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AVIATION & MILITARY GUIDE

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Russian view and the global aviation's process

MAKS 2017

Special partnership

Russian Aviation Military Guide

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EDITORIAL

Aviation ideas and proposals from Russia

The cooperation of Russian aviation industry with other countries 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 problems may evolve into global ones, failure of worldwide system safety and no 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 hitech technology, solid aftersales service and proven reliability of products, Russia is honest and friendly partner for many countries, ready for mutual work.

At the MAKS-2017 Russia again presents their best new aviation technologies, strategic program and investment prospects. It is true that MAKS is the best russian aviation show and one of the best in the world.

Valeriy Stolnikov

RUSSIAN-CHINESE HEAVY-LIFT HELICOPTER

Rostec may sign the contract with the Aviation Industry Corporation of China (AVIC) for the Advanced Heavy Lifter (AHL), a heavy-lift helicopter to be developed jointly by Russia and China, before the end of this year. This was announced by Victor Kladov, Director for International Cooperation and Regional Policy of Rostec, at the Fourth China-Russia Expo in Harbin (China). 'Negotiations on the conceptual model and configuration have been completed. At present, the draft contract between the parties is being prepared. We hope to sign the contract before the end of the year,' stated Mr. Kladov. 'Russian Helicopters, our subsidiary, is actively negotiating with our Chinese partners in this regard.'

The AHL is being developed jointly by Russian Helicopters and Avicopter, a Chinese company forming part of the Aviation Industry Corporation of China (AVIC). It is expected that the maximum takeoff weight of the aircraft will total 38.2 tons, while its service ceiling will total 5,700 meters. The helicopter will have a range of up to 630 kilometers, while its maximum speed will amount to 300 kph. The AHL's payload inside the cabin will total 10 tons, while its external payload will total up to 15 tons.

RUSSIAN-CHINESE AIRCRAFT

Viktor Kladov, Director for International Cooperation and Regional Policy of the State Corporation Rostec announced that companies from third countries might be involved in the development of the Russian-Chinese wide-body long-range aircraft at the IV Russian-Chinese Expo in Harbin, China.

'It is possible that the contractors for this aircraft will be selected on a tender basis in order to apply the latest equipment on it. Chinese partners will possibly like the third parties' contribution, because they had worked with the third parties in their development of C919,' Mr. Kladov said.

The United Engine-Building Corporation, part of Rostec's aviation cluster also participates in the program of joint development and production of a perspective engine for the Russian-Chinese wide-body long-haul aircraft. The start of the engine tests is scheduled for 2022, certification — for 2025.

The total budget of the program will be around $ 13 billion. In the basic configuration, the aircraft will be designed for 280 seats with a flight range of 12,000 km. The airliner will be assembled in Shanghai. The project of creating a wide-body long-haul transport aircraft, along with the creation of an advanced heavy helicopter, is a key joint project of Russia and China in the aviation field.

Optics for lasers at Munich

Shvabe Holding demonstrated about 70 developments in the field of photonics at Laser World of Photonics 2017 in Munich, the International Trade Fair for Photonics Components, Systems and Applications.

The key exhibits in the Holding's exposition were: an active element made of neodymium phosphate glass, an SWIR camera, the MBS-16 stereoscopic microscope, holographic optics, etc. These products are used in the aerospace and microelectronics industries and other fields.

'Shvabe is a leader and a systems integrator in Russian innovative photonics. The Holding is currently developing several areas in this field, including lasers, optic materials and photodetectors. In Germany, we are going to present samples of these products, including know-how — a brand-new element base for superpower laser stations. It is a real breakthrough in Russian optic science and technology, which will allow us to create energy centers of the future,' said Sergei Popov, the First Deputy CEO of Shvabe.

One of the most advanced developments of the Holding is a circular active element made of neodymium phosphate glass designed for large-sized high-precision active elements. Its unique composition amplifying laser irradiation is protected by several Russian and foreign patents and won the Russian Federation Government Prize in Science and Technology in 2016. It is going to be the key exhibit in Munich.

In addition to optics for lasers, the Shvabe exposition showed a new stereoscopic microscope, the MBS-16, designed to examine 3D, thin-film and transparent objects. The exposition also was included 17 types of diffraction optics, single- and multimode optic fiber, monocrystals and nanocrystalline material for laser Q switches, as well as aiming and ranging equipment — a total of approximately 70 developments.

PD-14: the second stage

The United Engine Corporation (subsidiary of Rostec State Corporation) successfully completed the second stage of flight tests of the Russian civil aircraft engine of the fifth generation PD-14.

PD-14 №100-07 (021) is a basic turbojet two-circuit engine, which is created within the framework of a wide cooperation of the UEC enterprises for the MC-21 airliner with the use of the latest technologies and materials, including the composite ones. It is the first engine for the commercial airliners successfully designed and developed in modern Russia. The PD-14 flight tests were conducted on Il-76 flying testbed at the Flight Research Institute named after M.M. Gromov in Zhukovsky, Moscow region.

'Successful testing of the PD-14 engine is a significant stage in the implementation of the program aimed at increasing the share of domestic components in our civil aircraft,' said Anatoly Serdyukov, Industrial Director of the aviation cluster at Rostec State Corporation. 'The creation of this type of turbo engine will equip them with one of the most important developments in the history of domestic aircraft construction – the medium-range MC-21 aircraft.'

The major aim of the trials was to confirm the working efficiency of the engine within different altitude and speed conditions, in which it will be operated on MC-21 airliner, and to assess the level of its operational performance.

At this moment, the engine is being re-assembled to resumeits tests on the ground stands.

The successful development of the engine PD-14 is an important milestone in the implementation of the new strategy of Rostec's aviation cluster, according to which the revenues of the cluster each year should increase by around 12% andexceed 1.5 trillion rubles by 2025. This impressive growth rates will be achieved through a substantial increase in civilian production (30-40%) increase in exports (by half) and improvements in operational efficiency: capacity utilization is expected to grow from 55 to 80%, which will optimize the overhead charges and investment in the production and its further expansion.In addition, it is planned to build a world-class after-sales service for helicopters and aircraft, which will increase revenue by more than 2.5 times due to the creation of a "single window" for customers and the transition to managing the life cycle of cluster products.

THE EIGHTH INTERNATIONAL MARITIME DEFENCE SHOW

The eighth International Maritime Defence Show (IMDS-2017) finished its work successfully. The Show is one of the world leading exhibitions in the field of shipbuilding and naval armament. The results of the Show demonstrate its high demand among marine industry enterprises. Its high status and place in the world system of defense exhibitions were reconfirmed.

