

RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of Industrial Weekly

№ 05 (12) June, 2017

Putin and Macron

*Historic meeting
between the two leaders*



FSMTS of Russia

*Main regulator
of the military export*



New Horizons

*SSJ100 aircraft in
business configuration*



World exclusive

*Unique system for rescue
from any height*



Russian innovations on the global aviation market





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Russian Aviation Military Guide

#05 (12) June, 2017

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CONTENTS

NEWS SHORTLY

- 2 Helicopter to Kenya
- 2 Ka-52 Alligator
- 4 Ka-62: first flight
- 4 Mi-171E to Pakistan
- 6 Medevac helicopter
- 6 The global market
- 8 VEB Group invests to MC-21
- 8 Service center in Azerbaijan
- 9 New Russian Aviation at Paris Air Show

MAIN TOPICS

- 10 Vladimir Putin and Emmanuel Macron

EXPORT REGULATION

- 16 FSMTC of Russia

DEVELOPMENT STRATEGY

- 20 The Historical Day

INTERNATIONAL COOPERATION

- 26 CRAIC was established

THE BEST TECHNOLOGIES

- 28 Sukhoi Business Jet - New Horizons

OFFERS AND PROGRAMS

- 34 The first Ansat in Mexico
- 35 Aviation jobs in Peru
- 36 In honor of Robert Bartini
- 37 'GK Launch Services'

WORLD PREMIER

- 38 'Russian Knights'

FORUMS AND EXHIBITIONS

- 42 Aviation cluster of Forum 'Army-2017'

WORLD EXCLUSIVE

- 44 Secure rescue at any height

EDITORIAL



Russian technologies: principals and prospects

The cooperation of Russian aviation industry with other countries including West Europe never stopped and now receives good new impulse. Experience in the supply of Russian aviation technology to the different countries confirms its high quality and reliability. Today efficiency and reliability are the main criteria. This is especially important given the difficult situation on the world stage and many problems around topics of safety.

It is necessary to remember that local conflicts may evolve into global ones, failure of worldwide system safety and non-ending crisis — all of this leads to an unstable and dangerous situation. Together with developing of aviation technologies in order to secure people's safety, we see global rivalry among sellers of aircraft, weapons and defense systems. This process increases in order to achieve such goals as increasing profits and market share. It is a real picture of our day.

World experience shows that it is no global main — how many aviation and weapon you have, but quality and possibilities of every single one of them. Other significant factor is technological independence from seller — modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hi-tech technology, solid after-sales service and proven reliability of products, Russia is honest and friendly partner for many countries, ready for mutual work. At the International Paris Air Show Russia again presents their best new aviation technologies, strategic program and investment prospects.

Valeriy Stolnikov

NAVAL AVIATION

Tactical flight exercise have been in Kaliningrad region with mixed helicopter squadron of the Naval Aviation of the Baltic fleet. More than 10 crews of attack and military-transport helicopters Mi-24 and Mi-8 of the naval aviation of the Baltic fleet took part in this exercises. Pilots of attack and military-transport helicopters Mi-24 and Mi-8 performed more than 20 planned sorties will produce dozens of launches of unguided missiles and bombings, and more than 500 shots from air guns. They fulfilled the elements of simple and complex piloting in the conditions of air combat, action in the composition of units in joint maneuvering and approaching the target, fulfilled the task of fire support of the naval strike groups and units of coastal troops of the Baltic fleet. The ground services specialists performed the complex task of maintaining a stable radio communication, radar control of aviation on the specified routes, issuing radar information on the points of command and control, and preparation of the runway, refueling helicopters, and implementation of masking of aircraft and ground support equipment.

AVIATION EXERCISE IN THE VORONEZH REGION

Crews of operational-tactical aviation of the Western military district made a massive missile and bomb strikes on the facilities of the conditional enemy in the Voronezh region during bilateral exercises of the Air Defense Forces and the aviation of the district. In total, the pilots spent in the air more than three hours, made about 50 test launches of rockets of class 'air-surface' and 'air-air', hitting more than 20 objects of the conditional opponent. The bilateral exercise involved more than 300 servicemen and involved about 150 pieces of weapons, aircraft, military and special equipment.

AVIATION PILOTS IN THE ARCTIC ZONE

The pilots of the formation of the army aviation of the Eastern MD went on duty in the Arctic zone of responsibility of the district. The crew of the transport helicopter Mi-26 made a flight lasting more than 4 thousand kilometers from Khabarovsk to Anadyr airport in Chukotka with several landings on the Kuril Islands. Within a few months they will perform tasks for the delivery of troops and cargo to remote Arctic garrisons by the military-transport helicopter Mi-26. In addition, there will be the delivery of food to the Arctic locations and conduction of a planned rotation of personnel, carrying on combat duty at Cape Schmidt and Wrangel island.

Helicopter to Kenya

Russian Helicopters Holding has completed the delivery of Mi-17V-5 utility helicopter for the Ministry of Interior and Coordination of National Government of the Republic of Kenya. The helicopter was produced at the facilities of PJSC 'Kazan Helicopters'.

A ceremonial transfer of the helicopter has been performed in the capital of Kenya, Nairobi, in the presence of the Minister of the Interior of Kenya. In accordance with the contract, 'Russian Helicopters' has also performed training of the Customer's specialists in addition to the delivery of the helicopter. The helicopter will serve the needs of the National Police of the Republic of Kenya.

'We have successfully completed the contract for the delivery of the first helicopter to Kenya. Currently, the total fleet of the Russian-made helicopters in the African countries exceeds 700 units and requires grad-

ual renewal. Russian-made helicopters have shown excellent performance when implementing the widest scope of missions in the African continent. We count on the further fruitful cooperation,' Alexander Scherbinin, Deputy Director General for Marketing and Business Development of Russian Helicopters Holding Company, noted.

The African countries have traditionally been one of the largest operators of Russian-made helicopters. Mi-8/17 type helicopters proposed to African customers are primarily used in civil aviation — for cargo, passenger and VIP transportation. High



flight and technical performance, reliability, capability to operate in a wide range of conditions and temperatures, multi-mission capability, easy operability and maintainability make Russian-made helicopters one of the best offers for the African market.

Ka-52 Alligator

Progress Arsenyev Aviation Company has produced this year's first Ka-52 Alligator — a reconnaissance and combat helicopter. The helicopter built at Progress has already successfully and fully completed all ground and flight tests required by the technical terms and conditions of the government contract. Several more rotorcraft bodies of the new helicopters are at their final assembly point at Arsenyev. Another batch of Ka-52 helicopters will be transferred to their operators.

The first batch of Alligators scheduled for delivery in 2017 per government contract terms was transferred to the Russian Ministry of Defense ahead of schedule in December of last year. In 2017, production of these helicopters will be more than doubled as some will be headed overseas. The first experimental unit for a foreign customer has already been assembled and is successfully passing all tests as planned.

'We took all necessary organizational and technological steps at Progress to expand production in view of the forthcoming volume increase. Today, the plant is ready to produce world-class Ka-52 helicopters in a timely manner, for the Ministry of Defense, as well as for foreign customers,' said Russian Helicopters Deputy CEO for Sales Vladislav Savelyev.

The reconnaissance and combat Ka-52 Alligator rotorcraft has been



produced for the needs of the Russian Federation's Ministry of Defense since 2010. The helicopter is designed to destroy tanks, armored and non-armored military equipment, ground targets, and enemy troops and helicopters both on the front line and in tactical reserves, in all weather conditions and at any time of the day.

The helicopter is equipped with the latest avionics and powerful

weapon systems, which can be configured for a variety of combat missions. The Alligator's coaxial rotors and increased pitch power control allow to effectively maneuver and perform complex aerobatics. In addition, the Ka-52 Alligator is equipped with electronic and active counter measures and signature control devices that reduce, scatter and distort the engine heat wake.

Organizer:

MINISTRY OF DEFENCE
OF THE RUSSIAN FEDERATION

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FORUM "ARMY-2017"**

Location

Exhibition operator

PATRIOT
EXPO

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'PENICILLIN' FROM RUSELECTRONICS

The holding company Ruselectronics has announced that the advanced artillery reconnaissance system 'Penicillin' would go into production in less than two years' time, with state trials expected to wrap up soon. The new system is able to pinpoint the location of enemy artillery less than five seconds after firing. In a press release Ruselectronics confirmed that mass production of the new artillery reconnaissance system would begin in early 2019. The St. Petersburg-based Vector Research Institute, part of the company, is tasked with developing the system. 'Penicillin' can detect the firing positions of enemy artillery, mortars, MLRS (multiple launch rocket systems), anti-aircraft and tactical missiles, and adjust artillery fire. During this 'Penicillin' works at safe distances away from the enemy, and can operate in automatic mode, without a human operator. This allows for precise artillery reconnaissance without risking the lives of army personnel.

NEW WIDE-BODY IL-96-400M

Passenger IL-96-400M aircraft was demonstrated at flight conference organized by Federal Air Transport Agency of Russia, where the negotiations on development of new wide-body passenger IL-96-400M aircraft were held. Representatives of Federal Air Transport Agency of Russia, Ilyushin Aviation Complex, 'UAC' PJSC, the State Scientific Research Institute of Civil Aviation, 'Aviadvigatel' JSC, and other Russian aviation companies took part in the given conference. According to General Designer of 'IL' JSC, Nikolay Talikov, wide-body long-range passenger IL-96-400M aircraft is being developed based on serial certified IL-96-300 aircraft for the purpose of further advancement of the given-type aircraft and enhancement of their transport capacity due to fuselage extension and installation of more powerful PS-90A1 engines instead of PS-90A ones. The aircraft ensures capacity of 400 passengers depending on the configuration used. Among the main features of the aircraft under development are installation of state-of-the-art indigenous flight navigation equipment ensuring flights as per all the navigation certificates, as well as modern passenger compartment ensuring comfortable passenger conditions enroute. We expect IL-96-400M aircraft to be serial manufactured at Voronezh Aviation Enterprise in 2020, Nikolay Talikov said. The further negotiations were marked with the issues on subsequent advancement of the power plant and IL-96-400M aircraft lease.

Ka-62: first flight

On May 25, a flight model of the newest Ka-62 helicopter made its first flight at the flight-test center of Progress Arsenyev Aviation Company, a Russian Helicopters subsidiary, part of State Corporation Rostec.



After completing all updates during ground races and hovering flights, the Ka-62 flight model made a 15-minute orbit flight at the speed of 110 kmph, as specified in the test program.

Test pilots of the leading developer of the Ka-62, Kamov Design Bureau, made an assessment of the helicopter's general performance and checked the operation of its primary power supply system, airborne equipment, and a power unit.

'Today's flight tests showed that we have successfully finished all necessary updates of the pre-production stage based on the results of the preceding steps of the program aimed at commissioning of the helicopter. In particular, we have checked the helicopter stability and controllability, as well as its main systems and assemblies,' said Russian Helicopters CEO Andrey Boginsky.

The Ka-62 flight model made its first takeoff in April of last year. Under

the commissioning program, Progress Arsenyev Aviation Company and Kamov Design Bureau specialists have been gradually running more and more complicated tests of the flight model to check its systems and equipment more thoroughly. Once the tests under this program are finished, the helicopter will participate in preliminary, and then in certification ground and flight tests. As of today, the company has produced several more Ka-62 experimental models.

The Ka-62's specific feature is a wide use of modern materials in its design including polymer composites, high-tensile aluminum, titanium alloys and steel. The volume of components made from polymer composites takes up to 60% of the helicopter's weight, which decreases its total weight when empty, and, consequently, boosts its speed, maneuverability and lifting capacity, as well as decreases fuel consumption. The helicopter airframe is

notable for its aerodynamic bodylines, spacious transport and passenger cabin and a three-post tailwheel landing gear.

Its other features include is a single-rotor design with a multi-blade anti-torque rotor ducted into the vertical tail fin. The helicopter has a five-bladed main rotor, two hydraulic systems, heavy-duty wheeled landing gear, wreck-resistant fuel system and a unique bird-resistant transparency.

The Ka-62 helicopter is designed for passenger transportation, offshore work, urgent medical aid, search-and-rescue operations, transportation of cargo in its cabin or sling-loaded, patrolling and ecological monitoring. Due to its high service ceiling and high engine power-to-weight ratio, the Ka-62 is also capable of performing search-and-rescue and evacuation operations in mountainous areas.

Mi-171E to Pakistan

Russian Helicopters handed over a civilian multirole helicopter Mi-171E to the Punjab province government of the Republic of Pakistan. The helicopter was manufactured at Ulan-Ude Aviation Plant and has already been accepted by the customer's representatives. The rotorcraft will be delivered to its destination by air transport.



Under the terms of the contract, the helicopter is manufactured in an easily convertible version, which will allow it to be used both in a transport mode and in a VIP configuration allowing to take 13 passengers on board accompanied by a flight attendant. In the transport configuration, the Mi-171E can carry up to 27 passengers in folding seats and up to 4 tons of cargo inside the cargo cabin or on an external sling. 'Russian Helicopters is expanding its supply markets for the world famous Russian aircraft. Among our customers there are more civil operators now, in particular from South Asia. Each helicopter is unique, and

the execution is maximally aimed at effective solution of tasks for buyers,' said Russian Helicopters Deputy CEO for Marketing and Business Development Alexander Shcherbinin. It is expected that the leadership of the Punjab province will use the Mi-171E multirole helicopter for passenger and cargo transportation, sanitary tasks, patrolling and emergency situations. The scope of application of this helicopter is further expanded by installing a set of search and rescue equipment - the LPG-150 winches and the TSL-1600 searchlight. Increased safety is ensured by installation of a ground proximity warning system (SRPBZ).

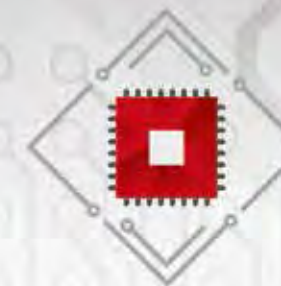
In January 2017, Russian Helicopters became the winner of an international tender and signed a contract with the government of the province of Baluchistan (Republic of Pakistan) for the supply of a civil Mi-171 helicopter. Helicopters of the Mi-8/17 family are manufactured today at Ulan-Ude Aviation Plant and Kazan Helicopter Plant, the subsidiaries of Russian Helicopters. As of 2014, more than 12,000 such machines were produced, which is a record number in the world among twin-engine helicopters. They were delivered to more than 100 countries and their total flying time is about 100 million hours.

As part of the International military-technical forum "ARMY-2017"



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- Test, measuring and diagnostic equipment
- Materials
- Electronic components and modules
- Additive technologies
- Energy
- Building technologies
- Industrial design
- Personnel training
- Specialized Innovation Club exhibition

Location:



Official partners:



Organizer:



YAK-130 TO THE MYANMAR

Myanmar has taken delivery of an initial batch of three Yakovlev Yak-130 'Mitten' advanced jet trainer/light-attack aircraft from Russia, senior Russian defence industry officials told at the LIMA 2017 exhibition in Langkawi. Officials would not confirm how many Yak-130 aircraft have been ordered by Myanmar but said that while the first batch was delivered in late 2016, deliveries of subsequent batches of the aircraft will continue through to 2018. They added that they expect Myanmar to order additional batches of the aircraft in the future. Confirming the development, Viktor Kladov, the director for international co-operation and regional policy of the Rostec State Corporation, told, 'We have delivered a few aircraft to the Myanmar Air Force (MAF), and they liked it so much they want to buy more.'

UNMANNED TILTROTOR

Russian Helicopters, part of State Corporation Rostec, showed a prototype of an unmanned tiltrotor created by VR-Technologies design bureau, at the 10th International Helicopter Industry Exhibition HeliRussia-2017.

The prototype of the UAV was first shown at the Army-2016 International Military Technical Forum in September 2016, after subsequently the tiltrotor was retrofitted with a control system for rotary power units and tested at semi-simulation stands. Flying and hovering tests in a copter mode have been fully completed, and automatic control systems are being tested at a stand for flights in the airplane mode. The first stage of the tests will be completed within two months. As a result, the UAV will be finalized — it will be equipped with a hybrid power unit, which will increase its flight range and duration.

'In the future, the unmanned tiltrotor will be used for remote monitoring and diagnostics of various objects, for transporting small loads to hard-to-reach places, as well as for geodetic and cartographic work. Currently, negotiations are underway with operators of the Northern Sea Route, oil and gas pipelines and power lines. Moreover, the technical concept of the UAV was developed in coordination with these companies,' said the CEO of VR-Technologies Alexander Okhonko.

By the fourth quarter of 2017 the tiltrotor will enter the second stage of testing, during which it will be tested in various flight modes, weather conditions and target payload elements. Mass production is tentatively scheduled for the end of 2018.

Medevac helicopter

At the 10th International Helicopter Industry Exhibition HeliRussia 2017 Russian Helicopters delivered the first of six Ansat medevac helicopters to State Transport Leasing Company

The contract to supply six multirole Ansats in medevac mode to State Transport Leasing Company was signed at the end of 2016. The agreement additionally provides for the supply of 10 Mi-8NTV-1 helicopters and 13 Mi-8AMT helicopters; per the agreement, all rotorcraft has to be delivered before the end of 2017.

The helicopters will be used in the implementation of a project aimed at timely emergency medical response to assist people living in hard-to-access areas of Russian Federation, which was approved by the Presidential Council of the Russian Federation for strategic development and priority projects.

'As part of HeliRussia-2017, we have officially transferred the first of six Ansat medevac helicopters stipulated in the contract to our colleagues from State Transport Leasing Company. RVS company, which will provide air medical ser-

vices in the Volgograd Region, will become the operator of the helicopter. In the near future, the helicopter will start performing its main task — saving human lives, and our holding company, in its turn, will exert best efforts to develop and expand medical aviation fleet in Russia,' said Russian Helicopters CEO Andrey Boginsky.

Ansat is a light twin-engine multirole helicopter with a hydro-mechanical flight control system. In May 2015, the modification with a medical module was certified. It complies with all international standards for medical aviation and allows to save a patient's life during transporting to a hospital.

The medevac Ansat has a number of competitive advantages over rivals in its class. First of all, it requires less operational, training and maintenance expenses. In addition, it can maintain high speed, which allows to use it for long-range trips.



According to the helicopter certificate, its design allows to convert it into a cargo version or into a passenger rotorcraft that can lift up to seven people, in just one hour.

The Ministry of Health of the Republic of Tatarstan became the first operator of a medevac Ansat; the rotorcraft was produced at Kazan Helicopters. The helicopter, which is intended for medevac tasks and onboard emergency medical response, was transferred to the Republican Clinical Hospital for emergency medical evacuation and transporting injured people.

The global market

Russian Helicopters holding intends to supply more than 150 combat helicopters abroad in 2016-2018 through Rosoboronexport. Under the effective contracts, it is planned to deliver more than 50 combat helicopters through Rosoboronexport to foreign countries in 2017. At that, deliveries will nearly double in 2018 as compared to the volume in 2013.

'From 2016 to 2018, a total of more than 150 combat helicopters will be produced and delivered to foreign customers,' says the holding's press office report. The program is intended to increase the export volume of combat and multipurpose helicopters. Specialists of both parties will analyze foreign markets and hold a range of marketing activities, including a series of meetings with potential clients and helicopter presentations.

'We note a surge in external demand for helicopter production. In spite of significant growth of the order

portfolio of combat helicopters produced by Russian Helicopters holding, we have not yet fully realized our capability of export supplies of combat equipment. Russian Helicopters has substantial potential in designing, manufacturing and modernization of export-orientated helicopters. We are mainly talking about promotion of Russian combat, transport-combat, multipurpose and training helicopters to markets in the Middle East, Latin America and South Asia,' said the representative of the company.

Russian Helicopters is a world leader in the helicopter



industry, and the only helicopter designer and manufacturer in Russia. The holding consists of five helicopter plants, two design offices, as well as enterprises involved in the production and maintenance of components, aircraft repair plants and a service company that provides aftersales support in Russia and overseas.

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IRKUT CORPORATION ON 2016

Irkut Corporation (UAC member) issued consolidated financial statements according to International Financial Reporting Standards (IFRS) for 2016. In the reporting year, Irkut Corporation's revenue increased by 17%, reaching almost 1.624 bln US\$ against 1.386 bln US\$ in 2015. The growth was achieved mainly due to 62% increase in export proceeds. The gross margin in 2016 was 28% compared to 16% in 2015. The profit from operating activities in 2016 exceeded 121 mln US\$, which completely covered the Corporation's borrowing costs. The net profit of the Corporation by the results of 2016 amounted to 18.219 mln US\$. The net profit for 2016 exceeded 1.1%. Irkut Corporation carries out serial production of Su-30SM and Su-30MK multirole fighters, developing Yak-130 combat-trainer, testing new Yak-152 primary trainer aircraft. Being the prime contractor, Irkut Corporation develops the family of MC-21 commercial short/mid range airliners.

DMITRY MEDVEDEV AND FANG LIU

1 May in Gorky (Moscow Region) Russian prime minister Dmitry Medvedev meets with Secretary General of the International Civil Aviation Organization (ICAO) Fang Liu. At the meeting Dmitry Medvedev said: 'We cooperate with ICAO and consider it a very important international venue for resolving issues related to developing air transport and civil aviation. Of course, your visit, your talks with my colleagues that deal with these issues and your participation in the St Petersburg International Economic Forum will promote ICAO's reputation and help enhance aviation security on both international and domestic routes because in its activities the Russian Federation is guided not only by its national laws but also by international conventions and a wide range of international decisions on air traffic and its security.'

Fang Liu said: 'I believe ICAO's participation in SPIEF will be useful for all of its participants and will promote the sustainable and safe development of international civil aviation. As you have just said, ICAO is indeed an important international venue, a UN body dealing with international transport development. You are an important partner for us as a member the ICAO Council and a major power developing civil aviation.'

VEB Group invests to MC-21

The VEB Group has invested US\$ 90 mln in creating the first Russian MS-21 narrow body passenger aircraft. A part of this amount has been made available as a prepayment for future aircraft, said Sergey Gorkov, Chairman of Vnesheconombank.

The maiden flight of the new MC-21-300 passenger aircraft took place on Sunday, May 28, with all systems operating normally. According to the program, the aircraft simulated a landing approach with a subsequent flight over, scramble and turn. This technique is a typical maneuver for the first flight of new types of aircraft.

'We are proud of our contribution to this project and whole-heartedly congratulate our colleagues from the Irkut Corporation. Our subsidiary, VEB Leasing, has ordered 30 machines. For the VEB Group the participation in the MS-21 project means not only

funding the creation of the new aerial vessel, but also assistance in establishing a sophisticated infrastructure, manufacturing facilities, and sale and after-sale servicing system,' Sergey Gorkov said.

The Irkut Corporation is creating a family of passenger MS-21 short- and medium haul liners. The share of components from foreign suppliers in the MA-21 does not exceed 40%. The MS-21 prototype is powered by PW1400G engines built by the USA's Pratt & Whitney Company. Aircraft designers plan to use an alternative power unit in follow-on models, the



Russian-made PD-14 engine. The bulk of the aircraft onboard instruments will be manufactured by the Radioelektronniye Tekhnologii (radio-electronic technologies) Concern (KRET). Depending on the model, the new airliners will seat 150 to 211 passengers. The basic version of the aircraft is MS-21-300, with a seating capacity of 180 to 200. Starting from 2020, Irkut plans to build 20 MS-21s each year, and from 2023 up to 70 machines a year.

Service center in Azerbaijan

Russian Helicopters, Azerbaijan Airlines and Silk Way Group has held talks on setting up a helicopter service center in Azerbaijan. Russian Helicopters CEO Andrey Boginsky, president of ZAO Azerbaijan Airlines Jahangir Askerov, president of Silk Way Group Zaur Akhundov, and CEO of Silk Way Helicopter Services Azer Sultanov took part in the negotiations.

Following the decision of the 16th session of the Intergovernmental Commission on Economic Cooperation between Azerbaijan and Russia, the parties confirmed their mutual interest in the project aimed at the creation of a service center for maintenance and repairs of the Russian/Soviet-built civilian and military helicopters in Azerbaijan.

Joint work on the project started in 2016. At ADEX-2016 International Defence Exhibition, Russian Helicopters and Azerbaijan's Silk Way Helicopter Services reached an agreement to open a service center for maintenance and overhaul of Russian-made Mi-8/17 type helicopters in Azerbaijan. In order to implement the deal, at the beginning of this year Russian and Azerbaijani specialists looked into a possibility to open the center at Heydar Aliyev International Airport.

To continue work started at the 10th International Helicopter Industry Exhibition HeliRussia-2017,



the heads of Russian Helicopters and Azerbaijan Airlines signed a document called 'Key action plan to organize a service center for maintenance and repair of Russian/Soviet-made civilian helicopters in the Azerbaijan Republic'.

'Azerbaijan is our traditional partner; this country has vast experience using Russian helicopters. With this in mind, opening a service center for Russian/Soviet helicopters in Azerbaijan seems of vital importance.

We have agreed with our partners on the relevance of the project and expect to sign requisite agreements and contractual documents until the end of summer,' said Russian Helicopters CEO Andrey Boginsky after the negotiations.

Currently, Azerbaijan operates a large fleet of Russian-made helicopters, including the Mi-8/17 type medium multirole helicopters and the Mi-24 and Mi-35M attack helicopters.

NEW RUSSIAN AVIATION AT PARIS AIR SHOW

Rosoboronexport, a member of Rostec, is bringing all Russian latest aircraft and helicopters to the International Paris Air Show 2017. The Russian delegation is led by Director Dmitry Shugayev of the Russian Federal Service for Military and Technical Cooperation. Vladimir Artyakov is named the head of the joint Rostec-Rosoboronexport delegation, while Rosoboronexport's team is entrusted to Sergey Kornev in charge of the company's AF Special Equipment and Service Export Department.

The Russian aviation equipment that Rosoboronexport is putting on display in Le Bourget is superior to its foreign counterparts in terms of cost-effectiveness, as well as capability of operating in the most complex environments and severe climatic condition. Attesting to this is the company's backlog worth \$19 bln,' says Sergey Kornev.

