



ODR

REGIONAL AVIATION. Russian aircraft manufacturer Sukhoi is offering the Superjet 100 family of 75 and 95 seat regional jets. This is also the launch customer for the new SaM146 engine, a joint effort of Snecma and NPO Saturn.

SAM146 JET ENGINE ON TRACK FOR QUALIFICATION

Synthesized image of the Superjet 100.



With the SaM146 propulsion system for regional aircraft, Snecma is diversifying its product range. This is not a new strategic move for the engine-maker, part of the Safran Group of France: back in the mid-1990s Snecma was already trying to convince partner General Electric to launch a smaller version of their industry-standard CFM56, dubbed the "CFM56 Lite". Snecma took another shot at the market in 1997-98, this time with Pratt & Whitney, through two new engine projects, the SPW14 and SPW16.

The high growth rate in regional aviation – one of the highest of all air transport segments over the next 20 years – is a solid reason for manufacturers to focus their attention on aircraft in the 70 to 120-passenger segment, and the engines needed to power them.

The SaM146 story reaches back to 1999, when Snecma decided to launch a demonstration program dubbed DEM21. This was an engine core (high-pressure section) sized for the regional jet market, to help sway manufacturers likely to develop such an aircraft. But while designing a small jet is almost as expensive as designing a large jet, it still has to be sold at a price appropriate for its size, so Snecma sought the support of a manufacturer from a country with lower costs. "Based on trends around the world, the success of a milestone project such as the SaM146

demands a collaborative, integrated approach," emphasizes Leonid Mozheiko, chief financial officer of NPO Saturn.

In 2001 came a timely announcement by Russian plane-maker Sukhoi that it planned to diversify into commercial aviation with a 60 to 95-seat plane designed with the assistance of Boeing, known at the time as the Russian Regional Jet. "Boeing was a consultant on this project, and was able to give us good advice early in the process," notes Jean-Pierre Cojan, head of Snecma's Commercial Engines division.

The aircraft was well designed, and quickly awakened the interest of non-Russian airlines, attracted by a new aircraft in a market dominated by Embraer of Brazil, which faced few competitors. In 2003 a group of airlines – Air France, SAS, Aeroflot and Sibir – were asked to provide initial input for the design of the new Sukhoi aircraft.

The Superjet 100 featured a modern design tailored for its market segment: 5-across seating, and above all the same landing categories (weather, visibility) as the Boeing 737 and Airbus A320, meaning that it could be used to complement or

VIEWPOINT



LEONID MOZHEIKO
CFO, NPO SATURN

What does the SaM146 project represent for NPO Saturn?

The SaM146 development project is unprecedented in Russia in terms of investments and forecast revenues throughout the product life cycle. But NPO Saturn management is convinced that the future of our company

depends on the success of this project. In other words, we're not only trying to create a competitive product, but in a larger sense creating a brand-new enterprise with a new mindset and management approach.

How are these changes expressed in practical terms?

NPO Saturn has deployed the resources needed to meet our goals, with a vast modernization program for our production facilities and production lines, and staff training in international management methods. The design work, split between NPO Saturn and Snecma, has proven very effective. This program is extremely important for both of our companies, and for Russia and France as well.

replace these widely-used twinjets. "The Superjet 100 should be the best plane in its class," says Cojan. "Three models were originally planned, including a 60-seat model that was later abandoned because it was considered too small. Today, we're working on 75 and 95-seat models, which will soon be joined by a larger one, from 115 to 125 seats. This will plug the gap with the smallest models in the Boeing 737 and Airbus A320 families."

Best-in-class technologies

To meet project requirements, Snecma offered the SaM146 propulsion system (engine + nacelle), developed in conjunction with Russian engine-maker NPO Saturn, and designed for several types of twinjets in the 70 to 100 seat category. Chosen by Sukhoi Civil Aircraft Company for the Superjet 100, the SaM146 is based on proven CFM56 technologies, but in the 13,500 to 17,500 lb thrust class. It has a six-stage compressor and a single-stage high-pressure turbine, benefiting from technologies developed for the M88 engine that powers Dassault's Rafale fighter. The propulsion system is designed to meet the most stringent environmental standards, both current and the upcoming CAEP VI. In production terms, NPO Saturn manufactures the low-pressure turbine and handles final assembly, ground

tests and acceptance tests. Snecma is in charge of the core, the full authority digital engine control (Fadec) and power transmission, as well as development integration and flight testing. Other Safran group companies are involved as well: Aircelle for the nacelle, Microturbo for the starter, and Hispano-Suiza for the control system.

Work kicked off in 2001, and four engines were ready for testing in 2006. The No. 2 engine, undergoing ground tests at NPO Saturn in early 2007, reached and even exceeded its maximum thrust rating, developing 18,000 lb of thrust. "We will shortly start tests of the No. 3 engine with its nacelle on the open-air test cell, making this a certifiable configuration," explains Snecma SaM146 program manager Robert Vivier. "The engine will then be shipped to the Joukovski air base for tests on a flying testbed, an Ilyushin 96, and then to Istres in France for other flight tests."

Certification is scheduled for 2008. A total of 12 preproduction engines will be built, for the certification of four Superjet 100 regional jets, expected by the end of 2008. Service entry is also slated for the end of 2008, and the Superjet 100 has already garnered 61 firm orders in Russia. ■

P. FRANÇOIS

BENCHMARKS

SAM146 MILESTONES

- ▶ **2001** Creation of Sukhoi Civil Aircraft Company (SCAC); start of design work on the SaM146.
- ▶ **2002** First ground test of Snecma's DEM21 core demonstrator.
- ▶ **2003** First indications of interest from airlines for the SaM146; Sukhoi selects the SaM146 to power its RRJ (later renamed the Superjet 100).
- ▶ **2005** Collaboration Agreement between Snecma and NPO Saturn.
- ▶ **2006** Framework Purchase Agreement between Snecma and NPO Saturn; First Engine to Test (FETT).
- ▶ **2007** First ground tests at beginning of year; test flights planned for end of year.
- ▶ **2008** Service entry and initial deliveries at end of year.
- ▶ **2023** Delivery of 800th Superjet 100 (estimation).