№ 5. 2011

AIR FLEET

aerospace technologies review

TUPOLEV OPENS SKY

TITANIUM IN AIRCRAFT INDUSTRY

Ti

titanium
in engine-building

Construction part
and landing gear
manufacture from
die forgings and
forgings

VSMPO-AVISMA
is the only supplier of
the largest die forging
Length: 4,255mm.
Weight: 3,210kg.

CORPORATION VSMPO AVISMA

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CONTINUOUS DEVELOPMENT IS THE KEYSTONE OF SUCCESS

Russian Corporation VSMPO-AVISMA, one of the world's largest manufacturer of titanium, increases its production output and intensively develops its own production in anticipation of market recovery. Mikhail Voevodin, the Director General of VSMPO-AVISMA Corporation tells about outcomes of 2010 and short-range plans of corporation.

■ **Question:** What are the main financial outcomes of 2010 and the first half of 2011 for the Corporation? Will you characterize and assess the dynamics compared to that of the crisis year of 2009?

■ **Answer:** In 2010 Corporation VSMPO-AVISMA manufactured 20.7 thousand tons of final titanium products that is 10% higher than set values and 5 % higher than in 2009. The net profit of corporation has increased by 3.4 times as compared to that in 2009 and equals 588 mln rubles. Revenue of VSMPO-AVISMA was 24.7 billion rubles in 2010. Share of sold products with high degree of processing (die forgings, disks, rings) has increased in 2010. This trend is a practical result of the investment program and will evolve in future.

Analysis of sales revenue for 2010 showed a slight decrease in its level compared to 2009 - less than 5 %. This trend is common to all export-oriented enterprises and reflects the impact of the depreciation of American dollar. At the same time, it should be noted that company costs are denominated in rubles and strongly influenced by inflation, which has exceeded 8 % by the end of 2010.

However, successful management of production costs made it possible to achieve profitable growth in profits in 2010 as compared to 2009.

During the first half of 2011 the net profit of the Corporation reached 2,778 bn rubles compared to net loss of 262.88 million rubles during the first half of the previous year. The increase of profit ensured growth of other profits over other expenses as well as growth of operating income.

In 2011 we are planning to produce 27,000 metric tons of titanium products and thus restore the volume of 2007. In addition the industrial titanium currently

sold $27 per kilogram will not return to the level of prices before the crisis ($45 per kilogram) as China steps up this production.

■ **Q:** What are the values of short-and long-term debt of company at present?

■ **A:** Since mid-2009 and throughout 2010 the Corporation has provided financial program to optimize the credit portfolio. The main work streams in the construction of financial strategy were: decrease in amount and cost of borrowed money, the optimization of the maturities and availability of security.

We managed to achieve the following results in 2010:

The total amount of borrowed money is decreased from 21.6 billion rubles at the beginning of 2009 to 15.6 billion rubles at the beginning of 2011 or by 28%.

The average interest rate on borrowed funds is decreased up to a level of 5%. This result was achieved by reviewing the approach to formation of the credit portfolio in the context of currencies. Borrowed funds in rubles (which deposit rate was over 14 % per annum) have been replaced by dollar credit lines (deposit rate of 5-6% per annum). A large-scale work

AIRBUS AND VSMPO-AVISMA: DEVELOPMENT OF VERTICAL CHAIN OF TITANIUM PRODUCTS SUPPLY

In August 2011 during MAKS-2011 Airbus and VSMPO-AVISMA signed the Memorandum of Understanding (MoU) for the strategic cooperation in production and supply of additional cost products, joint projects and especially Vertical integration project.

According to the MoU, the partners confirm their intensions to develop activity in supply of titanium raw materials, die forgings and additional cost products. The MoU includes various spheres of strategic cooperation such as development of new alloys for individual use of EADS/Airbus and possibility of industrial cooperation development within the framework agreement on Special economic area Titanium valley, which will be located in the city of Verhnyaya Salda, Russian Federation

The partners also confirmed their intensions to develop joint activity in the sphere of Vertical integration project. Within this project the activity of VSMPO-AVISMA for the sake of Airbus will not be limited with supply of raw materials and die forgings. In the future that activity will include roughing and preliminary mechanical processing of titanium elements.

on the refinancing of credit portfolio in order to attract more cheap credit affected the rate decrease.

Average maturity of borrowed money is increased from 10 to 20 months, which made it possible to neutralize the torque amplitude fluctuations in the repayment of credit portfolio and to ensure a smooth depreciation of credit lines.

Currently, almost the entire credit portfolio is an unsecured mortgage that also improves the economic sustainability of Corporation.

■ **Q:** What are Corporation plans for the development of long-term collaboration with manufacturers of aircraft and aircraft engines? Who are the new customers of Corporation in this field?

■ **A:** Long-term contracts are a certain guarantee to minimize the risks, both for suppliers and consumers of titanium alloys. And both of them have the ability to predict their development for a sufficiently long period. Thus, in recession period, many customers have reduced the volume of purchased products, but companies working on the basis of long-term agreements, kept the minimum volume of orders agreed in contacts, ensuring that capacity utilization of Corporation. VSMPO-AVISMA Corporation has long-term contracts with major consumers of the aerospace industry for 5 years or more, about 70 % of exports are shipped under the terms of the long-term contracts. Long-term portfolio of orders: Boeing, Airbus, Embraer, Goodrich, Messier Dowty, Eurocopter, Liebherr, Rolls Royce, Safran, Pratt&Whitney Canada, TEST, BTI etc. Currently, 5-6 projects of long-term contracts are being discussed.

■ **Q:** Do you plan to change the structure of export deliveries and deliveries to the domestic market for some industries? Why?

■ **A:** Corporation is a vertically integrated manufacturer of a wide range of products of titanium and its alloys. One of the main elements of VSMPO-AVISMA corporation strategy is development of the product portfolio, which includes extension of the range of supplied products and improving service for customers.

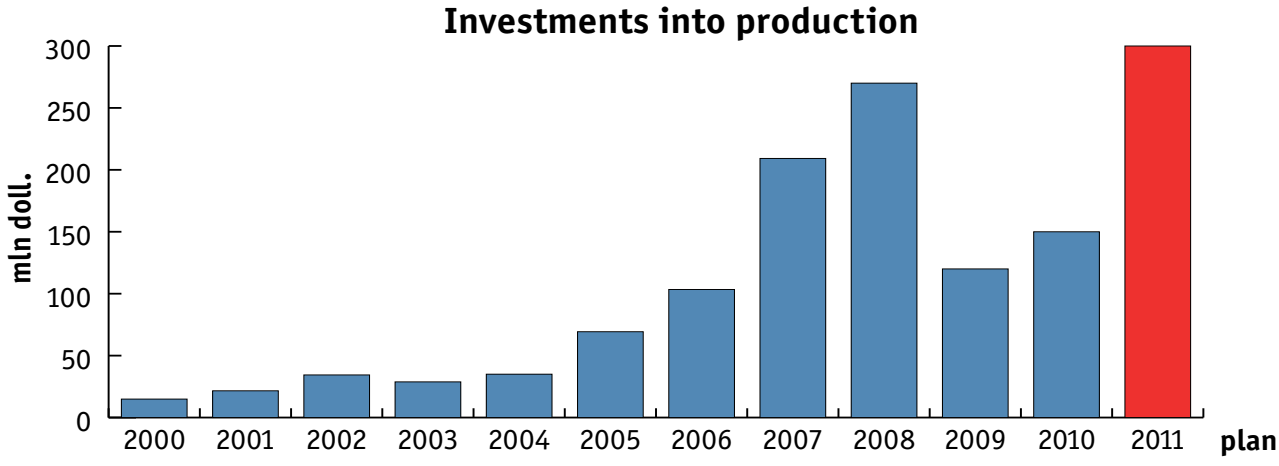
Since the late 90s VSMPO has been consistently implementing the strategy of increasing the share of exports die forgings in its release. In 2010, VSMPO supplied more than 400 codes of die forgings for export, and this number is increasing as VSMPO actively participates in all new aircraft programs. We have a very close collaboration with our key customers on development of new unique products, alloys and technologies to expand the use of titanium in their structures and improve the economic efficiency of aircraft and engine.

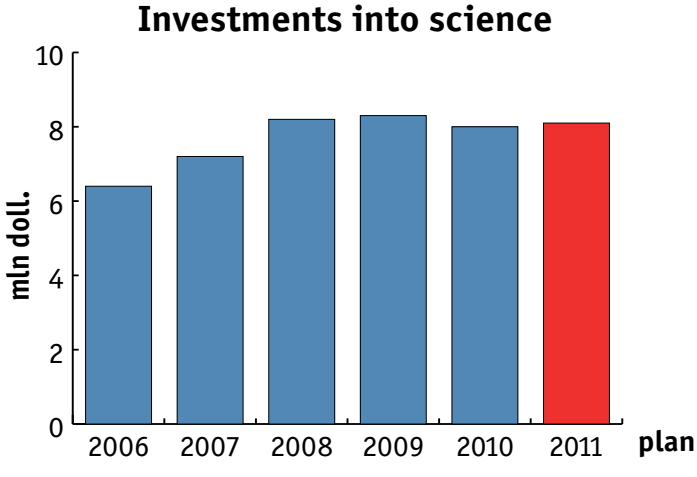
VSMPO-AVISMA ROLLS-ROYCE: STEP-UP OF COOPERATION

The Corporation VSMPO-AVISMA JSC signed three long-term agreements with Rolls-Royce on supply of products fro 2011-2015. The terms of each agreement are different but the extent of cooperation between the two companies has sufficiently increased compared to the beginning cooperation in 2000.

Under the terms of the three agreements VSMPO-AVISMA will supply Rolls-Royce with half-finished products, discs and rings die forgings.

The potential sales by the three agreements are expected to reach $ 250 million.





The next step in the last few years was the transition from delivery of die forgings to the delivery of parts with rough machining. Currently VSMPO-AVISMA Corporation increases the number of equipment for machining that allows delivering parts with the rough and prefinished machining.

Nowadays, VSMPO delivers over 1,000 codes of die forgings to domestic market. Changes in structure of supplies to the domestic market is mainly due to new air and energy projects in Russia. Corporation actively participates in developing parts for the future of advanced long-haul aircraft MC-21. In addition, corporation supplies the turbine blades having length of up to 1,300 mm for nuclear projects of Nuclear Power Station, and works out the turbine blades having length of up to 1,500 mm.

In order to increase the production, corporation completes the production of new product – precise bar of a small diameter and wire in the U.S. Such products are in great demand in medical and aviation (fastening) industry. With the commissioning of this production we hope to fill this gap in the line of products of VSMPO-AVISMA which is intended for the manufacture of medical products and fasteners, and provide

VSMPO-AVISMA EMBRAER: PROLONGATION OF LONG-TERM AGREEMENT

In August 2011 during MAKS-2011 VSMPO-AVISMA and Embraer S.A. (Brazil) signed Amendment for the existing Long-term agreement on supply of titanium alloy half-ready products and die forgings. The Amendment prolongs the term of the Agreement till 2020. The initial variant of the Agreement was signed in 2000 and since the scope of cooperation between Embraer and VSMPO-AVISMA has been extended and confirmed in 2006.

	2009	2010
Revenue from sold products (mln $)	820	815
Investments into production (payments) (mln $)	120	150
R&D (mln $)	8.3	8
Investment share to revenue (%)	14.6 %	18.4 %
Investment share + R&D to revenue (%)	15.6 %	19.4 %

Mikhail Voevodin, VSMPO-AVISMA general director (closer) signs agreement with Goodrich and Airbus on A350-1000 landing gear struts

AIRBUS, GOODRICH AND VSMPO-AVISMA: A350 XWB PROGRAM

In August 2011 during MAKS-2011 Airbus, Goodrich and VSMPO-AVISMA signed a long-term contract on supply of titanium die forgings for the main undercarriage leg of A350-1000 up to 2020.
Goodrich is the designer and supplier of the main undercarriage leg of the A350-1000. The experience of Goodrich in production of chassis as well as modern technologies and materials such as the VST5553-1 titanium superalloy created by VSMPO ensured Goodrich with the advantage over all the competitors when Airbus selected a supplier of chassis. The share of VSMPO in supplies of titanium die forgings for chassis is 100%.
Besides possibility of titanium products processing by VSMPO-AVISMA for creation of integrated chain of titanium supplies is considered. That chain spans the whole process from supply of raw materials and up to supply of ready products.

ourselves the opportunity to enter a new business with products of smaller range and greater accuracy of incoming stock.

A new rolling mill, which makes it possible to expand the range of seamless tubes used in aircraft hydraulic systems, has been put into operation at VSMPO-AVISMA tube plant in Ukraine.

■ **Q:** What prospects for exports are now in markets of China, India and the Asian region as a whole, where you are actively working in new directions for Corporation?

■ **A:** The Asian region as a consumer of titanium products has a great potential. Economy of Asian countries is ahead the U.S. and Europe on rates of recovery and growth.