IMDS-2017 exhibitors became 443 enterprises from 31 countries including 50 foreign enterprises. The exposition occupied 17 000 sq.m. of exhibition space in the halls as well as outdoor display, Sea Terminal quays and water area of the exhibition complex. All leading marine enterprises of Russia were presented as the participants of the Show. The great part of the exposition was occupied by manufacturers of component equipment, appliances, electronic elements, information technologies and double purpose products.

IMDS-2017 broad format allowed to present the products of enterprises at stands and the full-scale models near the quays and on outdoor areas as well as to demonstrate maritime artillery weapons in action at the artillery range. Participating enterprises of the Show demonstrated 32 boats at the quays of the exhibition complex.

IMDS-2017 brought 56 official delegations from 52 countries. Almost all countries dealing with production and exploitation of naval equipment attended the Show. The President of Socialist Republic of Vietnam, four Commanders of Naval Forces and other high-ranked officials visited the Show as official delegations. The extensive program of delegations was fully implemented. Its format and size exceeded previous IMDS exhibitions.

Official foreign delegations visited such enterprises as Krylov State Research Centre, Baltic Shipyard Ltd., Marine engineering services AQUA-SERVIS. There were more than 120 official negotiations in which the Commander-in-Chief of the Navy of the Russian Federation, officials of FSMTC of the Russian Federation, representatives of Rosoboronexport JSC and United Shipbuilding Corporation JSC took part.

Within congress and business events there were 22 events including four scientific conferences at the exhibition complex area and at Severnaya Verf Shipyard PJSC: International conference 'Navy and Shipbuilding Nowadays 2017'; 18th International conference MORINTECH-PRACTIC 'Information Technologies in Shipbuilding-2017'; International conference 'PLM -FORUM IMDS-2017 'Shipbuilding Product Lifecycle Management. Information support'; International conference 'Simulation and complex modeling in marine engineering and transporting systems' (ICM MTMTS 2017).

Russian national pavilion at EXPO-2017

Russia has opened its pavilion at the International Specialized Exhibition EXPO-2017 in Astana (Kazakhstan) that started its work on the same day. Shortly before the opening, the Russian pavilion was visited by Russian President Vladimir Putin. During the tour the Head of the state was accompanied by Denis Manturov, Minister of Industry and Trade of the Russian Federation, Alexander Novak, Minister of Energy of the Russian Federation, Alexey Likhachev, Director General of Rosatom. Russian participation in EXPO-2017 is organized by the Ministry of Industry and Trade of the Russian Federation. The operator of the exhibition is Formika Group.

The Russian pavilion surprised visitors with an unconventional opening ceremony. Instead of cutting the ribbon in the usual way, Georgy Kalamanov, General Commissioner of the Pavilion, and his colleague Rapil Zhoshybayev, Commissioner of the International Specialized Exhibition EXPO-2017, broke the ribbon made of ice. Mikhail Bocharnikov, Ambassador Extraordinary and Plenipotentiary of the Russian Federation to the Republic of Kazakhstan; Alexander Merten, Director General of Rusatom International Network, and other officials and representatives of big business have also participated in the opening ceremony, including representatives of URALCHEM United Chemical Company JSC, Uralkali PJSC, Republic of Tatarstan, Nornickel, Rosatom, Chelyabinsk Oblast, Transneft PJSC, Sverdlovsk Oblast, Rosseti PJSC.

'We are exploring the key theme of EXPO-2017 'Energy of the Future' with the example of a unique region of the Russian Arctic. This is the region that is considered to have the best prospects from the point of view of developing alternative energy in Russia. It is also rich in natural resources,' Georgy Kalamanov noted in his speech at the opening.

The Pyatnitsky State Academic Russian Folk Choir came to Astana specifically for the opening; it presented a program developed specifically for the opening of the Russian pavilion.

The 'Energy of the Arctic' introductory installation, multi-faceted sets with luminous texture of arctic ice, the 'Polar Semisphere' multimedia attraction as well as theme-based sectors devoted to the achievements of the domestic power industry and future developments in water power, carbon industry, alternative and renewable energy surprised the first guests of the Russian Pavilion. One of the most vivid elements of the exhibition is going to be a real arctic ice block. The pavilion is also going to demonstrate the achievements of Russian companies in the energy industry. For example, Rosatom presented a game-changer in the history of the Russian icebreaking fleet — a research development of the "Leader" nuclear-powered icebreaker. This is an icebreaker of the future that will make year-round navigation in the Arctic possible regardless of the weather; it will be able to break through 4-meter ice and achieve unprecedented speed. These features will significantly reduce the duration of transporting goods along the Northern Sea Route.

EXPO-2017 will operate until September 10, 2017.

‘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 competiveness of products and services of the Russian space industry, first of all, through optimization of launch costs and shorter 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/

MILITARY TECHNICAL COOPERATION

In Novo-Ogaryovo (Moscow Region) Vladimir Putin held a meeting of the Commission for Military Technical Cooperation with Foreign States. One of the most important thoughts that were made at the meeting was about what the defence industry companies that were granted the right to engage in foreign trade are assuming all responsibility for the quality of their products and compliance with the contractual terms of their foreign supplies

President of Russia Vladimir Putin at that meeting says: 'As you may know, on June 28 the Kremlin hosted a gala reception in honour of distinguished graduates of military academies. It is no exaggeration to say that they are the backbone of our Armed Forces, highly skilled professionals with the most advanced military knowledge. I would also like to note that this year over a thousand army service personnel from 30 countries graduated from Russia's schools of higher learning. About 8,000 foreign students study in Defence Ministry schools, with about a third of them from the CSTO member-states.

There is growing demand in the global arms market for qualified military specialists. In this context the training of military personnel, teaching them to operate Russian weapons and equipment, and building up the export of military services, should remain a major component of the military technical cooperation system.

Furthermore, competition in the world arms market is obviously growing; you know this better than anyone does. The combat efficiency of arms is a decisive criterion for potential buyers. I would like to note that Russian weapons have demonstrated reliability and wide-ranging functionality during the anti-terrorist operation in Syria, something we have discussed. It is necessary to carefully analyse this combat experience both for upgrading existing systems and for developing new and advanced combat hardware.

At the same time, it is necessary to enhance the military industrial cooperation framework itself. For this purpose, major structural changes have been made to the Russian defence industry. Major defence holdings have been brought together under one administration for the convenience of cooperation, production upgrades and higher financial stability.

