

газа и еще два - на линейную компрессорную станцию «Изборгская» (ОАО «Лентрансгаз»). «Сатурн» примет участие и в реконструкции компрессорной станции «Гаврилов-Ям» (ОАО «Мострансгаз»), поставив туда ГТД-6,3РМ - газотурбинный двигатель мощностью 6,3 МВт с комплектом монтажных частей и дополнительным оборудованием. Более мощный (10 МВт) двигатель получит компрессорная станция «Нюксеница» (ООО «Севергазпром»).

Помимо газоперекачивающих агрегатов, по заказу «Газпрома» НПО «Сатурн» выпускает и газотурбинные электростанции ГТЭС-2,5 мощностью 2,5 МВт. Две из них смонтированы на компрессорной станции «Сальская» (ОАО «Кавказтрансгаз»), являющейся частью проекта «Голубой поток» по поставке российского топлива в Турцию. Еще шесть ГТЭС-2,5 будут поставлены на второе по величине российское газовое месторождение в Песцово (ОАО «Уренгойгазпром»).

Расширение спроса на газотурбинные энергоустановки поставило перед «Сатурном» в начале XXI века задачу комплексной модернизации производства, целью которой должно стать принципиальное изменение технико-технологических возможностей компании и освоение в короткие сроки се-

рийного производства новых видов продукции энергетического машиностроения. Был разработан соответствующий бизнес-план и проведена большая работа по поиску стратегических партнеров, способных оказать помощь в реализации намеченного. Прошли переговоры с рядом крупнейших корпораций мира, занятых в секторе энергомашиностроения и гражданского авиадвигателестроения. В результате наиболее перспективным признали сотрудничество с японскими корпорациями.

В июле 2003 г. НПО «Сатурн» достигло соглашения с японской компанией Sumitomo Corporation, предусматривающего кредитование программы модернизации предприятия на сумму 60 млн. долл. в период 2003-2008 гг. Помимо этого, генеральный директор объединения Ю.В.Ласточкин, председатель совета директоров В.К.Глухих и вице-президент японской компании г-н Моринака подписали документ о глобальном сотрудничестве на российском рынке энергетического машиностроения до 2010-2015 гг. Это - первое российско-японское соглашение подобного рода.

В ноябре 2003 г. был подписан контракт по первому траншу кредита, в соответствии с которым НПО «Сатурн» получит первую

партию новейшего оборудования производства ведущих японских машиностроительных фирм - Mitsubishi Heavy Industries, Mitsubishi Electric Industries и Mori Seiki. В 2004 г. планируется комплексная поставка на предприятие пятикоординатных высокотехнологичных станков, в том числе и для эрозионной обработки. Подписание протокола о втором транше кредитования на 2005 г. (запланированное на ближайшее время) сделает работу «Сатурна» по модернизации производства еще более системной и комплексной.

Российско-японский проект позволяет принципиально изменить структуру кредитного портфеля НПО «Сатурн» и выйти на уровень долгосрочного проектного финансирования модернизационных программ. Следует отметить весьма существенный момент: процент по кредиту значительно ниже рыночных ставок кредитования в России. По словам заместителя генерального директора НПО «Сатурн» С.В.Чуклинова, весь комплекс работ в рамках сотрудничества с японской фирмой направлен на создание принципиально новой продукции на рынке энергетического машиностроения, соответствующей всем современным требованиям по качеству и экологии. AKO



The need and inevitability of restructuring the Russian aircraft engine industry has been talked and written about for a long time, but real success in industry overhaul has been scarce. The Saturn scientific and production association, better known by its Russian name NPO Saturn, has been one of the first companies to take on this complex and painful task both in word and in deed. The company has integrated within a single viable entity two leading national developers - the Rybinsk-based KBM design bureau and Lyulka-Saturn design bureau in Moscow, both having large experimental and production facilities (an experimental factory in Rybinsk and the Lytkarinsky machinebuilding plant in the

Moscow Region) as well as two large industrial facilities in Rybinsk.

At present, NPO Saturn is a major national developer and manufacturer of gas turbine engines for Air Force and naval and civilian applications as well as Russia's fuel and power generation industry. The corporation employs about 18,000 personnel, with its production facilities totalling an area of roughly 1,000,000 sq. m.

Yu.V. Lastochkin, M.Sc. (economics), a graduate of the Yaroslavl University, is director general of NPO Saturn. The board of directors and stockholders' meeting appointed Mr. Lastochkin director general of Rybinsk Motors in October 1997, while in 2001 he took over the

helm of the new vertically integrated company, NPO Saturn, the only such company in the Russian aircraft engine industry.

Under a federal governmental resolution, the corporation is prime contractor for developing and manufacturing the fifth-generation aircraft engine designed to power future warplanes. NPO Saturn's corporate development strategy is grounded in realisation of the fact that its designer divisions are the best and most viable ones throughout the national aeroengine industry. Currently, the corporation employs over 4,000 skilled designers, with the company being the industry's leader in terms of using information technologies for designing engines.