The Chinese industry, including aviation, is rapidly growing, powered by the government. VSMPO-AVISMA Corporation collaborates with Chinese companies more than 10 years.

The Chinese state company AVIC is the official agent of VSMPO-AVISMA Corporation in China for sales of products for aerospace, engine-building and other industries.

VSMPO actively collaborates with COMAC Corporation and Shanghai Aerospace Manufacturing Co. on delivery of titanium semi-products for program of regional jet ARJ-21 and advanced program of long-haul aircraft C-919. In January 2011, it was announced about opening of affiliated company VSMPO-Tirus in China to support our customers in Asia-Pacific region (Japan, China, India, Korea, Taiwan, Malaysia and others).

Corporation supplies titanium products to various units of Indian Aerospace Corporation Hindustan Aeronautics Limited (HAL). Among the customers are unit HAL Aircraft Division, which is a subcontractor of AIRBUS Corporation and manufacturer of components for Airbus A320 as well as helicopter unit HAL Helicopter Division. Upcoming collaboration trend is VSMPO participation in Indian engine-building programs. Supply of various types of titanium semi-products on several international engine-building programs is being discussed.

Moreover, VSMPO-AVISMA successfully collaborates with Korean companies – subcontractors of world's largest aircraft- and engine-building concerns. Large volume of supplies is on the industrial sector of the Asian market.

■ **Q:** What are the plans for the expansion of production capacities of corporation in coming years? Tell about the main objectives of the investment program?

■ **A:** Implementation of the strategic objectives of Corporation defines the following priority directions for development:

– increase in production capacities of titanium in order to ensure release of 40-42 thousand tons per year of semiproducts and final products;
– improving the melting capacities of Corporation, including reduce in costs of melting ingots due to increase in involvement of recyclable wastes to the charge material on vacuum arc furnaces (VAR) and cold-hearth furnaces (ELU, scull furnaces);
– further development and improvement of the unique metalforming integrated complex in order to increase the production of die forgings for aircraft industry;
– increase in production capacities of deeper conversion products including machining of structural die forgings and die forgings of aircraft engine-building industry.

■ **Q:** What is the volume of investments into production development and R&D and what is their share of total revenue?

■ **A:** Volume of investments into production development was 150 mln dollars in 2010 which is 25% higher than in 2009. Investment share of total revenue was 18.4% which is 3.8% higher than in 2009. Share of R&D cost is 1% of revenue and is 8 mln dollars on average.

■ **Q:** Previously, corporation planned to increase investment into production development by a quarter. To what extent did you manage to implement these plans in last year?

■ **A:** The plans, outlined in early 2010, were fully implemented, investments were 150 mln dollars. The main directions of investment into production development:

VSMPO-AVISMA AND PRATT & WHITNEY CANADA: EXPANDING THE RANGE OF SUPPLY

In August 2011 during MAKS-2011 VSMPO-AVISMA and Pratt & Whitney Canada (P&WC) signed a new long term contract in order to increase the scope of supply of discs die forgings. Under the contract, VSMPO-AVISMA will ensure 25% of P&WC need in titanium die forgings.

Establishing good personal relations with overseas partners is important for VSMPO-AVISMA leadership

development of production capacities on sponge titanium, melting, metalforming capacities and capacities for die forgings machining.

■ **Q:** Are the main customers willing to purchase products with the higher degree of machining, or such a direction is intended for new markets?

■ **A:** For our customers, obviously, it is very important to get products having a deeper processing for many reasons: decrease in costs for purchase (exception of the supply chain from one to almost all the "extra" units), decrease in their inventories, reducing of administrative costs (fewer procurement staff, reducing of costs for quality and production audits). At the same time consolidation and increase in business volumes of one supplier makes it possible for the customer to receive preferential prices, and we can predict a substantial increase in business volumes.

A striking example of the willingness of our customers to collaborate in high-tech products field is a joint venture with Boeing – Ural Boeing Manufacturing, which is equipped with the latest metal-cutting equipment and is engaged in machining of die forgings for Boeing 787.

As a result of UBM, Boeing receives stocks, similar in size to the final part, and Corporation increases the depth of products processing, increases the technological level of production.

The practice of establishing joint (subsidiary) enterprises with products with high added value will be widely developed in the special economic zone of industrial-production type "Titanium Valley", which will be organized on the territory of Verkhne-saldinskiy urban district of Sverdlovsk region, in close proximity to Corporation.

More to that I'd like to point out one important trend: the aircraft producers no longer want to produce parts of aircraft. They would like to concentrate on research and development, assembling and getting of chassis produced by suppliers. We would like to remain competitive company and that is why we have scheduled to invest $800 million in the development of production by 2015. Under this investment plan the Corporation will increase three times the production of die forgings for aircraft industry up to 8,000 t in 2015 compared to 2200 tonns this year. More to that VSMPO-AVISMA and Boeing will invest $10 mln in equipment for development of Ural Boeing Manufacturing.

■ **Q:** What are the prospects and risks for companies in the aircraft world market nowadays?

■ **A:** The main outcome of 2010 was a general recovery and further development of the global economy, which replaced a period of unprecedented financial volatility, which was accompanied by the most severe for the decades global economic slowdown and the collapse of trade performance. Since the development of the world titanium market is dependent on the general state of the global economy and the activity level of the main consumer of titanium production – market of manufacturers of commercial aviation, constituting about 40% of world consumption of titanium -today prospects of the industry are safe. Today we can safely say that aircraft manufacturing industry will develop rapidly, because the market situation in the sector of civil aircraft manufacturing market was characterized by the following in 2010:

– for airline companies 2010 was a year of recovery after a crisis;

– international Association IATA registered a long-awaited return to profitability: Growth rate by 7% in the segment of passenger traffic and by 19% – in transportation;
– deliveries of passenger aircrafts by Boeing and Airbus companies have reached a historic peak – 972 aircrafts (Airbus – 510, Boeing – 462);
– in 2010 aircraft manufacturers (Airbus and Boeing) received a total of 1,492 orders for new aircrafts, which is much higher compared to 2009, when only 587 aircrafts were ordered;
– boeing Company is planning to deliver the first batch of 787 Dreamliner aircrafts at the end of the third quarter of 2011;
– the first aircraft A350 is expected to enter into service in the middle of 2013.

According to prediction of Boeing Company, in the next 20 years, until 2029, the global market will be supplied with 30,900 new aircrafts (4,000 airliners in China) to the total amount of 3.6 trillion dollars. 960 aircrafts to the amount of 90 billion dollars for Russia and CIS are among them. 56 % or 17,410 aircrafts of the total amount will be used to expand existing parks of airline companies and 44 %, or 13,490 airplanes – to replace the old aircrafts. By 2029 5,400 aircrafts delivered before 2010 will remain in operation, according to Boeing company information.

The most dynamic and fast- growing segment will contain the single-aisle aircrafts with capacity from 90 to 220 seats. This segment includes Boeing 737 and Airbus A320, russian MC-21 and chinese COMAC C919 and Canadian C-series are also aimed to it.

The second largest segment (by the number of new aircrafts and in terms of investment in procurement) would be wide-body aircrafts with capacity ranging from 200 to 400 passengers. This segment includes Boeing 767, Boeing 787 and Boeing 777, as well as Airbus A330, A340 and A350 in the long term.

The third segment – segment of regional jet with capacity from 60 to 90 seats. 2,000 of such jets having a total cost of 60 billion dollars are predicted to be delivered in the next 20 years.

International Air Transport Association (IATA) predicts the industry to make a profit of 8.6 billion dollars. Thus, the net profit will be 46% less than in 2010, when the industry made a profit of 16 billion dollars. IATA recorded a growth in passenger flow 8.9 %, in 2011 – by 5.2 %. Growth is predicted due to more intensive use of the fleet while recording the fixed costs at the same level.

According to analysts, demand for titanium in the commercial aviation sector is predicted to reach 42,000 tons in 2011 and exceed 49,000 tons since 2012. By 2016, despite the past crisis, consumption rate can increase to 75,000 tons.

The main risks in the aircraft industry can be related, primarily, to unstable situation in the oil market and the delay of aircraft programs. For example, the delay in plans for development, testings and certification and commissioning into production of new generation titanium incorporated aircrafts Boeing B787 Dreamliner and Airbus A350 causes the drop in demand for titanium rolling and accumulation of large stocks of rolled titanium. Increase in average oil prices and an increase in the share of jet fuel in the operating costs of airline companies (approximately 26%, twice as large the rate in 2001-2002), which can lead to higher prices for transport and to decrease in their volume, decrease in profit of airline companies, and in consequence, and to decrease in orders of aircraft manufacturing concerns.

It shall be mentioned that everyone understands that business without risk is not the case, and we confidently look to the future, and are ready for any developments.

RUSSIAN AIR FORCE
COMMANDER ON UPGRADE PLANS

Russian air force commander held a press conference at MAKS'02011 opening day using this opportunity to present the service's modernization plans. General Aleksander Zelin said:"Our first priority is the Sukhoi T-50 (official designation PAKFA, acronym for Future Aircraft Complex of Frontal Aviation). This machine is better suited to Russia with her large territories, and allows force projection over distances. But I think we also need a lighter fighter, in the class of the F-35. In this class our industry is offering the MiG-35... We have not yet dropped the MiG-35D from consideration".

In more distant future the Russian air force will need a more advanced light fighter similar to the F-35, he added. He agreed with the statement that the T-50 will replace the heavy Su-27, while at this time there is no replacement for lighter MiG-29.

The MiG-35D is a twin seat derivative of the baseline MiG-35 single seater attributed to "4++ generation". It features the Phazotron Zhum-AE radar with active electronically scanned antenna (AESA), the first such unit developed and flight tested in Russia. Despite its elimination from the Indian medium multi-role combat aircraft (MMRCA) competition, the MiG-35 and its newly developed Zhuk-MA AESA radar demonstrated significant capabilities, including ground-mapping modes and the ability to detect, track and shoot at aerial targets. During demonstration flights, a MiG-35D development prototype destroyed an aerial drone with an air-to-air missile launched by an Indian pilot. The PAKFA is understood to have MTOW of 37 tons, some 10 tons above the respective figure for the MiG-35.

At MAKS'2011 Zelin confirmed earlier announced fast timescale for development and production of the PAKFA as outlined by Russian Prime Minister Vladimir Putin last year. Deliveries are planned to com-

MiG-35D

at Komsomolsk last May. This year the Russian MoD procures twelve Su-34 interdiction aircraft, Aleksander Zelin said. The Su-34 is developed to replace the ageing Su-24 swing-wing interdiction aircraft that is currently the most numerous type in Russian air force's combat aircraft inventory and the backbone of its Frontal Bomber units. As of MAKS'2011, the Russian air force has accepted seven Su-34s into squadron service. In addition, a handful of such machines fly with Russian MoD weapons assessment units and the industry.

mence in 2013 and full-scale production in 2014-2015. But some reporters were highly surprised to hear these dates, as they believe the production preparation may take much longer time. In his turn, president of United Aircraft Corporation Mikhail Pogosyan added two more PAKFA prototypes would be ready by the end of 2011. He estimated the market for PAKFA at six hundred units.

Before the PAKFA gets available, the Russian air force will be buying improved generation four fighters. Zelin noted that the service is due to receive up to a hundred Sukhoi Su-35s. The first of 48 production aircraft on firm order flew

PAKFA (T-50)

Su-34

The service is seeking a total of 120 Su-34s, he added. Five squadrons will operate this type, each with 24 Su-34s. Production at Sukhoi's NAPO plant in Novosibirsk is gradually picking up. As of MAKS'2011, the Russian air force has formalized orders for 32 Su-34s and working with UAC and Sukhoi on firming up contacts for follow-on batches. The service intends to have 70 Su-34s in 2015. The Su-34 holds a prominent position in Russia's State Arms Acquisition Program that was validated earlier this year and runs until 2020. The Su-34 is powered by two AL-31FM engines developed by NPO Saturn and produced by MMPP Salut. The airplane can carry

Su-35

8 tons of weapons load on 12 hard points. Last year Russian president Dmitry Medvedev offered China an exportable version, the Su-32, but so far there is no indication that China or any other foreign country is seeking to procure this aircraft.

On the eve of MAKS'2011 it become known that the Russian air force was also planning to acquire at least 18 Sukhoi Su-30SMs. This is a domestic version of the thrust-vectoring Su-30MKI that has been exported to Algeria, India and Malaysia. This series is produced by IAZ plant in Irkutsk. Meantime, Russia and India have reached agreement on the technical specification of the Super 30, a new version of the Sukhoi Su-30MK twinjet. It features an active electronically scanned array (AESA) radar, replacing the older N-011M Bars radar with its passive electronic scanning antenna. Irkut claims that the heavy, twin-

Yak-130

seat, multi-role supersonic jet with thrust-vectored engines will be the first exportable Russian fighter with an AESA. It is believed that an enlarged version of the Phazotron Zhuk-AE radar will be fitted to the Super 30.