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>
> ***Vladimir Putin***

> ***'I will emphasise that the defence industry companies that were granted the right to engage in foreign trade are assuming all responsibility for the quality of their products and compliance with the contractual terms of their foreign supplies. However, the Commission and other involved agencies should still be monitoring these activities. It is important to prevent any disruptions in the new procedure and to carefully monitor the operations…'***
>
> ***Vladimir Putin***

Several major groups were granted the right to foreign trade, which significantly increases their independence in talks and accelerates contractual work. Moreover, this measure is supposed to make military industrial cooperation easier and more convenient for foreign customers as well. I am referring to the opportunity to directly negotiate with arms manufacturers and to conduct the entire scope of operations from marketing to maintenance and repair of supplied equipment. In other words, these conditions provide for more efficient cooperation between the Russian defence industry companies and their foreign partners for the sake of further innovative development of the domestic industry.

I will emphasise that the defence industry companies that were granted the right to engage in foreign trade are assuming all responsibility for the quality of their products and compliance with the contractual terms of their foreign supplies. However, the Commission and other involved agencies should still be monitoring these activities. It is important to prevent any disruptions in the new procedure and to carefully monitor the operations.

I already spoke about the current use of Russian weapons, particularly in the fight against terrorists in the Syrian Arab Republic. I would like to thank both the military personnel,

and the designers and developers of one of our latest missile systems, Kh-101. This missile system has proved highly reliable. It is indeed the most advanced weapon with high precision and capacity, and a range of 4,500 km, which is quite good. A weapon of this class must be in the centre of our attention and the attention of our defence agencies and industrial companies.

All our decisions on supplies of arms to external markets are based on the current international situation in various regions – in order to prevent any imbalances and to avoid an escalation of conflicts. On the contrary, our weapons must be used to contain conflicts at the early stages.' /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.

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

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.

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 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/

EXPORT REGULATION

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.

UAC, RUSSIA

High prospects in the civil and military segments

The United Aircraft Corporation (UAC) participates in the International Aviation and Space Salon MAKS-2017 as the major Russian aircraft manufacturers. This Corporation unites more than 80 per cent of design and production assets of Russian aircraft industry. She also manages all key and most promising programs of development of the industry. UAC, which under one company represents the most well-known Russian aviation brands such as Sukhoi, MiG, Tupolev, Yakovlev and others, is today one of the world's biggest manufacturers and suppliers of aircraft.

INTERNATIONAL AVIATION AND SPACE SALON

At the MAKS-2017 UAC shows a joint exposition of the Corporation's divisions in the pavilion F1 with a total area of 1550 sq.m. Almost all models of civil, military, transport and special purpose aircraft produced by UAC, including T-50, SSJ100, Be-200, Yak-130, IL-76MD-90A, MC-21-300 and other are represented in the exposition. Visitors of the Airshow also be able to see the concept of the M-60 aircraft in the pavilion. The MC-21-300 full-flight simulator and a training complex for the Su-35 are demonstrating during the business and public days of the Airshow.

There are over 80 Russian aircraft to be seen on display and in the air of Zhukovsky. Among them MiG-29SMT, Su-30SM, Su-35S fighters, Yak-130 training aircraft, Su-34 front bomber, Tu-160, Tu-95MS, A-50U and many others. Guests of the show also can see the SSJ100 aircraft in the version for the Ministry of Emergency Situations on display. The flight program includes aerobatic teams of the Russian Air Force,

such as Swifts, Falcons of Russia and the Russian Knights on their newest Su-30SM fighters. Pilots of the Su-35S, Su-34 and T-50 aircraft will demonstrate their perfect skills in front of thousands of watchers. Within the business days at MAKS-2017, the Corporation plans to hold a number of meetings and contract signings. UAC representatives are take part in a number of lectures and conferences dedicated, in particular, to the development of digital technologies and HR.

MAIN SUCCESS THIS YEAR

The first flight of the MC-21-300 at the airfield of Irkutsk Aviation Plant, the affiliate of Irkut Corporation (a UAC member) is certainly the main success of the UAC this year. This project will be one of the main centers of attention at the air show in Zhukovsky. Yury Slyusar, the President of 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 the airlines will appreciate our new aircraft.'

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!'

MC-21-300 new generation aircraft with capacity of 163 to 211

However, Russian aviation export is notable not only for military aircraft. In recent years rather good results have been shown by civil segment for which UAC has been making big plans. Among Russian civil aircraft the Sukhoi Superjet 100 regional aircraft of a new generation is the most popular at foreign markets. The aircraft combines new aircraft engineering technologies, passenger convenience, significant economic advantages for airlines, proper environmental specifications.

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. High demands for comfort and economic effectiveness of the aircraft pushed forward introduction of advanced technical solutions in aerodynamics, engine-building, and avionics.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. We should sell internationally hundreds of aircraft. This is our goal in the civil segment', emphasized Yuri Slyusar.

Moreover, in December 2016 as part of an effort to expand foreign presence UAC was given a military-dedicated foreign trade license to be implemented on a direct basis. The military-dedicated foreign trade license has been issued by Federal Service for Military and Technical cooperation. This will help UAC improve maintenance and repairs of equipment previously delivered abroad, which includes every Su, MiG, Il, Yak and Tu airplanes.

Alongside with the right for direct maintenance and repairs of the equipment previously delivered abroad, the document also specifies UAC's capabilities to update such equipment and train foreign personnel to maintain and repair UAC products. Besides, the license authorizes UAC to establish joint ventures abroad which can maintain and repair aircraft.

The license enables UAC to proceed to coordinated efforts in this area, develop a single enterprise after-sale service system based on current experience and ensure the most efficient activities at markets with several brands available.

The new capabilities confirm there is a steadily growing demand for UAC aircraft. Moreover, opera-

EXPORT UPSWING

Thanks to the success of its products UAC is one of the world's leading aircraft manufacturers. UAC's revenues have been lately growing on average more than 30% per year. Sukhoi Superjet 100 civil airliners, Su-30 and MiG-29 fighters, Yak-130 operational trainers are among the most popular aircraft exported by UAC. The document received by UAC is to much more simplify foreign market procedures, which is good news for present-day and future UAC's partners worldwide.

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.

tional reliability and relatively low prices become increasingly significant. In this regard there is a reasonable increase of export of Russian aircraft having better reliability, up-to-dateness and well-balanced prices both for airplanes and further maintenance.

According to experts, it is Russian aircraft which in terms of life-cycle cost appear today as the most attractive in international markets.

INTERNATIONAL BESTSELLERS

UAC products include many aircraft which are proven international bestsellers. Thus, Su fighters exported by Russia number in the hundreds making these fighters come second and first worldwide. In 2011-2014s Su planes were the first in amount: in four years customers have received 139 aircraft, while Lockheed Martin delivered only 89 and Boeing delivered 60 planes.

UAC places big stakes on supplying fighter planes given that many countries plan to have their aircraft fleets upgraded. Among the most world popular planes is Yak-130 operational trainer which has been already delivered and being delivered to many countries. This is a top-class aircraft. It can be upgraded as a light fighter or close support plane which is highly demanded by Indian Air Force.

