

# Management of Complex Products with Agile PLM

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## **Introduction**

Complex products are necessary to stay competitive in an extremely dynamic and innovative market. The actual control of the complexity of the products, processes and costs often brings enterprises to their limits and costs can easily spiral out of control. Agile PLM is the backbone of economic product management. Traceability of product changes, revision baselining and managing customer specific product variants across the product lifecycle are standard features of Agile PLM. The Quick Start Program of Maier CSS accelerates the Agile PLM deployment. The key factors are pre-built configurations of forms, functions and process templates for manufacturing industry, for medical device or other complex equipment manufacturers especially. Efforts, time, costs and risks to Go-Live with Agile PLM are reduced extremely (TCO).



## **Complexity of Multidisciplinary Products**

Mechatronic systems in global markets and branches become more and more complex, not only in Automotive, Transportation, HighTech or Medical Devices.



*Illustration 1: Other examples of industrial mechatronic components and more or less complex products*

Complex technical systems of today are characterized by multilevel structures of many subsystems in multiple disciplines. Electronic and Software (IT) subsystems are dominant in complex and innovative products of today.

Customer needs, individual wishes, competition in global markets, new technologies and legal regulations increase the number of variants. National and global regulatory needs are ultimate and do not prevent changes. Regulatory compliance is mandatory.

A stringent variant definition avoids counter-productive and non-economical variants:

- Build generic structures,
- Flexibility in functions,
- Options and constraints to determine valid combinations.

## Systems Engineering and Validation

Systems Engineering (SE) is an integrative and well structured approach for collaborative product design between multidisciplinary departments. SE helps to reduce complexity in products and processes. It represents a (not really) new Design Methodology providing structures of

- Requirements,
- Functions,
- Specifications,
- Engineering items, assemblies,
- Validation, use/test cases,
- Audit and release process,
- Transparency and traceability

to support innovative design and development, multidisciplinary engineering, defined process phases and controlled information and change workflows.

The interdisciplinary product design is based on the V-Model that represents the systems design lifecycle. The V-Model improves project transparency and project control by specifying standardized processes and describing the corresponding results and responsible roles. It permits an early recognition of planning deviations and risks, improves process management and reducing project risks.

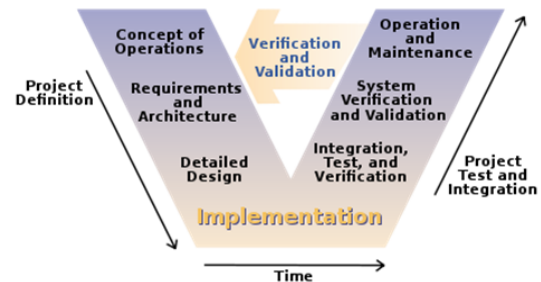


Illustration 2: The V-model of the Systems Engineering Process  
(Source: Wikipedia)

The specification stream of V-Model mainly consists of user and functional requirements and design specifications. The testing and validation stream mainly consists of test case specification, operational test methods and performance validation. Agile PLM should be the Backbone of the SE approach.

## Agile PLM – Innovation, Design and Process Backbone

Agile PLM supports product planning, concept, design test and simulation, efficiency, sharing product information and optimizes submission processes as well as early market introduction of a product. The central pieces of information are the requirements, item masters, bills of material and documents. Development, product documentations (regulatory assurance, design history file, device master record), as well as production documentation, baselines and traceability are visible for cross-functional teams. Agile PLM manages all aspects of product data and process management:

- Standardized process templates are the backbone of innovation and engineering changes.
- Graphical and non-graphical collaboration is supported by integration of many other enterprise applications like CAD, EDA, FEM/FBM, CASE, MKS etc.

- Visualization, Mark-Up and Mock-Up of multiple graphical file formats with web-based AutoVue is an essential and powerful tool,
- Bi-directional integration with ERP and CRM systems are available as well as
- Other Agile PLM modules, such as Governance & Compliance, Cost and Portfolio Management.

The Maier CSS Quick Start Program for time-to-value focused Agile PLM implementation grants a proven best-practice-approach of basic implementation up to successful go-live with Agile PLM. The Quick Start Program accelerates the Agile PLM deployment. The key factors are pre-built configurations of forms, functions and process templates.

SE compliant features are also part of the pre-customized Agile PLM and Maier CSS Quick Start Program along with innovation and engineering change processes that are compliant to ISO and CMII-R2 strategies. The R2 Initiative (Reduce Rework) defines skills getting faster and cheaper and avoiding corrective actions that occur typically in nearly any company, such as

- Non-productive meetings,
- Gathering actual information,
- Correction of documents,
- Fault repair, bug fixing,
- Rework, unessential work,
- Product recalls etc.

R2 Initiative is a proven amendment to the CMII Standards, compliant to SE and part of Maier CSS Quick Start Program: SE project starts with a CMII process. Market, customer and regulatory Requirements with verification and validation features are integrated. Agile PLM controls product data management and multidisciplinary innovation, design and change processes with audit and release steps.

### **Objectives and conclusion**

The big challenge to the enterprise getting economical products in short time to the markets is to acknowledge customer needs, to consider new technologies and to ensure regulatory compliance.

The really effective product development process needs the close collaboration and communication of cross-functional teams and departments across the enterprise. The Agile PLM provides the mandatory backbone to manage that complex information structures and processes. Key factors to success are:

- Reduction of product and innovation risks by using SE methods,
- Improvement of product and process quality,
- Reduction of total cost over the entire project and product lifecycle,
- Improvement of communication between all cross functional teams and departments across the entire enterprise and
- Standardized, reusable CMII-R2 process templates to avoid corrective actions and rework.

Oracle's Agile PLM application is a proven solution to manage these complex and multidisciplinary product designs, workflows, collaboration with CAD, EDA and Software, bills of material, document management and graphical visualization.

Come and see the Agile PLM solution with Maier CSS Quick Start Program, CAD-integration, graphical visualization and CMII processes at the MaierCSS stand #A9 in the showroom.

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