An alternative AESA is available for the Super 30 in the form of Tikhomirov's NIIP. Having revealed an experimental AESA at MAKS 2009, Tikhomirov demonstrated an improved version at MAKS 2011. India and Russia are also discussing other ways of further improving the baseline Su-30MKI. The list of air-launched precision-guided missiles for the Super 30 will be expanded. Russia has agreed to integrate the BrahMos supersonic cruise missile on the Super 30. Despite its large dimensions and heavy weight, in excess of 2,500 kg for newly developed air-launched version, as compared to three tons for land launch variant. Aircrew may be instructed to drop the weapon before landing, if it is not launched in flight.

So far a total of 170 Irkut-built Su-30MK series aircraft have been delivered to India, Algeria and Malaysia. These customers have placed orders for "over 300", Irkut says. The company continues to supply assembly kits to Hindustan Aeronautics Limited of India (HAL), which is gradually mastering Su-30MKI license production. Rosboronexport is understood to have clinched a follow-on order from Algeria of 16 Su-30MKAs broadly similar to the Indian Su-30MKI. The North African country previously bought 28 Su-30MKA all of which have been delivered already. Rosoboronexport and Irkut refuse to give exact numbers, but say the new contract is made up of firm orders and options.

Meantime, the Sokol plant in Nizhny Novgorod has completed deliveries of the initial batch of 12 Yakovlev Yak-130 advanced tandem-seat jet trainers to the Russian air force. The last three airplanes were shipped to customer base in March and have recently been accepted into squadron service. Another UAC's plant, IAZ in Irkutsk, continues work on its Yak-130s that were ordered by Algeria.

Zelin announced the development by 2016 of a new AWACS aircraft, designation the A100. The work is done by Beriev (on airframe with radar antenna on fuselage), Ilyushin (baseline airframe development), Vega Radio Engineering Concern (radar systems and their integration) and Perm Motors (improved PS-90A76 turbofans for longer loitering and enduracance). The A100 uses the Ilyushin Il-476 airframe and a new active array radar from Vega that will be capable for ground and aerial surveillance. The Il-476 is the upgraded Il-76 with PS-90A76 turbofans whose production is being set up at Aviastar plant in Ulianovsk (earlier Il-76s and A50s were produced at TAPO in Tashkent, but this enterprise is curtailing its aviation activities).

Zelin expects the first delivery of the Il-476 air lifter in 2013, while the industry has plans to commence Il-476 prototype testing in October this year. The Russian air force AWACS fleet currently consists of 26 Beriev A50s based on the Il-76. In the interim the service will be updating its in-service airplanes into the A50U, first of which was on display at MAKS'2011.

By MAKS'2011 time the number of Sukhoi Su-25 attack aircraft having undergone mid-life upgrade and modernization to Su-25SM standard has exceeded fifty, according to the Russian MoD. Respective program was launched in 2002 at the Aircraft Repair Station 121 based in Kubinka. The enterprise said at MAKS'2011 that the share of Russian government

Su-25

orders in its order book has risen from 83% in 2008 up to 99%. Last year the enterprise income exceeded one billion Roubles, and profit came to 25 million Roubles. This year, the station launched a program for the mid-life upgrade of the Su-25UB twin seaters.

The Su-25 entered service in 1981 and will remain operational until 2020. Its lifetime has been extended to 24 years and work continues on further extension. Its single-seat version is being upgraded to the Su-25SM standard that involves replacement of avionics to include a glass cockpit and addition of the Glonass global positioning navigation and targeting systems enabling use of modern precision-guided munitions. The initial batch of six Su-25s was accepted by the Russian air force in December 2006. In 2007 the 121 station delivered six more, in 2008 eight and 2009 thirteen. Starting in 2006 and until the end of 2010 the station delivered 39 Su-25SM aircraft to the main customer.

S-300

The Russian air force has plans to upgrade all of its Su-25 fleet to the Su-25SM standard. The Aircraft Repair Station 121 has been doing repair and lifetime extension work on four Su-25UBs two-seaters annually. Starting later this year, the work will also include bringing the aircraft, which entered service in 1986, to Su-25UBM standard similar to the solutions implemented on the Su-25SM.

Touching on the future air defense system of Russia, Zelin said that its core will be formed by the newest SAM system currently under development at Almaz-Antei concern. He specially mentioned the S-500 and the Vityaz in this regard. Both are under development and information on these remains scarce. Touching on the S-400 which is most advanced of SAM in Russian inventory, Zelin said this system "has proved capable of solving the tasks it was allocated" and therefore it will stay in service and supplement the S-500 and Vityaz when these become operational. Touching on the Vityaz, he said this system will replace the S-300 family, and specially mentioned the S-300P, the S-300PM and S-300MP1 in this regard. "Today S-400 systems are under the strategic command but I think in 2012 these systems will also be with military districts – the Eastern and the Western", Zelin said. In a more distant future Russia's VKO – abbreviation for "Air and Space Defense" – a structure of the armed forces that is being formed now, will rely largely on the S-500 and Vityaz as the two systems able to defeat both aerodynamics and space targets, Zelin said.

Vladimir Karnozov

keeping clarity

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ROSOBORONEXPORT:
RECENT DEALS AND DELIVERIES

Russia is expected to sell weapons for US dollar 11 billion in 2011, with aviation means accounting for 45-50% in the sales total. Most of these sales are generated by state arms vendor Rosoboronexport.

Sergei Kornev, aviation department chief at Rosoboronexport

Head of Rosoboronexport delegation at the Paris airshow 2011 and chief of the company's aviation department Sergei Kornev said during the show that deliveries of Russian-made combat aircraft and air-launched weapons were ongoing to India, Algeria and Vietnam. "Quite recently we delivered four Sukhoi Su-30MK2 multirole fighters to Vietnam", he observed.

At MAKS'2011 it became known that the Russian side delivered six more Mi-17V5 helicopters to Indonesia. With this delivery, the Indonesian inventory of such rotorcraft reached twelve. This information was confirmed by the local representative office of the Russian Technologies state corporation in Jakarta. The recent deliveries went on account of the credit granted in 2007 by the Russian government to one of the good customers in the region for Russian weapons and advanced aeronautics products.

The Russian helicopters are essential tools in service some of the seventeen thousand islands that Indonesia has in the Asia-Pacific region, said Indonesian defense minister Purnomo Yusgiantoro. He added that the need in deliveries of troops, military equipment and supplies is much in demand in the light of terrorist and separatist activities and the need to fight those.

The helicopters are also irreplaceable on search and rescue and humanitarian aid missions, the minister went on. In his turn, Lieutenant General Pramono Edhie Wibowo, chief of staff of the Indonesian army, said the Mi-17V5 features a high internal capacity and payload capability which makes it useful in service with the

land forces. He was quoted as saying that the Indonesian army will have 18 Mi-17s in service with the 31 helicopter squadron, and this number should be enough to transport a whole of battalion of crack troops. Terms of deliveries of six more helicopters to the already acquired twelve are not made public.

In addition to the Mi-17 series, the Indonesian armed forces also operate five Mi-35P attack helicopters, while the coastal guard uses a handful of Mi-2As. Three new Mi-35Ps were delivered at the end of the past year. Speaking to the media on that occasion, Purnomo Yusgiantoro said that the Indonesian MoD sees as its first priority the need to establish a squadron of the Sukhoi Su-27/30 (NATO codename Flanker) with full combat strength.

In August 2007 the customer placed order for six more such airplanes. Three additional Su-30MK2s were handed over in February 2009 and three Su-27SKMs at the end of 2010. The number of aircraft required to form a full-strength squadron is sixteen, the source specified. "At this time we have only ten Sukhoi fighters, and when their number reaches sixteen, we expect this number to produce a certain deterrent effect in relation to any would-be aggressor", the minister was quoted as saying. Indonesia received four Flankers (two Su-27SK single seat fighters and two Su-30MKK twin seat multirole aircraft) in 2003.

The much delayed contract with Jordan on two Ilyushin Il-76MF airlifters shall be fulfilled shortly. Both airframes are completed and currently at the Ramenskoye aerodrome in Zhukovsky near Moscow. One airplane has undergone all factory and customer acceptance trials. The second one is being prepared for trials. Both shall deliver later this year. So far Jordan has been the only customer for this version with stretched fuselage, a customized avionics set and Perm Motors PS-90A76 turbofans.

Su-30MK

Su-35

Russia and US are in agreement on 21 Mi-17 helicopters that are ultimately intended for the Afghan governmental structures and whose procurement is made by the US MoD. Deliveries are expected in 2012. Construction of these machines is ongoing, but Moscow and Washington are yet to pass some formalities to firm up this order.

The helicopters for the Afghan governmental forces are being assembled at the Kazan Helicopters. Training means will be provided separately from the main contract. The helicopters are customized with certain US-made items mostly in avionics and communications equipment. Previously the Afghan governmental structures acquired Russian helicopters, but the deal for 21 more Mi-17s is the first one that is being placed by US MoD. The value of the contract is US dollar 350 million.

Commodity-Money-Commodity

MiG-35D

Vietnam has reportedly ordered eight Su-30MK2 fighters in 2009 for US dollar 400 million. In February 2010 the customer firmed up option for 12 more such aircraft. The value of this deal is estimated at US dollar 1 billion. Deliveries have started. Kornev said that a batch of four airplanes has been shipped to Vietnam in time of Paris air show. These are being accepted by the customer.

Algeria shall become first user of the Yakovlev Yak-130 advanced jet trainer outside Russia later this year. The Respective contract went to Rosoboronexport, the airplanes are being completed at the Irkut Corporation's IAZ factory in Irkutsk. Kornev said Algerian pilots are now in Russia undergoing training in the Yak-130 as part of the contract materialization. He refused to give exact day when the deliveries will start but expressed hope they will be completed in 2011-2012 timeframe.

China has placed orders for more AL-31F engines that power Sukhoi Su-27/30 Flanker series and Chengdu J-20 fighters. The new contract for over one hundred and fifty AL-31Fs to power twin engine fighters will be executed by the Ufa UMPO company, Kornev said. Meantime, negotiations continue on Salut-made AL-31FN engines for the J-20, but no exact figures on this new emerging contract are known. Both UMPO and Salut have been delivering AL-31F-series engines to China before.

Rosoboronexport keeps mum on progress on new deliveries and sales of the Klimov RD-93 engines for the Chinese FC-1 fighter and its Pakinstan Air Force version JF-17. But this program is obviously in the need of Russian engines as it goes forward and new airframes are being built in China for Pakistan.

Meantime, Kornev confirmed that deliveries of the Kamov Ka-31 naval radar picket helicopters have been completed and thus PLA Navy has become a second operator of this asset. PLAN is understood to have nine such helicopters outfitted with powerful Oko radars with 360-degree observation. It has also received addition batch of Ka-28 antisubmarine deck helicopters.

Rosoboronexport delegation head admitted some delays with delivery of new batch of Mi-17 helicopters to India. The contract is for 80 such machines in a new version with avionics package from the Russian Avionics company. It features a full glass cockpit instead of dial instruments on hundreds of Mi-8/17 series machines delivered to India before. One of the reasons for delays was last-minute revisions of customer specifications to the new onboard equipment. "There has been a lot of changes and we need to take care of them", Sergey Kornev said.

MiG-29KUB refuels MiG-35 using "body stores"

Il-76MF

India is operating three Beriev AWACS aircraft with Israeli Phalcon radar and Vega onboard complex. The airframes were made in Tashkent TAPO plant in Uzbekistan. By now the enterprise degraded so much that it is no longer capable of producing Il-76 platforms on which these AWACS aircraft are based. In its turn, India wants more such aircraft. To meet Indian needs, Russia will be providing platforms in its home territory. The Aviastar-SP plant in Ulianovsk is setting up an assembly line of the improved Il-476. India was reported to have placed order for nine AWACS aircraft and is seeking nine more.

Commenting on the MiG-35 situation, Kornev said Rosoboronexport received report from the Indian tender committee short-listing European jets and turning down Russian and US proposals in the MMRCA tender for 126 multirole fighters. Although the MiG was screened out, Rosoboronexport says it will continue to offer this model to other customers. By cost-effectiveness it "should be" attractive, as it offers considerable performance at a unit price of some 10 million dollar below that for the much larger Su-30MK. "But Sukhoi is a huge airframe, not every country needs it – many nations would rather go for a smaller platform with lower cost", Kornev commented.

Rosoboronexport has illustrated the walls of its stand at Paris air show 2011 with large pictures of the Sukhoi PAKFA (T-50) fifth generation fighter. When asked about possible sales of these machines to overseas customers, Kornev answered that as of this time there is no formal permission from the Russian government for Rosoboronexport to market this airplane worldwide. India is the only exception as has been set by the government-to-government agreement between Moscow and New Delhi. Subsequently, Russian agencies and companies including Rosoboronexport were instructed to materialize this agreement. Doing so, Rosoboronexport, Hindustan Aeronautics Limited and Sukhoi have teamed up on shaping the Fifth Generation Fighter Aircraft (FGFA). The latter is effectively an Indian air force version of the PAKFA.

