

HELICOPTER INDUSTRY



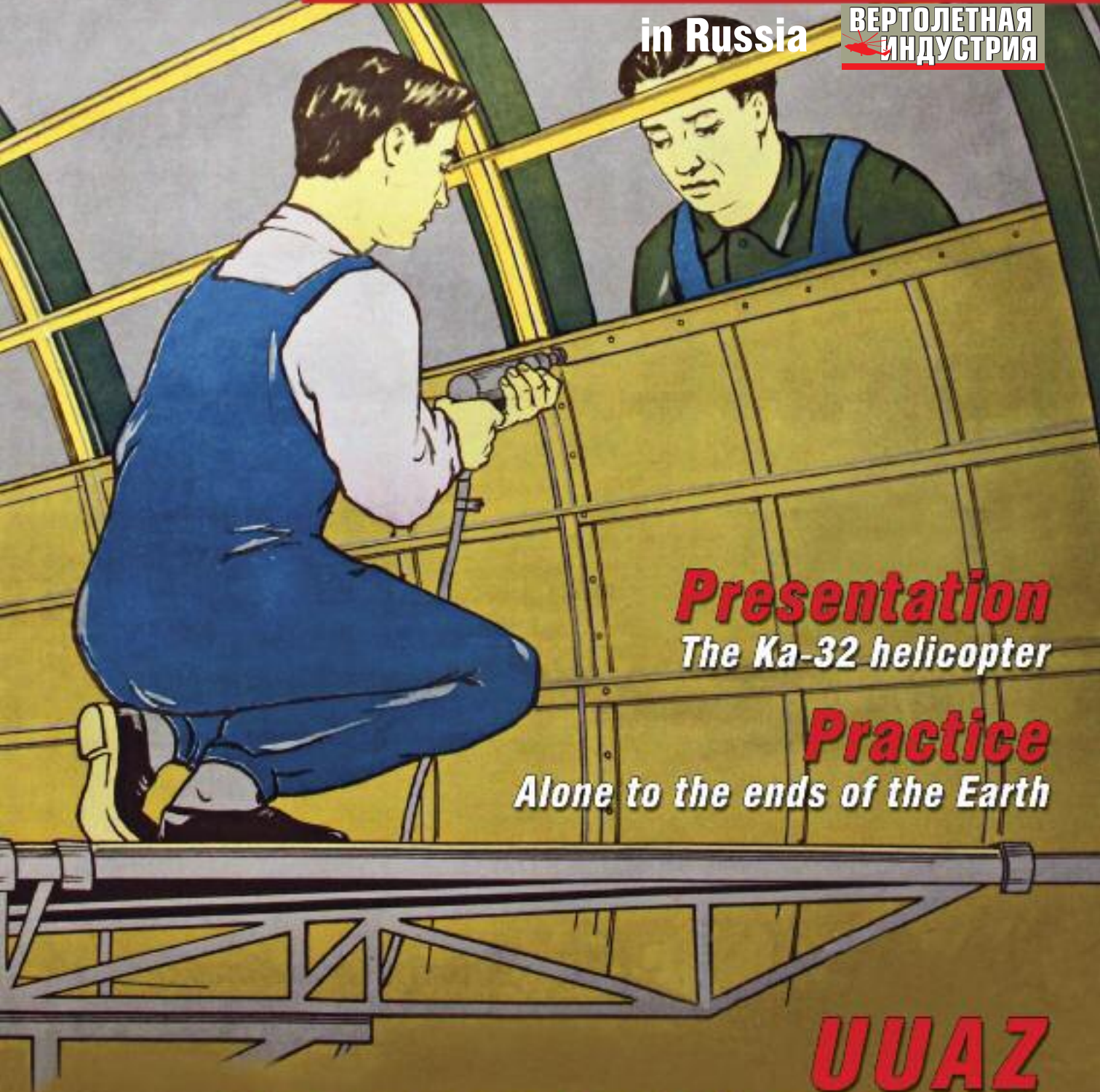
Mart 2010

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ВЕРТОЛЕТНАЯ
ИНДУСТРИЯ



Presentation
The Ka-32 helicopter

Practice
Alone to the ends of the Earth

UVAZ

Most successful helicopter plant



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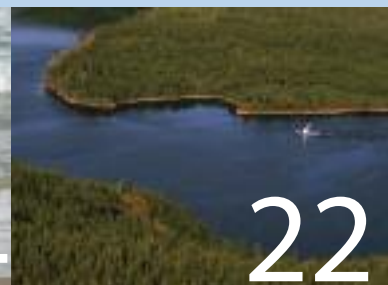
