

## DASSAULT AVIATION

*Developing sophisticated embedded aircraft systems with  
SMARTEAM for collaborative systems engineering*



# Company overview



Dassault Aviation Group is a major player in the global aerospace industry with 2004 turnover of €3.46 billion and 12,000 employees. Founded in 1936, the company today has a presence in more than 70 countries across five continents.

Dassault Aviation addresses the military aircraft market with fighter jets such as the Mirage and Rafale, and the executive aircraft market with business jets from its Falcon series. Structured to adapt its production to aerospace market cycles, Dassault Aviation works closely with a network of high-tech companies worldwide that comprise its extended enterprise.

## Business challenges

- + **Manage the systems engineering data model for development of complex embedded aircraft systems**
- + **Streamline collaboration among diverse partners and activities**
- + **Optimize staff efficiency by reducing data management time**
- + **Ensure consistency of data model changes**

# Situation

Today, customers demand more technologically-advanced, multi-functional products, whether in the electronics, automotive or aerospace markets. This translates into more sophisticated electronic and software embedded systems required to manage the increasing number of functions and their interaction.

In the aerospace industry, powerful embedded systems in military aircraft are required to support multi-mission, multi-sensor, and multi-mode systems used for aircraft operation in hostile and complex environments.

Developing these sophisticated embedded systems is a key challenge for aerospace manufacturers because it involves a large number of tasks such as: capturing product requirements; defining the optimal functional and technical architecture of the product; and maintaining data model consistency during incremental development.

This is the challenge Dassault Aviation faces in developing embedded Mission and Avionic Systems that control navigation and armament of its military aircraft.

"From initial customer requirements to specification and validation, more than 150 design engineers can be involved in a Mission and Avionic Systems project," said François Chivot, manager Systems Engineering Methodology and Tools, Dassault Aviation. "Any one of them must be able to find the right information at the right time."



*"A key challenge in developing Mission and Avionic Systems is to ensure consistency of the overall systems engineering data model comprised of product requirements, component specifications, design, and validation plan throughout the entire development lifecycle."*

**François Chivot, manager Systems Engineering Methodology and Tools**

# Solution

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 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 such as DOORS®, Rose®, and MS Office®.

“The SMARTEAM solution is a comprehensive collaborative systems engineering product suite that enabled us to completely support our end-to-end systems engineering process from needs management to final product validation,” said François Chivot, manager Systems Engineering Methodology and Tools, Dassault Aviation.

## End-to-End Systems Engineering Support

Dassault Aviation uses a standardized structured process for establishing the Mission and Avionic Systems product definition.

SMARTEAM provides instant access to data such as multiple product views including requirements, functional analysis, and systems architecture design. SMARTEAM manages the evolution of these different elements and ensures consistency all along the development cycle.

“By federating systems engineering data and third-party applications, SMARTEAM allows users to easily and intuitively navigate through the structure of a complex project via an easy-to-use interface,” said Eric Fricker, IT manager, Scientific and Systems Engineering, Dassault Aviation. “SMARTEAM allows us to easily implement a specific engineering data model.”

SMARTEAM gives Dassault Aviation a collaborative systems engineering environment that provides multi-domain engineers with instant and consistent access to the complete Mission and Avionic Systems definition.

## Fast customization and user adoption

More than 200 operational 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 SMARTEAM in less than six months.

“SMARTEAM can be easily customized to support process improvements, additional engineering data model components and implementation for new program developments,” said Eric Fricker. “We can progressively complement the solution while not interrupting the user’s daily activity.”