However, Russian aviation export is notable not only for military aircraft. In recent years rather good results have been shown by civil segment for which UAC has been making big plans. Among Russian civil aircraft the Sukhoi Superjet 100 regional aircraft of a new generation is the most popular at foreign markets. The aircraft combines new aircraft engineering technologies, passenger convenience, significant economic advantages for airlines, proper environmental specifications.

The key advantage of Sukhoi Superjet 100 is lower operational costs as compared to its 100-seat

competitors. Operational costs are minimized due to higher fuel efficiency and lower take-off weight. According to the aircraft operation study, its ownership cost is averagely 15-20% lower than the other similar class aircraft. The highly competitive lease rate supported by a state guarantee of depreciation value is also worth being taken into account.

SSJ100 capable of carrying 98 passengers is the first in its class aircraft featuring five-across seating, with big 32 inch distance between seats. Thanks to a combination of wider seats and higher cabin (over 2 meters) SSJ100 has more cabin space and bigger stowage bin capacity than such of competitors. The airplane has been built with the use of the latest design procedures and technologies by leading manufacturers such as French Snecma (engines) and Thales (avionics), US Goodrich (wheels) and Honeywell (APU). The interior has been designed by Italian office Pininfarina. In February 2012 the aircraft was certified by European Aviation Safety Agency (EASA).

There are over 80 Russian aircraft to be seen on display and in the air of Zhukovsky. Among them MiG-29SMT, Su-30SM, Su-35S fighters, Yak-130 training aircraft, Su-34 front bomber, Tu-160, Tu-95MS, A-50U and many others. Guests of the show also can see the SSJ100 aircraft in the version for the Ministry of Emergency Situations on display. The flight program includes aerobatic teams of the Russian Air Force, such as Swifts, Falcons of Russia and the Russian Knights on their newest Su-30SM fighters. Pilots of the Su-35S, Su-34 and T-50 aircraft will demonstrate their perfect skills in front of thousands of watchers. Within the business days at MAKS-2017, the Corporation plans to hold a number of meetings and contract signings. UAC representatives are take part in a number of lectures and conferences dedicated, in particular, to the development of digital technologies and HR.

INCREASING VOLUME OF SSJ100

According to UAC President Yuri Slyusar the Corporation has stable rate of mass production of Sukhoi Superjet 100. There are plans that every year more than 30 such aircraft shall be delivered to customers. Today about one hundred SSJ100s are being operated including those in other world regions, from South America to Southeast Asia.

Currently with available manufacturing capacities UAC enterprises are capable of producing up to sixty Sukhoi Superjet 100 per year. The Russian aircraft sparkles profound interest in Southeast Asia and Latin America. Experts confirm that in the context of 70-100-seaters this aircraft is becoming the most attractive for many international airlines. When interviewed Yuri Slyusar says UAC is intended to focus on further development of the Sukhoi Superjet 100 aircraft family to offer customers a range of regional planes.

It is worth noting that today a business jet version of the SSJ100s is also available. Following the results a number of measures, including auxiliary fuel tanks installation and other engineering solutions the range of the business version of the SSJ100 is increased to about 8,000km-long nonstop flight. /RA&MG/

UAC'S PRESENTATIONS AT THE LE BOURGET AIRSHOW

United Aircraft Corporation for the first time demonstrated its whole range of civil products at the International Paris Air Show 2017. The famous aerospace event that took place on the territory of the airfield and the Le Bourget exhibition complex. As part of the Corporation's development strategy, the full product line has been formed in all major segments of the civil aviation market: the Il-114-300 regional turboprop, the SSJ100 regional airliner, the MC-21 mainline narrow body and the LRWBA long-haul wide body.

The Sukhoi Superjet 100 aircraft in the livery of the Mexican Interjet airline was showcased on static display. As part of the UAC exposition, the flight simulator for the MC-21 family was presented in the pavilion of flight crew training. Recently MC-21-300 made it first flight from the airfield of the Irkutsk aviation plant. The simulator has an identical to the real aircraft control panels design, as well as software for the flight simulation and the operation of the on-board systems. The simulator is equipped with a visualization system in the form of three OLED panels.

The visitors of the UAC stand were able to look innovative components of the training complex of the MiG Corporation, such as the holographic visualization system of the Interactive Air Personnel Training System, which provides theoretical and practical trainings for the flight and technical personnel of MiG aircraft.

UAC's stand also presented models of SSJ100, MC-21-300, Il-114-300, Il-112V, MTS, Be-200, Be-103 aircraft and the concept of a prospective M-60 airplane. Perspective Multirole Fighter, Su-32, Su-35, MiG-29K, MiG-35, Su-30SM, Yak-130 and Yak-152 models will also be among showpieces. The vast program of negotiations with partners from different regions of the world is planned during the airshow's business days. **/RA&MG/**

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GLOBAL AVIATION

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: 'Ttoday 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 the airlines will appreciate our new aircraft.'

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.

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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

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 than 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 narrow 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

HIGH PRECISION MASTERPIECE

Presentation of anti-aircraft artillery weapon system PANTSIR-ME in Saint-Petersburg in the end of June this year was an absolute sensation in the world of military innovation. The system provides the ultimate protection against modern air threats, including small-size unmanned aerial vehicles. The naval missile and anti-aircraft artillery weapon system Pantsir-ME developed by the Tula KBP (part of the High Precision Weapons Holding of Rostec State Corporation) provides the ultimate protection against modern air threats, including low-flying and small-size unmanned aerial vehicles.

The creation of new innovative defense complex confirms the fact that Russian High Precision Weapons Holding is one of the world leaders in creating modern weapons.

The High-Precision Weapons Holding (a part of the Rostec State Corporation) was founded in 2009. The holding consists of a number of largest leading defense enterprises that are well known on the world arms market. It is sufficient only to mention such brands as the JSC Shipunov KBP Instrument Design Bureau', the 'Tula Arms Plant', 'Tulatochmash', the 'Tactical Missiles Corporation', the 'Nudelman Precision Engineering Design Bureau', the 'Kovrov Electromechanical Plant', the 'V.A. Degtyaryov Plant', the All-Russian Scientific Research Institute 'Signal', and others. As of today, there are 19 companies joined in the holding. Most of them are national and international leaders in their segments.

High-Precision Weapons Holding plays an increasingly important role on the world arms market. The holding is the Russian largest developer and manufacturer of the most modern and innovative high-precision weapons. The importance and potential of the Russian holding increase worldwide as well: On a scale of the top 100 weapons manufacturers in the world, the Stockholm International Peace Research Institute (SIPRI) rates the High-Precision Weapons Holding from Russia at 39.