Vladimir Karnozov

PAKFA (T-50)

MOTOR SICH AND CHINA: 55 YEARS OF PARTNERSHIP

Motor Sich Joint Stock Company from Zaporozhye is one of the leading enterprises which carries out a complete cycle of creation of up-to-date aeroengines beginning from marketing investigations, design and manufacture, and up to support in service and repair. In the course of years of its activity, the Company conquered respect and prestige among the customers and successfully collaborates with leading foreign enterprises. Manufactured by Motor Sich JSC, flight engines are operated in more than 120 countries. The company has collaborated with the People's Republic of China for more than 55 years, with Chinese partners enjoying the privilege compared to other numerous Motor Sich foreign partners.

Vyacheslav A. Boguslaev
Chairman of the Board of Directors,
Motor Sich JSC

Nowadays, hundreds of Motor Sich gas turbine engines power Chinese Yak-42, An-26 and K-8J aircraft, as well as Mi-17, Mi-26, Mi-171, Ka-28 and Ka-32S helicopters.

The Motor Sich representative office has worked in Beijing since 2003, with the company's technical experts working in various regions of China wherein flight hardware powered by Motor Sich engines are operated. These facts demonstrate a great importance of further development of cooperation with P.R.C. for Motor Sich JSC.

The ever-increasing importance of combat aicraft presents increased requirements, either to training of new pilots or to keeping in due condition the flight skills or to training of pilots of operating units in utilization of aircraft weapons. As a result of this, trainer airplanes and combat-trainer airplanes are of much importance in Air Forces of any country.

Aircraft performance is mainly determined by its engine.

Nowadays, more than three thousand trainer airplanes and combat-trainer airplanes powered by engines manufactured by our enterprise are operated in 40 countries of the world.

Proceeding with the tradition, we, together with Ivchenko-Progress SE, at present time are participating in creation of AI-222 family of engines. Those engines shall provide maximum thrust from 2200 to 3000 kgf, and – with installed afterburner – up to 5000 kgf.

Today, batch production of AI-222-25 engine with maximum thrust of 2500 kgf has been started for YAK-130 – a combat trainer airplane which is delivered to pilot training centers of Russian Air Forces.

Versions of AI-222K-25 (without afterburner) and AI-222K-25F (with afterburner) are designed for two-engine combat trainer, designated as L-15, which is created by Chinese Hongdu Aviation Industrial (Group) Corporation (HAIC).

In 2008, L-15 trainer powered by Motor Sich AI-222K-25 engines made its maiden flight. Obtained in the course of tests, performance of L-15 trainer powered by AI-222K-25 engines without the afterburner, as well as a relevant market research shown that this aircraft version was a one of interest for a number of prospective customers.

On 20th of October, 2010, L-15 LIFT airplane version, intended for pilots training, made its maiden flight. AI-222K-25F engines from Zaporozhye have taken it to sky.

At present time, flight tests of the airplane and the engine are successfully proceeding. It is expected that the deliveries of L-15 family airplanes could start in year 2012.

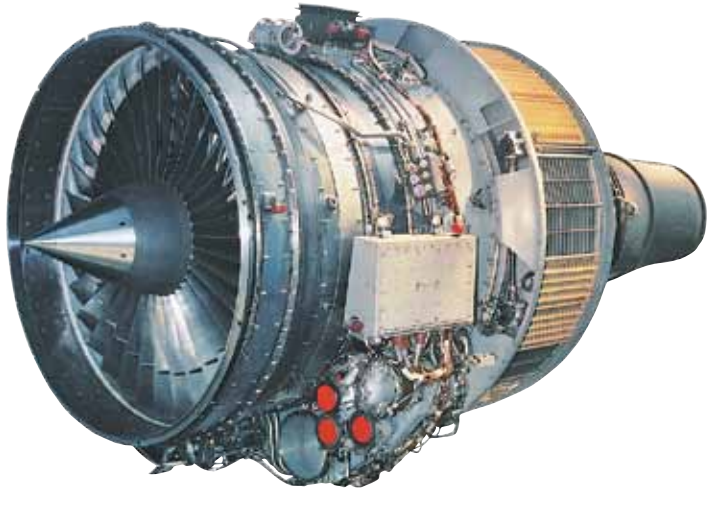
Today, production of D-436-148 engines for new regional airplanes of

An-148

An-148 family is one of priorities in the activity of Motor Sich JSC.

D-436-148 turbo-jet by-pass engine for passenger aircraft of An-148 family is the recent modification of D-436T1 engine. It complies with current requirements of ICAO as to contaminant emission and ensures noise level of An-148 airplane lower than is specified by standards. As to its performance, this commercially produced engine matches foreign analogues.

D-436-148



For various modifications of An-148 airplane and other passenger and transport airplanes powered by engines of D-436 family, Motor Sich JSC created two-shaft auxiliary gas-turbine engine AI-450-MS. This engine ensures starting of propulsion engines and supply of compressed air and electric power to on-board airplane systems when propulsion engines are not operating.

At present time, the works of creation of An-158 airplane, which is a 100-seat version of An-148, have been finished and on 28 February, 2011 it received IAC AR Type Certificate.

Today, the designers of Antonov SE are performing design works related to creation of executive version – An-168, and transport version – An-178. All these airplanes shall be powered by D-436-148 engine and its modifications.

In 2007, Motor Sich JSC obtained type certificate for new helicopter engine – TV3-117VMA-SBM1V – created by designers of the Company. This engine was created in order to improve flight performance of helicopters and their combat effectiveness, especially when operating in high mountain areas of hot climate countries. As to its performance characteristics, it complies with current technical requirements.

Engines

To boost safety of OEI flight, 2.5-minute power rating of 2,800 hp and 30-minute power rating equal to power of take-off power rating have been introduced. The engine capability has been also proved with regard to using two versions of continuous power setting with one engine inoperative: with engine power being equal to 2800 h.p. for 60 min and engine power being equal to power of take-off power setting.

To reduce helicopter climbing time, continuous take-off power rating has been introduced, which provides continuous operation of both engines at take-off power rating for more than 5 minutes, i.e. up to 30 minutes.

Installation of TV3-117VMA-SBM1V engines to the helicopter makes it possible to increase its climbing speed, increase altitude of effective ceiling, and to maintain high parameters of flight performance of helicopters with dust protection devices and shielded exhaust devices mounted.

Mi-8MTV helicopter powered by Motor Sich TV3-117VMA-SBM1V engines climbed at an altitude of 8.1 km for record 14 min when tested.

Taking into consideration the trends in aircraft market, as well as necessity to expand the list of manufactured products, Motor Sich JSC in 2006 started creation of MS-14 family of gas turbine engines of 1500 hp power class taking as basis the turbocompressor of TV3-117VMA-SBM1 engine. Electronic-and-hydraulic system of regulation, control and monitoring with full responsibility of electronic portion is used for engine control (FADEC – Full Authority Digital Engine Control).

Turboprop version of MS-14 engine is planned to be used as power plant for An-3-300 airplanes of local airlines. This engine may be used also in power plants of airplanes An-38, Be-32MK, etc.

On 23 of june 2011, at Motor Sich JSC facilities, the first starting of MS-14 turboprop engine was performed. This engine is intended to be used as replacement engine for An-2 airplane – a veteran of domestic fleet, it may be also installed to other airplanes of similar class. In future, a helicopter version of this engine will be created.

In today's world small aircraft are in big demand. To produce things demanded by market is a prerequisite of success and prosperity of the enterprise.

Taking into consideration the changes in current world market trends for helicopters, our Company carries out works related to creation of MS-500V – a family of new generation turboshaft engines belonging to take-off power class of 600 to 1000 hp which are intended to be installed in helicopters for various purposes with take-off mass of 3.5 to 6 t.

According to predictions of experts, market sector for helicopters of such class, thanks to their multi-purpose capability, shall be one of the most promising during the next years. MS-500V-01 engine with 810 hp take-off power is the basic engine of the family, and MS-500V – its modification with 630 hp take-off power – is being created according to Performance Specification of Kazan Helicopter Plant JSC for helicopter of Ansat type.

Development of MS-500V family engines is oriented towards creation of promising, capable to compete with foreign analogues, reliable, light and cost effective engines with low cost of life cycle.

Now, finalization of gas-dynamic parameters on test bench and finalization works for gas generators and full-size engines are in progress. At Motor Sich JSC, a series of special test benches was manufactured for per-unit finishing and ensuring execution of certification works.

At present time, on a global scale, a principle of creation of a family of engines on the basis of basic gas generator is widely used to ensure economic advantages in all stages of life cycle of engines. For that reason, when designing MS-500V engine, design solutions were utilized which would make it possible to create on its basis in future the promising engines of other types and purposes. These are turboprop and by-pass engines for small executive airplanes and general purpose aircraft, auxiliary engines, gas turbine drives, etc.

D-136 engine is the biggest helicopter engine manufactured by Motor Sich JSC.

TV3-117VMA-SBM1V

Mi-24

MS-500V

It ensures maximum take-off power of 11400 hp and, as per this parameter, has no competitors in the world. D-136 is operated in Mi-26 helicopters – the biggest load lifters in the world.

At present time, the designers of Ivchenko-Progress SE are developing the project of upgrading of D-136 engine.
The new engine is designated as D-136-2 and it will deliver maximum take-off power of 11500 hp, flat-rated up to +50°C. Emergency power operational mode of 14500 hp is also introduced. D-136-2 is intended to be used in the project of upgrading of Mi-26T helicopters. Batch production of the new engine shall be carried out by Motor Sich JSC.

Depth of experience in working in the P.R.C. market has demonstrated that Motor Sich JSC is open to mutually advantageous cooperation. Therefore, Motor Sich JSC participates in Aviation Expo China 2011 with hope to new contracts within already existing lines of cooperation, as well as with hope to start working at new projects of Chinese aircraft powered by Motor Sich engines.

Our goal is to manufacture durable and reliable engines, satisfying to the full extent the requirements of the customers and creating maximum comfort for the users.
We aspire to further strengthening of already established positive image of our Company – the reliable business partner.

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Transas press conference at MAKS'2011

RUSSIAN GOVERNMENT ORDERS SIX FFS FROM TRANSAS

Russia's ministry for transportation and the Federal agency of air transport announced on 17 August that St. Petersburg-based Transas company came first in most of the governmental tenders for full flight simulators (FFS). The company is awarded governmental orders worth Rouble 950 million for a total of three helicopter simulators (the Mil Mi-8MTV, Mi-8T and Kamov Ka-32A) and three jetliner simulators (two units for the Boeing 737NG, and one for the Antonov An-148 regional jet).

Speaking at MAKS'2011, Aleksander Neradko, head of the federal air transport agency said up to 80% of all incidents in the civil aviation are in "in one way or other caused by human factor". Induction of modern simulators can decrease the number of such cases falling to that factor. "In the Soviet Union we did not have the required technologies for high quality means of flight simulation. Today, Russia possesses the required technologies and Transas leads the way in that regard", said Neradko. He added that the agency is happy to award governmental contracts to a Russian simulator company "which has attained an internationally competitive level".

Neradko further said that the Russian authorities will "not longer tolerate" lack of modern simulator means for new aircraft types at their entry-into-service. "Sadly, it was the case when both the An-148 and SSJ100 entered revenue service – none had a FFS at that time". By now the An-148 has one certified FFS in Kiev, created by Antonov itself, and second, from Transas, at Moscow-Domodedovo. The SSJ100 does not have a certified FFS as of MAKS'2011, Neradko said.

Deputy transport minister Valery Okulov announced that the Russian aviation authorities has made decision to increase the number of simulator and flight hours from 150 before to 280 now for a young

Ka-32A

need long before the airplane entered revenue service with GTK Rossiya – the launch airline customer for the Russian-made An-148-100Bs. At MAKS'2007 IFC and Transas signed agreement worth Rouble 600 million (in excess of US dollar 20 million) on development, construction and delivery of a comprehensive set of training means. It includes a computer class, a level D full flight simulator (FFS), a level 3 Flight Navigation Procedure Trainer (FNPT). Besides, the set includes a cabin crew procedural training, but it was subcontracted to Akko firm that supplies some interior items for An-148s including business and economy class seats. All of the above mentioned components have been installed and now available at the S7 group training center in Moscow Domodedovo airport.

Established in 1990, Transas is the leading Russian specialist in aviation and ship simulators. Its core team is composed of seasoned experts in the field of simulation, notably for the naval vessels. Based in St. Petersburg, the company is in the top three of the world's ship simulator companies. This place it won in a tough competition with the monsters such as Nor Control, Ships Analytics and Krupp Atlas

pilot completing its flying course in a state-run flight training schools and that of commercial airlines. This number of hours is required for MPL license, he clarified.