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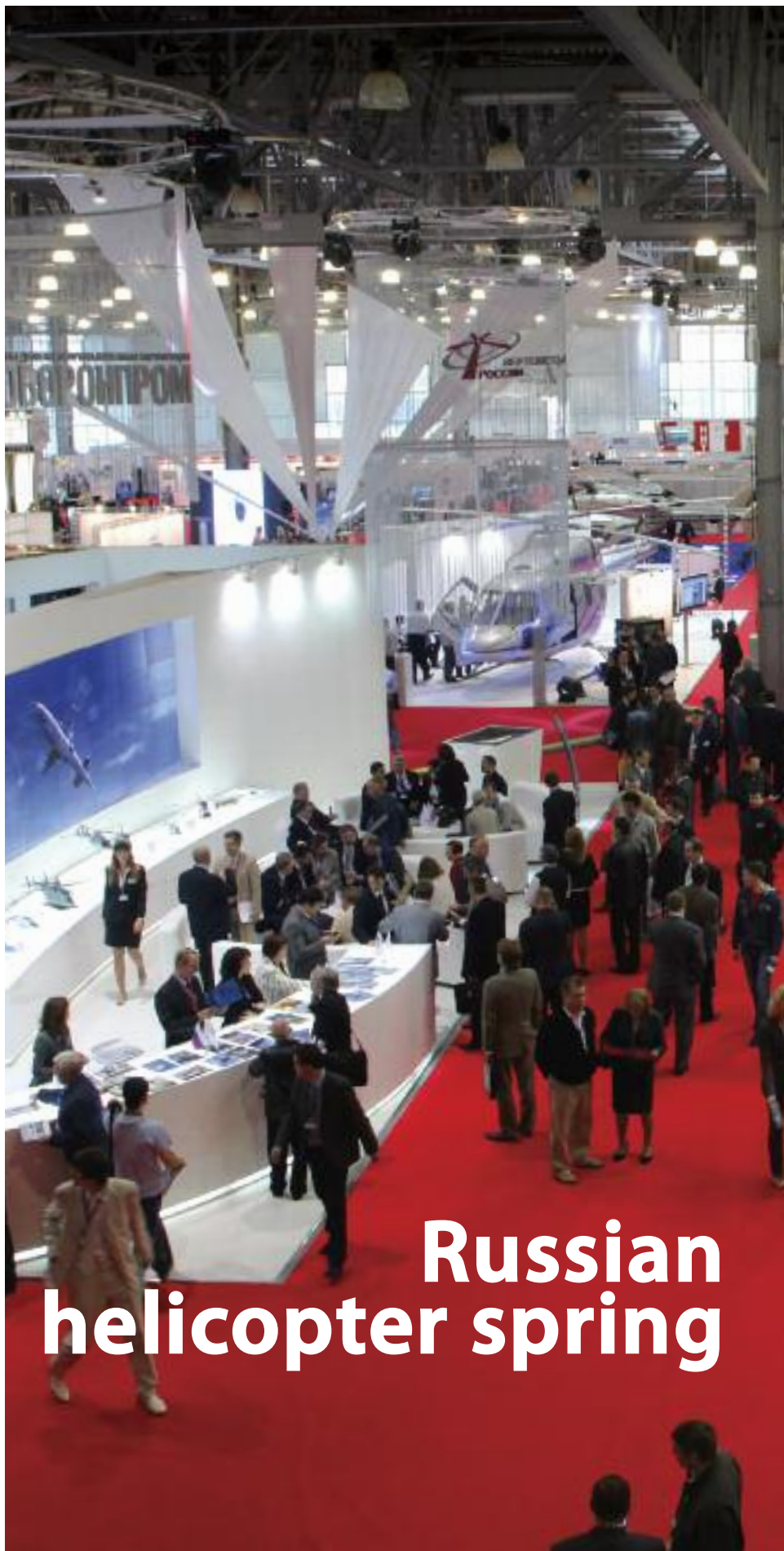
International Helicopter Industry Exhibition HeliRussia 2010 Crocus Expo International Exhibition Center, Pavilion No.1, Hall No.4, Moscow, May 20-22, 2010. For the third consecutive year a comfortable pavilion of the IEC "Crocus Expo" will host the International Helicopter Industry Exhibition HeliRussia 2010.