Rosoboronexport is setting up a joint Russian display covering a total area of 1,000 m2. Combining efforts of 15 defense companies, this will accommodate about 200 pieces of AF and AD equipment. Visitors of Rosoboronexport's booth C198 in Pavilion 2A will see 180-plus military products.

According to Rosoboronexport's specialists, of all combat aircraft brought to Le Bourget the most promising future on the world market is facing the MiG-29M/M2 multi-role fighter, Su-35 multi-role supermaneuverable fighter, Su-30MK series aircraft, and Yak-130 combat-trainer.

Among helicopters the highest export potential belongs to the Ka-52 scout-attack gunship, Mi-28NE attack

helicopter, Mi-35 attack helicopter with troop carrying capacity, Ka-226T light multi-purpose day-and-night helicopter, and Mi-26T2 heavy transport.

Also, Rosoboronexport is bringing modern Russian AD systems, namely the Antey-2500 SAM system, Buk-M2E SAM systems, Pantsir-S1 gun-missile system, and Verba man portable AD system. The Takhion and Orlan UAV systems are expected to gather crowds of foreign visitors as well.

Another noteworthy Rosoboronexport's exhibit is the full-scale specimen of the LINS-100RS inertial navigation system. Being a joint product of the Russian and French specialists, the system is designed for retrofitting older designs and equipping aircraft developed from scratch, including fifth generation fighters.

Most of the exhibits have been deployed in combat, where they proved to be reliable, high-quality, and trouble-free. 'The interest of foreign customers to modern Russian aviation equipment has been piqued by its performance demonstrated by the Russian Aerospace Force in Syria when it deployed precision air-launched weapons, as well as capa-

bility to deliver attacks far from the home bases within a wide range of altitudes and speeds. These are the most valuable features appreciated on the world market of combat aviation,' explains Sergey Kornev.

The special arms exporter is resolved to fulfill a rather extensive business program at the exhibition. They expect to meet government officials, representatives of the armed forces and business community of various countries, no matter what region of the world they belong to.

/RA&MG/

Rosoboronexport is the only state-owned arms trade company in the Russian Federation authorized to export the full range of military and dual-purpose products, technologies and services. It is a subsidiary of the Rostec Corporation. Founded on 4 November, 2000, now Rosoboronexport is one of the leading world arms exporters to the international market. Its share in Russia's military exports exceeds 85 percent. Rosoboronexport cooperates with more than 700 enterprises and organizations in the Russian defence industrial complex. Russia maintains military technical cooperation with more than 70 countries around the world.



VLADIMIR PUTIN AND EMMANUEL MACRON

In late May in Paris, the President of Russia Vladimir Putin met with the new President of France Emmanuel Macron. Evaluate the meeting as very constructive and promising. France and Russia continue to cooperate, and the differences in some positions are not a fundamental obstacle. Following bilateral talks, Vladimir Putin and Emmanuel Macron held a joint news conference.

On the beginning of the press conference President of France Emmanuel Macron said: 'First of all, I would like to thank President Putin for accepting the invitation which I extended to him during our telephone conversa-

tion some time after I took office. I invited him to come to this symbolic place, where today we celebrate the 300th anniversary, almost to the day, of Peter the Great's visit to France. The Russian tsar arrived in France to better understand the secrets of the kingdom, which stunned the world.

During the visit, which lasted several weeks, Peter the Great spent several days at Versailles, which already then represented the pinnacle of arts and technology, and where the ideals professed by Enlightenment figures and the genius of the spirit of that era were already beginning to

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Emmanuel Macron

emerge in the early 18th century. It was in Versailles that Peter the Great met with engineers, writers, and archivists. As we know from history, he returned to Russia some time later with new ideas and beliefs, as well as sketches (which we will see together in a short while), with a great desire to modernize your country. He was elected Honorary Member of the Royal Academy of Sciences, which was a source of inspiration for him.

Peter the Great is a symbol of the Russia that wanted to become open to Europe and borrow from Europe the things that made it great and strong. We have just talked about this during our discussion. What is particularly important about this story, which is now three centuries old, is the dialogue between Russia and

France that never stopped, the dialogue between our intellectuals and our cultures, which sowed the seeds of the friendship that has lasted to this day. This dialogue is marked by our outstanding thinkers, artists and statesmen.

You will see a sketch of the monument to Peter the Great, with which you are familiar, Mr. President, since you were born in that beautiful city which is dear to you. This is the statue that became the pride of St Petersburg, your beloved city.

This Russia that is open to Europe, and this Franco-Russian friendship is what I wanted to share with you by inviting you here, to Versailles. This was the basis of our discussion today. This history transcends us and has cemented Franco-Russian friendship.





'The ties between Russia and France did not begin with this visit however, but go back much deeper in time. The educated French public is familiar with Anna of Rus, Queen of France. She was the youngest daughter of Yaroslav the Wise, married Henri I and made a substantial contribution to France's development as one of the founders of at least two European dynasties, the Bourbons and the Valois. One of these dynasties is on the throne to this day in Spain.'

Vladimir Putin

During the presidential election, France made a sovereign affirmation of its commitment to independence, its European choice and its desire to influence the fate of the world. None of the major challenges these days can be tackled without a dialogue with Russia.

This is exactly why I wanted to discuss together — as indeed we did during our lengthy conversation — a range of issues related to the present and future of our countries. I had the opportunity to discuss some important issues with President Putin. I reminded him of our priorities in Syria. And I think we will be able to work together in this direction — at any rate, this is my wish for the upcoming weeks.

Our absolute priority is the fight against terrorism and destruction of terrorist groups, primarily, ISIS. This is the guiding light of our actions in Syria. Apart from the efforts within the coalition, I would like to strengthen our partnership with Russia.

I would also want us to arrange a democratic transition while preserving the Syrian state. I believe that the dysfunctional states in this region

weapons will trigger an immediate response — from France, at least. My hope is that we exchange useful data and discuss our view of the situation on the ground.

Moreover, France will carefully monitor humanitarian access to civilians in the region and the process of evacuation across the conflict zones in the area, because during a conflict whose complexity is clear to all, innocent civilians must not become victims of our occasional collective inability to make a decision.

Based on these principles I would like to strengthen cooperation between our countries. There is also a desire to eventually find an inclusive political solution that would eradicate terrorism and restore peace in Syria.

Regarding the situation in Ukraine, we spoke about different details and the implementation of the so-called Minsk Agreements. We would like — and I hope President Putin will confirm what I say — to see regular talks in the Normandy format in the near future, including Germany and Ukraine, as well as a complete summary of their results. We would like

to hear a detailed OSCE report in the Normandy format on structural elements of the current developments in the region.

This process should continue in this direction and we exchanged views on this issue. I then said that, for my part, I would like us to de-escalate this conflict and its consequences on both sides as part of the Minsk process.

More broadly, we expressed the desire to make contacts between our civil societies more open and active to promote closer ties and constructive dialogue, like the current exchanges between France and Russia aimed at allowing young people, economic bodies, and academics and thinkers to engage in dialogue and become closer in order to overcome all kinds of miscommunication.

We would like to organise a Franco-Russian civil society forum. We will do this and call it the Trianon Dialogue in reference to the exhibition that we will visit in a couple of minutes. This will allow representatives of civil society and the academic community as well as the younger generation to work together more

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Emmanuel Macron

closely. As for bilateral relations, I would like us to continue and intensify them.

As part of our cultural cooperation, important exhibitions took place last year, one organized by the Louis Vuitton Foundation together with the Hermitage and the Pushkin Museum. I would like artists, musicians, writers and academics to work in the best conditions, therefore our ministers of culture will work on the corresponding roadmap.

President of Russia Vladimir Putin noted in his response statement: 'I would also like to thank President Macron for inviting me to come to

this wonderful corner of France, to Versailles, which I have never visited before. It is definitely an impressive place that speaks of France's grandeur and its long history, which plays a substantial part in the ties our two countries share. This is reflected in the exhibition we are about to visit, an exhibition marking the 300th anniversary of the visit to France by tsar and reformer Peter I. The ties between Russia and France did not begin with this visit however, but go back much deeper in time.

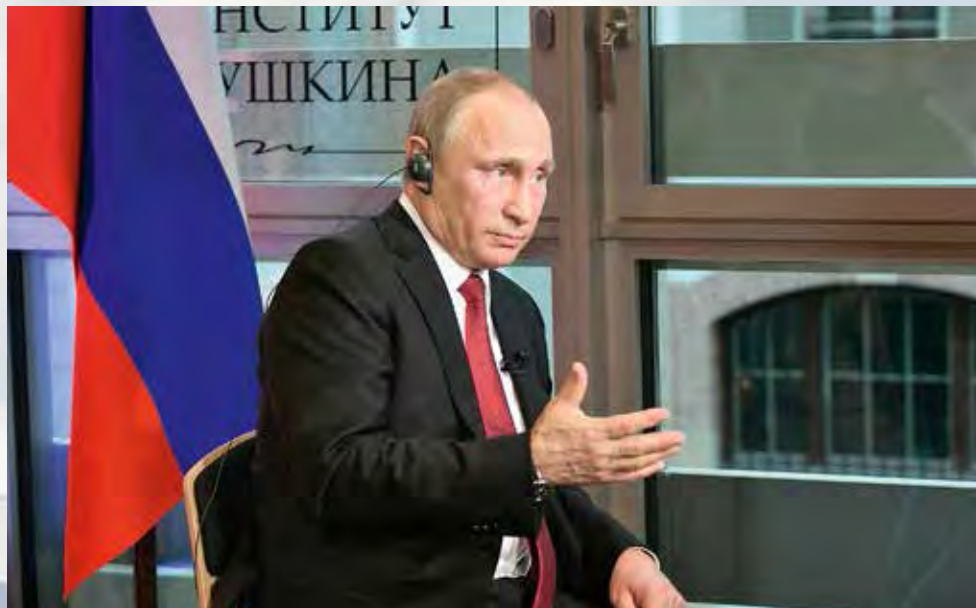
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of Yaroslav the Wise, married Henri I and made a substantial contribution to France's development as one of the founders of at least two European dynasties, the Bourbons and the Valois. One of these dynasties is on the throne to this day in Spain.

However, today, we spent more time discussing our bilateral relations and relations between Russia and the European Union. We spoke about the problem spots in the world and looked together for common approaches to resolving these complicated matters.

I believe that our countries' fundamental interests are far more impor-





tant than political considerations of the moment. The French business community understands this best and continues working actively in Russia. Let me remind you that over these past years, not a single one of the close to 500 French companies working on our market has left Russia, despite the difficulties and economic constraints. Furthermore, we see the interest our French friends show in expanding this economic cooperation. Last year, direct French investment in the Russian economy increased by \$2.5 billion. Our bilateral trade is growing too. It was up 14 percent last year, and grew by 23.7 percent in the first quarter of this year.

We discussed humanitarian cooperation in considerable depth. We spoke about the undisputed need to develop our youth exchanges. More Russian students should study in France and more French students should come to Russia to study the history, culture and languages of our countries. I noticed that President Macron has a number of people with knowledge of Russian in his entourage. I hope they are not Sovietologists, but specialists in Russia in the broad sense, encompassing our language, culture and history. This is a positive development. I hope that we will have more supporters here, more people who understand us better, are attuned to us, and with whom we can hold substantive discussions on matters of mutual interest.

The exhibition we will visit now presents priceless items from the State Hermitage Museum related to Peter the Great's visit to France in 1717. As President Macron and I noted, this visit has become a major milestone in the history of our bilateral relations, setting them on a friendly track for many years to come.

Indeed, we spoke about key bilateral issues, the economy and cultural ties. We also spoke about the Ukrainian crisis and opportunities for solving the Syrian issue. Needless to say, we did not ignore the complicated and highly dangerous situation surrounding the North Korean nuclear issue and missile programme. We are fully committed to searching for joint solutions to all these problems. Of course, these solutions must improve the situation, not make it worse.

We agreed that fighting terrorism remains a critical common challenge today. The President suggested establishing a working group and exchanging delegations between Moscow and Paris in order to develop in practical terms — and I'd like to emphasize this — cooperation in countering the terrorist threat that is extremely dangerous both for us and for the European countries, including France.

As for the Syrian issue, our position is well known and I described it for the President again. We believe it is impossible to counter the terrorist threat by destroying the statehood

of countries that are already suffering from internal problems and disputes. I am convinced that positive results can only be achieved by working together in the fight against terrorism. However, I would like to repeat that we can achieve these results only if we join efforts in practice, countering together this plague of the 20th and 21st centuries.

I would like to thank the President once again for his invitation. He mentioned that Peter the Great spent several weeks in France, but as we know, everything in the diplomatic world is built on the basis of reciprocity. I would also like to invite the President to visit Russia. I hope he will be able to spend several weeks in Moscow.'

Responding to a question about 300 years of Russian-French diplomatic relations, Vladimir Putin explained: 'You said that we are celebrating 300 years since Peter the Great's visit to France. This visit was a major event in our bilateral relations, so how can there be nothing to celebrate? We are celebrating this 300th anniversary. So long as we have the desire to celebrate, we will always find something to celebrate. This is especially true because, as I have just said, our bilateral trade is recovering, we are now looking for common ground on key issues on the international agenda, and, it seems to me, we are capable of making a common effort to move forward, or at least to start moving forward together towards resolving the key current issues. As for Russia's alleged meddling in whichever elections, no, we did not discuss this matter and President Macron showed no interest in it. And why would I bring it up? I think this issue does not exist.'

During his visit to France Vladimir Putin gave an interview to the newspaper Le Figaro. Answering journalists, the Russian leader noted in particular: 'As I have said to my French colleague and our French friends today, Peter the Great was above all a reformer, a man who not only implemented the best and the most up-to-date practices, but also was undoubtedly a patriot, who fought to secure for Russia the place it deserved in international affairs. But above all, he was committed

'I believe that our countries' fundamental interests are far more important than political considerations of the moment. The French business community understands this best and continues working actively in Russia. Let me remind you that over these past years, not a single one of the close to 500 French companies working on our market has left Russia, despite the difficulties and economic constraints. Furthermore, we see the interest our French friends show in expanding this economic cooperation. Last year, direct French investment in the Russian economy increased by \$2.5 billion. Our bilateral trade is growing too. It was up 14 percent last year, and grew by 23.7 percent in the first quarter of this year.'

Vladimir Putin

to reforming his country, making it modern, resilient and forward-looking. He succeeded in many, if not all of his undertakings. He focused on research, education, culture, military affairs and statehood, leaving an immense legacy that Russia has been relying on to this day, let alone the fact that he founded my hometown, St Petersburg, which was the capital of Russia for many years.'

One of the issues related to the extension of NATO to the East. Vladimir Putin answered it: 'For us this is a sign that our partners in Europe and in the United States are, pardon me, pursuing a short-sighted policy. They do not have the habit of looking one step ahead. Our Western partners have lost this habit.'

When the Soviet Union ceased to exist, Western politicians told us (it was not documented on paper but stated quite clearly) that NATO would not expand to the East. Some German politicians at the time even proposed creating a new security system in Europe that would involve the United States and, by the way, Russia. If that had been done, we would not have the problems we have had in recent years, which is NATO's expansion to the East up to our borders, the advance of military infrastructure to our borders. Perhaps, the United States would not have unilaterally withdrawn from the Anti-Ballistic Missile Treaty.

This treaty was a cornerstone of current and future security. The missile defence facilities in Europe — in Poland and Romania — would not have been built, which, undoubt-

edly, creates a threat to our strategic nuclear forces and disrupts the strategic balance — an extremely dangerous development for international security. Perhaps all this would not have happened. But it did, and we cannot rewind history, it is not a movie.

We have to proceed from the current situation. In this respect, we need to think about what we want from the future. I think we all want security, peace, safety and cooperation. Therefore, we should not build up tensions or invent fictional threats from Russia, some hybrid warfare etc.

You made these things up yourselves and now scare yourselves with

them and even use them to plan your prospective policies. These policies have no prospects. The only possible future is in cooperation in all areas, including security issues.

What is the major security problem today? Terrorism. There are bombings in Europe, in Paris, in Russia, in Belgium. There is a war in the Middle East. This is the main concern. But no, let us keep speculating on the threat from Russia.

... We are willing to cooperate, as I said a while ago at the 70th anniversary of the United Nations, when I called on all countries to unite their efforts to fight terrorism. However, this is a very complex issue.'

/RA&MG/





FSMTC OF RUSSIA

Military-technical cooperation between the Russian Federation and foreign states

Since 2000, the Russian Federation has established a sufficiently effective system to manage its military-technical cooperation with foreign partners. The system is headed by the Federal Service for Military-Technical Cooperation ('FSMTC of Russia'). The Federal Service for Military-Technical Cooperation is empowered with control and supervision over the MTC area. FSMTC of Russia is a decision making authority on import to and export of military purpose products as decreed by the President of the Russian Federation. FSMTC of Russia is authorized by the President of the Russian Federation to issue licenses to Russian defense companies and other entities required to import and export military purpose products.

FSMTC of Russia is in charge of the system of military-technical cooperation with other countries. Major areas of FSMTC of Russia activities are:

- control and supervision in the area of military-technical cooperation in compliance with laws of the Russian Federation;
- participation alongside with other federal government authorities in implementing policy in the area of military-technical cooperation;
- submission of relevant proposals to the President of the Russian Federation, the Government of the Russian Federation, and Defense Ministry of the Russian Federation.

Federation, the Government of the Russian Federation, and Defense Ministry of the Russian Federation.

FSMTC of Russia is a decision making authority on import to and export of military purpose products to/from the Russian Federation as decreed by the President of the Russian



Federation. It is authorized by the President of the Russian Federation to issue licenses to defense companies and other entities required to import and export military purpose products. FSMTC of Russia is authorized to grant and revoke trade licenses to/from manufacturers of military — purpose products. It is the head decision-maker in the matters of Russian participation in defense exhibitions and shows in terms of showcasing military purpose products and technologies both in the Russian Federation and abroad. Yet another crucial function of FSMTC of Russia is to issue end-user certificates for import military purpose products

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In conformity with the law of the Russian Federation, FSMTC of Russia performs control and supervision functions relating to:

- Compliance by federal government authorities, government authorities of the Russian Federation constituencies and Russian organizations in the field of military-technical cooperation with legal acts and regulations of the Russian Federation and key state policy guidelines in the field of military-technical cooperation, requirements of the Russian Federation laws on export control over procurement of military purpose products;
- Implementation of underlying state policy principles in the field

of military-technical cooperation including state monopoly;

- Efficient functioning of state regulatory system in the field of military-technical cooperation;
- Fulfillment of international treaties of the Russian Federation in the field of military-technical cooperation;
- Marketing, advertising, and exhibition activities in the field of military-technical cooperation;
- Efficient allocation of funds from the federal budget to finance activities in the field of military-technical cooperation, as well as efficient use of federal property by military-technical cooperation-affiliated entities;
- Level of foreign trade prices for export and import military purpose products with due regard to protection of economic interests of the Russian Federation;
- Level of local prices for military purpose products to be funded



FSMTC of Russia submits draft decisions to be signed by the President of the Russian Federation and the Government of the Russian Federation on deliveries of military purpose products to foreign customers, as well as on other foreign trade issues relating to military purpose products.



international treaties of the Russian Federation in the field of MTC and submits proposals for concluding and implementation of any such treaties.

FSMTC of Russia submits in the established manner proposals for creating, composition and arranging activities of bilateral and multilateral intergovernmental commissions relating to MTC, sets up relationships with international organizations relating to MTC. FSMTC of Russia is in charge of intergovernmental commissions relating to MTC on behalf of Russia and therefore it is instructed by the President of the Russian Federation and the Government of the Russian Federation.

The Federal service for military-technical cooperation receives requests from foreign customers for supplies of military purpose products, registers them, appoints contractors among Russian entities, informs foreign customers on the state of their requests, and supervises preparation and approval of relevant decisions, monitors how MTC-affiliated entities progress in meeting the requests of foreign customers for supplies of military purpose products. /RA&MG/

out of the federal budget, and supplied to foreign customers under international treaties of the Russian Federation.

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issues relating to military purpose products.

Also FSMTC of Russia develops jointly with federal government stakeholders conceptual approaches to increase MTC efficiency, as well as to review trends in the development of the global market of military purpose products. FSMTC of Russia elaborates jointly with federal government and stakeholders draft



THE HISTORICAL DAY

In the Russian city of Irkutsk was the first flight of MC-21 aircraft. For the Russian aircraft industry and the Russian industry as a whole it was a truly historic day. A large-scale program of development of new Russian civil aircraft family is developing successfully.

On 28 May, 2017, the maiden flight of MC-21-300 commercial aircraft took place at the airfield of Irkutsk Aviation Plant, the affiliate of Irkut Corporation (a UAC member). The duration of the flight was 30 minutes at the altitude of 1000 meters, at the speed of 300 km/hour. The flight plan included checking of in-flight stability and controllability, and also the controllability of the power plant. According to the program, during the flight a simulated landing

approach was performed, followed by a flight over the runway, climbing and turning. This technique is typical for the maiden flight of new types of aircraft.

The aircraft was piloted by the crew commander Oleg Kononenko, test pilot, the Hero of Russia, and the copilot Roman Taskayev, test-pilot, The Hero of Russia. Oleg Kononenko reported: 'Flight mission is accomplished. The flight went in the normal mode. There are no obstacles revealed preventing the tests continuation.'

Roman Taskayev noted, that 'characteristics and operational modes of the power plant are confirmed, all aircraft systems operated without glitches.'

Oleg Demchenko, the President of Irkut Corporation, stated: 'Today is the historic day for our personnel and the whole big team, which works on creation of MC-21 aircraft. We put the most advanced technical solutions in our aircraft, to provide enhanced comfort for passengers and attractive economic characteristics for air carriers. I am happy to declare the

maiden flight of the MC-21 aircraft has been successfully accomplished. I congratulate all project participants on our common holiday!'

Yury Slyusar, the President of United Aircraft Corporation (UAC), stressed, 'MC-21 is created in a wide cooperation, where together with Irkut, other enterprises of the United Aircraft Corporation are actively participating, namely Aerocomposite company, Ulyanovsk and Voronezh aircraft plants, UAC Integration Center in Moscow. This is an important stage in the formation of the new UAC industrial model. According to our estimates, the global demand in the MC-21 segment will be about 15,000 new aircraft in the next 20 years. I'm sure

MC-21-300 new generation aircraft with capacity of 163 to 211 passengers targets the most massive segment of aviation market. MC-21 aircraft provides passengers with the qualitatively new level of comfort, due to the biggest fuselage diameter in the category of narrow-body aircraft. This design decision significantly widens private space of each passenger, ensures free passage of passenger and service trolley over the aisle, and shortens airport turnover time. Natural lighting of the passenger cabin is enhanced due to big windows. Comfortable air pressure and advanced microclimate will be maintained in the aircraft.

the airlines will appreciate our new aircraft.'

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air pressure and advanced microclimate will be maintained in the aircraft.

MC-21 aircraft features an innovative ergonomic pilot cabin.

High demands for comfort and economic effectiveness of the aircraft pushed forward introduction of advanced technical solutions in aerodynamics, engine-building, and avionics.

MC-21 aircraft is superior to existing counterparts in terms of flight-technical characteristics and efficiency. The best Russian and international companies participating in MC-21 program fully comply with their obligations, while introducing





The major contributor to the enhancement of flight-technical characteristics of the aircraft is the wing made of polymer composite materials, the first-in-the-word one developed for narrow-body aircraft with the capacity of over 130 passengers. The share of composites in MC-21 design exceeding 30% is the unique for this category of aircraft.

their most advanced design solutions. The major contributor to the enhancement of flight-technical characteristics of the aircraft is the wing made of polymer composite materials, the first-in-the-word one developed for narrow-body aircraft with the capacity of over 130 passengers. The share of composites in MC-21 design exceeding 30% is the unique for this category of aircraft. For the first time in the history of Russian aircraft manufacturing, the airliner is offered to the customers with two options of power plant — PW1400G of Pratt & Whitney

Company (USA) or PD-14 of United Engine Corporation (Russia). New-generation engines feature reduced fuel consumption, low noise and hazardous emissions. MC-21 aircraft meets prospective environmental requirements. Calculated reduction of direct operational costs for MC-21 is 12-15% lower than for counterparts. The initial portfolio of firm orders for 175 MC-21 aircraft provides utilization of production capacity in the coming years. All firm contracts are prepaid. Technically, the MC-21 employs many innovative technologies. Its airframe features fuselage made of Aluminum-Lithium and other advanced metallic alloys using state-of-the-art manufacturing equipment from Broetje, Durr, Premium Aerotec, Demag, Hymer and other European firms. The share of composite materials in the MC-21 structural weight is at 40-45% compared to 10-15% for the previous generation. Composite parts for the aircraft are supplied by the recently erected factories in Ulianovsk and Kazan run by the AeroComposite company. These

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parts are made using the revolutionary technology of vacuum infusion (developed jointly with Hexcel, Diamond, FACC AG and other western firms). This provides a sharp contrast to all other makers, including Airbus and Boeing: these continue to rely on the classic manufacturing methods that necessitate use of big, expensive autoclaves. The all-composite wing is notably lighter than metallic, and contributes 8% to the MC-21's combined 20% better fuel efficiency over in-service aircraft. To make 20-meter-long wing consoles, AeroComposite uses an automated system to lay down a pre-form as a set of twenty four carbon bents each 6mm wide. Then it goes into so-called vacuum sack. Where, the binding substance is being applied. Firming up is done in a special heating device (different to typical autoclave as it develops lower temperatures). The manufacturer asserts that no other technology makes it possible to manufacture the wing of that aspect ratio with given lift/drag and weight efficiency. Gambling on such promising technologies as the vacuum infusion seems inevitable for a manufacturer which is seeking to achieve a substantial boost in flight and cost performance in the domain of nar-

row body jets. The new technology promises substantial cuts in manufacturing costs. Even though it is yet to be declared mature enough for mass production, AeroComposite has already manufactured several sets of composite parts for testing and operable prototypes. /RA&MG/



MC-21-300 Flight Performance

| | |
|-----------------------------|---|
| • Two-class layout capacity | 163 seats (16 business + 147 economy) |
| • Dense layout capacity | 211 seats |
| • Maximum takeoff weight | 79,250 kg |
| • Maximum payload | 22,600 kg |
| • Maximum flight range | 6,000 km |
| • Dimensions | |
| Length | 42.2 m |
| Wing span | 35.9 m |
| Height | 11.5 m |



YAK-130



Combat Trainer Aircraft Yak-130

The Yak-130 two-seat combat trainer aircraft provides basic and advanced pilot training for modern and advanced combat aircraft including super-maneuverable fighters of '4 ++' and '5' generation.