Holding is existing export contracts and the conclusion new is being conducted almost constantly. There is every reason to believe that results of 2017 will surpass last year's figures, when the High-Precision Weapons recorded the high efficiency of their foreign economic activities.

The products of the holding's companies are well known on all continents and much sought after on international arms markets. Interest in the products of the 'High-Precision Weapons Holding' grows due to the objective situation.

Such a success (the holding did not belong to the world's top 100 weapons manufacturers before) can be explained by increasing deliveries both to the Armed Forces of the Russian Federation and to the foreign market. According to an SIPRI expert, 'the Russian companies ride the groundswell of boosts in military spending and arms export. Eleven companies from the top 100 list are Russian ones. Their income has increased by a total of 48.4%'. It also can be noted that the High-Precision Weapons Holding belongs to the top 10 world's defensive rankings by an overall production and supply increase rate.

The exports of the holding are based on warfare systems well known on the international market such as 'Pantsir-S1', 'Palma', 'Kornet-E', 'Konkurs', 'Metis-M1', 'Igla-S', 'Arkan', 'Verba', 'Shmel', 'Kapustnik', and others as well as on training systems, armored vehicles upgrade, and so on (for more details, see this issue of the newspaper 'High-Precision Weapons').

The holding's products are well known and much sought after on

Pantsir-ME. Key characteristics

- The Pantsir-ME complex combines a powerful artillery weapon system, effective multimode missiles and an integrated multispectral radar and optical fire control system fitted on the turret.
- The combat capability and kill capacity of one channel of these missile and artillery systems are 2 to 4 times higher than those of systems comprising only artillery weapons.
- Engagement zone:
  - missiles, km: range: 1.5-20; altitude: 0.002-15
  - artillery, km: range: 0.3-4; altitude: 0-3
- Number of targets simultaneously engaged by one module: 4
- A combat module can be operated independently or within a battery consisting of 4 modules.
- Control system - radar and electro-optic, television + thermal imager, laser rangefinder
- Automated control system
- All-weather 24/7 operation
- All the stages of combat performance are performed in motion

the markets in the Middle East, the Gulf, Northern Africa, Latin America, India, Central and Southern Africa. The holding is constantly expanding the geography of its exports. This is due to product line extension, development of new models and upgrade of products in demand as well as well thought-out service policy.

The holding invests much into the development of promising designs of weapons and military equipment, enhances and augments its development and production potential, and invests in the development of models of tomorrow.

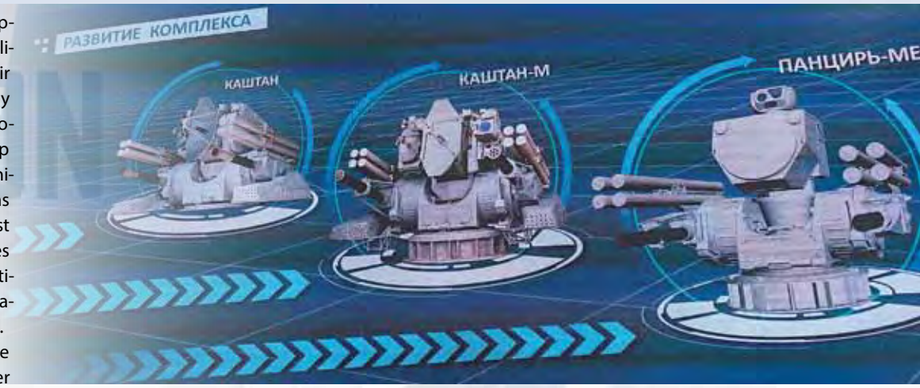
It is evident that the demand for high-precision weapons only increases around the world. They do not miss. They are mobile, fast, maintenance-friendly, reliable, and the most modern. The newest technological solutions are used. 20 years ago, the proportion of high-precision weapons used in local conflicts amounted to up to 7%. In recent years, this share has increased by up to 90-95%. The most designs of the High-Precision Weapons Holding are the best in the world and determine the technological vectors of development in their segments.

In 2016, the High-Precision Weapons holding toped the planned revenue value by more than one milliard US dollars. The holding is gradually taking a more important position in the global arms market. A considerable amount of holding's production enterprises supplies is carried out serving the interests of many regions. Moreover, the arms produced by the holding constitute the basis of high precision weapon park of many countries. The High-Precision Weapons holding is the biggest developer and producer of the top-notch high precision weapons in Russia.

Experts in the global arms market confident that interest in high-precision weapons in the world will only grow. Therefore, the demand for the products of the leading Russian holding will also grow from year to year.

However, we will continue the story about this year's sensation — Pantsir-ME.

The naval weapon systems Pantsir-ME and its forerunners Kashtan and Kashtan-M developed by the Tula KBP (part of the High Precision Systems Holding) are the only systems in the world that combine a powerful artillery armament, an effective multimode missile armament and an integrated radar-optical armament control system in a single turret mount. Equipped with two types of armament (which is already a considerable advantage), these systems have better characteristics of each individual armament type as compared to their analogues.



The creation of the new weapon system Pantsir-ME provides reliable protection for ships against air threats with absolute probability virtually equal to 1, including protection against low-altitude anti-ship missiles and unmanned aerial vehicles. The key feature of the systems created by KBP is that they can first open fire on a target with missiles and then, in the dead zone of anti-aircraft missiles, use artillery armaments, if the target is not destroyed.

'One of the key imperatives in the strategy of Rostec weapons cluster is the development and creation of new weapons, including anti-aircraft missile systems. The development of the Pantsir-ME system is a consistent element in the implementation of this strategy. The creation of almost each primary system required brand-new high-tech solutions. As a result, the destructive potential of Pantsir-ME is 3-4 times higher than that of Kashtan-M,' says CEO of Rostec Sergey Chemezov. Thus, the missile intercept zone has been increased from 10 to 20 kilometers in length and from 3 to 15 kilometers in height. All the stages of combat performance – from target search to firing – are performed in motion. The combined use of radar and optical control systems provides an all-weather 24/7 operation. All the system processes are automated, the crew ensures only supervision and control.'

High engagement effectiveness is determined by the new features implemented in the Pantsir-ME system. The modular design remains intact: 1 command module and up to 4 combat modules depending on ship type, which allows a flexible defence. The combined missile and artillery armaments ensure an effective engagement of all types of targets within the whole range of field conditions and counter-weapons with a potential for further development until 2020-2025.

