Collaborative Systems Engineering

Gain control of the development process

Do you have an effective system for managing requirements throughout the development process? Can you get products to market fast—in a controlled fashion and at a high quality level? Collaborative systems engineering from IBM is designed to help you gain control of the development process. Manage complex systems more effectively to improve quality and preserve your brand image. Meet desired standards for quality, time to market and time to volume. Transform your approach to product development.

Manage complex systems collaboratively

Collaborative systems engineering can help manufacturers of complex products implement a sophisticated systems engineering discipline that addresses both the whole product or electromechanical subsystem level. This IBM solution combines business process re-engineering consultancy, proven industry practices, product lifecycle management expertise and an integrated IT-based environment for complex systems design and management, including implementation. Our solution helps enable you to design, propagate and validate complex mechatronics systems to introduce quality products faster.

Leverage complexity to drive innovation

Collaborative systems engineering helps companies define their products' requirements and functions and control them throughout the entire product development process. Implementing this solution can help manufacturers:

- Reduce product development and production expenses through focused re-use of intellectual capital related to system definition, design, verification and validation.
- Speed time to market by reducing system definition and test cycle times.
- Control and manage product and process complexity, making new levels of complexity possible—ultimately to introduce innovative, cutting-edge products for competitive advantage.

- Collaborate and share knowledge globally through more dynamic product development chains to help increase flexibility, reduce costs and drive innovation.
- Improve process quality, supporting your efforts toward process certification, such as Capability Maturity Model Integrated (CMMI).
- Reduce risks associated with loss of intellectual capital by capturing information and knowledge within the systems.

Manage greater complexity

Developing products is more complex than ever. Collaborative systems engineering from IBM synchronizes development to provide a consistent approach to systems development from needs identification through verification and validation. Greater control of requirements can help you manage higher complexity across your worldwide value chain. Achieve quality, cost and time-to-market targets while introducing more complex, integrated products.

Leverage our services and experience

Collaborative systems engineering from IBM includes transformational services and implementation based on best practices within companies of all sizes around the world.

- Our solution is built on an open and flexible architecture to give you the means to grow your business and systems, and the ability to respond quickly to market changes.
- We offer a growing set of readily available integrations to useful best-of-bread applications, as well as dedicated service resources for consulting, implementation and training.
- We have experience with more than 10,000 successful product lifecycle management implementations in nearly all industries.
- Our global consulting organization employs 85,000 professionals in 160 countries, including more than 1,300 experts dedicated to product lifecycle management.

Build on a set of proven practices

Collaborative systems engineering can significantly help improve development processes for complex products by providing a set of proven practices for:

- Requirements definition and management.
- Functional design and system architecture.
- Collaborative systems lifecycle management.
- Composite document generation.

IBM's solution can help manufacturing companies:

- Improve product quality by maintaining the integrity of functional allocation and system architecture throughout the product development process.
- Keep control of and shorten verification and validation cycles through consistency of system data as well as capabilities to streamline the generation of test reports.
- Reduce time to market through the efficient reuse of system definition and program management assets.
- Improve collaboration with development partners through better integration of system design and detailed design disciplines.

Achieve tangible benefits

Dassault Aviation has achieved clear and tangible benefits from its ENOVIA SmarTeam™-based solution for collaborative systems engineering. The solution:

- Cut the time-to-freeze of the product definition from three days to three hours—more than 85%.
- Helps the company master product complexity—150 engineers can now simultaneously access the 600 requirements modules, architecture models and the 20,000 application interfaces.
- Provides engineers with instant access to any Mission and Avionics Systems product definition, and hence, facilitates adherence to initial systems requirements and the resulting product design.
- Facilitates communication and activity coordination, and thus reduces rework time and costs spent on errors due to design inconsistency.