The guided and unguided weaponry allows employing Yak-130 for training and combat missions.

Yak-130's long service life and low operating cost minimizes expenses for training and maintaining readiness of combat pilots. The aircraft is designed by the A.S. Yakovlev Design Bureau, a part of Irkut Corporation JSC.

Serially manufactured at the Irkutsk Aviation Plant, the Yak-130 is being successfully operated by Russian and foreign Air Forces.

New-Generation Aircraft

- The Yak-130 is the world's first combat trainer aircraft with aerodynamic configuration and performance in subsonic flight close to those of '4++' and '5' generation combat aircraft.

- The Yak-130 is essentially a monoplane with an integral aerodynamic configuration which combines the fuselage, wing and all-moving horizontal tail in a single load-carrying system.

- The developed wing root extensions, adaptive wing in combination with the highly automated fly-by-wire system ensure the controllable flight at angles of attack up to 35 degrees without use of thrust vectoring.

- A relatively high thrust-to-weight ratio (over 0.6) and moderate wing loading ensure outstanding maneuverability and take-off performance of this combat trainer.

- The Yak-130 avionics set comprises digital fly-by-wire system, glass cockpit, and digital sighting-and-flight navigation system.

- The information-and-control field provides pilots with all required information. It is arranged on the basis of three multifunctional coloured 6'x8' LCD's and head-up display in the front cabin.

- Yak-130 is the best cost-effective choice for both fighter pilots training and various combat employments in low-intensity conflicts.

CRAIC WAS ESTABLISHED

Commercial Aircraft Corporation of China, Ltd (COMAC) and United Aircraft Corporation of Russia (UAC) held an establishment ceremony for the Long Range WideBody Commercial Aircraft Program joint venture name as China-Russia Commercial Aircraft International Co., Ltd. (CRAIC), 2017. The main responsibility of CRAIC is to develop a new generation long range wide body commercial aircraft and take charge of its commercial operation. Chairman of COMAC Mr. Jin Zhuanglong, President of COMAC Mr. He Dongfeng, President of UAC Mr. Yuri Slyusar, the vice president of UAC Mr. Vladislav Masalov attended the ceremony.

Under the depth development of China-Russia comprehensive strategic cooperative partnership, the long-range wide body commercial aircraft is a major strategic and pragmatic cooperation between Chinese and Russian enterprises in the field of high-tech development. On June 25, 2016, under the testimony of President Xi Jinping and President Putin, COMAC and UAC have signed a joint venture contract. After the full consultation between the two companies, we agreed to establish a joint venture for project cooperation in accordance with the equivalence principle. At present, the two companies have completed the industrial and commercial registration process with a business license. The name of this joint venture is China-Russia Commercial Aircraft

International Co., Ltd. (CRAIC), based in Shanghai.

Chairman Jin Zhuanglong indicated that 'the establishment of CRAIC marking an important progress for the Long Range Wide Body Commercial Aircraft Program. COMAC and UAC shall cooperate and unit as one, try our best to make the program to be the great model in the corporation history between China and Russia; in accordance with international mainstream airworthiness standards, we will develop a competitive long range wide body commercial aircraft, provide a better service to the airlines and more contribution to the global aviation market.'

President Yuri Slyusar emphasized that 'I am fully supporting to the establishment of CRAIC. It means the long-range wide body commercial aircraft program took

the most important pragmatic movement, it also witness the cooperation determination and the succeed expectation by both sides. We would like to develop the wide body aircraft together, ensure the performance of manufacturing, operation, after sale's service, marketing and sales, etc.'

As the long-range wide body aircraft program operator and main manufacturer, CRAIC is responsible for product and technology development, manufacturing, marketing, sales and customer service, consulting, program management and other related field. During implementation process, CRAIC will take full advantages from both sides for the development of wide body series. CRAIC shall also adopt a modern enterprise governance structure, sets up the board of directors and

the board of supervisors. The first chairman Vladislav Masalov, the vice president of UAC, was appointed by UAC. The first general manager Mr. Guo Bozhi, AP of COMAC, was nominated by COMAC. The board of directors consists of four directors from both sides.

The supplier selection of CRAIC shall base on a market-oriented and standardized principle. CRAIC will carry out global bidding and provide priority to suppliers that are more experienced, can provide competitive product and willing to share the risk during development. CRAIC welcomes and encourages more suppliers to consider manufactured localization by the local investment or joint ventures.

At present, both sides have determined the development strategy of the stretched and shortened series of the long-range widebody commercial aircraft, formulated initial technical plan, confirmed the basic range of 12000 km and 280 seats for typical 3 classes. All the information will be clarified to the domestic and airborne suppliers in RFP. Final assembly shall be completed in Shanghai.

According to 9 years innovation and entrepreneurship development, COMAC explored a specialty of China in civil aviation industry, built up 6

platforms in civil aviation industry development phase, established a technology innovation system and industry system in civil aviation, basically acquired the capability of the whole industry chain in aircraft development and product manufacturing, etc. COMAC accumulated abundant experiences of important program development and operation, possessed the core competencies in large passenger aircraft

The supplier selection of CRAIC shall base on a market-oriented and standardized principle. CRAIC will carry out global bidding and provide priority to suppliers that are more experienced, can provide competitive product and willing to share the risk during development. CRAIC welcomes and encourages more suppliers to consider manufactured localization by the local investment or joint ventures.

program of China. COMAC has a significant achievement in the current capability of civil aviation product development, talent team build up and company hierarchy innovation. Nowadays, 2 of ARJ21 aircrafts have been Enter Into Service, the market operation and sales were in good condition, the number of passenger transportation was over 10,000; C919

aircraft has succeed in its first flight, accessed to the flight test and certification test stages; the development of the long-range widebody commercial aircraft program was moving forward stable, with the CRAIC establishment, China's commercial aircrafts shall become more serialized, marketization, industrialization, and internationalization. /RA&MG/





SUKHOI BUSINESS JET – NEW HORIZONS

In the beginning of February 2017, the international natural resource mining and processing company — Kazakhmys corporation, based in Kazakhstan, launched the operation of Sukhoi Business Jet — SSJ100 aircraft in business configuration. JSC 'Sukhoi Civil Aircraft' (SCAC), at the request of the customer, delivered the long range SSJ100 with basic interior of the passenger cabin in May 2015. Later on, the VIP interior developed and manufactured by Comlux company was installed in Comlux customization center (Indianapolis, USA), with the support of SCAC specialists.

The aircraft is designed to carry 19 passengers. There is a VIP cabin in the forward area, consisting of four passenger seats, a table and a sofa, as well as a service zone with a new additional lavatory and a wardrobe. The second cabin is equipped with fifteen business class seats in 2-1 layout, three in a row. Comlux KZ airline operates this SBJ to the benefit of Kazakhmys corporation.

'This replenishment of the aircraft fleet will allow both our employees and top management to travel with comfort. This is the right and necessary business tool for our company,' — said Eduard Ogai, head of Kazakhmys in Kazakhstan.

SCAC fully shares the opinion that successful people should be able to travel to any location in the world and knows that often the decision to take a trip is taken quickly. Wherever they go, they should

have a comfortable means of transportation, internet and communication on board, and Sukhoi Business Jet (SBJ) was created to complete such tasks.

The level of comfort on board the SBJ is comparable to that offered by the famous giants of business aviation to their passengers. So, the cross section of the passenger cabin is 2.12m in the passage, which allows tall passengers to stand in full size in the cabin, and the aircraft's onboard

systems maintain ideal conditions at all stages of flight.

EVALUATION OF PROSPECTS

The dynamic development of the air transportation market in the early 2000s greatly influenced the decision to create a business version of Sukhoi Superjet 100. According to the estimates of JSC 'Sukhoi Civil Aircraft', the volume of demand of the world market in the period of 2015-2034 in the segment of administrative aircraft created on the platform of Liners, could reach 400 aircraft, while the share of SBJ could reach up to 10% of the market in this segment. The main regions where Sukhoi Business Jet is most actively promoted today are Russia and the CIS, Asia and the Middle East.

The profile of business liners operators is as follows: 60% are airlines engaged in business transportation, 25-27% are corporate clients (national and transnational corporations), private individuals, professional and sports teams, 13-15% are state customers (federal governments, ministries and departments). On average,

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the volume of world's supply in the Liners segment is up to 10 aircraft per year. If there is a demand for SBJ, the production program can be up to 3-4 aircraft per year.

SBJ IN OPERATION

Currently, nine SBJs are being operated in different configurations and perform flights both in Russia and abroad:

Among SBJ operators at the moment there are: RusJet airline, special flight detachment 'Russia' of Administrative Department of the President of the Russian Federation, flight detachment of EMERCOM of Russia, Royal Thai Air Force, Kazakhmys corporation and others.

In total, nine aircraft of SBJ version have performed more than 1.5 thousand commercial flights, having spent over 2.5 thousand hours in the air from the beginning of operation of the first aircraft in December 2014.

FROM THE MOCKUP TO THE FIRST COMMERCIAL FLIGHT

The layout of SSJ100 business version cabin, made on the platform of basic version of the aircraft was first introduced at the International Aviation and Space Salon MAKS in 2013 in Zhukovsky. The interior of the cabin was designed to accommodate up to 19 passengers on board, and it was divided into several zones.





The layout of SSJ100 business version cabin, made on the platform of basic version of the aircraft was first introduced at the International Aviation and Space Salon MAKS in 2013 in Zhukovsky. The interior of the cabin was designed to accommodate up to 19 passengers on board, and it was divided into several zones.

The first and second cabins were intended for business meetings. They were equipped with comfortable furniture, a modern multimedia system, working tables and rotary-reclining chairs which could be transformed into horizontal position — almost all passengers in this configuration had the opportunity to relax lying down on the chair. The main passenger's cabin was equipped with a full-fledged workplace and a place for rest, as well as a wardrobe. There was a separate lavatory in the tail of the aircraft, just behind the main passenger's cabin. The service zone included the seats for two flight attendants, a galley with modern equipment, a lavatory for the crew and accompanying persons, as well as a closet for placement of passengers' belongings.

Following the interest which was raised by the new product of SCAC within the framework of MAKS 2013, Sukhoi Business Jet was presented at JetExpo-2014 air show, where only business liners are being demonstrated.

By that time, the interior was substantially refined, in particular, composite materials were actively used, which is important both from the point of view of aircraft weight efficiency, since the composite materials have low specific gravity, and its reliability. They have an exceptionally high specific strength and rigidity. Another advantage of using the composite materials is manufacturability of the interior elements of any size, as well as structures of complex and unusual shape, for example, as far as furniture is concerned.

The first cabin, intended for business meetings, was equipped with comfortable furniture, a monitor, a modern multimedia system, rotary-reclining chairs. The cabin of the main passenger was equipped with a full-fledged workplace, a monitor, a sofa, which can be transformed into a bed, a wardrobe and a lavatory, as well as a LED lighting system. Currently the aircraft which was presented at JetExpo in 2014 is operated by RusJet.

Sukhoi Business Jet was certified in November 2014. The Interstate Aviation Committee Aviation Register confirmed the possibility of installation of the enhanced comfort passenger cabin interior on Sukhoi Superjet 100, as well as the possibility of safe flight operations of this aircraft type with the enhanced comfort layout which was submitted for certification.

Sukhoi Superjet 100 aircraft was presented in a new configuration as early as December 12, 2014, within the framework of the Russian-Indian summit in New Delhi, that was aimed at strengthening and development of bilateral relations between the countries.

The Russian delegation arrived to Russian-Indian summit by Sukhoi Superjet 100 VIP, which performed a non-stop flight on Moscow-New Delhi route. The flight lasted 6 hours 05 minutes with a range of 4,738 km. Thus, this flight became the longest passenger flight performed by Sukhoi Superjet 100 serial aircraft.

Passengers were able to accommodate comfortably in a cozy cabin of Sukhoi Superjet 100, its the equipment allowed not only to solve the work issues during the flight, but also to relax and concentrate before business meetings. It should be noted that a sofa with the possibility of side accommodation of passengers at all flight stages was for the first time created and certified by the Russian developers on this aircraft.

ROYAL THAI AIR FORCE — THE FIRST FOREIGN SBJ CUSTOMER

In July 2016, JSC 'Sukhoi Civil Aircraft' transferred two Sukhoi Business Jets to Royal Thai Air Force. The delivery was carried out basing on the results of the tender that was won in 2014. The aircraft are used to transport the top officials of the state and the high command of Thailand. The supplied SBJs are the first SSJ100 in business version purchased by a foreign customer.

