



5. Electro-mechanical design integration

During the product development process, a lack of coordination between engineering disciplines may result in design inconsistencies, delays, and poor quality. To ensure a smooth integration of the mechanical and electronics product content, early and effective collaboration between Electronic Computer Aided Design (ECAD) and Mechanical Computer Aided Design (MCAD) designers is critical.

The new-generation CATIA V5 Circuit Board Design (CBD) enables circuit board assemblies to be designed in the context of the mechanical design. Pertinent information, such as spatial and technological constraints, can also be sent to ECAD systems.

Conversely, CBD can import an electronic assembly from ECAD systems for analysis of the design in the context of the full digital product definition. Exchanges via industry standard facilitate connecting to multiple ECAD systems while protecting existing ECAD investments.

The value of IMPD:

- Efficient creation of mechanical shapes of printed circuit boards in the context of the mechanical assembly
- Rapid collaboration between mechanical and electronics engineers based on industry standard.

The way forward

IMPD delivers the key capabilities electronics manufacturers of any size need to reap the benefits of an integrated, distributed and managed global 3D product development process.

IMPD's comprehensive set of flexible and integrated solution building blocks addresses the needs of the design, engineering and manufacturing disciplines at work in the development of electronic products. It provides a powerful infrastructure for collaboration among distributed teams, and facilitates integration with EDA systems users.

Find out how leading solutions from IBM and Dassault Systèmes, combined with proven electronics methodologies and implementation support, can help you make the most of your business opportunities.

"Our PLM solution based on CATIA V5 and SMARTEAM enables our teams in 11 countries to collaborate simultaneously in all stages of product development from ideation to after-sales service."

*Hans Wickström
European IT Director, Peltor*

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**Integrated Mechanical Product Development (IMPD)
A PLM solution for electronics manufacturers and suppliers**

Fostering innovation and speeding global product development



ibm.com/solutions/plm

Exploiting industry dynamics

The development of electronics products has become more complex and competitive than ever before and faces intense pressures, including:

- An accelerating pace of innovation and rapid technology changes
- Increasing product and process complexity
- The need to deliver products faster and at a reduced cost
- A demand for higher quality products
- The need to be flexible to rapidly adapt to changes in customers' requirements
- The globalisation of product development.

As a result, in an industry where technological innovations evolve rapidly, it has become increasingly significant to integrate the various design engineering and manufacturing disciplines and teams involved in creating an electronics product.

The ability to re-use product designs, capitalise on corporate know-how, integrate design and manufacturing, as well as simulate and analyse a virtual product is key. This unleashes innovation and efficiencies throughout the entire value chain and ensures right-to-market delivery of new products.

A fully-integrated and collaborative approach

For more than 20 years, IBM and Dassault Systèmes have worked in close collaboration with the most successful electronics companies, OEMs and suppliers alike. Building on technological leadership and extensive industry experience, IBM and Dassault Systèmes have developed Integrated Mechanical Product Development (IMPD), a Product Lifecycle Management (PLM) solution for electronics. IMPD fosters innovation, helps streamline and integrate the complete 3D product design process, facilitates realtime collaboration from design to production, speeds new product development, and facilitates faster access to new markets.

IMPD combines CATIA V5 best-in-class design and engineering capabilities with SMARTEAM for collaborative product data and lifecycle management, and industry-specific proven methodologies – DS PLM Practices – developed in conjunction with leading electronics customers for rapid and effective implementation.

Flexible and integrated solution building blocks

IMPD solution building blocks provide a fully integrated, yet flexible, mechanical 3D product development environment from styling to manufacturing, while leveraging existing investments. In particular, they address the following processes:

1. Concept and style / Industrial design
2. Design for manufacturing
3. Mold and tooling design
4. Design optimisation
5. Electromechanical design integration.

"In the electronic consumer goods industry, what is new today is old tomorrow. CATIA V5 and SMARTEAM help us innovate at the speed of market demand."

Per Gustafsson
European Marketing Director, Peltor

1. Concept and style

In today's highly competitive consumer electronics markets, the styling aspect of products is a key differentiator against competitors as well as being crucial to gaining immediate consumer excitement.

In addition, rapid changes in consumer tastes and demands are forcing companies to come up with new innovative designs at an extremely fast pace.



The unique and powerful subdivision surface technology of CATIA V5 Imagine & Shape allows stylists to directly model their ideas in 3D, providing them with complete creative freedom. Realistic 3D geometric models can be quickly and easily created without prior sketching or prototyping and can then be directly leveraged by engineers. CATIA V5 is the first and only PLM solution to incorporate this technology, enabling designers to explore a wide variety of sophisticated conceptual design proposals while simultaneously integrating downstream technical constraints.

