

AN ENVIRONMENT FOR INNOVATION

PLM with the 3DEXPERIENCE platform



ADDRESSING COMPLEXITY

Competition from new entrants and customer pressure to deliver increasingly complex products at faster rates make innovation and operational excellence critical aspects of success. Aerospace and defense companies see technology such as robotics, factory automation, Internet of Things (IoT), artificial intelligence and big data analysis as an efficient way to improve the way they conceptualize, design, manufacture, test, certify and service new aircraft. A proven way companies address complexity is by adopting product lifecycle management (PLM) to manage product engineering processes. While a necessary first step, PLM alone is no longer enough if you intend to optimize your product development and manufacturing processes and integrate your supply chain. Linking non-engineering activities to PLM information in one data model on a single platform is the answer to keeping everyone involved in sync, from concept to takeoff.

This white paper discusses the role of PLM in addressing product development challenges and why augmenting PLM with a platform approach provides maximum advantage. Companies that connect their entire product development ecosystem or value network can better accelerate innovation and achieve business objectives.

SUPPORTING GROWTH WITH PRODUCT LIFECYCLE MANAGEMENT

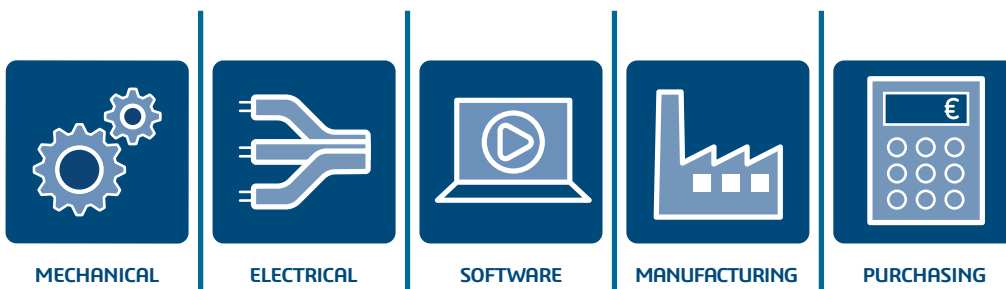
Product lifecycle management is a systematic approach to managing the entire lifecycle of a product from inception, engineering design, manufacturing, service and product end-of-life. PLM comprises an integrated set of software tools for managing critical information generated by product development. PLM marries this data with associated engineering and business teams and processes. Common PLM processes include: design management, project management, engineering change and configuration management, and bill of materials (BOM) management.

Many companies have reaped significant productivity, quality, and time-to-market gains from their successful PLM implementations that streamline common processes. **In addition to PLM, companies need additional capabilities, not only to manage rising complexity, but also support additional business processes.** The additional processes include: portfolio and program management, managing and securing data, quality management, customer relationship management, supplier collaboration and manufacturing execution.

PLM has become more than part of an IT infrastructure; it should now be part of an overall strategy for sustainable growth and competitive differentiation. Now, more than ever, it is critical to evaluate your current and future business needs to ensure your PLM strategy aligns with your business strategy.

Creating sustainable growth and competitive differentiation requires aligning your PLM strategy with your business strategy.

ACCELERATING THE INNOVATION PROCESS



To stay ahead of the competition while meeting customer expectations, Aerospace & Defense manufacturers constantly integrate new technologies to accelerate innovation, lower costs, and increase manufacturing agility. Companies benefit from using a virtual environment with digital continuity, and simulation. This type of environment allows optimal cross-discipline collaboration across teams (e.g., engineering, quality, costing, manufacturing, and service). Some PLM solutions, initially developed to support the mechanical design process, do not encompass all disciplines. Consequently, those extended disciplines outside the PLM realm typically maintain separate sets of product data in their own system and databases, creating silos of information in multiple file formats.

For Aerospace & Defense manufacturers with multiple sites or with global partners and suppliers, sharing basic design information is challenging at best. Information is stored in silos creating work duplication, errors and wasted time as stakeholders' search for the latest information.