Treetod Sonjance, Air Chief Marshal of the Thai Air Force, mentioned the following at the aircraft delivery ceremony: 'Since September 2014, from the moment

of the contract for purchase of Sukhoi Business Jet aircraft was signed, SCAC employees have made every effort to deliver a high-quality product that exactly meets our requirements specifications and is equipped with everything necessary for ground handling. The delivery of aircraft, like all previous stages of cooperation, went in strict accordance with the schedule.'

SBJ for the Royal Thai Air Force fleet is divided into three zones: a four-seat VIP zone, a business zone with six seats and an additional lavatory, a standard zone accommodating 50 passengers. The aircraft are equipped with the state-of-the-art passenger comfort systems, including various types of communication and a multimedia entertainment system on board. The SBJ flight range is more than 4,500 km for eight passengers. The assembly of the aircraft, including the interior, is performed in Russia.

SPECIAL PURPOSE AIRCRAFT FOR EMERCOM

In September 2014, the United Aircraft Corporation concluded the contract with the EMERCOM of Russia for delivery of two airborne command posts on the basis of SSJ100 aircraft and the aircraft were trans-

ferred to the customer as early as the end of 2015.

One of them, having medical-evacuation functions, was designed and manufactured in such a way as to provide transportation of up to 58 passengers in a passenger version or up to four injured persons on medical modules and a group of accompanying doctors in a medical evacuation version. One of the medical modules can be equipped with a newborn infant intensive care nursery — it is a unique modern

option that is available on few special purpose aircraft.

Embarkation and disembarkation of the injured can be carried out both on stretchers and on a lifting device specially designed for these aircraft.

The second aircraft, with its multiple functions, is to be used as a command post, but the requirements specifications also provided for the installation of two medical modules for the evacuation of the injured. In the passenger version, this aircraft can have 19 passenger seats,





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however, it provides more comfortable conditions for the work of the emergency operations center.

In addition to special convertible cabins and medical equipment, both aircraft are equipped with special search equipment, satellite telephony, wi-fi and internet on board, internal and external videoconferencing, radiation monitoring equipment, as well as the operator's seat for monitoring all special systems on board.

VEMINA Aviaprestige company was selected for the development, delivery and installation of the interior elements. The aircraft created in the course of the project are unique. The aircraft are the mobile command post, providing uninterrupted com-

munication for the control, coordination and interaction of special reaction forces.

SUKHOI BUSINESS JET FOR ATHLETES

A mockup model of SportJet by Sukhoi, an aircraft designed specifically for professional athletes was presented in summer of 2016. The aircraft cabin is divided into four functional zones: a recovery zone with multifunctional physiotherapy equipment, a recreation zone with comfortable sleeping places and biometric data control devices built into SMARTseats, a zone for the coaching staff, where they can analyze the team's actions in the inviting atmo-

sphere, as well as a convenient zone for administrative staff.

DEVELOPMENT COURSE

Thus, SBJ is a unique aircraft that can not only meet, but also exceed the expectations of the most demanding customers. It can also be a flying office both for regular employees and for top management of the company and its guests, and a meeting-room for high-level negotiating parties, a command post in an emergency situation, a transport for quick evacuation from the disaster zone, a communication point and a means of maintaining the physical strength for the Olympic champions.

The development of SBJ project goes on and currently the aircraft is being continuously improved: it is planned to gradually introduce individual technical solutions in accordance with the wishes of the customers, for example, a shower booth, integral airstairs, satellite communications, in-flight entertainment systems and other options. In addition, it is planned to install auxiliary fuel tanks and wing tips which will significantly increase the flight range. After all, the goal is to ensure a non-stop flight over a distance of more than 7000 km. /RA&MG/

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THE FIRST ANSAT IN MEXICO

Russian Helicopters, part of State Corporation Rostec, featured its commercial and military helicopter named Ansat at the International Aerospace Exhibition FAMEX 2017, in Santa Lucía, Mexico City, Mexico.

We see Mexico as one of our main partners in Latin America. This country operates a significant number of Russian-made helicopters, so in the course of negotiations at the forthcoming exhibition we will pay key attention to service and after-sales support. Additionally, we want to acquaint our Mexican partners with the Ansat light helicopter, which, due to numerous modifications, is capable of solving tasks of both civil and security agencies. The helicopter is successfully operated in Russia and already has foreign customers,' said Russian Helicopters deputy CEO for after-sales service Igor Chechikov.

At the exhibition, specialists from Russian Helicopters will present a wide range of civil multirole rotorcraft. Guests will have a chance to have a look at Ansat in its VIP modification and at multirole Ka-32A11BC in the firefighting mode. The military model range will be represented by the Mi-17V-5 transport helicopter. Apart from that, Rosoboronexport's stand will feature a model of the Ka-226T helicopter. As part of the exhibition, Russian delegation anticipates an extensive business program aimed at closer cooperation with Latin American countries.

Currently, there are more than 50 Russian-made helicopters registered in Mexico, mainly of the Mi-8/17 type. In 2014-2015, the company successfully collaborated with the Mexican Secretariat of National Defense by performing extensive repairs of 19 Mi-17/Mi-17-1V helicopters. At the end of March 2016, Russian Helicopters executed the first contract for aftersales maintenance of the Mi-171V multirole helicopters operated by the Mexican Navy.

The Mi-17V-5 military and transport helicopter belongs to the Mi-8/17 family and is supplied to various security agencies in Russia and abroad. The helicopter is capable of carrying up to 4,000 kg in the cargo compartment or on external sling. It can also be used to perform combat tasks with the use of various armaments, for search-and-rescue, ambulance and special operations. The helicopter is equipped with modern avionics and communication systems.

Ansat is a light twin-engine multirole helicopter with a hydro-mechanical flight control system designed for 7-9 people. It can take 1,300 kg of load, and its cabin can be rapidly re-configured. Different modifications of that helicopter,

as well as the possibility of quick change of accessories allow it to successfully solve tasks of both civilian and security agencies. In December 2014, it was certified for passenger transportation. In May 2015, the modification with a medical module was certified. In October 2016, the first Ansat in a VIP configuration was delivered to a customer, and last November Russian Helicopters signed first contracts to supply medevac Ansats to China.

The Ka-32A11BC helicopter is intended for special search-and-rescue operations, installation and elevated works, transportation of cargo in its body or on a sling, evacuation of sick and injured, firefighting, and patrolling. The Ka-32A11BC helicopters are equipped with cutting edge firefighting systems, including a Bambi Bucket and Simplex as well as water guns for horizontal firefighting. The Ka-32 type helicopter in hovering mode can perform draft and discharge of 3,200 liters of water in as little as 1.5 minutes. Design features with a coaxial scheme ensure highly precise hovering and maneuverability. That is why the Ka-32A11BCs are second to none in providing fire safety in urban conditions with lots of high-rise buildings. /RA&MG/

AVIATION JOBS IN PERU

Russian Helicopters holding continues its successful cooperation with Peru. In May this year, the holding has successfully participated in the exhibition 6th International Exhibition of Technology in Defense and Prevention of Natural Disasters (SITDEF 2017, Lima, Peru). And in those days, it was announced that Russian Helicopters has fulfilled two contracts for the supply of aviation equipment for Mi-8/17 and Mi-24/35 helicopters that belong to the Peruvian Air Force. Contracts were signed in the summer of 2016 following a tender.



Delivery of authentic components for Russian-made helicopters is an important part of maintaining equipment in constant flight readiness and improving flight safety. We are pleased to note the desire of our Peruvian counterparts to combat counterfeiting and to purchase spare parts for helicopters directly from the manufacturer. We are counting on a gradual increase in the volumes of supplies and expansion of cooperation,' said Russian Helicopters Deputy CEO for After Sales Service Igor Chechikov.

The fleet of Russian-made helicopters in Peru is one of the biggest in the Western Hemisphere. The country operates more than 100 Russian-made helicopters. The Armed Forces of Peru are actively using Russian Mi-8/17 and Mi-24/35 helicopters in the most difficult and inaccessible areas of the country. Russian Helicopters products take part in special operations of the Peruvian armed forces in the fight against drug trafficking and illegal mining of minerals.

One of the most important tasks of Russian Helicopters is to provide first-class maintenance of helicopter equipment throughout its life cycle. To this end, the holding is actively developing a system of after-sales service in all key regions of the world, includ-

ing the countries of Latin America. The integrated after-sales service system offered by the holding company ensures repairs and modernization of helicopters in the shortest possible time, thus supporting helicopter fleet in constant operational readiness.

At the SITDEF 2017 Russian Helicopters specialists under the auspices of AO Rosoboronexport showed the Mi-17V-5 military and transport helicopter, the Mi-171Sh military and transport and Mi-26 heavy transport models. Additionally, Russian Helicopters staff showed their Peruvian partners the Ansat light helicopter, which due to numerous modifications is capable of solving tasks for both civilian and security agencies. Negotiations with representatives of security agencies from the region's countries helped promote Mi-26T2 and Ansat-U helicopters, as well as develop the after-sales system for Russian-made helicopters in the region.

The Mi-17V-5 military and transport helicopter belongs to the Mi-8/17 family and can be used to perform combat tasks with various armament, for search-and-rescue, ambulance, and special operations. The helicopter is equipped with new VK-2500 engines, modern avionics, modernized transmission, and can transport up to 4,000 kg of cargo in the cabin or on an external sling.

Russian Helicopters is constantly improving the helicopter's characteristics to boost its competitiveness.

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The Mi-26 is the world's best serial helicopter in terms of cargo weights. Its performance indicators are unequaled. The helicopter is capable of transporting up to 20 tons of cargo in its body or sling loaded. Currently, Russian Helicopters produce the helicopter's new upgraded version, the Mi-26T2. It is equipped with modern avionics. The crew is reduced from five members in the Mi-26T to three in the Mi-26T2, thus lowering direct operating costs and expenditures for training and retraining of flight personnel. The design, equipment, and systems of the Mi-26T2 allow to use it around the clock in usual and adverse weather conditions, over flat, hilly and mountainous terrain. /RA&MG/



Young specialists of Russian Ilyushin Aviation Complex took part in the festivities dedicated to the 120th anniversary of the birthday of Robert Bartini, an outstanding aircraft designer and aerodynamicist. The Ilyushin workers were joined by beginning aircraft designers of Myasishchev Experimental Design Bureau and other enterprises of the industry, students of field-oriented higher education institutions, and young specialists of Roscosmos and United Rocket and Space Corporation.

The festivities were opened by the General Director of Ilyushin Aviation Complex Aleksei Rogozin, who emphasized Bartini's role in the formation of the country's aviation. Aleksei Rogozin pointed out that even today Bartini can serve as a symbol of professional success and offbeat approach to problem solving. 'Bartini was a man of creative mindset, capable of achieving goals which are critical for our country. By commemorating a man of such stature, we ourselves are becoming better at what we do. Let us remember that there is no such thing as unsolvable tasks. Let us move forward and derive inspiration from our great predecessors,' Aleksei Rogozin stated.

Among those who gave their welcoming speeches were also pilot-cosmonaut, twice Hero of the Soviet Union, president of the Cosmonautics Federation of Russia Vladimir Kovalenok; first vice-president, general director of the Cosmonautics Federation of Russia, honoured test engineer of space systems Vasily Kuznetsov; acting first deputy general director and acting state secretary of United Rocket and Space Corporation Dmitry Shishkin; and HR director of United Aircraft Corporation Lyubava Shepeleva.

The educational program of the festival included an interactive lecture on the famous aircraft designer, viewing of a documentary film, and a team game during which the future engineers were drawing up a promising aerospace project. Three teams presented their versions of an 'aircraft of the future' based on Bartini's works.

The festivities concluded with an exciting flashmob – red paper planes were flown. The flashmob was a tribute to Bartini, in particular with regards to his words about his main desire: to make 'red' (Soviet) aircraft faster than the 'black' (Nazi) ones. The young designers wrote their wishes and dreams on the paper planes,



which were later flown into the sky in the territory of the Memorial Museum of Cosmonautics at the All-Union Exhibition of Achievements of National Economy.

Robert Bartini was a physicist, aircraft designer, and maker of more than 60 aircraft projects, an author of scientific papers on aerodynamics, an inspirator of the Soviet space program. Sergei Korolyov called him his teacher; among his colleagues had been aircraft designers Sergei Ilyushin, Oleg Antonov, Vladimir Myasishchev, Aleksandr Yakovlev. For his versatile talents, he was sometimes compared with Leonardo da Vinci. A special aerodynamical effect, 'Bartini Effect', was named after him.

The festivities were prepared by the employees of Ilyushin Aviation Complex jointly with the representatives of Roscosmos State Space Corporation, United Rocket and Space Corporation, and United Aircraft Corporation (UAC). /RA&MG/



'GK LAUNCH SERVICES'

Within the frameworks of implementation of the strategy to develop commercial potential of the Russian space industry and in accordance with ROSCOSMOS decision, Joint Stock Company GLAVKOSMOS (a part of State Space Corporation ROSCOSMOS) and Limited Liability Company International Space Company Kosmotras (KOSMOTRAS) established a Joint Stock Company 'GK Launch Services'. This new Russian entity will become an operator of commercial launch services for satellites with the use of Soyuz family launch vehicles and the launchers developed on the basis of RS-20 rockets from the Russian launch sites. GLAVKOSMOS owns 75% and KOSMOTRAS – 25% of the new company's stock.

