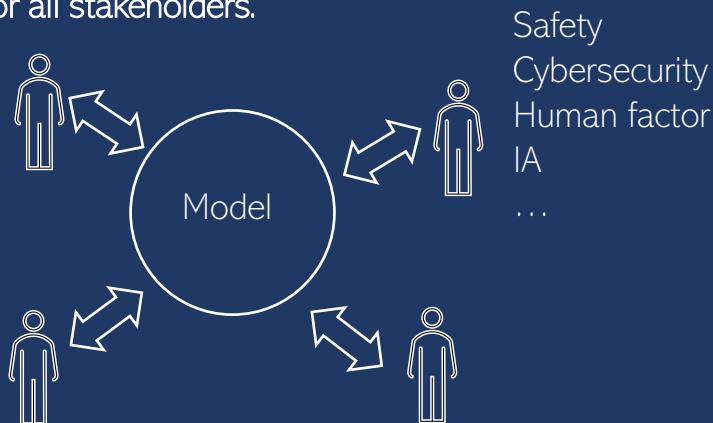
The MBSE process offers a step-by-step methodology that provides a progressive description of the system.



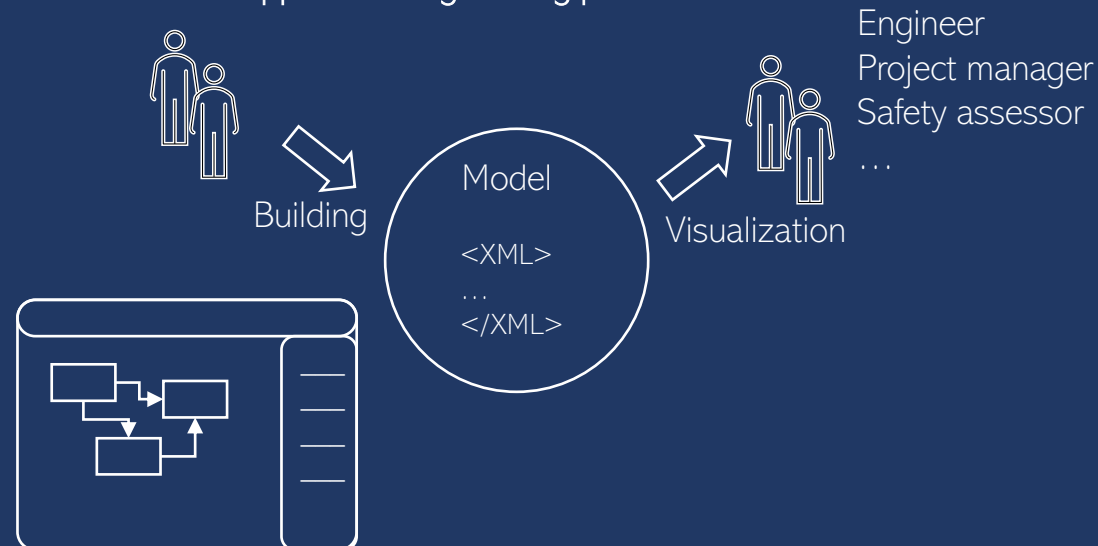
Various representations facilitate system construction and representation.



The system is described in a unified and central representation that represents the singular truth for all stakeholders.



The system is built upon stored data in a database in XML format. Specific representations are produced to support the engineering process.

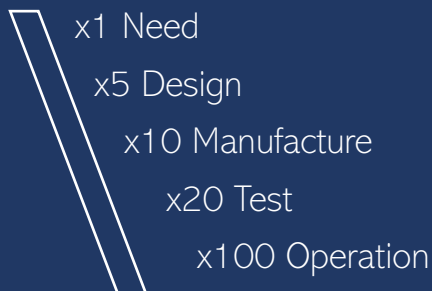


MBSE benefits

- ❑ **Clarity:** Utilize concise, standardized, graphical representations.
- ❑ **Consistency:** Minimize duplication; each element should be created once and reused throughout the model.
- ❑ **Traceability:** Link elements throughout the system description process, from need definition to physical definition.
- ❑ **Completeness:** Maintain a centralized representation of the entire system to easily identify gaps in definition.
- ❑ **Verification:** The structured format of the model facilitates static analysis, similar to software.
- ❑ **Communication:** Standardize representations to enable collaborative work and establish a unified reference point.

MBSE it's not an extra burden, it's another way of working

Cost to fix
specification errors



MBSE value to
reduce error risk

Elicit system objective unambiguously
Identify unexpected opportunity
Ensure traceability
Build and share system description
Ease system evolution

Ramp-up
Training
Licence

MBSE costs