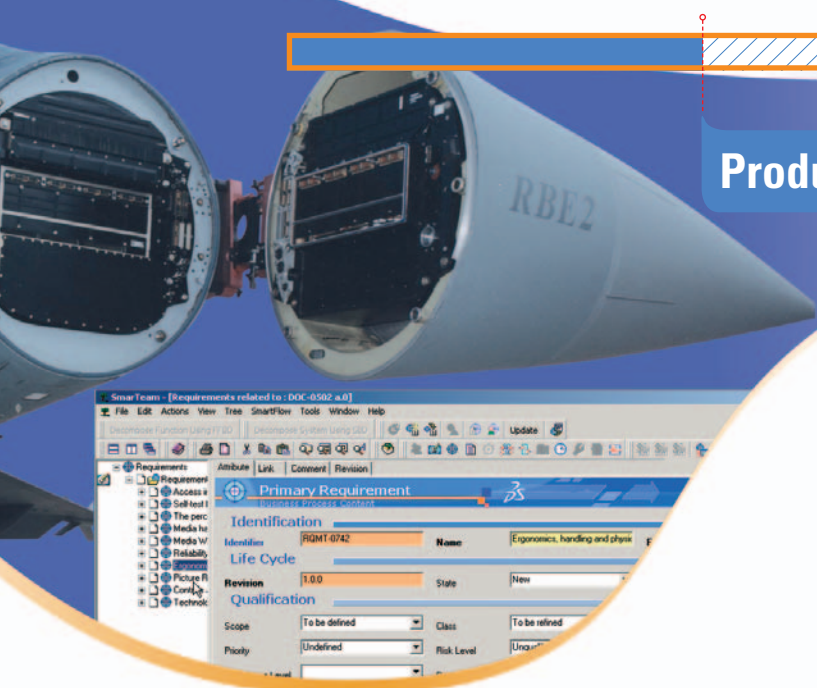


**Product definition freeze time: - 85%**



*“The ease of deployment of SMARTEAM gives us a competitive advantage as it provides our customers with an environment they can also use to manage the evolution of the product.”*

**Eric Fricker, IT manager, Scientific and Systems Engineering**



# Results

Dassault Aviation has achieved clear and tangible benefits from its SMARTEAM solution for collaborative systems engineering:

## Fast Product Definition and Validation

SMARTEAM enables Dassault Aviation to rationalize its systems engineering process. “We have cut the time-to-freeze of the product definition from three days to three hours, more than 85%,” said Jean-Hugues Bénédit, manager Rafale Core Avionics platform, Dassault Aviation.

“Today, Dassault Aviation engineers no longer waste time looking for data,” said Jean-Hugues Bénédit. “With just a few clicks, they have immediate access to the right information and the correct version. It saves hours every day.”



*“Without SMARTEAM, it would be impossible to manage the growing complexity of new generations of Mission and Avionics Systems.”*

**Jean-Hugues Bénédit, manager Rafale Core Avionics platform**

## Product complexity mastered

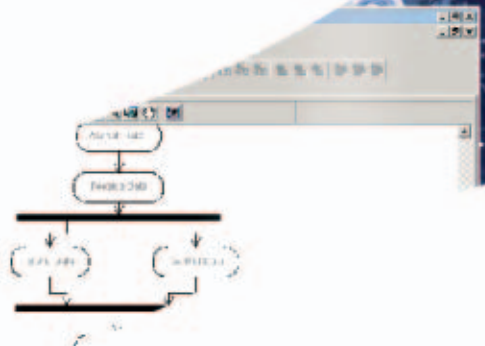
SMARTEAM has enabled Dassault Aviation engineers to maintain dependencies between the large amounts of systems engineering data. This allows all disciplines to easily manage configuration and therefore, modifications, as well as manage the design of complex Mission and Avionics Systems in a consistent manner.

With SMARTEAM, the time required to manage the systems engineering data model for Mission Avionics Systems has dropped by 25%.

“SMARTEAM truly simplifies the work of our 150 engineers who can now simultaneously access the 600 requirements modules, architecture models, and the 20,000 application interfaces,” said Jean-Hugues Bénédit.

During the lifetime of an aircraft (more than 30 years), customers regularly need to upgrade the mission capability of their products. Dassault Aviation can now continuously and easily adapt and match product design to requests for evolution.

“We have to handle requests for product evolution. SMARTEAM addresses this challenge by helping us to maintain the consistency of the overall engineering data, the related technical specifications, and our final design,” said Jean-Hugues Bénédit.



**Data access time: instantaneous**

### Improved product quality

SMARTEAM provides Dassault Aviation 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.

“Since we know that the information we access is systematically up to date, we do not have to check it. This saves us a huge amount of time,” said Jean-Hugues Bénédit.

### Streamlined collaboration

SMARTEAM has enabled Dassault Aviation to structure and organize the development process of the Mission and Avionics Systems for all actors, including its partners. This facilitates communication and activity coordination, and thus reduces rework time and costs spent on errors due to design inconsistency.