Transas' recent success with governmental orders follows successful completion of the An-148 full flight simulator. In many ways the An-148 regional jet is the best piece of technology available from the Russian and Ukrainian aviation industries. As of September 2011 opening, six An-148-100s are in service with GTK Rossiya operating out of Pulkovo airport of St. Petersburg, three with Aerosvit flying from Borispol airport of Kiev, two with Polet airlines headquartered in Voronezh and one with Ukraine International Airlines (MAU).

Ilyushin Finance Co. (IFC) that sells the airplane in Russia and internationally under agreement with Antonov, recognized that

An-148-100 crew station

AN-148-100B


Procedure simulator at Transas pavilion at MAKS'2011

Electronic. Transas entered the market for aviation simulators thirteen years ago, with a unit for the Mil Mi-8 helicopter corresponding to A level. This device is still operational with its original customer, SPARK company of St. Petersburg.

In 2010 Transas delivered ten helicopter simulators. The company plans between 20 and 25 deliveries in 2011. Most of them are for the Mi-8, Mi-17 and their derivatives, but recently the company produced a model for the Mi-26, the world's largest rotorcraft. Next in the line is the Mi-38, the most advanced of all flying Russian rotorcraft with entry into service scheduled for 2012. Transas is also contracted to integrate an avionics suite for the Mi-38 and the flight simulator as well. At MAKS'2011 two prototypes of this helicopter, one with Pratt&Whitney PW127/5 and one with Klimov TV7-117V were on display, both outfitted with avionics from Transas company.

Victor Godunov, general director for aviation programs at Transas, says that UTair, the world's largest rotorcraft operator, has procured three full flight simulators for various models of the Mi-8 and installed them at the company's training center in Tyumen. Today, Transas is fine-tuning another FFS, that for the Mi-26T super heavy helicopter, in Tyumen. Besides, Transas won UTair order for an ATR-42 simulator. And this marked the first case when a global operator ordered a Russian company to make a simulator for a western airplane. The simulator has recently been delivered to the customer and ranked as "level A flight training device".

In addition to work on the FFS, Transas also supplies some avionics items including VTs-3 processor, a centerpiece in the VSS-100 system. "I love the An-148 for its elegant, esthetic appearance", says Victor Godunov. "I find it's a very successful aeronautical design, too", he adds, "We at Transas believe the project will develop and generate big sales. Personally, I think the An-148 is a very reasonable project with every chance for success in the marketplace. But save me to compare it with other aircraft programs further than saying that I like the An-148 more", he went on. "Key figures that participate in the An-148 project are the right people who know what they want and the ways to achieve their goals. They have a good feel for the economics and try to carry out a clever financial policy that would lead not just them but the whole of the An-148 team to success", Godunov carries on.

The An-148 simulator is installed at the S7 simulator center along with same-grade devices from Thales and CAE on Boeing and Airbus airplanes. This was the decision of Ilyushin Finance Company based on the agreement reached between it and S7 at Farnborough 2010. Being second largest Russian airline, S7 needs to maintain skills of its crews at the required level. This entails a lot of flight simulation. Training process at the S7 simulator center is streamlined. This facilitates entry into service for the An-148 and the related means of training. Besides, many technicians and pilots have an opportunity to take a look and compare. "It is a good thing that our simulator is located nearby simulators for western aircraft from leading simulation companies. It pleases me to hear comments from pilots who sometimes find our products same or higher quality", Godunov says. The An-148 simulator is the first level D unit that was ever created it Russia for an indigenous airplane design in accordance with the Doc.9625 standard.

Solvent demand for the An-148 family aircraft from the side of airlines is estimated at between 400 and 600 units. Preparing flight crews for them and maintaining aircraft-handling skills creates a need for some 20-30 full flight simulators. Besides, there are some governmental structures that also seek aircraft of that size and performance. They may want this airplane in special versions, and hence additional need in customized means of training. IFC and Transas are addressing these market needs.

Vladimir Karnozov

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Tu-214ON

TUPOLEV OPENS SKY

At MAKS'2011 Tupolev demonstrated for the first time in public two newest models in its narrowbody twin jet family. One is the Tu-214ON special mission airplane nicknamed "legal spy" and the Tu-204SM, a deep modernization of the baseline passenger jet.

The Tu-214ON's nickname "legal spy" reflects its intended use on inspection flights over territories of foreign countries that are participant in the Open Skies treaty to monitor military infrastructure development. It is a heavily instrumented airplane with highly integrated sensor suite. It combines radio receivers and transmitters, interrogators, radars, thermal imagers, as well as photo and TV cameras. Performance of all items shall meet internationally agreed specification, with prescribed image quality.

The Open Skies treaty was signed on 24 March 1992 in Helsinki by twenty seven nations, by now their number has risen to 34 (all European except US and Canada). Russia ratified the treaty ten years ago and has been using specially equipped Tu-154 trijets and An-30 turboprops as surveillance airplanes.

With maiden flight in June 2011, the airplane shall complete acceptance trials with the Russian Ministry of Defense (MoD) by the year-end. The ON version is based on the most recent and advanced Tu-214 "D" platform with 11,000km range and loitering capability up to 14 hours. The "D" platform was specially developed for government structures including Special Air Detachment responsible

Tu-204SM

for transportation of Russian leaders and MoD. They are seeking over a dozen special mission aircraft on the given platform, of which two Tu-214SR ("radio relay airplane") and two Tu-214PU ("control post") aircraft have been delivered.

Moscow-based Vega Radio Equipment Concern acts head contractor of the Russian MoD for this model. Vladimir Verba, Vega general designer, said a second Tu-214ON will be completed at Kazan-based KAPO plant next year and expressed hopes that a third Tu-214ON be ordered by Russian MoD "later on".

While the Tu-214ON does have orders, these for its stable make Tu-204SM are yet to come. In early September co-owner of Red Wings airline, the largest Tu-204 operator with eight airframes, has sent a letter to Russian prime minister Vladimir Putin urging him to take personal control over the Tu-204SM program.

Aleksander Lebedev has asked Putin for a more substantial governmental support to this project that is meant to maintain Russian competitiveness on the market for narrowbody jetliners until the next-generation MS-21 becomes available in 2016. Launching the Tu-204SM into series production can provide sufficient work load to three key Russian plants: Aviastar, KAPO and Perm Motors. Besides, it will help further development of Red Wings, currently the largest dedicated passenger charter airline in Russia, Lebedev writes.

Red Wings signed preliminary agreement for 44 Tu-204SM airplanes in late 2010, but earlier this year Ilyushin Finance, that was meant to structure financial package for this deal, decided to quit the project as it found it too risky in the view of weak governmental support. After IFC quitted, the United Aircraft (UAC) has been trying to arrange the deal via Kremlin-controlled VEB bank, so far without success. UAC says there is "several other intended customers" for the type, and talks with them continue.

Oleg Alasheev, Tu-204SM chief designer, says that so far two operable prototypes have logged over 70 flights and that Tupolev is commencing certification trials after completion of manufacturer's trials in August. The 108-tonne MTOW twin jet can transport up to 215 passengers 4,800km or 166 passengers 6,100km. First delivery is planned for 2012, but so far there are no firm orders.

UAC is trying to talk UTair into launch customer role for the Tu-204SM. Andrey Martirosov, UTair general director confirms his airline is considering indigenous airplanes. "We have 38 former generation airplanes that need replacement. We are also planning fleet growth for business expansion", he said. The airline has strategic development program for the next five years, which calls for acquisition of 120 new generation airplanes including ATR42-500/600, Superjet 100 and Boeing 737NG for which contracts have been signed already.

Touching on the Tu-204SM, Martitosov said: "UTair is largest commercial operator of Russian aeronautic products if rotary wing aircraft are taken into account. If UAC gives us good terms and the airplane comes to specification, we will go for it. At this time we are not involved into any serious negotiations that may lead to a contract. At the same time, Russia has good traditions in passenger aviation and potentially can produce competitive airplanes. I spoke to Tupolev leaders and highlighted the issues that must be solved before contract negotiations commence. Our talks will resume if Tupolev solves these issues".

China operates one Tu-204-120 with Rolls-Royce Rb.211-535 series engines and western avionics delivered in 2008. The airplane won European Aviation Safety Agency (EASA) type certificate in 2009. Four more airplanes were contracted, but their deliveries have been halted due to a number of reasons.

Vladimir Karnozov

A380

AIRBUS FIGHTS BOEING IN THE RUSSIAN MARKET

After Paris, where Boeing signed two major purchase agreements with Aeroflot and UTair, Airbus has made a huge effort by drawing Transaero from being a Boeing-only airline. At MAKS'2011 the latter signed agreement for eight A320neo thus becoming the type's first customer in the whole of Russia, CIS and Eastern Europe. "Furthermore, they are taking up to 20 today's A320s from leasing companies starting in 2013", says executive vice-president Chris Buckley, the highest-ranked Airbus manager sent to MAKS'2011. "This is certainly a bitter news for Boeing since Transaero has a large Boeing fleet", he observed happily.

Today Transaero operates 66 Boeing airplanes and days before MAKS'2011 opening received a 737-800 with the Sky Interior. But Buckley believes the 737s will not stay long with the airline. He claims Transaero came to decision to replace its entire 737 fleet with Airbus narrowbodies in 2018-2020 timeframe. "They decided to capitalize on the Airbus advantages, as the neo is 15% more efficient than the 737-800".

Boeing president for Russia/CIS Sergei Kravchenko made a statement that the current 737NG is as effective as the neo, and that the NG+ offers 10-12% advantage over the competition. His Airbus counterpart reacted, that mister Kravchenko seems to have being suffering from overheating under the sultry sun at MAKS'2011. "From airlines operating 737-800s and A320s such as Air Berlin we know that they are nearly the same in terms of operational economics. The neo will be 15% more efficient. This makes it a very different aircraft", Buckley said.

At MAKS'2011 Buckley and VSMPO general director Voevodin signed agreement: the Russian titanium supplier will make landing gear struts for the A350-1000. Since this model is heavier than earlier -800 and -900 versions, its struts

need to be stronger. Buckley says that first set of these struts shall be delivered to Airbus by 2016 in the view of the A350-1000 maiden flight in 2017. Commenting on the titanium, Buckley observed that Russian supplies meet Airbus needs in titanium by 60% as compared to Boeing's 40% - adding one more argument to Airbus better position in the local market.

Admitting Boeing's recent successes in sales to Russian airlines, Buckley said that three major Russian airlines - Aeroflot, S7 and now Transaero are Airbus customers. "Besides, A320s recently went to Sky Express and Tatarstan, so our customer base in the region has been expanding further". In mid-September, on the eve of Jet Expo 2011, the European airframer calculated that at that time 14 Russian and CIS airlines and business jet companies operated 204 Airbus aircraft (including eight ACJs), and noted that 112 more Airbus aircraft were "to come" into Russia later on.

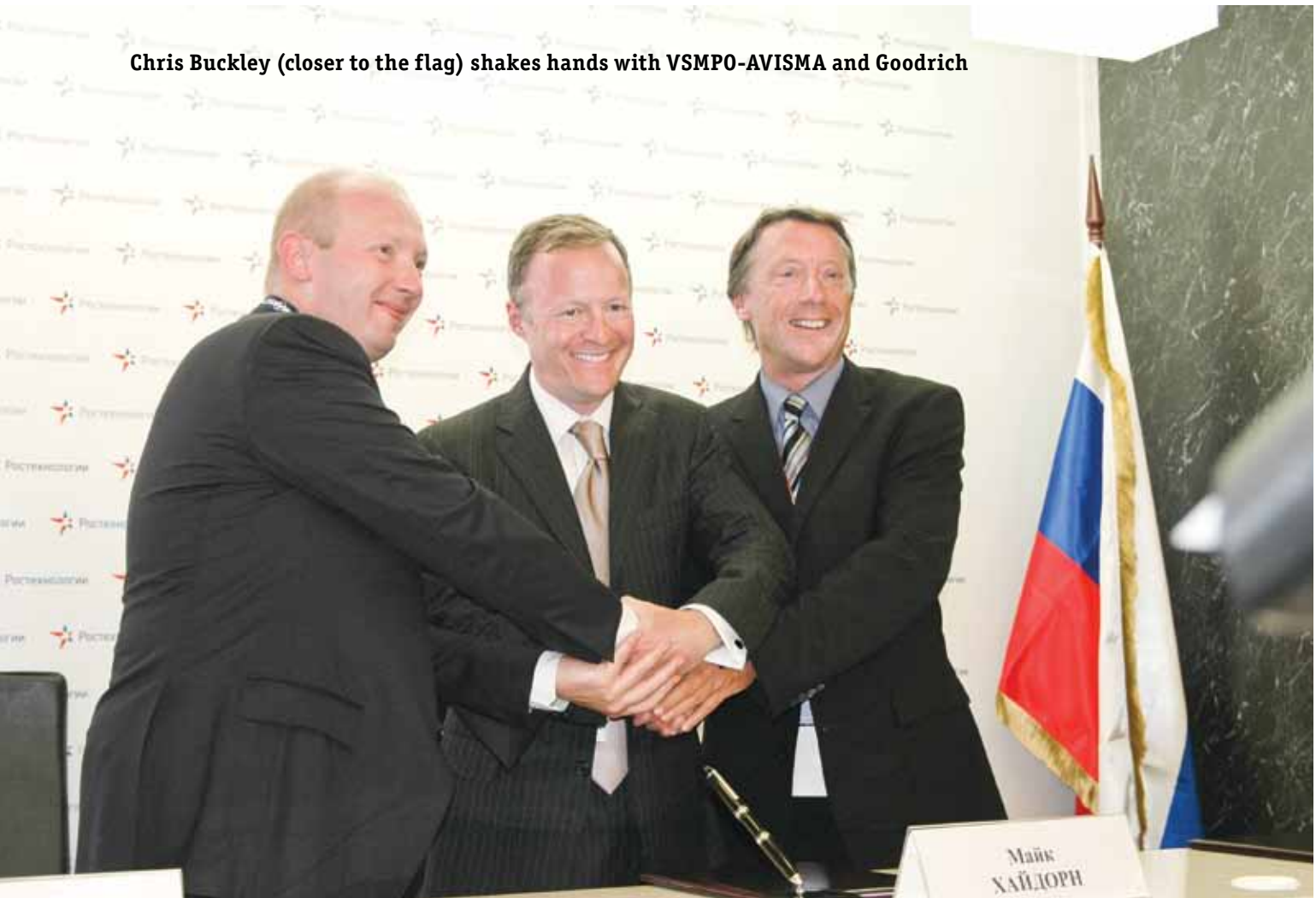
He made a special case of Aeroflot. At Paris certain representative of the Russian flag carrier told reporters that he was very unhappy with Airbus for not selling him two A330s. While admitting that this was at issue at Paris, Buckley said the situation has been amended. Airbus prioritized Aeroflot and soon found a slot for a brand-new A330 suddenly becoming available. "We have already signed for it. This is a twelve A330 Aeroflot directly purchased from us. The airplane delivers in November this year".

