

# SYSTEMS ENGINEERING FOR PRODUCT DEVELOPMENT

How can you manage increasing product and process complexity?  
Compliance to ever growing stringent industry regulations?  
Increasing pressure to deliver products faster?  
Traceability from customer needs and initial requirements  
to final product validation?

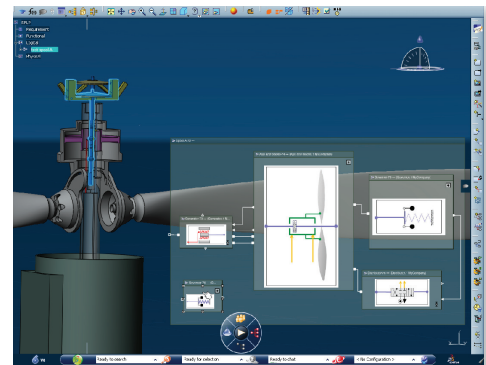
In a global competitive environment, regardless of your industry, these are some of the most intense pressures you are facing for any new product development.

**Systems Engineering** is paramount for addressing these challenges. It helps comprehend, organize, and manage the complexity of product development throughout its lifecycle from concept to production to operation, starting with the early stages including answering requirements, defining a product's functions, and establishing its technical architecture.

To successfully complete the development of a product, both technical and business aspects such as performance, cost, schedule, sourcing, manufacturing, and disposal must be considered. Systems Engineering integrates **multiple domains and brings together contributors from diverse technical disciplines** to provide a **high-level, comprehensive definition** of a product. This interdisciplinary approach looks at the product as a whole, with all components working together as a single unit.

Leveraging its long-time experience as a leader in Product Lifecycle Management (PLM), Dassault Systèmes has introduced a unique RFLP approach as the cornerstone of its Systems Engineering solutions. This approach provides a comprehensive, collaborative definition of a product across its different views from Requirements, Functional (targeted services), Logical (technology), and Physical (implementation) design.

DS solutions for Systems Engineering centralize all development efforts around a unified, collective product definition, and bring the various disciplines



together on a common platform to foster collaboration and innovation.

Moreover, the components from multiple disciplines (such as mechanics, thermodynamics, and electricity including electronics) as well as the numerous interactions between them are modeled on a common platform to enable dynamic simulation of the complete system via a virtual prototype. The behavior of the product in operation is thoroughly assessed while various design alternatives are tested very early on.

## Key Advantages

- Comply with standards and regulations
- Improve product quality and customer satisfaction as new products are designed and developed reflecting the voice of the customer
- Reduce development costs and rework by bridging the gap between product requirements, design and product launch processes and disciplines
- Improve visibility and collaboration as teams are using a central repository
- Insure "right to market" delivery through traceability between final product validation and initial customer expectations
- Perform realistic simulation very early in the design phase



## Key Features

### Requirements Management

- Requirements capture and analysis
- Traceability matrices to validate specifications
- Impact analysis reports to identify risks
- Specification reports generation for requirements

### System Architecture

- Modeling environment to define the functional and logical architecture
- Definition of implementation links between Requirement, Functional, Logical and Physical objects
- Assign behaviors (discrete or continuous) to each object and simulate the global architecture, including functions allocations and architecture templates
- Definition of business rules, architecture checks, and trade-off analysis based on Knowledgeware
- Full lifecycle management, from versioning to configuration, alternatives, and collaborative design as all objects are managed in a single PLM platform
- Integration to catalog and enterprise standards management

### Logical Control Modeling

- Behavior modeling environment to define behavior of functions or logical objects. Different editors are proposed and can be mixed (data flow, state chart and grafcet).
- Advanced debug capabilities
- C-code generator

### 3D for Systems

- Creation and reuse of 3D representation associated with the logical equipments
- Creation of 3D pathway associated with signals
- Definition of business rules, architecture checks, trade-off analysis for clash, engine burst, leakage, CEM, all based on Knowledgeware

### Dynamic Behavior Modeling

- Easy modeling of multi-discipline systems and interacting components through Graphical editor
- Availability of ready-to-use model libraries, based on the open and object-oriented Modelica® Language
- Powerful symbolic solver enabling scalable simulation of multi-disciplinary systems

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