The combat module of Pantsir-ME includes a multifunction radar station with a phased antenna and an intercept missile with an engagement range of 20 km, which ensures simultaneous engagement of 4 targets, as well as an engagement of new types, updated anti-ship missiles and small-size air threats and surface targets. The combat module can work autonomously and as part of a cell of 4 modules. The system can be installed on ships with a displacement of 300 tonnes and more. **/RA&MG/**

ALMAZ – ANTEY TO DISPLAY MORE THAN 150 EXHIBITS AT MAKS'2017

«Almaz – Antey» Air and Space Defence Corporation» (Almaz – Antey for short) will participate at the International Aerospace Saloon MAKS'2017, to be held 18-23 July, 2017 in Zhukovsky near Moscow. There will be over 150 items of military, civilian and dual use nature on display at the show, produced by the companies that are members in the Corporation.

The Corporation will exhibit the following samples of full-scale equipment:

- A combat vehicle in the Tor-M2DT surface-to-air missile (SAM) system.
- A launcher in the S-400 Triumph SAM system.
- A loader-launcher unit (LLU) (transporter-erector-launcher (TEL) in the Buk-M2E SAM system complete with a containerized simulator.
- Missiles for the S-400 Triumph, Tor-M2E SAM systems and Shtil-1 naval multichannel antiaircraft system.
- The Protivnik-GE radar.
- A radar for detection of detached rocket stages of space vehicles.
- The 55Zh6ME and 1L125E radars.
- The 1L122E compact radar.
- Elements of the Gorizont-E control station for guidance of interceptor aircraft.
- An experimental example of the Ulybka-M multiservice direction-finding meteorological system attributed to the new generation.

The following items will be exhibited in the form of scaled models and posters at the Corporation's stand: S-400 Triumph, S-300PMU2 Favorit, Antey-2500, Tor, Buk and Osa-AKM1 surface-to-air missile systems, the Rif-M, Shtil-1 and Klunok naval antiaircraft missile systems, the Nebo-SVU, Nebo-UE, Kasta-2E2, Fara-VR radars, the MSP-418K active jamming pod, the Omul electronic countermeasure system.

Mr. Vyacheslav Dzirkaln, deputy general manager at the Almaz – Antey Corporation, responsible for external economic relations, stressed that during MAKS'2017 the Corporation's exhibition stand will be instrumental in informing show visitors about core businesses and promising directions of activities for the Corporation. A wide spectrum of products will also be available at the stand. More than twenty enterprises that are members in the Corporation will exhibit with their products.

During MAKS'2017 Almaz – Antey employees will brief show visitors on (stealth) technologies to do with controllable concealment, camouflaging and disguise, and those to make radar images of flying vehicles for further use in detection and identification of aerial targets. The aforementioned technologies will be present in the form of material samples, mockups and guiding documents.

There will be a thematic zone for the Corporation to demonstrate civilian and dual-use products. The latter include the Avrora-2 mono-impulse secondary radar — multimode digital system for air traffic surveillance and control, the Sintez-PIVP set of automated facilities to plan utilization of air space (air traffic management), the Sintez set of automated facilities for air traffic control, the Lira-A10 airport radar, the Sopka-2 air route surveillance radar, the DMPL-S and DMRL-3 meteorological radars, the Lotsman optical system for instrument landing in poor visibility conditions, the KSA UVN set of automated facilities for remote video surveillance etc.

Mr. Dmitry Savitsky, deputy general manager at the Almaz – Antey Corporation, responsible for air navigation systems and dual use products, said: 'The Almaz – Antey Corporation acts as an original equipment manufacturer and system integrator for the Unified Air Traffic Control System. So that it will pay special attention to demonstration of our innovative solutions in radio-technical support for flight operations and air navigation services. These will be on display as a separate segment'. He further said that many equipment items on display are installed in the centers of the Unified Air Traffic Control System in Russia; they have been service-proven in this country and abroad.

Achievements in 3D-prining technologies and in frame of the Russian government's policy for import substitution will occupy a special place in the exposition of the Corporation. Items on display will include mock-ups of microwave electronic submodules for applications in radar systems, a modern television transmitter, 3D printers and parts that were manufactured using that equipment.

There will be information available for show visitors on how the Corporation makes items for radio photonic equipment and printed circuit boards, and about applications of 3D printing technologies. Members of the accredited media are invited to the press conference that is planned to be held by Mr. Yan Novikov, general manager of the Almaz – Antey Corporation.

This summer is the eighth time the Almaz – Antey Corporation exhibits its products at the International Aerospace Saloon in Zhukovsky held on a biannual basis. For the remainder of the year, the Corporation has plans to exhibit at the Army-2017 international military technical forum in Kubinka, Moscow Region, and at Dubai Airshow 2017.

The Almaz – Antey Corporation is one of the largest integrated structures the Russian military-industrial complex with a workforce of 127 thousands. Armed Forces of more than fifty countries operate equipment manufactured by the Corporation. /RA&MG/

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ON LAND, ON SEA AND ON ICE

Kupol, IEMP (Izhevsk Electromechanical Plant) improves its ADMS and expands its application area

Izhevsk Electromechanical Plant Kupol (a part of Concern VKO 'Almaz – Antey') decided to present its advanced development Tor-M2DT Antiaircraft Missile System at the International Airspace Show MAKS-2017. This System created for work in arctic conditions will certainly become a sensation of the Show, for not so often manufacturers and vendors present their newest products to the general public, especially their prototypes.

Tor-M2DT ADMS, an arctic version of the Tor-M2 system, was first shown to the general public on May 9, 2017 during a parade on the Red Square. Now there is an opportunity to get acquainted with this combat vehicle. The system's combat means are placed on a two-section tracked chassis of cross-country type; this ADMS can operate in totally unreachable areas, on completely worn-down, snow-covered and icy terrains. All the required provisions were made for the system's effective operation under arctic winter conditions. The ADMS combat means were also adapted to work in the Arctic. These products are designed to protect the sky on the northern borders of our motherland in the most extreme conditions.

Tor-M2DT is not the only product of Kupol, IEMP. First delivery of the latest Tor-M2 missile systems for the Army Air Defense Forces took place last year. The plant managed to achieve serious improvements in performance characteristics of its ADMS. Compared to previous versions, the new system doubled the ammunition. New-generation missiles now have an extended zone of destruction and improved accuracy.

Another important achievement is a capability of the short-range AD system to fire missiles in motion. In 2015 Tor-M2U hit targets while moving at a speed of 25 km/h; in 2016 there was a successful firing while the combat vehicle moved at a speed of 45 km/h. Today, the air defense missile system manufactured by the Izhevsk Electromechanical Plant Kupol is the first in the world capable to cover troops continuously on their march and during their maneuvers in a battle.

Speaking about new Tors, it should be noted that Kupol, IEMP has been main enterprise not only in production of the short-range AD systems since 2013, but also in their development. The plant itself develops its own special equipment, being in fact a research and development manufacturing complex.