The company has gained a high tempo of fixed-asset replacement. Large sums of money have been invested in dedicated production lines meeting world-class standards and cutting-edge manufacturing equipment has been bought. Today, the corporation's production capabilities are quite compliant with most stringent international standards ensuring production of fifth-generation gas turbine engines.

Boasting a concentrated scientific, production and financial resources, the company provides the whole life cycle of such sophisticated product as the gas turbine engine from shaping its configuration and designing to maintenance through its service life.

Besides defence applications, a main sphere NPO Saturn operates in is development and mass production of engines to power civil aircraft. Today, designers of civil gas turbine engines are resolving the following problems:

- increasing the environment friendliness of third-generation aircraft engines and making them compliant with international noise and emission standards that are getting ever more stringent;
- developing a new-generation turbofan engine designed to fit the future Russian Regional Jet aircraft family featuring high exportability.

The key to resolving the first problem is development of the D-30KU/KP-3 Burlak derivative to enable a sizeable chunk of the Russian aircraft fleet to operate without any restriction up to 2020. The second task is to be handled by joint development of versatile engine SM146 by NPO Saturn and French corporation SNECMA Moteurs.

At present, under the Russian Ministry's of Transport federal programme Modernisation of the Russian Transport System (2002-2010) that makes provision for re-engining the operational Il-76, Il-86, Tu-154M and Il-62M fleets, NPO Saturn is working on the draft design of the D-30KU/KP-3 Burlak engine, a comprehensive upgrade of the D-30KU/KP-154 turbofan, with work comprising several approaches at once.

One of such approaches is emission reduction. In early October 2003, NPO Saturn received from the Aviation Registry of the International Aviation Committee the type certificate for its D-30KU-154 engine with the low-emission combustor engine. Thus, the Tu-154 fitted with the upgraded powerplant meets ICAO's 1996 and 2004 standards in full.

Another approach to improving the engine is via noise reduction. Today, the ambient noise during takeoff and landing is the principal criterion determining if an aircraft can operate international services. Under the Rosaviacosmos-approved R&D programme and the governmental contract, NPO Saturn is upgrading the engine to make the Tu-154M compliant with ICAO's Chapter 3 standard while having a margin of at least 5 EPN dB without hampering the aircraft's performance. This is to allow the most mass-produced Russian aircraft to fly on international routes after 2010-2012 when ICAO introduces even tougher noise restrictions.

NPO Saturn has manufactured three prototype engines featuring additional hushkits. The prototypes are undergoing their rig tests. A Tu-154M fitted with an upgraded powerplant has been prepared for its certification flight trials. The plane is slated to receive its ICAO Chapter 3 certificate of conformity in the third quarter of 2004, while retrofitting the production engines with hushkits is supposed to be launched late this year.

NPO Saturn's cooperation with SNECMA Moteurs on SM146 engine development is of strategic importance to the Russian corporation. NPO Saturn and SNECMA Moteurs participate in the SM146 engine programme on the 50:50 basis. In January 2003, the SM146 was selected for installation on future Russian regional aircraft RRJ under development by a

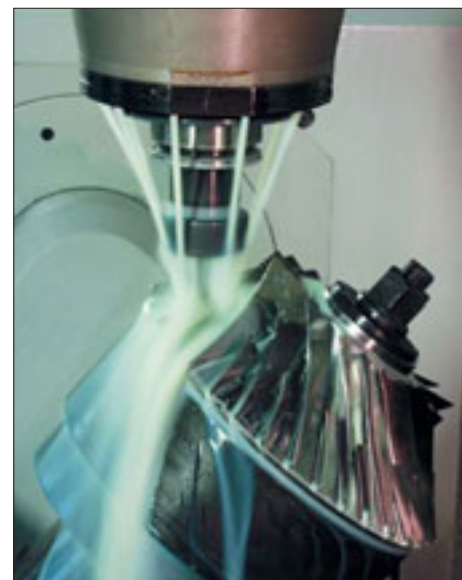
group of companies, with Sukhoi's Civil Aircraft, Ilyushin and Boeing among them. In March 2003, the SM146-powered RRJ project won the tender issued by Rosaviacosmos for a regional aircraft family. In April 2003, Sukhoi's Civil Aircraft (RRJ prime contractor), SNECMA Moteurs and NPO Saturn signed a trilateral memorandum of intent (MOI) providing for their continued cooperation in developing and building the new aircraft engine.

The SM146 is Russia's first international aircraft engine development programme. The turbofan is being developed with the use of the latest scientific advances and cutting-edge domestic and European technologies. The engine is going to be certified in the United States and Europe, which will make it a full-fledged player on the global aircraft engine market. Once services lives of third-generation engines expire, the SM146 is supposed to fully fill NPO Saturn's civil engine production segment.

The RRJ programme implementation is a graphic example of international high-tech cooperation and, probably, Russia's last chance to regain its positions on the airliner and civil aircraft engine market. At the same time, NPO Saturn's participation in international programmes of such a scale enables the company to drive up its technological level and ensures additional orders and, hence, hundreds of new jobs for skilled personnel.

All over the world advanced aircraft gas turbine engine production technologies are also used in manufacturing ground-based powerplants designed, among other things, for gas pumping units and electric power generation facilities. NPO Saturn pursues proactive programmes in this field too.