This is the only international exhibition in Russia where companies from Russia and other countries present world's achievements in every helicopter industry segment, from design and manufacture to operation.

The exhibition is held in accordance with the Russian Government direction and allows demonstrating defense-related products.

Helicopter industry development is one of the top-priority tasks for the Russian Government at the moment. Demand for helicopters in Russia is obvious. Russia is lagging behind other advanced countries in the amount of civil helicopters per head. For example, while in Canada there are 56 helicopters per one million citizens, in Russia there are only 14. The amount of civil helicopters in Russia totals 2 000, which doesn't satisfy the country's needs.

Helicopter industry in Russia is in progressive advance. Demand for Russian helicopters is high both in Russia and abroad. Now they are being operated in more than 70 countries of the world and Russian helicopter manufacturers have sold out their product line for 2010 and about 50% for 2011. Despite all this, such world key helicopter players as Eurocopter, AgustaWestland and Bell Helicopter are expanding their presence in the Russian market.



Russian helicopter spring



First stage of work of these companies in Russia is regarded as rather successful. For example, in 2009 Eurocopter delivered to Russia 15 machines and currently it has a fleet of 66 helicopters in service operating all over Russia. AgustaWestland is carrying out a co-project to establish a final assembly line of AW139 civil helicopters in Russia, the contract for which was signed at HeliRussia 2008. Bell Helicopter sold over 40 helicopters to Russia in 2007-2008.

licopter Industry Association. The planner of the exhibition is CJSC Russian Helicopter Systems. The Steering Committee was chaired by Deputy Minister of Industry and Trade Denis Manturov. Eurocopter Vostok acted as the general sponsor of the exhibition.

144 companies from 16 countries participated in the Second International Helicopter Industry Exhibition HeliRussia-2009. These included: Russia,

insurance companies as well as helicopter dealers.

13 helicopters were demonstrated at the exhibition. Those included: Ka-52 Alligator, Ka-226, Ansat, Mi-171, Mi-2, EC 145, AS 350, BK 117C, Colibri EC 120B and R 44 (4 items).

The participants, organizers and guests of the exhibition received letters of congratulations and telegrams from President Medvedev and Vladislav Pu-



It goes without saying that operation of foreign manufacture helicopters involves demand for spare parts and service. Development of ground infrastructure also requires a wider range of solutions.

HeliRussia-2009 – Second Time in Russia

On May 21-23, 2009 the Crocus Expo International Exhibition Centre (Moscow, Russia) hosted the Second International Helicopter Industry Exhibition HeliRussia-2009 organised at direction No. 8-p of the Russian Government of January 14, 2008. The exhibition was organised by the Ministry of Industry and Trade of the Russian Federation under the initiative of the He-

licopter Industry Association. The planner of the exhibition is CJSC Russian Helicopter Systems. The Steering Committee was chaired by Deputy Minister of Industry and Trade Denis Manturov. Eurocopter Vostok acted as the general sponsor of the exhibition.

The list of participants of HeliRussia 2009 comprised developers and manufacturers of helicopters, helicopter simulators, components, cabins and special helicopter equipment. The companies providing ground support, radar control and helipads development, service centres and fuel stations also had a chance to demonstrate their products. The list of participants also includes transportation, leasing and in-

tilin, the First Deputy Chairman of the Military and Industrial Commission under the Government of the Russian Federation.

The following officials took part in the formal exhibition opening ceremony at 12 pm on May 21, 2009 in Pavilion No 1 of the Crocus Expo Exhibition Centre:

- Mr. Leonid Reyman, Advisor to the President of the Russian Federation,
- Mr. Denis Manturov, Deputy Minister of Industry and Trade of the Russian Federation,
- Mr. Vladimir Popovkin, Deputy Chief of Armaments of the Armed Forces of the Russian Federation, Deputy Minister of Defence of the Russian Federation,

•Mr. Andrey Reus, CEO of OPK Oborprom,

•Mr. Mikhail Kazachkov, Chairman of the Board of the Helicopter Industry Association,

•And other officials.

