PRESS KIT

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1/. PowerJet overview

The regional market is expected to log the highest growth rate of any air transport segment in the next twenty years. To meet the specific needs of this market, Snecma is offering the purpose-designed SaM146 engine, developed in conjunction with Russian engine manufacturer NPO Saturn.

In July 2004, the two partners created a 50/50 joint company called PowerJet, to handle all aspects of the SaM146 program, including development, production, marketing and sales, as well as customer support and MRO services.

The partnership between Snecma and NPO Saturn goes back several years already, first through subcontracting for CFM56 engine parts, and now for the SaM146 propulsion system destined to the regional aircraft market. Snecma and NPO Saturn decided to team up on a new regional jet engine in 2002. This move reflected both confidence in the market (estimated at a potential of 5,000 aircraft in the 70-100 seat category over the next 20 years), and long-standing mutual trust between the two partners.

In April 2003, the SaM146 was selected by Sukhoi Civil Aircraft Company (SCAC) for the SUPERJET 100 regional aircraft, which will be the first application for the SaM146.

Three years after winning the contract, Snecma and NPO Saturn, now operating through PowerJet, are pleased to celebrate the SaM146 First Engine To Test (FETT), a major step in the engine development program.

2. A new player in the small jet market

PowerJet structure, location and role
The PowerJet joint venture, created in July 2004, is equally owned by Snecma and NPO Saturn. It is in charge of all SaM146 program management tasks, spanning design, production, marketing and support. PowerJet has two operating units, one in France (PowerJet SA), the other in Russia (PowerJet ZAO).

Responsibilities
Within this entity, Snecma is in charge of the core engine, control system (Fadec), accessory drive (accessory gearbox, transfer gearbox), overall propulsion system design integration and flight testing. NPO Saturn is responsible for the components of the low-pressure section, engine production assembly and ground testing.

PowerJet will deliver a complete propulsion system, comprising both engine and nacelle. This implies the involvement of two other SAFRAN group companies: Hispano-Suiza, in charge of the engine control system; and Aircelle, in charge of nacelle production and certification. PowerJet can therefore offer a complete propulsion system to both Sukhoi Civil Aircraft Company and airlines.

Robust financing plan
PowerJet shareholders enjoy the support of the French and Russian governments, a testimony to their confidence in this innovative project.

3. The SaM146 engine

The SaM146 engine has all the advantages needed to enter a very competitive market, with very demanding customer requirements in terms of low cost of ownership, high dispatch reliability, maintainability and environmental friendliness. The SaM146 incorporates proven advanced technologies, to give airlines economical operation in commercial service.

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A new concept
• It is a complete propulsion system, comprising engine + nacelle + equipment.
• It is the only engine designed and developed from the very beginning for the regional aircraft market.
• It ranges in thrust from 14,000 to 17,500 lb. Therefore, with a single engine powering an entire family of aircraft, the airlines will reap the benefits of commonality and economies of scale.
• It offers comprehensive services, based on "Total Power Support", an extensive range of tailored support and maintenance services. The SaM146 capitalizes on Snecma's vast experience with product support. SaM146 MRO will be provided exclusively by PowerJet, through the global networks of Snecma Services (CFM56) and NPO Saturn.

Advantages
• Airlines can simply adjust the thrust level via the FADEC and benefit from Engine Management Optimization.
• The SaM146 will meet the most stringent environmental standards both in terms of emissions and noise.
• It features a modern architecture, based on experience with the CFM56 (the most reliable and economical engine in its class), and using a single-stage high-pressure turbine. The SaM146 high-pressure compressor has fewer stages and fewer parts than all its competitors, which helps reduce maintenance costs as well as engine weight and fuel consumption. The upshot is a significant reduction in cost of ownership.
• It ensures the airlines of the best product value through an optimized cost of ownership thanks to engine reliability, low parts count, easy flight-line maintenance and reduced repair costs, with a 20% reduction target over CFM reference;
• PowerJet is setting up a complete support organization, designed to meet all daily and long term airline expectations through Customer Support Management Team, a Customer Support Center (24/7), training support, flight operational support, etc.
• PowerJet offers a wide range of services for the SaM146 propulsion system well suited to customer needs.

4. Other cooperation activities between Snecma and NPO Saturn

Parts production: VolgAero, a Western showcase in Russia
The VolgAero plant, inaugurated in October 2005, is now up and running. It includes over 10,000 square meters of workshops, plus another 2,500 square meters of offices. It will eventually deploy about 100 modern machine tools, including 21 numerical control machining cells.

VolgAero primarily makes parts for the SaM146: fan disk, low-pressure spool, HP compressor casing, HP and LP turbine casings, supports for the Nos. 1 and 2 bearings, intermediate casing, exhaust casing and all accessory components.

The plant has three product lines: rotating parts; mechanical and mechanically-welded casings; and engine accessory components. It also offers shared facilities for chemical, thermal and surface treatments (plasma, shot-peening, sand-blasting, etc.).

Open-air test cell
Construction of the open-air test cell in Poluevo (Russia, Rybinsk area) is now completed and ready to carry out some required certification tests for the SaM146 engine. This test rig will cover three types of testing: performance, certification tests (operation in cross-wind, water and ice ingestion), and acoustic certification of the propulsion system. There are only three facilities of this type in the world today.
Cenco International, a subsidiary of Techspace Aero (SAFRAN Group) has designed the open-air test bed, while NPO Saturn was in charge of building the pylon. A special joint venture has been created to manage this test cell.

