DASSAULT SYSTEMES

Sukhoi Civil Aircraft Company

Aerospace & Defense Case Study

SUKHOI
CIVIL AIRCRAFT
A Sukhoi and Alenia Aermacchi Company

Challenge
Sukhoi Civil Aircraft Company (SCAC) is striving to become the first Russian airplane manufacturer to fully design its aircraft using digital technology.

Solution
SCAC uses the **3D**EXPERIENCE Platform from Dassault Systèmes to develop unique and complex engineering designs and associated documentation in a 3D environment, as well as to perform engineering analyses, manage specifications, tolerances, model ergonomics, and establish and expand a knowledge base.

Benefits
The company created a complete digital mock-up of the Sukhoi Superjet 100, with benefits that include improved product quality and a reduction in development time and cost.

Leader of Russian civil aircraft industry
International competition in the 75 to 100-seat regional aircraft market is particularly fierce, especially when the marketplace includes heavyweights such as Bombardier Aerospace and Embraer. But Russian aircraft manufacturer Sukhoi Civil Aircraft Company (SCAC) JSC intends to tip the scales in its favor with the Sukhoi Superjet 100 (SSJ100). To enter the global civil aircraft market, Sukhoi Aircraft Holding Company developed a strategy to diversify its offering. The SSJ 100 is the result of this strategy and is the first regional passenger airliner in Russian aircraft history.

It is the first time a Russian aviation company has taken part in a large-scale international project, along with over 30 leading foreign companies, for the development of this type of aircraft. An ambitious project like this requires innovative technologies, and it was decided at SCAC's inception to use 3D design software to develop aircraft virtually. The SSJ100 model was an example of this innovative approach and became the first Russian airliner fully developed using digital tools. The plane was manufactured using technologies that have never been used in the Russian aircraft industry before. This includes jigless assembly, automated mating of airframe subassemblies, automatic riveting and a variety of other innovations.

Creating a new-generation aircraft
To meet the design challenges of the SSJ 100, SCAC required a solution with functionalities for developing unique and highly complex designs in 3D, as well as for performing engineering analysis, managing specifications and 3D-model tolerances, modelling ergonomics, establishing and expanding the knowledge database. "All these features are provided by Dassault Systèmes' **3D**EXPERIENCE Platform, our choice for sustainable development of the highest quality," Danil Bershov, head of information technology directorate, SCAC said.

SCAC uses many industry applications from Dassault Systèmes for various purposes, including part and assembly design, function-based parameterization, redesign work, space allocation for wiring and piping, as well as existing best practices.

Moreover, to develop a new-generation aircraft, the company had to work in an integrated information environment, where the design office, suppliers, and manufacturing plants are interconnected within a common system. This is particularly critical when working with western strategic suppliers such as Safran Group (Snecma and Messier-Bugatti-Dowty). It enables all stakeholders to access and monitor the 3D-digital model in real time. Engineers can find even the slightest discrepancies and correct them as early as possible. This integrated information environment greatly simplified the detailed design definition of the full aircraft, before transferring all data to the production system of the SSJ100's airframe. For example, with documents and drawings available in digital format, paper-based documentation was reduced to a minimum.

With respect to the ergonomics of various construction and maintenance tasks, the fact that designers work with a digital

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Danil Bershov, Head of Information Technology Directorate, SCAC

Sukhoi Superjet 100 Photo: M. Lystseva

Sukhoi Superjet 100 Photo: Shermetyevo

mock-up enables them to simulate human interactions, which helps identify tight spots or impossibilities even before building the physical prototype. "Sometimes, we do not need to build a physical mock-up," Bershov said. "The digital environment is so realistic, it is a perfect alternative when verifying passenger or worker ergonomics. We perform these digital verifications with CATIA and as a result reduce new product development time and costs. We are currently implementing a system for the design of wire and cable harnesses in 3D, also using the **3D**EXPERIENCE Platform," he said.

Sukhoi Superjet 100 success

SCAC accomplished its goal of creating a fully digital model of the aircraft and delivering it to its production facilities that use the mock-up for CNC machine tool programming. "The machining centers we work with ensure production of the highest quality and precision. We can assemble the manufactured parts without additional adjustments," Bershov said.

In the spring of 2011, SCAC began delivering its SSJ100 to airline companies. As of early November 2012, eleven airplanes were sold, one to Armavia and ten to Aeroflot. To date, the SSJ 100 has made for than 7,900 flights for a total of more than 15,580 flight hours. In January 2012, the SSJ 100 was granted an IAC Aviation Register certificate and in February 2012 the plane was certified by the European Aviation Safety Agency (EASA). SCAC has received over 170 firm orders for the SSJ100 aircraft, including orders from foreign companies. Customers include Aeroflot, Transaero, Gazpromavia and Yakutia (Russia), Interjet (Mexico), Lao Central Airlines (Laos) and Sky Aviation (Indonesia) and others. The company forecasts demand, up to 2031, to reach a total of 5,750 60 to 120-seat regional jets. This includes 390 planes for Russian and CIS airlines. SCAC plans to supply up to 1,000 SSJ100 aircrafts with various modifications that include a business jet version.

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Focus on Sukhoi Civil Aircraft JSC

The Sukhoi Civil Aircraft Company develops, produces, markets, sells and services civil airplanes. SCAC is a joint venture of the Russian Sukhoi Company and the Italian aerospace company Alenia Aermacchi.

Products: Sukhoi Superjet 100 (SSJ100)
Employees: 2000
Headquarters: Moscow

For more information
www.scac.ru

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