Buckley further said that improving relationships with Aeroflot and Transaero can be seen as a bridge to sales of the A380 to these airlines. Transaero "needs" to replace 747-200s and perhaps some of their 747-300s. This creates a sales potential for some 20+ Airbus superlarge quads. He further stated Airbus and Aeroflot have been doing a joint study on employment of A380s on the Russian carrier's route network, specially mentioning the long haul services from Moscow to NY and Russia's Far East destinations: Khabarovsk and Vladivostok.

Touching on the size of the superlarge passenger jet market in Russia, Buckley says he generally agrees with Boeing's estimation: 40 new aircraft by 2030, "but we would probably argue for some more, but their figure is a good estimate. I take it as a minimum figure".

Wrapping up, Buckley says MAKS'2011 was a good show for Airbus. "The organizers have been learning and improving with every MAKS. For Airbus this show is a good platform to hold negotiations with our airline customers and the Russian industry with which we have a number of ongoing industrial cooperation programs".

Chris Buckley (closer to the flag) shakes hands with VSMPO-AVISMA and Goodrich



Airbus Corporate Jets

After a period of good sales in Russia and Commonwealth of Independent States (CIS), Airbus registered somewhat lower interest in the region to its corporate solutions. Speaking to the Russian media at Jet Expo 2011 opening, Francois Chazelle, vice president, worldwide sales at Airbus Corporate Jets, attributed this to the worldwide economic crisis that hit Russia harder than many other countries. Business jets were selling better here in 2008, he observed. The European airframer revealed that eight ACJs are operated in the CIS. Touching on his marketing strategy, Chazelle said he shall be devoting more time and effort to corporate and private clients in the region, whereas governmental structures used to be the primary targets in the past. One of such is the Russian government's Special Air Detachment which ordered two ACJ319s. These are under completion work now. Another important customer is the government of Ukraine. The later has recently confirmed, via a public speech of deputy prime minister Borys Kolesnikov, that the purchase of an ACJ319 was made in 2005 by the previous administration of president Yushenko. This airplane, however, was long to get completed, and delivered only a year ago. At Jet Expo 2011 Airbus demonstrated a Comlux A318, noting that this is one of 15 ACJs available for charter flights in Europe. Comlux now has an Airbus with Internet on board, giving its travelers the convenience of using their SIM cards and cell phones through roaming services provided onboard. Chazelle says 60% of his clients ask Airbus to provide not only a [green] airplane but also do completions work for them, and CIS customers are not an exception to this rule. He said in recent years Airbus has been completing 3-4 ACJs annually at its own completions center in Toulouse, in cooperation with seven Airbus-certified companies worldwide including the recently approved TAECO in Xiamen, China. To-date sales have totaled 170 including 110 narrow bodies and sixty wide bodies, of which about one hundred has been delivered. Last year deliveries totaled 15 worth $1.5billion including two widebodies. China's Deer Jet recently received its first ACJ configured for 28 travelers, Chazelle confirmed. "They ran a big presentation of it in the Forbidden City of Beijing, and said this airplane will be largely used for transporting delegations". Speaking of delivery dates, Chazelle said if a new customer signs for an Airbus narrowbody today, he may get one in 2014, "but for my client I can offer a slot in 2013". Chazelle said the "sharklets" are available for his clients adding that first such equipped ACJ will appear in 2013.

Vladimir Karnozov

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RUSSIAN HELICOPTERS: NEW MODELS AND SALES

The MAKS'2011 international aerospace "saloon" saw public debuts of several new rotorcraft models including the Mi-26T2 super heavy, the Mi-382 Klimov-powered medium utility and the re-developed Mi-34 dubbed the Sapsan.

Touching on China, general director of the Russian Helicopters said that the work with this country proceeds "at a very fast pace" and observed happily that "China remains our strategic partner, this country is a long standing customer for Russian rotorcraft". Today, PRC operates over three hundred Russian-made helicopters of the Mil Mi-8, Mi-17 and Mi-26 models, while Kamov Ka-28 and Ka-31 deck rotorcraft serve with the Chinese Navy. Last year the Russian Helicopters signed another contact for deliveries of thirty two more machines of the Mi-171 model. Besides, a contract is being finalized on delivery of thirty Ka-32s in fire-fighter version. Of new Russian models, the Mi-26T2 has especially good prospects in China.

The Russian Helicopters puts "a future heavy helicopter" on the list of its top priority programs, to follow the line of the Mi-6, Mi-10 and Mi-26. "We tried to find mutually beneficial terms with our foreign partners so as to distribute to project participants a colossal development costs needed for this kind of rotorcraft", according to an insider in the company. "The Europeans have been developing technologies for a super heavy helicopter of their own. Consultations with them brought little. We were luckier in our talks with the Chinese", he collaborated.

After successful participation of Russian Mi-26s in rescue operations in North-East provinces following earth shake, China purchased four Mi-26s and made decision for joint development of a next generation heavy helicopter with Russia. "The Chinese filed application for joint development of a next generation heavy helicopter on mutually acceptable terms. We came with a reciprocating offer, and it was accepted. The Chinese government provides necessary funding", the source added.

"There is a hope that after a series of false starts, the next generation super heavy helicopter project is now on a firm footing", he concluded.

The Mil Mi-26T2 operable prototype flew daily during the show, demonstrating higher power-weight ratio and better handing characteristics. The baseline Mi-26 with 20-ton payload capability had its maiden flight in 1977 and still remains world's biggest helicopter in service. The Mi-26T2 is intended for both military and civilian customers and uses "some flight control algorithms already proven on the Mi-28N", according to Aleksei Samusenko, General designer at Mil.

The Mi-26T2 features the BREO-26 digital avionics suite from the Ramenskoye PKB.

Mi-382

Mi-26T2 and Mi-28

Aircraft

Mi-17V5 and Mi-26T2

It has a glass cockpit on five LCDs, a digital autopilot and a Glonass-aided navigation system enabling IFR operations.
A Transas TSL-1600 search light working in either standard or IR compatible allows better observation of cargo being carried on sling, and use of night vision goggles. Flight crew is decreased from five to two pilots, but an operator is needed when cargo is carried on sling.

The Mi-26T2 is powered by a pair of Progress D-136-2 with FADEC. Each of these motors develops 12,500hp at emergency power mode and delivers extra 250hp at takeoff mode.

This year the Mi-26T2 passed preliminary manufacturer's trials, certification trials shall commence after MAKS'2011. Funding is structured by the Russian Helicopters holding company. The lion share's of it comes from the Rostvertol plant, a Mi-26 manufacturer which fell under control of the Russian Helicopters in late 2010, through purchase of a major stake.

Out of a hundred Mi-26s in service worldwide, the Indian air force has four. It is considering the Mi-26T2 and the Chinook in an ongoing tender for ultra heavy helicopters. India is also evaluating the Mi-28NE and Boeing AH-64 Apache which were short-listed in competition for 22 strike helicopters. At MAKS'2011 the Mi-28NE exportable version debuted at static line, modeled from the Russian air force Mi-28N whose production commenced in 2006.

Another MAKS'2011 debutant came in the shape of the Mi-382 helicopter (msn 38011). This experimental machine was on static display, representing a new evolution of the baseline Mi-38. It differs from the baseline model in having 3,750-hp Klimov TV7-117V in place of PW127/5

Mi-8MTV

turboshafts. The 38011 was flown back in 2003 on experimental P&Whitney Canada motors, but on the eve of MAKS'2011 underwent deep upgrade getting new avionics and engines.

The Mi-38 is positioned as next-generation helicopter in the class of the very commercially successful Mi-8/17 family, which it will rather supplement than replace. Basically a civilian machine in 5-tonne class payload and roomy cabin for passenger operations, the Mi-38 can provide a platform for development of future transport and multipurpose helicopters for the Russian armed forces.

Both development prototypes 38011 and 38012 are in airworthy condition and undergoing trials, Russian Helicopters said at the show, adding that prototypes 013 and 014 are "being completed". All four are equipped with IKBO-38 glass cockpit sets from St. Petersburg - based Transas. Certification of the primary passenger version with 32 seats is planned for next year, series production start for 2013 and deliveries for 2014. Mi-38 variants include military transport, special mission, cargo (with sling), medical and air surveillance.

The TV7-117V had long been in development with first operable turboprop version TV7-117S appearing back in 1997 and its improved and certified TV7-117SM development in 2003. These, however, were produced in small numbers due to failure of the Ilyushin Il-114 regional turboprop project. Two years ago the turboshaft version was re-started flowing progress with the Mi-38 program. The Klimov develops 3,750hp at emergency power and 2,800-3,000 hp at takeoff mode respectively, while demonstrating fuel consumption of 195 gram per hp.

Today's TV7-117V is a 3D computer-aided design, completely made on computer screen. Retaining compressor and elements of combustor from the original TV7-117, the today's version features a completely new turbine and FADEC.

Using "something old, something new" enabled Klimov to cut development cycle while delivering high performance. Recent innovations were mostly to improve reliability and evade possible problems in mass manufacture and operational service. Engine development continues and shall complete early next year, in time to allow Mi-382 complete flight trials by the end of 2013. As of MAKS'2011, Klimov had ten engines assembled, including four "completely flight ready" to support the 38011 flight trials.

Overall, the helicopter business is on the rise in Russia these says. The State Weapons Program 2020 put into force by the Kremlin earlier in 2011 calls for procurement of over thousand locally made helicopters in the next ten years. This was announced by Dmitry Pertov, general director at Russian Helicopters holding. He said the process of signing orders with the Russia's MoD is ongoing in the view of completion by the year-end. "Immediate manufacturing plan" has been put together and accepted by the customer, he added. The plan calls for about a hundred helicopter deliveries to Russian armed forces this year. In the following years the deliveries shall proceed at annual rate of between 120 and 160 units.

The Russian MoD is moving from its earlier practice of per-year contracts with the local industry towards long-term orders. In particular, the ministry and the Russian Helicopters are putting together five such long-term orders, for each of the five large final assembly plants situated in Kazan, Ulan-Ude, Arseniev, Kumertau and Rostov-upon-Don. First agreement, with the Rostvertol located in the city of Rostov-upon-Don, has been signed already, Petrov collaborated. It calls for production of the Mi-35M, Mi-28N and Mi-26 family helicopters.

Before MAKS'2011 the Russian Helicopters' backlog stood at 461 machine (as of early August 2011). This total is largely made up by local civilian and foreign military orders. "This figure will grow up substantially by the year-end as we continue to turn "quasi-firm" orders from the MoD into proper firm orders", Dmitry Petrov said. He clarified that the firming up of these "quasi firm" orders goes on in accordance with the Russian standards on implementation of the State Weapons Program's positions.

The big domestic orders will help boost expansion of the Russian Helicopters' production capacities. "We will further expand our manufacturing capability to match the growing solvent demand from in the local and overseas markets", Petrov said.