Centralizing product design around a single, consolidated, real-time view of the latest product definition fosters collaboration and better decision-making and eliminates time-consuming, error-prone data synchronization.

SHIFTING BEYOND PLM

PLM (Product Lifecycle Management) is widely accepted for providing a 'single version of the truth' for product definition data. But what if you can do more? By shifting to all digital data, models and processes to replace the manual storing and copying electronic files, companies seek to change their business models and improve the way they work. Using digital technology, every stakeholder can immediately access and leverage the latest data whenever and wherever needed. **Digital continuity speeds up collaboration and improves team efficiency so there is more time for innovation.**

Product ideas can come from anywhere in a company's ecosystem which includes suppliers and consultants. This 'value network' requires a single, up-to-date digital master. The digital master becomes the product definition. Combining inputs from design, engineering, sales, supply chain, end-customer or after sales creates a "holistic digital product definition" that evolves with every new stakeholder contribution. Instant communications, real-time collaboration and real-time updates of data allow teams to more effectively collaborate to develop new product ideas and refine them faster.

Even though PLM systems today manage product development well, they lack the capability to digitally connect the entire value network and manage a single, holistic representation of the product.

STRUCTURE AND FLEXIBILITY FOR INNOVATION

To spur the innovation process and raise competitiveness, more companies view adopting a business platform as critical to their move to digital. According to Accenture¹, "By 2020, 25% of the world's economy will be digital and in this digital age, companies' success hinges on enabling people to learn, adapt and propose new solutions with the help of technology. Ideas can come from anywhere creating a context for social collaboration." Moreover, according to Roland Berger,² these High Value Design ecosystems are key to securing long term growth in today's fast-changing world.²

The right structure, a single system with apps that connect all stakeholders and provides the capability to create exceptional products and customer experiences, allows focus on innovation and product development. **Using one innovation platform for one digital product definition allows teams to virtually create, visualize, simulate, prototype and validate products and experiences without upfront significant capital investment.**

A platform provides the structure and flexibility to link stakeholders 24/7/365 from diverse locations. This allows the capture and sharing of knowledge and expertise, while managing and securing data and intellectual assets and processes throughout a product lifecycle. Sometimes called a "digital thread", a platform connects all functions involved in a product lifecycle, from development to after-market.

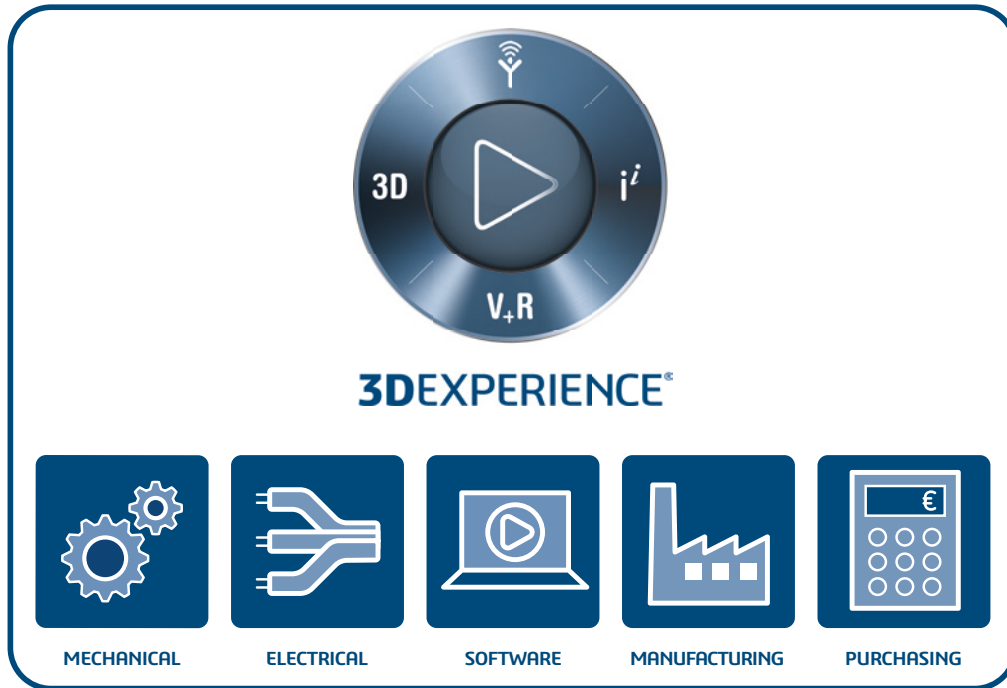
An "innovation platform" delivers the critical capabilities necessary to create exceptional products and experiences