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5. Program update, sales & marketing

Development status
On November 30, 2005, in line with the development timetable, the SaM146 core made its first test run at Snecma test facility in Villaroche (Paris area), successfully reaching its nominal thrust.

On July 9, 2006, the SaM146 First Engine To Test (FETT) made its successful first ground test at the NPO Saturn test facility in Rybinsk.

Flight tests will begin in February 2007 on an Ilyushin 76 flying test bed provided by Russian laboratory LII. Two series of tests will be carried out: one in Moscow, the other in Istres, southern France, at one of Snecma's dedicated flight test centers.

A total of nine SaM146 engines will be used for certification testing, logging more than 4,500 accelerated mission cycles during the process. Certification of the SaM146 is scheduled for March 2008.

Sales & Marketing
PowerJet and Sukhoi Civil Aircraft Company (SCAC) are involved in joint marketing efforts, especially through the Airline Advisory Boards that include airlines interested by this project. Five board meetings have already been organized. In addition, numerous technical groups meetings took place involving airlines specialists (eg cockpit and avionics), the activities of which resulted in hundreds of aircraft design specification changes.

PowerJet is also taking part in sales campaigns along side with SCAC to provide integrated sales packages. In December 2005, Russian airline Aeroflot placed an order with SCAC for 30 SURPEJET 100 aircraft (95 pax) in basic configuration. The first SUPERJET 100 deliveries to Aeroflot are scheduled for November 2008. In addition, Finance Leasing Company, based in Russia, signed a definitive contract concerning 10 aircraft in February 2006.

6/. PowerJet's parent companies

- ### Snecma

The world's broadest choice of aircraft and rocket engines
Part of the SAFRAN Group, Snecma is one of the world's leading aerospace propulsion companies, offering the broadest choice of aircraft and rocket engines.

Snecma designs and produces commercial engines that are leaders in their thrust class, such as the CFM56, the world's best selling and most reliable commercial aircraft engine. CFM56 engines, produced in partnership by Snecma and General Electric, power more than 6,200 Airbus and Boeing aircraft for some 450 customers and operators worldwide, and have set a new standard of reliability and operating cost in commercial jet propulsion. Snecma is also a partner to General Electric on various large turbofan engines: the CF6, GE90 and GP7200.

Snecma is active in all three segments of the military aircraft market – combat, training and transport – with the M88-2 (Rafale), the M53-P2 (Mirage), the Larzac® for trainer aircraft and the TP400-D6 turboprop engine for the A400M military transport aircraft.

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Snecma is the propulsion prime contractor on Europe's Ariane space launchers. It develops and produces a wide range of propulsion systems and equipment for launchers, space vehicles and satellites (Vulcain®2, HM7B, PPS®1350, etc.).

Partnerships with Russian aerospace industry

Over the past few years, Snecma has embarked on a policy of collaboration with Russian partners, especially for the production of CFM56 engine parts. The CFM56 powers some 40 jetliners for Aeroflot, Transaero, Sibir and Pulkovo. Snecma also teams up with Russian company Fakel to develop plasma thrusters for spacecraft.

In addition to this industrial teaming, Snecma has established scientific and technical partnerships with Russian universities, the aeronautical labs CIAM, TsAGI, VIAM and the flight testing specialist LII Gromov.

- **NPO Saturn**

At the cutting edge of Russian engine technology

NPO Saturn is the main Russian designer and manufacturer of gas turbines for aviation and industry. The company produces engines for both civil and military aircraft, along with turbogenerator sets for electric power plants and gas pumping stations, and engines for unmanned aerial vehicles. Deploying an extensive array of state-of-the-art production and R&D resources, NPO Saturn develops and produces advanced gas turbine solutions.

NPO Saturn has two main strategic objectives in its development of aircraft engines: continuous upgrades to engines throughout aircraft service life, and working with leading companies around the world to develop new engines. More than 4,000 D-30KU/KP commercial engines are operated by 139 Russian and international airlines and have logged over 40 million flight-hours.

NPO Saturn engines power the world-famous Sukhoi fighters, such as the AL-31FP engine that powers the advanced multipurpose 4+ generation Su-37 and Su-MKI fighters. These aircraft are in operation in the air forces of the Russian Federation and other countries around the world. In addition, NPO Saturn makes helicopter turboshaft engines and turbofan engines for small unmanned aerial vehicles.

The SaM146, a strategic challenge

Aiming to establish its position in the global civil aviation market, NPO Saturn actively supports international collaboration with industry leaders, including Snecma. Through the SaM146, NPO Saturn will enter the civil aviation market with a very modern product, designed to be certified to standards set by EASA (Europe) and the FAA (United States). The SaM146 offers a major opportunity for the Russian aviation industry, at the very moment when it is ready to re-enter the global aviation market.

7/. SAFRAN Group companies involved in the SaM146/SUPERJET 100 program

Snecma: SaM146 engine
Aircelle: nacelle & reverse
Hispano-Suiza: engine control system
Microturbo: air turbine starter
Sofrance: filtration system
Techspace Aero: lubrification system
Snecma Services: maintenance, repair and overhaul
Cenco Inc.: open-air test bench
Sagem Défense Sécurité : Engine Over Speed Unit (EOSU)
Messier-Dowty : SUPERJET 100 landing gear system

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