Establishment of GK Launch Services is driven by new challenges on the launch services market, and creates a new level of public-private partnership for business in space domain. Combined efforts of GLAVKOSMOS and KOSMOTRAS will give an impetus to the promotion of Russian launch vehicles on the international market. Bringing together unique expertise and resources of the two companies will significantly expand a scope of the launch services offered and thus enable orbital injection of various types of spacecraft with the mass ranging from 1 kg to 6 metric tons into the most popular orbits. This also meets an increasing demand in the segment of commercial space projects dealing with development and launch of small class satellite constellations and individual spacecraft.

According to Alexander Serkin, CEO of GK Launch Services, creation of a dedicated company will facilitate strengthening the positions of Russia on the international market and increase the workload of the Russian launch sites. The GLAVKOSMOS and KOSMOTRAS cooperation will enhance competitiveness of products and services of the Russian space industry, first of all, through optimization of launch costs and short-

er timelines of the launch projects implementation.

JSC GLAVKOSMOS is an enterprise of ROSCOSMOS State Space Corporation (the only shareholder) with the key objectives to promote the Russian space industry capabilities on the world market and to manage challenging space projects. During more than 30 years of its history, GLAVKOSMOS has successfully implemented 120 international contracts. Launches of more than 20 small satellites have been carried out since 2012. In 2017, the company plans to launch more than 100 small satellites for 15 foreign and Russian customers under the existing contracts. GLAVKOSMOS is an operator of Soyuz-2 commercial launches and a coordinator of ROSCOSMOS international projects. Spacecraft for the following customers have been launched on Soyuz-2 launch vehicles to date: Skybox Imaging, Norwegian Space Center, UTIAS SFL, SSTL, UK Space Agency, and DLR. The company's wide range of activities includes integrated solutions in creating satellite systems of various applications, turnkey solutions for Earth observation, telecommunications, space research and exploration, provision of Earth observation data from the Russian satellite constellation, as well as export of Russian space equipment.

It is also responsible for coordination of Russian enterprises activities for Soyuz-ST commercial launches in the Guiana Space Center. Among partners and customers of GLAVKOSMOS are NASA, Arianespace, Great Wall China and other private companies, as well as Russian and European universities.

International Space Company KOSMOTRAS

LLC (a Joint Stock Company until August 2016; from then on — a Limited Liability Company) was established in 1997 under the Russian law. The company's head office is located in Moscow, Russia. KOSMOTRAS is a launch service provider offering launches of converted RS-20 rockets on international and domestic markets. The rocket is capable of delivering payloads with the mass of up to 2 metric tons into LEO. These payloads are launched either in dedicated missions or as part of cluster (multiple small satellites) launches. Since the inaugural mission in April 1999, KOSMOTRAS has carried out 22 commercial launches lofting 128 payloads into orbit for 37 customers from 28 countries. Among KOSMOTRAS' customers are major aerospace companies and space agencies such as ESA, CNES, JAXA, KARI, EIAST, KACST, NEC, Airbus Defence and Space, MDA, SSTL, SSC, as well as universities and private companies. /RA&MG/



Vladimir Karnozov

'RUSSIAN KNIGHTS'

New program: successful world premiere in Malaysia

At the International Exhibition LIMA'17 (Malaysia) there was the world debut of famous Russian Aerobatic Team 'Russian Knights' (Russkie Vityazi) with new Su-30SM multirole fighter jets. Experts and ordinary spectators were unanimous: the premiere was very successful.

The Russian Knights aerobatic team was founded on 5 April 1991 on the basis of the 1st Squadron, 234th Composite Air Regiment of the Moscow Military District. Its mainstay was the best military pilots of Kubinka AFB, who mastered aerobatics to perfection on the Su-27 fighters assigned to Kubinka in 1989. Since 1992, the Russian Knights aerobatic team has been organic to the Russian Air Force's Kozhedub Aircraft Demonstration Centre (ADC), while ADC itself is part and parcel of the Air Force's Chkalov Training and Field Test Centre in the city of Lipetsk now.

The 'Russian Knights' is an aerobatic demonstration team of the Russian Air Force. Originally formed on April 5, 1991 at the Kubinka Air Base as a team of six Sukhoi Su-27s, the team was the first to perform outside the Soviet Union in September 1991 when they toured the United Kingdom. On December 12, 1995, disaster struck as three team jets flew in-formation into a mountainside near Cam Ranh, Vietnam during approach while en route to home from a Malaysian airshow during adverse weather conditions.

Last year, the 'Russian Knights' marked their 25th anniversary and turned a new leaf in their history: after having flown the Sukhoi Su-27 and Su-27UB aircraft, they started the conversion to the Su-30SM advanced supermanoeuvrable fighters. Members of the famous aerobatic team ferried the first four aircraft of the type from Irkut Corp's Irkutsk Aviation Plant to their home station, Kubinka AFB, in the Moscow Region



mance even more spectacular and enable it to conduct long-distance flights to air shows in various corners of the world.

'Su-30SM is an excellent aircraft, therefore, our demonstration program at LIMA'17 was a lot of new solo flying components through the usage of the fighters super-maneuverability', said the leading pilot of 'Russian Knights' Andrey Alekseev.

The Su-30SM twin-seat supermaneuverable multirole fighter powered by a pair of AL-31FP engines with thrust vector control is a derivative of the export-oriented Su-30MKI built by Irkut Corp. since 2000. The Sukhoi design bureau and its sub-contractors adapted the aircraft's radar, radios, IFF system and some other equipment to the RusAF's standards.

The Su-30SM's large fuel load and inflight refueling system enable it to accomplish difficult missions far away from friendly airfields, which is especially relevant to Russia with its vast expanses. The capability is further facilitated by the fighter's two-man crew, whose two-seat cockpit allows the Su-30SM to be used as combat trainer in addition to its primary role.

Also at LIMA'17 General Dato' Sri Hj Affendi bin Buang, the Chief of the

Royal Malaysian Air Force, together with the top-management of Irkut Corporation and UAC, held a meeting with Russian and Malaysian pilots. Pilots of the 'Russian Knights' aerobatics group and the 11th squadron of the Royal Malaysian Air Force performed demonstration flights on supermaneuverable Su-30SM and Su-30MKM aircraft respectively.

General Dato' Sri Hj Affendi bin Buang named Su-30MKM fighter as one of the best of its class and expressed his gratitude to the makers of this magnificent aircraft. 'Development of the Su-30MKM pro-

gram is very important for Malaysia's defence capability', the Chief of the Royal Malaysian Air Force said.

The air aces of the Malaysia and Russia, whose performances constantly evoke admiration of the audience, highly praised flight characteristics of their aircraft. Col. Gborg,

the pilot of the Royal Malaysian Air Force named Su-30MKM as the wonderful aircraft. 'This is the best fighter I have been flying for my twenty-year career', he added.

Mr. Oleg Demchenko, the President of Irkut Corporation, marked the high skills of pilots and

their ability to use fighter's capabilities to the maximum extent. Mr. Alexander Tulyakov, the First vice-president of UAC, said: 'Positive assessment of aircraft given by Russian and Malaysian pilots is very important for us — the developers and manufacturers.'

/RA&MG/

on 14 October 2016. The other four Su-30SMs were ferried from Irkutsk a month and a half later, on 30 November.

The team's receiving Su-30SM fighters differing from the Su-27 in having higher manoeuvrability, the mid-air refueling system and cutting-edge avionics will make its perfor-



AVIATION CLUSTER OF FORUM 'ARMY-2017'

At the end of this year a special aviation cluster considerably extended as compared with 'Army-2016' is due to be introduced within the frameworks of International Military and Technical Forum 'Army-2017', which is to be held from 22 to 27 August in the largest Russian Patriot Convention and Exhibition Center located in Moscow region. Aviation equipment is to be deployed at Kubinka airfield near Forum 'Army-2017' site.

The aviation cluster is to be a further development of International Military and Technical Forum 'Army' which is an integrated business platform for promoting all types of military equipment including aviation necessary both for sustaining Armed Forces of Russia and promoting the best aviation equipment at world arms market.

It is worth noting that the new aviation cluster will entirely use the unique opportunities of both International Forum 'Army' (the largest in Russia and among the largest in the world) and opportunities of the site hosting the International military expo.

One of the tasks to be solved at Forum is searching for technologies which can be used in civilian industry of Russia including aviation. This

will provide the additional prospects for the participants including foreign aircraft manufacturers.

The aviation cluster of International Military and Technical Forum 'Army-2017' is to introduce the whole range of modern and advanced military and civil aviation equipment at a static site and inflight, show technological innovations by leading world aircraft manufacturers in exhibition halls, enable to have key trends of international aviation

industry discussed in the context of Forum business program.

There is a great professional interest in 'Army-2017' including its aviation cluster. Russian and foreign aircraft manufacturers focused on searching for new partners, new technologies and products, are expected to be fully engaged in the process.

A number of aviation aspects will be shown within the frameworks of 'Army-2017' main display at the exhibition. The thematic areas will

include 'Military and civil aircraft', 'Engine technology', 'Aircraft weapons', 'Simulators', 'Airfield facilities', 'Maintenance facilities' etc. There is also a special display dedicated to intra-industry and international cooperation related to aerospace programs and projects.

Among the major participants are Russian Aerospace Forces, 'Roscosmos' corporation, rocket and space industry enterprises of Russia and other countries, 'UAC', 'PAO', 'Rostech' and its members such as 'Technodinamika', 'KRET', 'ODK', 'Russian Helicopters' and others. An eventful flight program with in air demonstration by individual planes and air display teams is also expected.

/RA&MG/

For more details on the aviation cluster of 'Army-2017' as well as terms and conditions, see:
<http://www.rusarmyexpo.ru>; info@rusarmyexpo.com



Sergey Kulik

SECURE RESCUE AT ANY HEIGHT



Unique autonomous rescue parachuting back-pack system for emergency escape

The innovative Russian private Space Rescue Systems Ltd. (SRS Ltd.) company (www.cosmic-rs.com) proposes a unique and unrivalled emergency rescue vehicle SPARS® — an Autonomous Rescue Pneumo Transformable Chute Back-pack System — a validated forefront rescue solution for guaranteed secure individual emergency escape from nearly any high elevation structure (skyscrapers, offshore platforms etc.). The SPARS® project is resulted in a creation of a brand new pneumo-framed aerodynamic devices technology. There is no doubt in the near future this solution is going to be a must-have in skyscrapers construction all over the world

The SRS Ltd. proposes a SPARS® high rise escape technology that has a global nature. It is uncovered market niche with an obvious but unrealized human requirement to be and to feel safe while living or working in high elevation buildings. In case of emergency than traditional evacuation is impossible or ineffective those people all over the world have practically no means of urgent secure rescue from the height and need an alternative solution.

Actually the technical reviews shows that at present there are practically no means for secure alternative escape starting from 60÷80 m height and higher available on the market. But according to the said firefighter's statistics about 3÷5% of people being caught in alarm situation on the high-rise building used to try escaping from the windows and

usually perished. On the other side homeland security analytics says that in average an every skyscraper in the world is expected to be subjected to a fire case (terroristic attack or other emergency) once in every 47 years.

So the SRS Ltd. has decided to resolve the problem in finding an alternative to traditional evacuation methods technical solution. It takes about eight years of R&D to resolve the task. Finally it is resulted in creation a brand new escape technology — an Autonomous Rescue Pneumo Transformable Chute Back-pack Solution for secure personal rescue from high-elevation structure in case of emergency than traditional evacuation methods are impossible.

The SRS. Ltd company in outsourcing cooperation with 18 leading Russian and foreign aerospace companies has fulfilled full-scale research and development activities to devel-

op the project from conceptual proposal stage to releasing operating prototypes unparalleled anywhere in the world.

The SPARS® escape technology is based on a synergy of sophisticated aerospace technologies such as Air-Aspirator Rapid Inflation; Elastic Pneumo-Frame Catapult Ejection; Air-Drag Deceleration; Air-Bag Shock Absorbing and others. Such technologies were invented for space probes deceleration during descent in atmospheres of Solar system planets and its landings on surfaces.

The SPARS® device provides a secure individual escape of untrained person or valuables cargos with weights 45÷120 kg. from about any of existing high-rise (50÷1000m) facilities (skyscrapers; towers; offshore platforms etc.) with guaranteed safe landing on any underlying surface in urban terrain or water in

case of emergencies than traditional evacuation methods are impossible.

The SPARS® solution meets the Russian Ministry of Emergency Situations (EMERCOM) requirements for high-rise emergency escape apparatus (GOST R 22.9.08-2005; GOST R 12.4.206-99) and provides for the following unique capabilities, never implemented before:

1. Alternative of emergency escape (so-called 'last resort rescue')
2. Emergency evacuation of an untrained person having weight of 45÷120 kg, from heights of 50÷1,000 m;
3. Ready-for-use in 45÷60 sec;
4. Self-sustained operation and independently selected escape route;
5. User-friendly operation for untrained persons and fully automated rescue procedure right from start;
6. Personal protection against external hazards during evacuation;
7. Appropriate weight of a back-pack-type carried device;
8. Secure injury-free landing on any underlying surface.

