



Lifecycle Phase

Model-based engineering practices will create and share digital data artifacts across all phases of a product lifecycle including product development, planning, sourcing, building, operating, and maintaining.

Digital Twins

Digital twins can simulate the behavior of physical assets, systems, and processes. They enable organizations to reduce risk and cost by correcting issues before they occur, improve performance through optimization, and enhance decision making with real-time insights and data.

Voice of Customer

In model-based engineering, traditional document-centric approaches of capturing the voice of the customer are replaced with model-centric approaches like model-based systems engineering. This digitizes customer requirements using a structured approach to systems modeling and facilitates collaboration, data linkage, and requirements traceability.

Model-Based Systems Engineering

Model-based systems engineering (MBSE) is the formalized application 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*

Model-Based Systems & Software

Model-based software promotes reusability, requirements traceability, and code coverage through an automated verification and validation process. Adopting a model-based software engineering approach and developing model-based systems can ensure that traceable requirements drive software change and allows for model validation through digital twin environment testing.

Model-Based Design

Model-based design extends the use of 3D CAD models into areas of the design domain that are document-centric or uses documents to augment 3D CAD model data. Model-based design centralizes all data into the 3D CAD model and uses that model as the source authority to complete domain activities.

Model-Based Definition

Model-based definition is an annotated model and its associated data elements that define the product in a manner that can be used effectively without a drawing graphic sheet. *ASME Y14.47*

Model-Based Manufacturing

Model-based manufacturing uses digital models to define, simulate, and optimize part manufacturing processes.

Model-Based Assembly

Model-based assembly uses digital models to define, simulate, and optimize the processes to assemble parts.

Model-Based Quality

Model-based quality uses digital models to define, simulate, and optimize quality assurance processes.

Model-Based Testing

Model-based testing uses a model of the system's behavior to generate test cases that cover scenarios of the system's behavior. The generated test cases can be executed on the system to verify its correctness and ensure that it meets the required specifications.

Model-Based Sustainment

Model-based sustainment applies digital models to sustainment activities like simulating operating scenarios, predicting failure modes, and optimizing maintenance scenarios.

MBx

MBx is a term to refer to all domains in model-based engineering.

Digital Thread

A digital thread is a framework of integrated data from multiple systems and processes throughout the product lifecycle. It enables better decision-making and reduces the risk of errors by ensuring that all stakeholders have access to the same, accurate, and current information.

Feedback Loops

Feedback loops are essential in a digital thread because they enable continuous learning and improvement, ensuring that the product or process being developed is optimized for quality, performance, and efficiency. By using data to inform decision-making and drive continuous improvement, organizations can improve their competitiveness and deliver products that meet customer needs.