Advisor to the President Leonid Reyman declared that thanks to the governmental support the Russian helicopter industry has very good development prospects and this exhibition will also contribute to its growth.

pride in its helicopter industry". "The scientific and technical potential that we managed to preserve and the transformation that is happening in the industry now create the basis for coming back to the tasks the domestic helicopter industry has always faced", - he said.

Mr. Manturov added that the Ministry of Industry and Trade together with the helicopter industry representatives consider mutual projects related to the deve-

lopment of the Russian exposition. It presented its developments in cooperation with the Ural Optical Mechanics Plant named after Yalamov and CJSC Transas. The exhibition stand of OJSC Helicopters of Russia ran non stop presentations of Russian helicopters, which gathered big audiences.

Over 30 foreign helicopter companies took part in HeliRussia 2009. The list included such leaders of the world heli-



Mr. Reyman read out the message of Russian President Dmitry Medvedev addressed to the guests and participants of the exhibition. It was stated in the document that "the Russian helicopter industry has big scientific and technical potential and traditions". "Such exposition will foster the exchange of technologies and strengthen international cooperation in the helicopter industry", says the message of the Russian President. It also states that "the growing number of the exhibition participants and guests testifies to the good perspectives of this show space".

In his turn, Deputy Minister of Industry and Trade of the Russian Federation Denis Manturov who was present at the ceremony noted that "Russia had always taken

development of a new line of Russian helicopters.

Over a hundred of Russian companies (both members of OJSC Helicopters of Russia and independent manufacturers and operators from the regions) presented a large scope of expositions. Samples of military products were also demonstrated at the exhibition showing the spectrum of national achievements in this field. The most striking example of defence products was the military helicopter Ka-52 Alligator, which was exhibited before the public outside of Crocus Expo Pavilion No.1.

The helicopter holding company OJSC Helicopters of Russia was in the

copter market as Eurocopter, Bell Helicopter, MD Helicopters, Turbomeca, Becker Avionics, Pall Corporation, Breze-Eastern, Honeywell Aerospace, Kamatics, Simplex Manufacturing, Semia and others.

The exhibition was visited by the representatives of INTERNATIONAL HELICOPTER SAFETY TEAM, and its Program Director Mark Liptak made a presentation at one of the conferences. The Helicopter Association International (HAI) has become a traditional participant of HeliRussia. This year its delegation not only organised an exhibition stand but also participated in the international conference Helicopter Market: Reality and Perspectives.



Ambassadors and military attachés of Bangladesh, Bolivia, Egypt, Korea, Thailand, Peru, Libya, India, Indonesia, Germany, Israel, Canada and other countries expressed their interest in the exhibition.

A big business programme was part of the exhibition. One of the key events was International Conference Helicopter Market: Reality and Perspectives, organized by Helicopter Industry Association with the support of AviaPort Agency. The conference touched upon the parameters of the Russian helicopter market from the point of view of consumers and helicopter producers. The presentations included: report on the forecast of the world helicopter market by Honeywell Aerospace (Market Analysis Director Charles Park), report on the American helicopter market by Helicopter Association International

(Vice-President Edward DiCampli), report on the Russian helicopter market (Chairman of the Helicopter Industry Association Board Mikhail Kazachkov), report on the development prospects of the biggest Russian helicopter operators Aviation Company UTair. The conference was held on the first day of the exhibition and caused a broad resonance among the Russian helicopter market participants.

There is a big number of Russian helicopters being operated in the world and therefore the helicopter holding OJSC Helicopters of Russia held a conference Safety of the Russian Helicopters, which was interesting both for Russian and foreign operators.

Reduction of costs, optimization of business processes and work perfor-

mance improvement seem to be the most vital tasks for manufacturers of helicopters and components as of today. One of the most powerful and effective instruments for solving these tasks is the world-wide acknowledged methodology of lean production (Lean Production, Lean, