

Dassault Aviation revolutionizes aircraft development with the virtual platform and PLM

Overview

■ Challenge

To maintain its lead in the aggressive executive jet market, Dassault Aviation needed to revolutionize the development process by collaborating more closely with its global partners.

■ Why Become an

On Demand Business?

By reducing development time and costs, eliminating physical mockups and sharing risk with partner companies, Dassault Aviation is able to develop superior aircraft more quickly, while providing enhanced maintenance and support.

■ Solution

CATIA® V5, an advanced 3D CAD system, used in conjunction with ENOVIA® product lifecycle management software and DELMIA® for definition of maintenance and support operations.

» On Demand Business defined

An enterprise whose business processes—integrated end-to-end across the company and with key partners, suppliers and customers—can respond with speed to any customer demand, market opportunity or external threat.



By enabling its worldwide partners to collaborate in realtime on the next-generation Falcon 7X business jet, Dassault Aviation has made dramatic gains in productivity. Today, 30 aircraft are already in production, and 70 have been ordered—an exceptional endorsement considering that the Falcon 7X will not be certified before the end of 2006.

■ Key Benefits

- Over 50 percent reduction in assembly time
- 66 percent reduction in tooling costs
- Total elimination of assembly problems
- Superior 3D modeling helps cut materials use for sustainable development
- Elimination of the need for physical aircraft prototypes

“Our aircraft must not only be of the highest quality and security, they must also be tailor-made to customer specifications. Business jet buyers are a limited club. We have to give them what they want.”

— Jacques Pellas, CIO,
Dassault Aviation

On Demand Business Benefits

- Reduction in assembly time of over 50 percent, from 16 to 7 months
- Reduction in tooling costs of 66 percent
- Total elimination of assembly problems through collaborative part design
- Elimination of the need for physical aircraft prototypes

A leading manufacturer striving to stay ahead

Dassault Aviation is a world leader in the executive aircraft market with business jets from its Falcon series, and in the military aircraft market with its fighter jets such as the Mirage and Rafale. The Falcon division represents more than half of Dassault Aviation's €3.4 billion business.

To maintain its position, Dassault Aviation must focus on delivering high-quality, secure aircraft that are custom-tailored to client requests. The company must also constantly innovate and optimize its business processes and operations to remain flexible in the face of economic variations. "Staying competitive means delivering more than our competitors in all areas of aircraft development," said Jacques Pellas, CIO, Dassault Aviation.

New product innovation and speed-to-market are key competitive aspects, but in the aircraft business there are other, wide-ranging concerns as well. Since the life of an aircraft can span more than 30 years, Dassault Aviation must make ongoing aircraft maintenance and support a priority. And, since new aircraft projects involve large groups of risk-sharing partners, Dassault Aviation has to develop its aircraft in concert with a geographically dispersed team of global partners.

The virtual jet

To address its business challenges, and in particular, optimize development of its new Falcon 7X business jet, Dassault Aviation, using IBM PLM solutions developed by Dassault Systèmes, created the world's first virtual development platform. The goal of the virtual platform was to enable Dassault Aviation and its 27 partners in Europe, the USA and Canada to concurrently design the Falcon 7X from their home sites.

Dassault Aviation linked its partners through a single, virtual collaborative workspace in which they shared a common, fully configured, constantly updated digital mockup of the Falcon 7X. The mockup was based on the Falcon 7X definition that more than 300 partner representatives and 200 Dassault Aviation engineers had developed together on a "physical" platform during the aircraft's joint definition phase at Dassault Aviation's St. Cloud site near Paris.

"Thanks to the virtual platform, we were able to work together right from the conception stage, sharing the same database and the same tools, which is something we could not do in the past," said Jérôme Camps, aerospace engineer, Dassault Aviation.

"We created the virtual platform in order to work as though we were on a physical platform, and to share a common database among our 27 partners around the world in near real time."

– Jacques Pellas

In parallel to the virtual platform project, Dassault Aviation launched an ambitious plan to restructure the company's entire IT system. This included expanding its PLM platform to integrate product development from conception to manufacturing to maintenance.