Transforming a business means moving from a document-based, "siloes" system to a data-driven environment. A data-driven environment not only fosters innovation and increases productivity across functional, role-based domains, certification is simplified and faster. In a file-based world, electronic documents such as PDF files do not automatically update when data changes. A lot of non-value added time is spent on processes to synchronize data and create new file versions instead of on innovation and development. The advantage of digitally-connected applications is real-time updates. Data-driven applications automatically share the latest digital product definition. A virtual representation or model of real-world objects, allows all teams in the value network to explore and contribute to the product definition throughout the development process. **Using a virtual model as the single source of truth allows companies to optimize their innovation process.** Unlike a value chain, which connects contributions in a serial way (up and down the chain), a connected value network works in parallel. New contributions and changes are visible to everyone in real-time.

From the most remote sales office to the edge of the supply chain, an innovation platform eliminates silos by providing a single, up-to-date and holistic view of the product definition. **Increased collaboration and an optimized product development cycle helps you exceed objectives and meet customer requirements.**

Develop tomorrow's products by leveraging today's tools. Adopt a platform-based strategy to connect your value network and support your critical applications.

THE 3DEXPERIENCE PLATFORM



With the **3DEXPERIENCE®** platform, an enterprise is digitally connected through data-driven apps working from a single and complete product definition. The platform provides different functional views on the same data, rather than separate data repositories for each function.

The **3DEXPERIENCE** platform supports:

- **product modeling** with design, engineering and systems engineering applications that revolutionize the way organizations conceive, develop and realize new products and that support additive and subtractive manufacturing;
- **value network collaboration** for sustainable innovation across the extended enterprise;
- **manufacturing excellence** via virtual simulation of planning, management and optimization of global operations;
- **simulation technology** dedicated to structures, fluids, plastic injection molding, acoustics and structural applications that help rapidly evaluate the performance, reliability and safety of materials and complex assemblies before committing to physical prototypes;
- **real-time information intelligence** by gathering, aligning and enriching big data-whether internal or external, structured or unstructured, simple or complex.

The platform supports any CAD system. Designers can leverage the benefits of the platform and additional capabilities without changing CAD applications, migrating data or authoring designs in a new environment.

The **3DEXPERIENCE** platform natively supports social networking and information intelligence, for instant communication and data access throughout the extended enterprise. Project teams can, for example, engage in social collaboration, share, view and simulate 3D models on line and transform big data into insights in the context of a user's needs through the creation of customized business dashboards – all in the same environment.

The **3DEXPERIENCE** platform offers access to a part supply marketplace. This **3DEXPERIENCE** Marketplace offers a comprehensive and intelligent catalog of components for designers to search, download and insert into their designs. The marketplace also includes a seamless way to get parts made and collaborate with leading digital manufactures world-wide

ANY CAD PLM AND THE 3DEXPERIENCE PLATFORM

One key set of apps on the **3DEXPERIENCE** platform are **PLM Collaboration Services**. **PLM Collaboration Services** provide capabilities to manage designs authored with CATIA V5, **3DEXPERIENCE** CATIA, SOLIDWORKS and 3rd-party CAD tools. These comprehensive and robust set of capabilities ensure PLM data is accessible by everyone in the value network and that all relevant stakeholders are included in relevant PLM processes. For example, notification of a design update is delivered to all associated team members from design and engineering to manufacturing, purchasing or service and support organizations.