Reduce time and expense of product development

It is in the early stages of the product development process where manufacturing companies commit up to 80% of their total investment. IBM can help companies establish the requirements, functions and system component definition of a new product to help:

- Limit the costs associated with managing and testing complex products, and reduce the time and expense required to bring products to market.
- Reduce operational costs by facilitating collaboration between internal and external business associates.
- Implement process improvements that can help you become a Capability Maturity Model Integrated (CMMI) Maturity Level 3 (or higher) developer.
- Improve management of development and production expense through focused re-use of knowledge about program definition, functions and architecture design.

Integrate for a team effort

Collaborative systems engineering (CSE) from IBM provides proven industry practices, as well as dedicated functions designed to significantly improve systems engineering practices. Built on top of the standards-based and highly flexible ENOVIA SmarTeam™ architecture, CSE is a sophisticated set of functions and templates that support leading practices for the most demanding systems engineering disciplines—supporting diverse local as well as remote development teams.

Rely on leading, standards-based technology

Collaborative systems engineering from IBM represents a unique combination of proven systems engineering methodology and sophisticated user functions on top of a standards-based and flexible IT-infrastructure. The solution features:

- Leading IBM integrated hardware and middleware products, which are designed to link your legacy systems effortlessly with other platforms—including your associates', business partners' and customers' systems.
- IBM WebSphere® Business Integration, which extends process integration capabilities with additional globalization features, collaborations and connectors that broaden functionality.
- Your architectural preference—including UNIX®, IBM AIX®, Microsoft® Windows® and specific processing needs—across different combinations.

Leverage ENOVIA SmarTeam functionality and ease of use

Collaborative systems engineering from IBM consists of PLM practices developed by Dassault Systèmes in combination with ENOVIA SmarTeam™ software.

- Functional Decomposition and System Structure Definition provides development teams with a clear presentation of a hierarchical functional and logical product definition. It handles impact and dependencies between market needs, functional product definition, technical requirements and system structure.
- Requirements Management supports the engineering process through correct multidisciplinary technical specifications.
- Project Management Derivation integrates project management information and project data to help cut development time and costs, while helping to assist project knowledge capitalization.

The solution is based on ENOVIA SmarTeam, a rapidly growing collaborative product data and lifecycle management software technology known for its implementation simplicity, ease of use and low cost of ownership. The following software modules—which are tailored to use in a systems engineering context and can be further customized for your specific requirements—can be part of CSE.

- ENOVIA SmarTeam Foundation
- ENOVIA SmarTeam Workflow
- ENOVIA SmarTeam Editor
- ENOVIA SmarTeam Electronics Template

To drive our client's success, IBM provides a wide range of capabilities and operational services to enable overall transformation of innovation and integration of the systems engineering disciplines and processes.

Speed customization and user adoption

To address the challenges of developing Mission and Avionic Systems, Dassault Aviation assessed the different solutions available on the marketplace. In 1999, the company chose ENOVIA SmarTeam, an IBM PLM Solution developed by Dassault Systèmes, to support its systems engineering process and federate all systems engineering data and associated third-party applications.

EnNOVIA SmarTeam gives Dassault Aviation a collaborative systems engineering environment that provides multidomain engineers with instant and consistent access to the complete Mission and Avionic Systems definition. More than 200 operational ENOVIA SmarTeam workstations provide Dassault Aviation with a flexible environment for rapid solution implementation. Dassault Aviation customized and deployed a first version of its data model within ENOVIA SmarTeam in less than six months.

Minimize operational cost

Collaborative systems engineering from IBM is designed to help manufacturing companies:

- Lower development costs by supporting the key product definition and decision phase where critical success factors impacting overall product development are defined.
- Preserve existing infrastructure investments by integrating dissimilar platforms, data systems and processes.

The ENOVIA SmarTeam-based IT infrastructure can help minimize operational costs as it:

- Can be easily maintained and extended.
- Relies on industry standards.
- Disposes of a large number of proven connectors to disparate data systems and applications.
- Provides a set of sophisticated administrative tools.