The Russian Helicopters holding has successfully completed the first phase of corporate structure building started in 2007. Now the holding controls three design houses, five mass production plants and several major component makers. Its workforce is now 37,000. By Russian accounting standards in 2010 the company produced products and rendered services for US$ 2.7billion. By international standards EBITDA various activities in 2010 generated US$ 461million, profitability came to 17.5%. Petrov claimed the Russian Helicopters' share in the global rotorcraft market has grown to 14% in terms of new sales.

PRODUCTION OF RUSSIAN HELICOPTERS OVER YEARS (FACTS AND PREDICTIONS)

2003	2004	2005	2006	2007	2008	2009	2010	2011 plan	2012 plan
72	75	83	94	104	169	183	214	267	> 300

Mi-26T2

This ranks the Russian Helicopters as number three among world's largest rotorcraft producers. By number of helicopters in active service worldwide, the Russian designs take 13%. Today, over 7000 Russian-made rotorcraft are in service with 110 nations.

The Russian government subsidizes the Russian Helicopters. In the period of 2011-2013 timeframe the government promises to provide Rouble 12.2 billion in non-refundable aid to various rotorcraft programs. One of the key programs with the governmental backing is the Mi-171A2. This helicopter is a next-generation version of the long-serving Mi-17, which itself evolved from the Mi-8. Today, the share of the Mi-17 family machines in the total production output of the Russian Helicopters comes to 75%. The Mi-171A2 shall obtain certification in 2014.

The Russian government has allocated Rouble 3.6 billion in 2011-2013 timeframe for the future high-speed helicopter program. Announcing this decision, the deputy minister for industry and trade Denis Manturov said the government has agreed to allocate Rouble 400 million in 2011, 700 million in 2012 and the remainder in 2013. "We allocate a moderate sum for this year since the work is only picking up and at this stage the industry simply could not do more that its capacities allow", he explained. Meantime, Kamov and Mil design houses have been competing between each other with proposals of the Ka-92 and Mi-X1 respectively. One of those shall be selected in late 2012 in an internal competition being conducted by their parent company, the Russian Helicopters.

The Russian Helicopters say much attention is being paid to improving quality of customer support. The company is aiming at setting up a global network of authorized maintenance and spare part centers. In India a technical center has been established and one in China will start operations this year. A joint venture in Vietnam with Russian Helicopters keeping a 25% has been established. It will be the only manufacturer-approved distributor of spares in the region. This move is made to fight "grey" spares market. Talks are being held with interested US companies on joint effort in support of the large and growing fleet of Russian-made helicopters in Afghanistan, Iraq and neighboring countries. If successful, this process will see setting up more technical support and maintenance centers in the region, in addition to one previously announced in partnership with UAE companies.

A grey horse in the Russian helicopter stable is the Mi-34S1. It represents a further evolution of the Mi-34S developed back in the times of the Soviet Union and first flown in 1986. A small series of semi experimental Mi-34S machines was produced, but these suffered from numerous teething problems. A dozen of such machines went to Algeria, but they were grounded after only a year of operations due to short lifetimes and technical issues.

The Sapsan project is aimed at improving the baseline model to such an extent that it attains competitiveness with the best US models such as those from Robinson. Changes introduced to the Mi-34S1 demonstrated at MAKS'2011 involved new shaping of the fuselage, windows, control system, and introduction of hydrolics and a new engine. Initially, the Mi-34S1 will be used for initial pilot training and by sportsmen.

The Mi-34S1 factory trails shall be completed by the end of this year, and be followed by certification tests, which require 130 to 150 sorties. Type certificate is expected in early 2012, enabling to commence series production later that year. UTair is considering using Mi-34S1 also for geologic research and survey. The Mi-34S1 is "competitive" to the Robinson R44, according to Dmitry Petrov. "Its pricing will be kept in the right range so that to make the new machine attractive to aviation clubs and commercial sector".

The Mi-34S2 version differs from the Mi-32S1 in having a 504-hp Arrius-2F turboshaft engine from Turbomeca in place of the Vedeneyev M9F radial piston developing 365hp. The TBO period for this model is said to be 1,500 hours, while airframe and most of its key systems will be operated "on-condition". An initial batch of the Mi-34S2 shall be completed in 2012 at the plant in Arseniev, Russia's Far East.

UTair is being considered in the role of the Mi-34S1/S2 launch customer. This company is world's largest commercial rotorcraft operator and also largest commercial operator of Russian aeronautical products (by numbers in active service). In presence of Vladimir Putin, the prime-minister of Russia, UTair signed for 40 Mi-171s at MAKS'2011. Deliveries are due in 2012-2013. In September 2010 UTair accepted last batch of 40 previously ordered Mi-171s. Now it has a fleet of over 50 Mi-17s made in Kazan and Ulan-Ude.

In spring this year UTair general director Andrei Martirosov applied his signature under preliminary contract for ten Mi-34S1s in the view of deliveries in 2012. Around that time the Russian Helicopters signed a memo of understanding with Aero Progress of France, which agreed to become Mi-34S dealer in Europe. The French company seeks two helicopters for delivery in 2013.

Vladimir Karnozov

Mi-34S2

NEW AN-148 DELIVERIES

On September 9, 2011 the Polet (Flight) airline commenced revenue service on the Antonov-148 regional twinjet, thus becoming second Russian operator of the type after launch customer GTK Rossiya.

That day the newly acquired airplane flew round trip Voronezh – St. Petersburg – Voronezh. On its first revenue flight with Polet the airplane was 90% full. The airline's general director Anatoly Karpov was on that flight, which lasted one hour forty minutes and went on cruise altitude of nine to eleven thousand meters. "The An-148 is a very comfortable airplane, with a quite cabin. Stewardesses say it is convenient to work in: here are two kitchens, two sanitary units in the back and aft, and comfortable leather seats for passengers. I believe the An-148 is at the world's level and in some respect fares better its foreign competitors. We are happy to be among first operations of this new type", Karpov said.

What is remarkable about Polet An-148 project is that the financial package for it is structured by Russia's largest financial institution, the Savings Bank (Russian acronym Sberbank). Furthermore, this project is the first one for Sberbank when it acquires airplanes from domestic manufacturers. Polet took delivery of two newly constructed An-148-100E regional jets from the VASO plant in Voronezh on July 20, 2011. The respective deal is structured by Sberbank Leasing (special leasing structure wholly owned by the bank), and calls for ten such aircraft to be built at VASO and placed with Polet in 2010-2011 time frame. Reportedly, these airplane go at US dollar 26 million each.

Commenting on lessor selection, Polet general director Anatoly Karpov said Sberbank Leasing offered the airline a lowest interest rate for hired capital. The An-148 will supplement five Saab 2000s and six

Polet general director Anatoly Karpov

Saab 340s operated on Polet domestic passenger routes. The airline also operates five An-124-100 Ruslan super large ramp air lifters on outsized cargo market and three Il-96-400T side-door heavy freighters on international market for transportation of general cargo. Several years ago Polet's An-124 crews distinguished themselves in China, on a very complex and technically difficult mission. It was about air transportation of a semi-disassembled P-3 Orion from China into US, after this spy plane crashed landed in the territory of People's Republic of China following mid-air collision with a PLAAF J-8II interceptor.

Sberbank Leasing has made a leap into aircraft leasing business since late 2009, when it structured its first deal, into leaders of the Russian lessors. Today, it takes second place in the national ranks with 36 passenger planes placed with a dozen of Russian airlines. Sberbank director Oleg Gamov said a deal for twenty more airplanes is structured and being implemented. Most of the placed airplanes are Boeing and Airbuses. Rare exceptions include three An-140s built by Aviacor that were initially ordered by now-bankrupt Financial Lease for Yakutia, and later re-funded by Sberbank Leasing. The number does not include five Tu-204-300s in service with Vladivostok Avia: although Sberbank provided bulk of the capital, the deal was structured by Ilyushin Finance, ranked third largest Russian lessor with 30 placed airplanes and 136 more in the portfolio (as of July 2011).

Meantime, Ukraine's largest carrier also became an An-148-100 user. The Ukrainian International Airlines (acronym MAU) took acquired one airplane directly from Antonov. It came in airline-customized interior with 73 seats in two classes which is five seats more than earlier factory standard's.

Aircraft

The airline seeks three such airplanes by the end of this year and has a total requirement for 22 An-148s and An-158s by 2015. The respective long-term acquisition agreement was signed during the aircraft delivery ceremony on 3 August. The newly acquired airplanes will be supplied by Antonov's plant in Kiev that already delivered two An-148s to AeroSvit. Financial package for MAU is structured by newly founded LeasingTechTrans company, a government owned startup lessor (it might soon change its name for Antonov Finance). The airline intends to open An-148 revenue flights on 18 August. It is understood that the new Antonov was selected by formerly-Boeing-only airline (with 18 NG and Classics narrowbodies) on insistence of the Ukrainian government which holds a 60% stake in it.

At this time the largest An-148 user is GTK Rossiya, which operates a fleet of six An-148s. In early September the airline said that one of its airplanes demonstrated flight time in excess of 400 flights hours. This record was set in August 2011 on the airframe with registration RA-61004. It is interesting to notice that the An-148 jets generated 11% of all Russian traffic on regional jets in 2010, coming second after the CRJ fleet, which accounted for 51%. Still, this indicates the potential coming from modern indigenous types capable of high utilization. Roughly, the An-148 requires a third of the man-hours required by Soviet models, and in this respect is comparable to the 737NG. "To many of my colleagues, this airplane brings hope," says Lev Lander, head of the GTK Rossiya engineering base at Pulkovo, St Petersburg.

The airline operates the Antonov in same manner as 737s and A320s: their MRO programmes adhere to an "on condition" principle rather than the periodical calendar maintenance of Soviet aircraft. Lander continues: "Unlike many other airlines, we do not feel shortage of qualified personnel. Lots of skilled [technicians] are on the dole after the Soviet types quitted service en masse in 2007 to 2009, and many feel they don't have a chance to qualify in Airbus or Boeing due to their poor English. Not everyone has the ability to learn foreign languages, and means to do so. Good [technicians] keep coming to me asking for a job on the An-148. Those who get accepted fall in love with this airplane as they feel it can help them stay in the profession."

Russia is recovering from the worldwide crisis, with a 30.8% passenger traffic rise in 2010, to 147 billion passenger-kilometres. This figure is expected to double by 2020 and more than triple by 2030, which shall enable the Russian carriers to increase their share in the world's traffic to some 4-4.5%. To support this growth, Russia needs around 1,000 new passenger jets.

As part of its fleet renewal, Aeroflot wants 20 An-148s and 10 more SSJ100s. the Russian flag carrier considers placing orders for this and other indigenous types, Aeroflot general director Vitaly Saveliev told Russian media after meeting Russian prime minister Vladi-mir Putin. During previous meetings with Saveliev, Putin demanded that the national carrier buys more home-made products and asked for a detailed long-term plan for new airplane acquisitions. In reply, Aeroflot prepared a long-term fleet development strategy that calls for acquisition of up to 500 airplanes for its own needs and those of other airlines under its control. These include A350s, 777s and A320s, as well as SSJ100, An-148, An-140 and MS-21. One of its postulates is that the share of Russian airplanes shall be around 40% by 2020.

In July Saveliev wrote a letter to the Russian government where, reportedly, listed strong and weak points of the newly acquired SSJ100 msn97008 highlighted by first month of operations. Aeroflot insists that further deliveries shall be completely in line with the December 2005 contract terms including previously agreed technical specification to fuel burn, utilization and completions of interior – to which the msn97005 does not correspond in full. In the case these terms are met by the manufacturer, Aeroflot promises to buy ten more SSJ100s. "We previously ordered 30 Superjets and are ready to firm up a follow-on order for ten more", Saveliev said. "Aeroflot is ready to place a new order for the An-148. Our daughter company GTK Rossiya operates six such aircraft and they perform quite well. That's why we seek to buy twenty more of them", he further stated. Aeroflot is also interested in the MS-21 which is under development in view of deliveries in 2016. "We hope this airplane will come to being", Saveliev said. Aeroflot has approached UAC and Irkut with request of proposal. "If they offer us good terms corresponding to the market realities, we will, surely, place an order for this aircraft as well", Aeroflot head told the media.

Vladimir Karnozov

MAKS'2011: COMMERCIAL AIRPLANE SCORES

Sergei Chemezov of Russian Technologies welcomes German partners on next generation radio equipment

The biannual aerospace "salon" at the Ramenskoye airfield near Moscow held tenth time on 16-21 August 2011 brought a few surprises. While the general public was stunned by the first-ever appearance of Sukhoi's fifth-generation fighter PAKFA, Airbus, Bombardier and local manufacturers were busily collecting new orders on the growing Russian commercial aviation market.

Transaero surprised the many. Until recently it stayed a Boeing-only airline. Before MAKS'2011 it had 66 US-made jets plus three Tu-214s of the different world. At the show this airline surprisingly signed for eight A320neo. Airbus' executive vice-president Chris Buckley claimed Transaero will also take 20 "today's A320s" from leasing companies and then totally replace its 737 fleet with Airbuses in the 2018-2020 timeframe. Buckley further said Aeroflot purchased one more (12th) A330 directly from the European manufacturer (not counting ten such aircraft the carrier signed for with leasing companies). Rival Boeing did not land any new deals.