The SPARS® unit for individual use had required a special certificate basis. In this regard the National Standard (GOST) 4240-001-2012 specifying medical and technical requirements for injury-free operation by untrained persons rescued by means of new type SPARS® shock-

absorbing systems entered into force in 2013.

To have certification tests performed a special Hybrid-III (USA) crush test dummy-based anthropomorphic (bionic-like) instrumentation station has been developed and created by the SRS Ltd., which has no equals in Russia.

A full cycle of comprehensive calculations and testing to validate design properties and performance has been performed. Up to now the SPARS® device technical operational reliability is 98.7% but further testing is under way.

New SPARS® escape solution provides the following advantages:

1. Alternative (a 'last resort') escape mean for ordinary person in case of emergency in the high-rise structure;
2. Secure rescue of untrained personnel (18÷70 years old) from high elevations from 5 till 1000m (no practical means available starting from 50 m height);
3. Off-line capability of the system provides mobility that helps to find optimal self-escape way of out from emergency situation;
4. Smooth automated ejection from the emergency object after manual initialization of the system;
5. Guaranteed deploy of the canopy with 3÷5 m loss of height irrespective of air flow speed pressure;
6. Protection from dangerous external factors (fire, hits, smoke) during descent;

The SPARS® General Specifications

1. Total Assembly Weight — 25 kg
2. Rescue Payload Weight — 45÷120 kg
3. Descent Elevations — 5÷1000 m
4. Landing Velocity — 5÷7 m/s
5. Landing Angle — < 30°
6. Footboard Barrier Elevation — 1.5 m
7. Descent Time — 3÷150 s
8. Ready-to-use Time — 45÷60 s
9. Launch Initialization Time — 15÷20 s
10. Inflating Gas — Air;
11. General Dimensions:
 - a. Assembled — 900x450x300 mm
 - b. In Descent mode — 6,500x2,700mm (without canopy)

Actual Landing Impact Loads:

Acceleration directions:

'chest-to-back' — up to 8÷10 g

'side-to-side', 'head-to-pelvis' — up to ± 6 g

Acceleration Exposition Time — less than 0.5 s

Acceleration Growth Velocity — less than 500 1/s

User's age — 18÷70 years

7. Safe landing on any underlying surface in urban terrain;
8. Reusable and does not sink.

In packed and assembly complete mode the SPARS® system weights 25 kg with back-pack dimensions





850x450x350mm and has easy — to-use suspension system.

The SPARS® has its Technical Data Sheet (TU 801130–5047075064–01–10) and working design documents issued. Under the SRS Ltd requirements Russian gas-filling systems (GFS) manufacturing company has mastered Autonomous Two-Stage GFS for SPARS® (TU 8042–017–45307693–2013).

The SRS Ltd. Intellectual Property Rights on SPARS® and its 'know-hows' have been completely protected within Russia (9 Patens, 3 Trade Marks) and abroad under PCT (Patent Cooperation Treaty) procedures 2 'umbrella' requests for SPARS® have entered national level in 15 countries and covered 78% skyscrapers and

95% potential SPARS® manufacturers. 13 Patents of the US, China, Japan, Canada, South Korea, Singapore, the Ukraine, Indonesia, Malaysia and Australia have been already received.

Three Russian EMERCOM Certificates of Conformity were received for the SPARS®. 'Aerospace medicine and military ergonomics' R&D Institute of the Russian Air Force has granted an official approval for the SPARS® physical adaptability.

The SRS Ltd. company now is looking for cooperation with a strategic Partner and/or investor in order to industrialize the brand new SPARS® product; to make it commercial; to prepare and set up its production and to enter with it into a global commercial market having all nec-

essary intellectual property rights protected.

An accurate assessment of the terms, timeframes and investments required for the SPARS® industrialization it is foreseen that a Partner from the region where product itself (or its production) could be demanded (Middle East, China, US, Europe, Asia-Pacific etc.) could formulate and provide the SRS Ltd. Company with the regional authority technical requirements to upgrade the product specifications and also could determine the necessary level of licensing.

At the same time in order to reduce production costs it is desirable to find and select a local manufacturer taking into account its technical capabilities and possibility to use appropriate production process technologies.

Upon receiving necessary information from a Partner the SRS Ltd. Company could finalize the design documentation, to fabricate a prototype with specifications meeting local needs and to determine expected investments and timeframes necessary to prepare and to run mass production of the product in the region.

Shares and Conditions in the business organization is a matter of further negotiations. The SRS Ltd. Company would be ready to demonstrate its good willing approach and to meet a Partner in negotiations halfway with necessary flexibility in some critical questions aiming to achieve mutually beneficial cooperation.

Such forms of cooperation as Joint Venture, Technical, Manufacturing or License Agreements are feasible.

For a strategic industrial Partner sought who would be interested to

run mass production of the SPARS® in the region and enter an empty market with protected rights it would be necessary to have production technology experience in the fields of:

- thin coated/laminated fabric manufacturing;
- assembly from these fabrics a complex air-beam-frame air-proof inflatable structures;
- parachute canopy manufacturing;
- air-aspirator gas filling manufacturing;
- plastics (carbon) manufacturing and forming
- human field (air-borne) tests plastic forming and others.

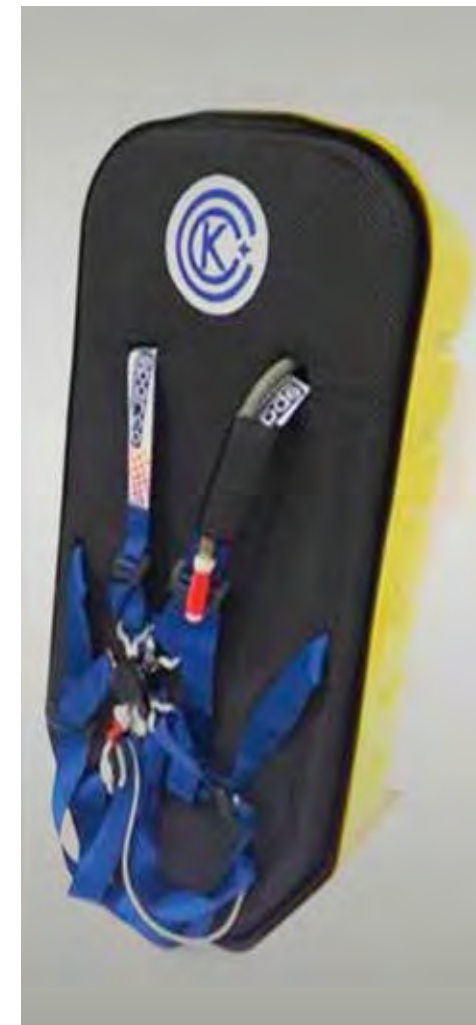
A Partner sought may be expected to undertake part of those activities or provide financing for already SRS Ltd. Company existing outsourcing manufacturing solution in Russia on a mutually beneficial basis.

As for the SPARS® solution operation such a potential entity sought (hotels, profitable houses; skyscraper's management company; offshore platform management; air-borne attractions & entertainment companies etc.) should only require a free window exit sized 1000x500 mm at the appropriate height to use Autonomous Pneumo Transformable Escape Chute and propose to its clients an additional exceptional secure service with limited warranty.

General market estimations shows there are over 7,303 finished and 2,500 under construction skyscrapers worldwide with the heights of 100÷828m, over 100,000 buildings having height of 50÷100m and more than 800 offshore platforms. Taking that analysis into account the SPARS® may have potential market capacity of up to \$700-850 million annually.

Furthermore, the SPARS® estimated potential market capacity is worth over \$3.5 billion in commercial sector alone. The Governments market is bigger but for accepting that new technology implementation it may require some updates of the appropriate local norms and regulations.

/RA&MG/



There are following innovations in the proposed SPARS® technology:

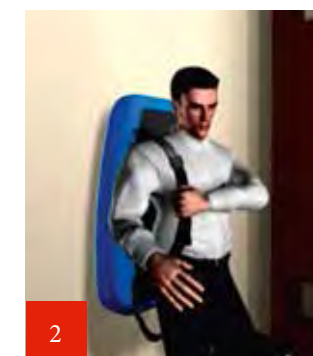
1. A brand new free parachuting technology (means and escape method) was created for emergency escape from heights higher than 50 m where practical methods for safe evacuation of a person are not available on the market.
2. Sinergy solution based on specially designed and produced from film-laminated fabric a rapid inflatable air-beam single volume frame structure for:
 - Elastic catapult ejection of a human from a window of an emergency object;
 - Forced deploy of the canopy with only 3÷5 m loss of height and irrespective of air flow speed pressure for deployment (usual parachute requires of 25÷100 m free fall and/or 250÷350 km/h speed of airplane to be deployed);
 - Guaranteed safe landing with 5÷6 m/s vertical velocity on any underlying surface in urban terrain using integrated air-frame shock absorbing pneumo dumper.
3. Fully automatic mode of usage (after manual initialisation of the apparatus) and all the descend envelope accelerations bearable for an ordinary person make the escape solution available for use by untrained people from 18 till 70 years old;
4. New type of light weight air-proof film coated fabric for air-beam inflatable frame structure was created.

The Special National Standard (GOST) for shock acceleration limits for untrained human using new type of lodgment Rescue Parachuting Systems was issued.

The Crash test dummy Hybrid-III 50% percentile was instrumented, calibrated with the help of centrifuge, certified and used as anthropomorphic instrument for human acceleration checking during field tests and validation of the Autonomous Pneumo Transformable Escape Chute.



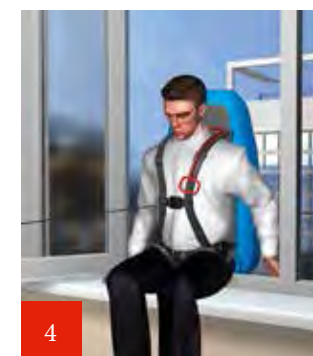
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| 'RA&MG' №02 (09) | February 18th | IDEX 2017 / NAVDEX 2017 (19-23.02.2017, UAE, Abu Dhabi) |
| 'RA&MG' №03 (10) | March 20th | LIMA 2017 (21-25.03.2017, Malaysia, Langkawi) |
| 'RA&MG' №04 (11) | April 02th | LAAD 2017 (04-07.04.2017, Brazil, Rio de Janeiro) |
| 'RA&MG' №05 (12) | June 18th | Paris Air Show 2017 (19-25.06.2017, France, Paris) |
| 'RA&MG' №06 (13) | June 27th | IMDS-2017 (28.06-02.07.2017, Russia, S-Petersburg) |
| 'RA&MG' №07 (14) | July 15th | MAKS-2017 (18-23.07.2017, Russia, Moscow) |
| 'RA&MG' №08 (15) | August 22th | ARMY-2017 (22-27.08.2017, Russia, Moscow) |
| 'RA&MG' №09 (16) | September 17th | AVIATION EXPO CHINA 2017 (19-22.09.2017, China, Beijing) |
| 'RA&MG' №10 (17) | October 02th | INMEX SMM India 2017 (03-05.10.2017, India, Mumbai) |
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| 'RA&MG' №12 (19) | October 15th | SEOUL ADEX 2017 (17-22.10.2017, Korea, Seoul) |
| 'RA&MG' №13 (20) | November 04th | Defense & Security 2017 (06-09.11.2017, Thailand, Bangkok) |
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| 'RA&MG' №15 (22) | November 20th | MILIPOL 2017 (21-24.11.2017, France, Paris) |
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ОФИЦИАЛЬНОЕ ЕЖЕДНЕВНОЕ ИЗДАНИЕ ФОРУМА

№01, 22 августа 2017 года

Главный старт дня

Научно-деловая программа «Армии-2017»: все грани обеспечения вооружением МО РФ

Вчера во второй день работы форума «Армия-2016» стартовала насыщенная научно-деловая программа Второго Международного военно-технического форума «Армия-2016». В мероприятиях деловой программы принимают участие руководители и представители ведущих компаний и предприятий оборонно-промышленного комплекса, государственные структуры, эксперты.

Посвященным различным аспектам обеспечения национальной безопасности России. По мнению многих экспертов, ключевым мероприятием научно-деловой программы второго дня стал круглый стол «Россия в меняющемся мире: вызовы, опасности, угрозы», организованный Военной академией Генерального штаба ВС РФ. Участники заседания обсудили военно-политическую обстановку в мире и факторы ее destabilization, возможности современных и перспективных систем национальной безопасности России. Также в рамках научно-деловой программы прошли круглые столы, посвященные

ные перспективам развития военно-медицинской техники, новым инструментам решения задач боевого космического взаимодействия, вопросам совершенствования ракетно-артиллерийского вооружения, организации дорожных

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August 22-27, 2017

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Four issues: 'First day', 'Second day', 'Third day', 'Fourth day'

Reports on the work of the Forum, the most important current business and presentations, the representation of participants, their exposition and programs.

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Registration for participation in briefings: www.aviasalon.com

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