Additional PLM applications include:

- **change management** to provide an enterprise-wide change and notification process to address increased product complexity;
- **configuration management** to efficiently manage product variants for faster delivery of personalized products to market;
- **Bill of Materials (BOM) management** to ensure everyone has their required view of the holistic digital product definition; and
- **document management** for version and change control.

The platform also provides a host of model-based business applications to improve product planning and ensure proper governance of data and processes, including the ability to:

- **translate the “voice of the customer”** into traceable, data-driven requirements that define new features or products;
- **plan product portfolios and efficiently manage projects and programs;**
- **classify, secure, and reuse sensitive data**
- **enforce common quality processes** and support global and local regulatory requirements;
- **establish a well-defined material compliance process** to request, review, and approve versus regulations.

ENOVIA solutions for Product Lifecycle Management deliver the flexibility, open standards, scalability and specific product development business processes to accelerate innovation across the extended enterprise and complex engineering processes.

PRODUCTION READY INNOVATION

A production ready environment allows companies to meet program requirements while still driving innovation initiatives. Aerospace and defense companies using the 3DEXPERIENCE platform can rapidly integrate new technologies like additive manufacturing and robotics into production. Companies create a flexible 'production ready' environment by transforming their innovation process to leverage digital continuity and simulation. For example, by replacing physical prototypes with virtual models, products can be tested faster, at much lower cost with improved quality.

Aerospace start-up Joby Aviation uses design, simulation and PLM technology on the cloud as it develops a prototype for an urban air vehicle. Having access to the latest technology allows Joby and companies like them to enter the light aircraft market without massive capital investment. And, regional manufacturers like Russian Sukhoi Aircraft, Brazil-based Embraer and Chinese COMAC are transforming their development processes as well as big players like Boeing and Airbus. Players large and small see technology as the way to stay nimble and competitive.

The 3DEXPERIENCE platform with industry solution experiences create an environment for innovation and growth. Six fundamental elements support this 'production ready' environment. See the six building blocks or business processes that support new product or programs initiatives to improve the way you deliver value to your customers.

THE BUILDING BLOCKS FOR PRODUCTION READY INNOVATION

Companies driving product innovation and modernization initiatives use these business process initiatives to provide the right environment to meet requirements and meet or exceed production targets:

- 1. Shift to a Model-Centric Paradigm** – applying a Model Based Enterprise approach, a common set of processes and methods and access to one set of 3D models and data removes bottlenecks and accelerates innovation.
- 2. Simplify new material (composites and ceramics) production** – evaluating producibility in design before reaching the shop floor and connecting teams throughout the process, regardless of location and ensuring that downstream processes match the correct engineering release.
- 3. Leverage simulation across the development process** – using simulation from the concept phase, through detailed design and testing accelerates the process of evaluating the performance, reliability and safety of materials and products before committing to physical prototypes.
- 4. Rapidly prototype parts** – using tools on the platform such as function driven Generative Designer automatically generate conceptual parts from a functional specification. Digital prototyping, combined with digital analysis and simulation, allows product development teams to virtually create and analyze mechanical products in their operating environment.
- 5. Develop via immersive systems** – Using virtual reality in development, engineers experience the spatial aspect of any product even very complex large air or space vehicles as it comes to life.
- 6. Certify 'on-demand'** – Replacing physical molds, simulation and Generative Design allows engineers and designers to virtually optimize and test parts to meet requirements. Using additive manufacturing value network suppliers, connected to your enterprise via the 3DEXPERIENCE platform, can 3D Print certified parts.

SUPPLIER, SAFRAN TRANSMISSION SYSTEMS

Safran Transmission Systems designs, develops, produces and supports power transmission systems for aircraft engines. "The main challenge in our profession is to be able to ramp up production on new programs and to reach the level of performance our clients expect," said H el ene Moreau-Leroy, CEO, Safran Transmission Systems. "The creation of Aero Gearbox International, our jointly-owned company with Rolls-Royce, has made it more essential than ever to streamline collaboration with a common toolset that facilitates access and use of intellectual property."

To increase the efficiency of its programs Safran Transmission Systems selected the **3DEXPERIENCE** platform to coordinate activities with suppliers, and with the people working in methods, product development, and testing to trace their progress throughout a project. Prior to adopting the platform, data was managed by heterogeneous and often incompatible software, which impeded data flow between divisions, subsidiaries and partners. "The **3DEXPERIENCE** platform enables us to replace a number of outdated or independent applications that operated in silos with an integrated system that provides us with a global, unified view of our group's activities," Charles Manin, CIO, said. A single source of information helps ensure that the technical, physical and functional characteristics of a product are linked and taken into account by all project actors.

"Developing a power transmission system requires managing a huge volume of data," Michel Dion, responsible for configuration management, added.

"At the configuration management division, we are responsible for the airworthiness of our products.

It is, therefore, our job to make sure that every project stakeholder works on a single product reference with reliable, up-to-date data that complies with the requirements of our external and internal customers," he said.

"Smooth and instantaneous exchange of information with our partners, subcontractors and subsidiaries is an absolute necessity to meet project deadlines," Jean-Philippe Salini, PLM manager, said. "The **3DEXPERIENCE** platform provides our product development stakeholders with real-time access to the most up-to-date and compatible information enabling multi-disciplinary collaboration that improves the efficiency of our design and engineering programs."

"The **3DEXPERIENCE** platform provides our engineers with a leaner approach to their activity," Dion said. "Superfluous tasks are greatly reduced, enabling us to focus on doing quality work and delivering products to market on time. For example, it normally takes anywhere from three to 18 months to carry out a design change, depending on its complexity. Thanks to easy and rapid access to accurate information on the **3DEXPERIENCE** platform, we can reduce this time by up to 30% on configuration control tasks."

"To keep pace with advances in engine design, we must innovate and introduce new power transmission systems concepts," Moreau-Leroy said. "This evolution is only possible if we master the required technologies and advance the way our products are manufactured. The **3DEXPERIENCE** platform helps us to efficiently and productively deliver on this dual objective by allowing all actors and functions to collaborate in real time using integrated tools on a single platform and by providing project traceability from the earliest design stages. The **3DEXPERIENCE** platform actively contributes to helping us work towards a goal we hold dear: zero defect design," she concluded.

30%
REDUCTION
IN CONFIGURATION
CONTROL TIME

[Read the full case study here.](#)

CONCLUSION

Product lifecycle management remains a proven and key component of an Aerospace & Defense manufacturer's product development process. Today's fierce competition and product and process complexity requires a platform-based approach to fully integrate your entire value network. Available on premise and in public or private cloud, the **3DEXPERIENCE** platform is a business experience platform that provides software solutions for every organization in your company – from marketing to sales to engineering - to create differentiating consumer experiences. With a single, easy-to-use interface, it powers Industry Solution Experiences, based on comprehensive brand applications for 3D design, analysis, simulation, real-time collaboration manufacturing planning and execution and information intelligence. With all team members connected via the **3DEXPERIENCE** platform each stakeholder accesses a single source of product definition. This digital continuity plus access to data-driven applications increases time for innovation while delivering efficiency, improved collaboration, lower costs and faster time-to-market.

Why select point solutions to manage the product development process, when it is possible to connect your entire value network to a single version of the truth? From the largest companies to small start-ups, hundreds of aerospace and defense companies rely on the **3DEXPERIENCE** platform to meet engineering and business objectives. The **3DEXPERIENCE** platform with PLM is the foundation for innovation and execution.

READY TO LEARN MORE?

[See how your organization can integrate new technologies to accelerate innovation, lower costs, and increase manufacturing agility.](#)



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¹www.accenture.com/_acnmedia/PDF-5/Accenture-IT-Tech-Trends-Technology-Vision-Exec-Summary-2016.pdf

² High Value Design How to maintain competitiveness in advanced engineering – Roland Berger Focus, November 2017 (source: roland_berger_high_value_design_3.pdf).

Our **3DEXPERIENCE**® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE**® Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes' collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 220,000 customers of all sizes in all industries in more than 140 countries. For more information, visit www.3ds.com.