The value of IMPD:

- Unique technology for easy transformation of an idea into a virtual 3D shape
- Seamless integration between styling and downstream engineering disciplines such as mold and tooling design.

"With the CATIA V5 Imagine & Shape workbench, we can present our customers with more high quality design proposals than before."

Baptiste Hannebicque
Design Manager, Estech

2. Design for manufacturing

One of the key challenges of the product design-to-production process lies in making sure that the parts designed are suitable for fabrication. Designers need to have access to instant manufacturing information to prevent design flaws and manufacturing rules violations that otherwise result in higher project cost and schedule overruns.



Thanks to CATIA V5 advanced knowledge management capabilities, manufacturing specifications are captured and embedded in intelligent templates and introduced early in the design process. Manufacturing information is automatically taken into account in the design of sheetmetal parts or plastic parts, for instance, speeding design and avoiding design changes late in the process.

In addition, CATIA V5 intuitive 3D tolerance and annotation capabilities – combined with the SMARTEAM collaborative platform to store, manage and transfer data – allow efficient collaboration on precise quality specifications between different internal teams or with external suppliers.

The value of IMPD:

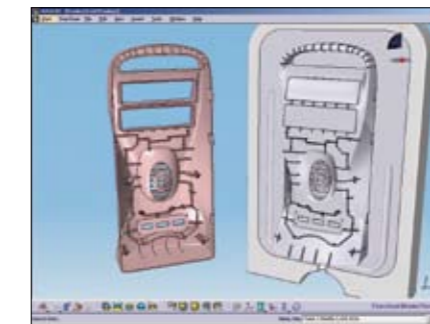
- Right-first-time, ready-for production design
- Efficient collaboration and secured data transfer with SMARTEAM.

"With CATIA V5, collaboration of styling design and mechanical design is going well. The engineering collaboration helped us reduce manufacturing costs to 75 percent on mock-up orders."

Yoshiro Kato
MMD Business and Development Center,
Panasonic Shikoku Electronics

3. Mold and tooling design

Dynamic and flexible collaboration between teams and applications is essential to address any potential manufacturing issues early in the development cycle, before the molds and tools are actually produced.



CATIA V5 helps ensure that product design, mold and tooling design, and mold and tooling creation are automatically and seamlessly linked. CATIA V5 Functional Molded Parts (FMP) leverages core and cavity extraction capabilities and a functional modelling approach to enable the automatic extraction of industrial molds and tools. Unique relational design capabilities allow modifications made to the initial design to be directly propagated to the associated mold representation, avoiding inconsistencies and costly iterations.

The value of IMPD:

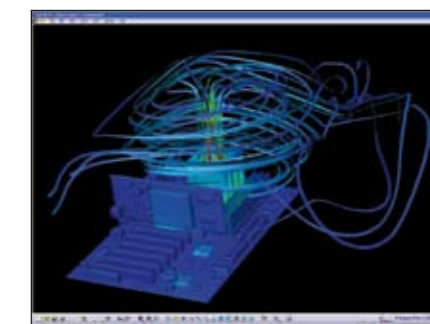
- Increased productivity and flexibility to design molded parts and related tooling
- Simulation of mold, tools and NC tools behaviour to better address potential issues arising from manufacturing processes
- Reduced time-to-manufacturing and cost of tool ramp-up due to tighter integration with product development.

"Because the toolmaker can work directly from the model, interaction between the design team and the toolmaker is greatly simplified, eliminating misunderstandings."

Bryan Kennedy
Engineering Support Manager,
Black & Decker

4. Design optimisation

Balancing increasing complexity with rising performance and quality requirements is a challenge at the heart of the product development process. 3D virtual prototyping as well as digital analysis and simulation allow development teams to digitally create a 3D product and its environment, then simulate and analyse its behaviour to gain early insight into key factors that determine its quality and performance.



With CATIA V5 powerful applications and an extensive network of specialised technology partners, IMPD provides wide and in-depth coverage of all digital mock-up, analysis and simulation processes to test and validate a virtual product, as well as identify potential design flaws early in development.

From fluid dynamics and heat transfer analysis to realistic deformation simulation, IMPD empowers development teams with the best tools for accurate digital product evaluation.

The native integration between the design, simulation and manufacturing applications bridges different teams to optimise design, speed the product development process, and minimise the cost for quality products.

The value of IMPD:

- Reduction of costly physical prototypes
- Reduction in product development and validation time due to tight integration between the design, simulation and manufacturing worlds
- Ability to explore, compare, test, and validate multiple design alternatives.

"The use of CATIA V5 greatly reduces time from design to die production. Problems can be investigated, understood and resolved quickly using analytical solutions obtained with CATIA V5."

Takehiko Tanaka
Assistant Manager of e-Vehicle Business
Group, Personal Audio Visual Network
Company, Sony Corporation