The corporation is running a programme, under which a wide range of 2.5-325MW gas turbine powerplants are manufactured. Ordered by United Energy Systems of Russia (UES), the 110MW GTD-110 gas turbine engine and its derivative, GTE-110 electric powerplant, as well as PGU-170 and PGU-325 combined-cycle plants, are in production. According to UES top managers, the GTE-110 is to provide



the mainstay for the national electric power industry's upgrade. In 2003, NPO Saturn and Silovye Mashiny concern won the tender for developing and manufacturing GTD-110 combined-cycle plant derivatives. The tender was issued within the framework of the competition under the aegis of the Russian Ministry of Industry, Science and Technology for governmental contracts providing for important innovative projects in 2003-2004.

On 16 September 2003, the GTE-110 interdepartmental acceptance test certificate was signed at the Ivanovo hydroelectric power station, with the unit then entering experimental service with the industry. The design documentation of the GTD-110 (the gas turbine for the GTE-110) was coded O1, which means the product's full-rate production was launched.

NPO Saturn manufactures a family of 2.5MW, 6MW, 8MW, 12MW and 18MW compact powerplants designed to meet the needs of independent power consumers. With the prices of energy resources on the rise, small powerplants from NPO Saturn are the good alternative municipalities and industrial companies could use. At present, the corporation manufactures various-capacity gas turbine powerplants in Omsk, Cherepovets, Naryan-Mar, Vologda, Usinsk and a number of other towns and cities throughout the nation.

In 2003, NPO Saturn launched an aggressive medium-capacity powerplant promotion campaign, with the product facing bright vistas in Russian provinces. Now, key tasks in this field are close contact with customers, optimisation of all gas turbine production aspects, provision of maintenance and overhaul and forming a reserve engine exchange stock.

The gas-compressor unit and gas turbine engine market is another strategic field for the company to operate in. In this connection, mention should be made that NPO Saturn and Gazprom have been running the Saturn-Gazprom integrated cooperative programme since 2001.

The company commercialised generation 4+ gas turbine engine GTD-4RM intended for gas-compressor units. Its gas-generator served the basis for a whole range of advanced, efficient,



highly commonised 4MW, 6.3MW and 10MW engines.

The first 4MW gas-compressor unit has completed its trials with success at the underground gas storage (UGS) in Kasimov. In 2004, two units like that are to be sent to the UGS in Kaluga, with another two to go to the Izborskaya line compressor station operated by the Lentransgaz joint stock company. NPO Saturn will take part in rebuilding the Gavrilov Yam gas-compressor station, operated by Mostransgaz, by supplying a 6.3MW GTD-6.3RM gas turbine, mounting components and extra equipment. The Nyuxenitsa gas-compressor station, operated by Severgazprom, will be fitted with a more efficient, 10MW engine.

In addition to gas-compressor units, NPO Saturn also manufactures 2.5MW GTES-2.5 gas turbine power stations ordered by Gazprom. Two of them have been installed at the Kavkaztransgaz joint stock company's Salskaya compressor station that is part of the Blue Stream project aimed at supplying Russian gas to Turkey. Another six GTES-2.5s will be delivered to the second-largest Russian gas deposit in Petsovo, operated by the Urengoygazprom joint stock company.

Growing demand for gas turbine powerplants in the early 21st century required from

NPO Saturn a comprehensive upgrade of its production facilities to ensure a drastic change in the company's technical and technological capabilities and commercialising new power engineering products in the shortest time possible. A business plan has drawn up and a lot of work has been done to find strategic partners able to help the company in achieving its objectives. Negotiations with a number of major power engineering and civil aircraft engine corporations have been held throughout the world, resulting in cooperation with Japanese corporations being considered to be most promising.

In July 2003, NPO Saturn reached agreement with Japanese corporation Sumitomo on the latter giving \$60 million credit to NPO Saturn to finance its corporate upgrade programme during 2003-2008. In addition, Saturn's Director-General Yu.V. Lastochkin, Chairman of Board V.K. Glukhikh and Sumitomo's Vice-President Mr. Morinaka signed an agreement on global cooperation on the Russian power engineering market for the period till 2010-2015. This is the first Russo-Japanese agreement of the kind.

In November 2003, the contract on the first tranche of the loan was signed, under which NPO Saturn is going to take delivery the first batch of advanced equipment from such Japanese machinebuilding majors as Mitsubishi Heavy Industries, Mitsubishi Electric Industries and Mori Seiki. In 2004, high-tech five-axis machines, including those for erosion machining. The agreement on the second tranche in 2005, slated to be signed in the near future, will made NPO Saturn's efforts to upgrade its production facilities even more systemic and comprehensive.

The Russo-Japanese project allows a radical reshuffle of NPO Saturn's credit portfolio and long-term project funding of upgrade programmes. A rather important thing is worth mentioning: the loan interest is far lower than crediting rates in Russia. According to NPO Saturn's Deputy Director-General S.V. Chuklinov, all work within the framework of cooperating with the Japanese company is aimed at developing radically novel power engineering hardware meeting all up-to-date quality and environment protection standards. 