**Data package management time: - 25%**

*“With SMARTEAM, we have succeeded in giving to all 150 actors a single structured view of both the product and the process. It creates a synergy and they really have the feeling of belonging to a whole.”*

**François Chivot, manager Systems Engineering Methodology and Tools**

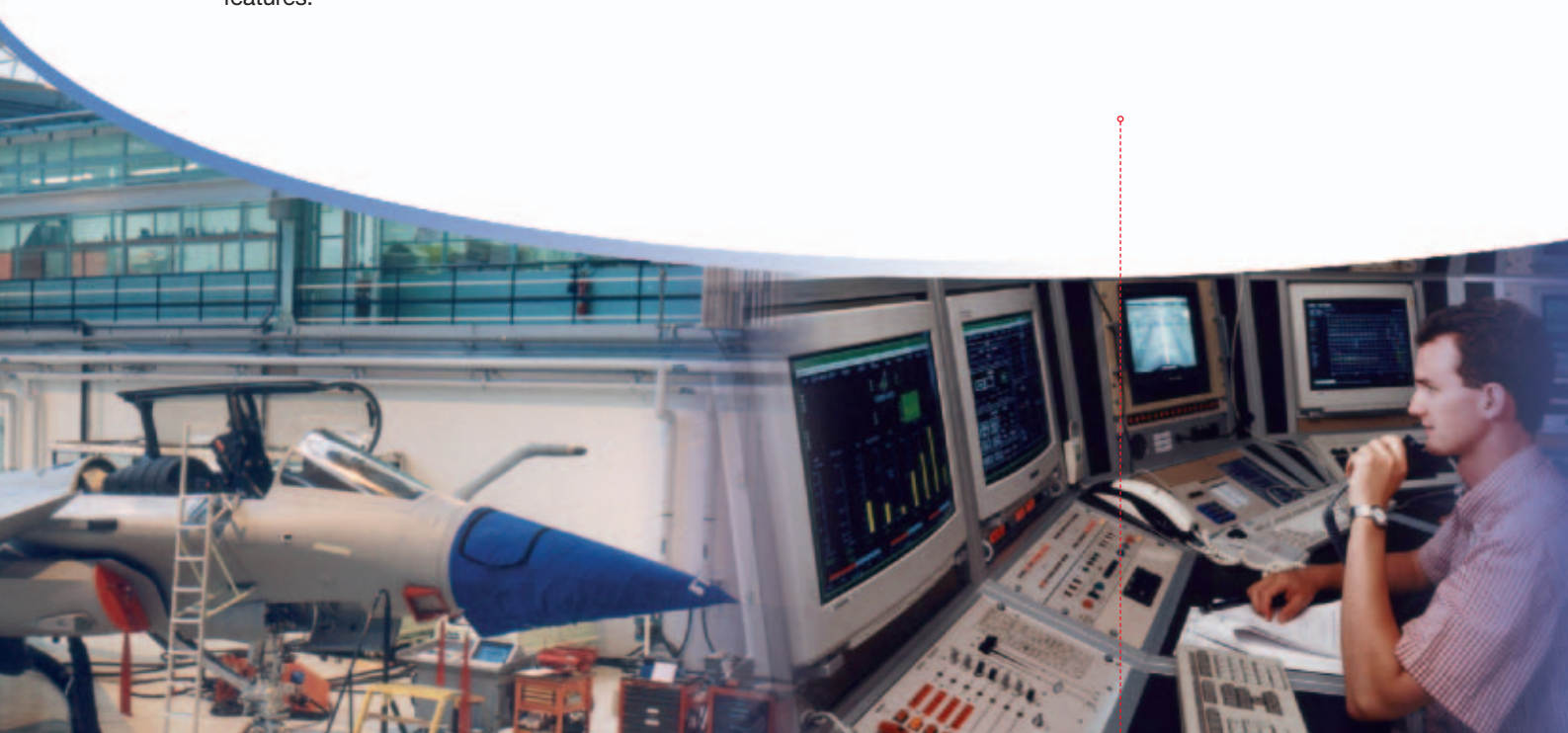
# Future

SMARTEAM helps Dassault Aviation to drive its end-to-end Mission Systems and Avionics Systems development from needs identification through to final system validation. It is the product information backbone that provides Dassault Aviation engineers and their partners with a collaborative systems engineering environment.

In the future, Dassault Aviation will continue to extend the functional perimeter of its collaborative systems engineering solution by integrating new SMARTEAM features.

In addition, the solution is used to support all new Dassault Aviation projects and programs.

“With SMARTEAM we are convinced that we made the best choice to manage our systems engineering data. The flexibility of SMARTEAM ensures that we can consistently improve and adapt our process to face upcoming business challenges,” said François Chivot.



## – 85% Product definition freeze time

Time to freeze product definition cut from three days to three hours.

## Data access time

Accessing information used to



**: Instantaneous**  
take up to a week.

**- 25% Data package management time**  
Time now fully dedicated to design.



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