Apart from the system's major upgrade, the plant has diversified its chassis in order to expand the ADMS application. Together with a traditional tracked version of its chassis, a wheel version — Tor-M2K was created, which is preferred by countries with a developed paved roads network. Another version is Tor-M2KM, an autonomous combat module, which can be mounted on any customer's chassis with load-lifting capacity of 15 tons as well as transported on external load slings of a helicopter and placed in hard-to-reach areas — on the highest elevation points on mountainous terrains, roofs of buildings, etc.

In September 2016, the autonomous combat module of Tor-M2KM ADMS succeeded in engagement of various air targets being placed onboard at the Admiral Grigorovich frigate that sailed in open sea at a speed of 8 knots. It was the world's first successful firing of a land-based ADMS from a deck of a warship. This firing demonstrated once again a wide range of possibilities of the Tor ADMS application and became an important step in ongoing work in development of unified sea and land short- range air defense systems.

...Tor family ADMS is a modern enterprise production. However, Osa ADMS, which was the first short range air defense system manufactured by Izhevsk Electromechanical Plant, is still in service of the Russian army and twenty other armies of different countries worldwide. The

Main purpose of the Tor missile system is to provide anti-aircraft defense of tank divisions, motorized brigades and major important objects. Also, Tors are part of a layered air defense system, where they work in cooperation with S-300 and S-400 surface-to- air missile systems and Buk ADMS covering them at short range where long-range systems are vulnerable to air threats breached first holding line.

Tor missile systems are capable of effective engagement of tactical aircrafts, helicopters on battlefield, including 'hovering' method, UAVs, including small-size, anti-radar missiles, low-flying cruise missiles, guided bombs, other modern and perspective means of air attack.

Modern Tors are able to detect up to 48 targets in one radar antenna rotation at a distance of 32 km, track 10 of them, rank them by degree of threat and simultaneously engage 4 most dangerous targets. Minimum target cross-section is 0.1 sq. m., i.e. the system is able to engage air attack means manufactured with Stealth technology.

9M331D surface-to-air missiles (SAM) that from Tor-M2U ADMS ammunition are capable to intercept targets flying at a speed of up to 700 m/s, at a range of 1 to 15 km, at a height of 0.01 up to 10 km, with a crossing parameter of up to 8 km. The most advanced 9M338 SAMs are used in Tor-M2 ADMS. Killing probability is estimated to be close to 100% that makes it possible to abandon previous methods of simultaneous firing of two missiles at one target — today Tors operate following the principle: 'one target — one missile'.

enterprise has developed a program of ADMS upgrade to the Osa-AKM1 level, which provides the system with performance characteristics compared to Tor-M1 ADMS characteristics. As a result, a customer receives a cost-effective option of a fully up-to-date ADMS. Due to competitive price/quality ratio, the product has a large export potential.

A wide range of the special equipment produced by JSC IEMP Kupol will be presented at MAKS-2017 in the form of mock-ups.

Also, a full-scale model of a commander and operator's simulator will be presented at the show; Kupol, IEMP, produces not only ADMSs, but also means for crews learning and training. The simulator provides computer simulation of an air target situation and enables training of crews at minimal cost.

All defense products of Kupol, IEMP are the best in its class. Work on the Tor family ADMSs improvement constantly continues.

Introduction of leading-edge developments within Russian military-technical ideas, continuous re-equipment of production means, strict quality control of products, effective management and personnel care — ensure constant leadership of the Tor missile system in the class of short-range air defense. /RA&MG/

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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.

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

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/

PORTFOLIO EXCEEDS $4 BLN

The leadership of Rosoboronexport, a member of Rostec, took part in the 17th meeting of the Indo-Russian Intergovernmental Commission on Military and Technical Cooperation. The meeting co-chaired by Defense Ministers S.Shoigu of Russia and A.Jaitley of India took place in Moscow.

The permanent Indo-Russian Intergovernmental Commission on Military and Technical Cooperation is an effective tool for cooperation between the two states. The fact that this platform is regularly used to discuss the most urgent issues on the agenda and the high level of co-chairs suggest unprecedented attention that Russia and India pay to such sensitive area as military and technical cooperation.

'In effect military and technical cooperation long ago became one of the basic elements of the Indo-Russian ties. And this is partnership in every sense of the word, for we have traditionally been transferring technologies for production of unique Russian military equipment within the scope of our contacts with India's facilities. Today's portfolio of orders of Rosoboronexport in India is worth way more than $4 bln. And this does not include documents pending signature. There is no doubt that in the next year or two the aggregate volume of contracts signed between India and Russia in line of military and technical cooperation since 1960 will breach the $70 bln. barrier,' says Director General Alexander Mikheev of Rosoboronexport.

Today's military and technical cooperation complies in every respect with India's Make-in-India policy aimed at developing the national defense industry of the country. All military and technical cooperation planning that India and Russia do today is long-term. The current program implemented by the partners covers 2011-2020. This succeeded the 2001-2010 program.

All in all, prospects are enormous for developing military and technical cooperation to the mutual benefit of the countries in all fields of military equipment. Rosoboronexport is ready to cooperate with India in any form, including supply of finished military products, arrangement of their aftersales servicing, as well as transfer of production technologies to India's manufacturers, both state and private, within the framework of the Make-in-India concept. /RA&MG/

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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. Yury 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.'

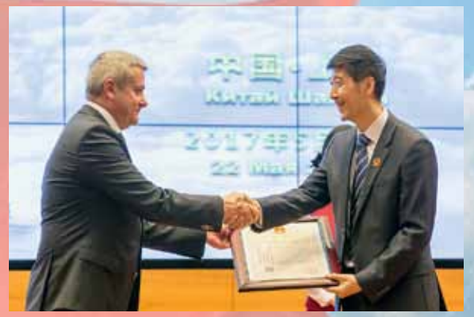
President Yury Slyusar emphasized that 'I am fully supporting to the establishment of CRAIC. It means the long-range wide body commercial aircraft program took the most important pragmatic movement, it also witness the cooperation determination and the succeed expectation by both sides. We would like 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 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/



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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 aftersales service Igor Chechikov.