Further surprise came from Russia's largest lessor Ilyushin Finance (IFC) which previously bought only indigenous jets from domestic manufacturers. IFC landed the deal for 30 Bombardier C-series twin jets worth US$ 2billion by catalogue prices. Chet Fuller, senior vice president for Bombardier Commercial Aircraft, and Alexander Roubtsov, IFC general director applied their signatures under a preliminary purchase agreement that calls for the acquisition of three CS100s and seven CS300s (with options for 10 more) and purchase rights for another 10 of the new Canadian narrowbodies.

Roubtsov described the CS300 as "the best in its class," further noting that the 120- to 145-seat twinjet fits perfectly between the 99-seat Antonov An-158 regional jet and the 150- to 162-seat Irkut MS-21-200 twinjet already in the portfolio of the Russian leasing firm. "There is large amount of work ahead of us, as we need to finalize the main purchase agreement and get approval of the company's council of directors," he said. "Next year the purchase agreement shall be finalized. The aircraft being acquired are intended for customers in Russia and outside it." Bombardier did not reveal the value of the deal, quoting only the CS300's $66 million sticker price.

Indigenous products in IFC's portfolio include the Ilyushin Il-96-300 (passenger) and Il-96-400T (cargo) four-engine, widebody aircraft, Tu-204-100/300 and Tu-214 narrowbodies and An-148/158 regional jets. At MAKS'2011 IFC placed six An-158 large regional jets with Cubana de Aviacion. First delivery is scheduled for next year, when first deliverable batch of these 90-seat jets will roll out Antonov's plant in Kiev. The lessor also firmed up earlier signed agreement with Irkut on the MS-21 narrowbody. The order is for 28 firms and 22 options.

A newly formed leasing arm of the Russian Technologies (Rostechnologii),

added to the MS-21's show success. Aviacapital-Service placed order for 50 firms (35 MS-21-300 and 15 MS-21-200) and 35 options. Deliveries are due in 2017-2022. The deal is valued at US$3.8billion. The engines are said to be a mix of PW1400G and Russia's PD-14s. While the next generation of the Russian narrow bodies did well at MAKS'2011, the current one did not. The Tu-204SM 210-seater debuted at the show, with first and second (flown for the first time a week before the show opening) prototypes on display. But it generated little interest and continues in the search for a launch customer.

Sukhoi landed three deals. Gazprom Komplekt acting on behalf of the Russian fossil fuel giant firmed up order for 10 SSJ100 in "95LR" version, amounting to US$323 million by sticker prices. These airplanes are intended for Gazpromavia corporate carrier. Second deal was with Indonesia's PT Sky Aviation for the purchase of 12 SSJ100s in "95B" version worth US$379million. Finally, VEB Leasing, a leasing arm to one of the Kremlin's cornerstone financial institutions, undertook obligation to structure the financial side of the earlier announced purchase of 24 SSJ100s by UTair, the respective transaction estimated at US$761million. Furthermore, Aviotech of India declared its intent to order ten airplanes with option for ten more in VIP configuration.

On 25 August Aeroflot accepted its second Sukhoi Superjet 100 (SSJ100), msn97010, from Sukhoi Civil Aircraft (SCAC) via VEB Leasing lessor, with intent to use it on revenue passenger services starting on 27 August. The airplane is named after pilot Dmitry Ozerski. Initially, the msn 97010 will be used on Moscow – St. Petersburg route and, starting on 2 September, will commence service to add Astrakhan. Aeroflot SSJ100s feature two-class cabin for 87 passengers, including 12 business travelers, and can cover a distance of 2,300km. The airline ordered 30 SSJ100s and negotiates follow-on deal for ten more.

"Aeroflot was the first Russian airline to operate SSJ100", Vitaly Saveliev said on this occasion. "These airplanes are becoming an import element in our fleet, helping us stay with the most modern and technically advanced fleet in the whole of Europe. We use the SS100 primarily on domestic services in a hope this type would help us maintain our leadership in that market sector. The SSJ100 demonstrates a large potential. The first airplane has showed itself well on our domestic services. We are going to place it on international routes soon".

The Russian flag carrier's first SSJ100 was accepted on 16 June and since then has been flying from Moscow to St. Petersburg, Nizhny Novgorod, Ekaterinbourg and Ufa. In the first calendar month of operations, Aeroflot's SSJ100 logged 101 FH in 60 flights. Due to technical reasons, it was flight-ready 17 days in its first month. The airplane got grounded for 12 days in July following an in-flight malfunction of air conditioning system. In second half of July Aeroflot resumed SSJ100 flights, performing up to 4 round trips daily. By MAKS'2011 opening the airplane logged 139 flights lasting 227.5 hours.

During the show Aeroflot initiated leaks about its ongoing negotiations with Russia's United Aircraft on purchase of 12 An-148s. The deal valued at US$0.3billion is to be sealed by the year-end. This shall help Aeroflot general director Vitaly Saveliev fulfill his pledges to prime-minister Vladimir Putin. The prime-minister demands that the Russian flag carrier buys more indigenous jets. Putin flew into MAKS site onboard his lavishly furnished Il-96-300VIP quad: four more such planes plus two An-148VIPs are being built at VASO under governmental orders, according to the plant's general director Vitaly Zubarev. Putin was present at MS-21 and SSJ100 signing ceremonies and appeared happy that his "buy Russian" urgings brought new orders to Russian airframes.

Shortly after MAKS Vitaly Saveliev said the airline will buy 126 indigenous airplanes by 2025. "Many people ask me whether Aeroflot is going to buy from Russian airframers? We already do! Aeroflot placed orders for 30 SSJ100s, of which two have been delivered and operate on our network of routes. We are going to place orders for a total of 126 indigenous airplanes by 2025". Up to 40% of the Aeroflot fleet will be made up of indigenous aircraft of the SSJ100, An-148, An-140 and MS-21 types. "The question is now whether the domestic manufacturers be able to produce that many modern airplanes", Saveliev asks instead of making a conclusion.

Vladimir Karnozov

IFC general director Alexander Roubtsov (signs) and Bombardier senior vice president Chet Fuller

BOEING: "DUOPOLY IS NO MORE"

Boeing chief forecaster said "the time of Airbus and Boeing's duopoly is over", observing the Chinese, Russian, Canadian and Brazilian manufacturers enter the market for commercial jets.

Sergei Kravchenko, Boeing president for Russia/CIS

Vice-president for marketing Randy Tinset spoke to media at MAKS'2011. He admitted that in China and Russia the local manufacturers take governmental subsidies for granted, which further complicates Boeing's market position. Furthermore, the US airframer continues to lose its market share and blames Airbus for this, since the rival enjoys "illegal subsidies" from the European governments.

Yet Boeing "will not focus on competition", and instead will continue to innovate and invest into new products with better qualities and market value, as well as advanced technologies that would help reduce manufacturing costs.

In the period of 2010 – 2030 Boeing predicts the global economy to rise with an average annual rate of 3.3% (respective figure for China is 7%, Russia and CIS 3.4%). Consequently, the number of airline passengers would grow at a rate of 4.2%, passenger traffic (in pkm) with that of 5.1% and cargo traffic 5.6%. To support this growth, the airline industry needs 33,500 new airplanes worth 4billion dollars.

Of those large regional jets account for 6% (1,980 units in total), narrow bodies for 70% (23,370), wide bodies for 22% (7,330) and super large aircraft for 2% (820). Respective figures for dollar value are 2% (70billion), 48% (1,950 billion), 43% (1,770 billion) and 7% (270 billion). At the end of the given timeframe, the world's commercial airliner fleet will list 39,530 aircraft compared to 19,410 in 2010.

Boeing president for Russia/CIS Sergei Kravchenko also spoke to the media at MAKS'2011. He said Boeing forecasters "considerably underestimated" the Russian/CIS market and had to correct it prognosis "several times", while sales of Boeing airplanes continue to run above the forecasters' expectations. In the past 12 months Boeing sold 107 new airplanes to the region, Kravchenko said. These include 16 Boeing 777s to Aeroflot in two consequent deals and 40 737NGs to UTair.

Randy Tinset acknowledged his team has recently amended Russia/CIS forecast for higher figures. He specially mentioned three things about this decision. "The economy of the region has been growing faster than our prediction was", he admitted. In particular, there is a larger demand in the narrowbody sector, he added. Lastly, the local airlines appear "really capable" of managing profitable growth of their businesses, offering better services to passengers which includes opening new routes and increasing frequencies.

As compared to Boeing's forecast figures published one year ago, the current forecast has grown by 12% in aircraft numbers and by 20billion dollars by value, up to 110billion billion. Russia/CIS is now "sixth largest" single-market in Boeing forecast. The region's GDP will grow at 3.4% annually (world's average 3.3%) and passenger numbers at 4.3% (world's average 4.2%), according to Boeing.

As of today, Boeing predict 1,080 sales to the region in 2011-2030 timeframe including 160 large regional jets, 680 narrow bodies, 200 wide bodies and 40 super large airplanes such as the 747 and A380. Respective dollar value is 10, 60, 30 and 10 billion dollars accordingly. The local fleet will grow from 1,140 currently to 1,400 in 2030, of which 820 will be replacement aircraft, 260 additional ones and 410 continuing in service.

Boeing first published its market prognosis for Russia/CIS in 2007, and since then doubled its original airplane figures for these territories. Tinset explained this by "changes in the quality and quantity of trusted data" Boeing receives from official sources and airlines. Besides, the real condition and usage of "thousands of Soviet era airplanes" were not known for Boeing in the earlier times. All this together has resulted in a major departure from the overcautious attitude to Russian fleet data that Boeing forecasters used to take. "We increased our forecast for Russia/CIS as we were getting more confidence in the data we were using", Tinset explained.

Russia/CIS will continue to be "one of the important markets, together with North America and Europe" regarding replacement aircraft, whereas fast-growing China and most of Asian territories will lead the way in procurement of new airplanes to add to their existing fleets. Out of 1,080 aircraft sales Boeing predicts in this region, Russia accounts for 75%, followed by Ukraine, Kazakhstan, Azerbaijan and Turkmenistan.

The share of Russian/CIS passengers travelling on Boeing airplanes rose from 3% in 1995 to over 30% in 2011. Today, Boeing has 24 airline customers in the region and 255 airplanes placed with them – and that is more than all other foreign manufacturers combined. These airplanes perform 750 flights, carrying 89,100 passengers daily. In the past 12 month Boeing collected 107 more orders worth 11 billion in this region. Recent sales include 16 Boeing 777s to Aeroflot in two consequent deals, 40 Boeing 737NGs to UTair and 50 more narrowbodies to other carriers, as well as an 767 to Azerbaijan.

Sergei Kravchenko insists the decision to take one of the 787 operable prototypes from flight-testing and send it to MAKS'2011 for three-day static display was influenced by the continuing importance of the local market to Boeing. "Each of these airplanes carry 22 tons of Russian titanium", Kravchenko carried out, adding that more than 2,000 Russian engineers in Boeing Moscow center and contracted engineering companies took part in the design process. Boeing has already completed cooperation programs with the Russian industry worth 6billion dollars.

Boeing is going to invest 27billion dollars into Russian programs over "next decades", Kravchenko stated. Of those 18billion will be spent on purchase of Russian titanium and development of new technologies, such as those Boeing developed together with TsAGI on use of advanced composite materials in the 787 airframe. Further 5billion will go for services that various Russian organizations offer on aircraft development (in cooperation with Boeing Moscow design center) and scientific research, as well as on purchase of software from Russian programmers. The remaining 4billion is scheduled for various space projects such as those related to the International Space Station (ISS), and related services.

Today, about 40% of Boeing needs in titanium are met by Russian suppliers compared to 60% for Airbus, another major importer of Russian titanium for commercial aircraft production.

Certification for the Boeing 747-8I super large airplane is expected by the end of this, with less than 200 flight hours left to be made as of MAKS time. Timely certification shall enable entry in service with Continental at the year-end. The 787 on display at MAKS'2011 amassed 1,300 flight hours (FH) out of over 4,100 for all operable prototypes. A total of 90 pilots have so far flown the Dreamliner. It was also stated the 737NG+ (more recently renamed into the Boeing 737 Max) offers 10-12% advantage in operational economics in relation to the Airbus competition.

Boeing further said it does not cooperate with United Aircraft on composite materials but does work with various Russian scientific institutes and engineering firms on the subject. Boeing cooperates with 17 Russian scientific establishments in 8 regions of Russia. Besides, it is in the process of opening its engineering office in Kiev, the capital of Ukraine. Moscow office employs 1,200 Russian engineers (their total number comes to 2,000 with contracted engineering firms taken into account). Boeing trained/qualified over 5,000 Russian engineers during all time the Moscow engineering center has been operational since late 1990s.

Vladimir Karnozov

Dreamliner crew station

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