"We expanded our use of PLM for the Falcon 7X program in order to optimize the aircraft from the outset and throughout the entire development process," said Jacques Pellas, CIO, Dassault Aviation. "The virtual platform is based on CATIA V4 and V5 for product definition and digital assembly, ENOVIA VPM for real-time sharing of digital mockup. We also use DELMIA from Dassault Systèmes for definition of maintenance operations."

Impressive results

Dassault Aviation has set new standards for aircraft development thanks to PLM and its virtual platform:

Unprecedented product quality—Since the Falcon 7X was entirely defined with 3D digital precision prior to assembly, including 40,000 parts, 200,000 fasteners and the aircraft's sophisticated equipment and systems, Dassault Aviation was able to construct a business jet of unparalleled quality.

"Thanks to PLM, we created an absolutely perfect definition of the aircraft," said Jacques Pellas. "When we reached the assembly stage, from the first aircraft we had the quality that previously took us several dozen aircraft to achieve."

Assembly time cut in half—By defining the parts and structure of the Falcon 7X digitally with its partners via the virtual platform, Dassault Aviation dramatically reduced the assembly time of the aircraft. "Parts that are defined virtually fit together perfectly the first time to one-hundredth of a centimeter," said Jean-Claude Hironde, Deputy Senior Vice President, Research, Design and Engineering. "Previously, an assembly used to take us 16 months. For the first Falcon 7X, it took us only seven months."

Total elimination of assembly problems—Through the virtual platform, Dassault Aviation's risk-sharing partners were able to share and refine the detailed design of their sections in context of the Falcon 7X. This upstream co-development set the stage for a flawless assembly.

"We have eliminated assembly problems by 100 percent," said Jean-Claude Hironde. "The few times we did have some difficulty were due to the fact that the parts did not respect the digital definition in CATIA."

Key Components

Software

- CATIA V4, V5
- ENOVIA VPM
- DELMIA

Business Partner

- Dassault Systèmes
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Why it matters

Aircraft manufacturer Dassault Aviation revolutionized the aircraft development process for its Falcon 7X business jet, enabling unprecedented collaboration with its global partners through the use of a virtual design platform. The solution completely eliminated assembly problems and the need for physical mockups, and cut tooling costs by 66 percent and assembly time by 50 percent.

Reduced tooling costs—Prior to the virtual platform, Dassault Aviation required specialized tools to assemble its aircraft. However, thanks to the precision of digitally defined parts and the perfect alignment of drill holes between sections, many positioning tools have become obsolete.

“We have cut tooling costs by at least two, maybe even three times because we require significantly fewer tools for the Falcon 7X than for previous aircraft,” said Jacques Pellas.

Elimination of physical prototypes—The digital mockup of the Falcon 7X is so precise that Dassault Aviation was able to cut out the costly and time-consuming step of building a physical prototype.

Sustainable development—IBM PLM solutions contribute to Dassault Aviation's policy of sustainable development by helping the company to advance economically while ensuring environmental quality.

“From an economic perspective, PLM increases our competitiveness through optimized development processes and reuse of corporate knowledge,” said Jérôme Camps. “From a social perspective, it enables us to improve conditions for people by anticipating and optimizing ergonomic factors. Environmentally, it allows us to use only what is required to build an aircraft, and we no longer produce physical prototypes.”

Moving forward

Dassault Aviation will continue to enhance its use of PLM by migrating from ENOVIA VPM to ENOVIA VPLM. The company also plans to extend use of the virtual platform to other projects such as the Unmanned Combat Air Vehicle (UCAV). In addition, it intends to increase the functionality of the virtual platform by increasing the frequency of data exchange and to offer e-conferencing to enhance real-time collaboration.

IBM PLM solutions developed by Dassault Systèmes have enabled Dassault Aviation to meet and exceed the challenges of the executive business jet market. With its groundbreaking virtual platform, Dassault Aviation has not only reinforced its position as a leader in the aerospace industry, but also revolutionized the way all aircraft will be developed in the future. “The Falcon 7X project made the whole company feel younger,” said Jacques Pellas. “You can feel the enthusiasm at each production site you visit.”

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New Orchard Road
Armonk, NY 10504
U.S.A.

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