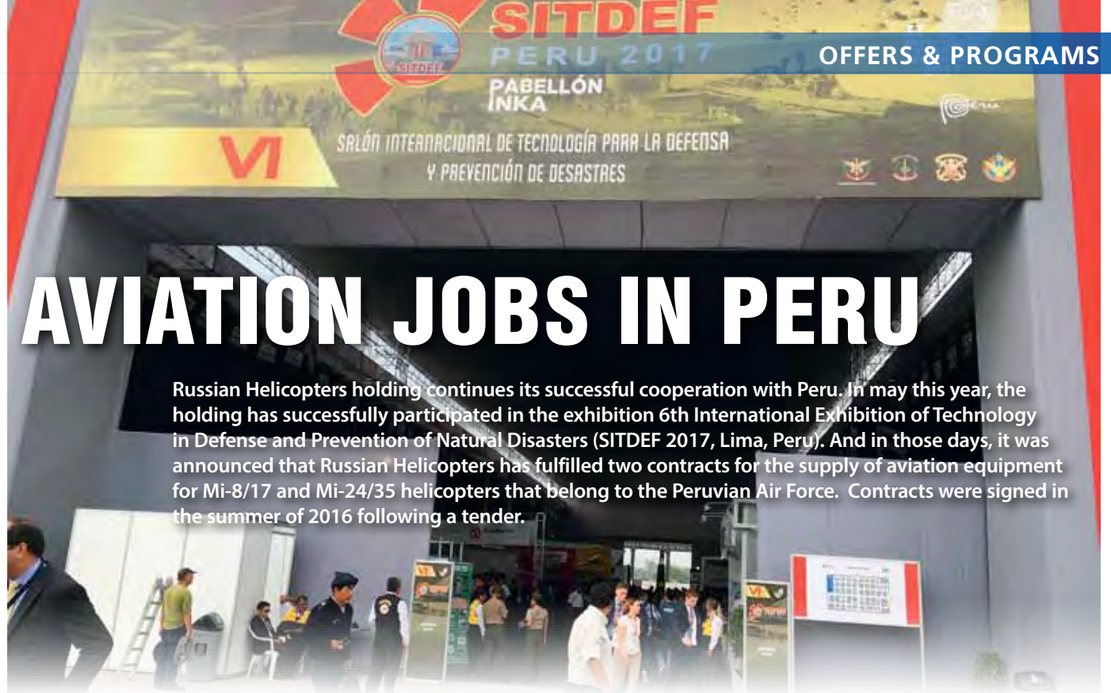
At the exhibition, specialists from Russian Helicopters will present a wide range of civil multirole rotorcraft. Guests will have a chance to have a look at Ansat in its VIP modification and at multirole Ka-32A11BC in the firefighting mode. The military model range will be represented by the Mi-17V-5 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.

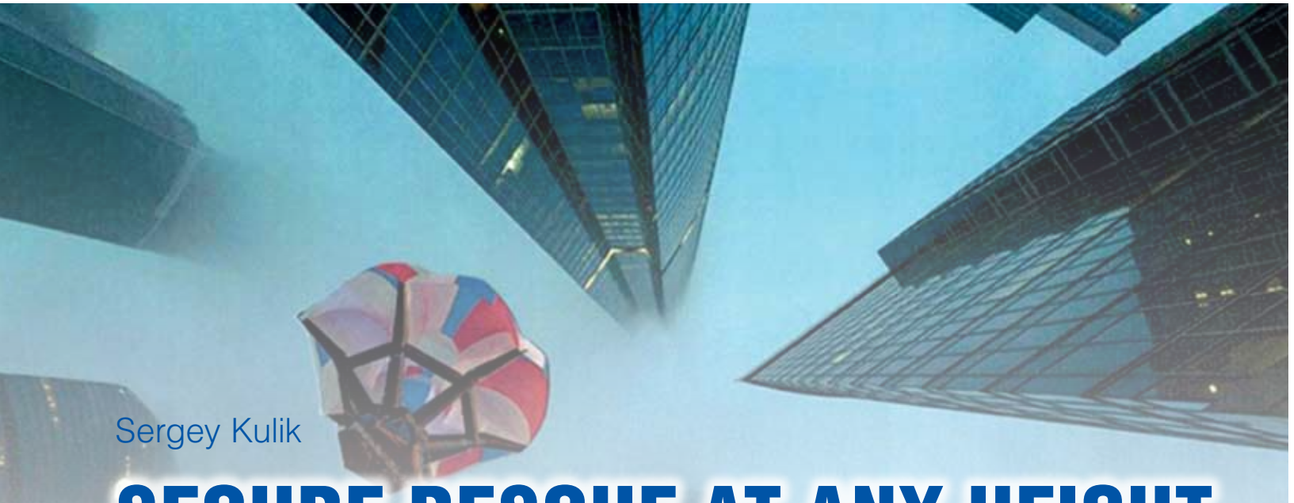
One of the most important tasks of Russian Helicopters is to provide first-class maintenance of helicopter equipment throughout its life cycle. To this end, the holding is actively developing a system of after-sales service in all key regions of the world, including the countries of Latin America. The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

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. 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 VIP configuration was delivered to a customer, and in November Russian Helicopters signed first contracts to supply medevac Ansats to China.

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/



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 develop 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 anthropomorphous (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;
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

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. Aassembled — 900x450x300 mm
    b. In Descent mode — 6,500x2,700mm *(without conopy)*

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

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, Malasia 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 necessary intellectually 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/

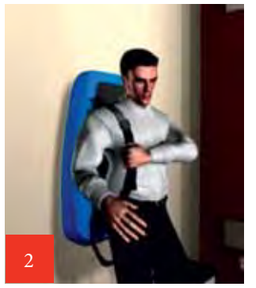
There are following innovations in the proposed SPARS® technology:

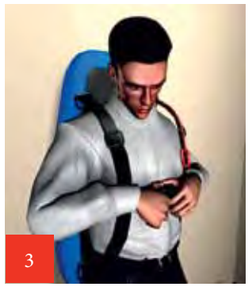
1. A brand new free parachuting technology (means and escape method) was created for emergency escape from heights higher than 50 m where practical methods for safe evacuation of a person are not available on the market.
2. Sinergy solution based on specially designed and produced from film-laminated fabric a rapid inflatable air-beam single volume frame structure for:

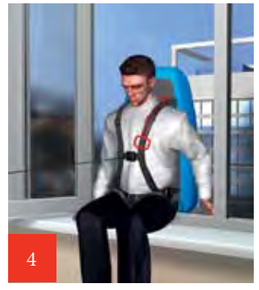
– Elastic catapult ejection of a human from a window of an emergency object;
– Forced deploy of the canopy with only 3÷5 m loss of height and irrespective of air flow speed pressure for deployment (usual parachute requires of 25÷100 m free fall and/or 250÷350 km/h speed of airplane to be deployed);
– 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.

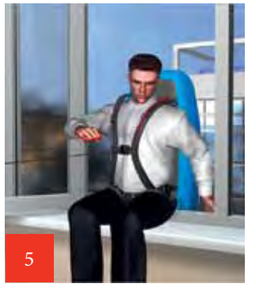
3. Fully automatic mode of usage (after manual initialisation of the apparatus) and all the descend envelope accelerations bearable for an ordinary person make the escape solution available for use by untrained people from 18 till 70 years old;
4. New type of light weight air-proof film coated fabric 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' №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)
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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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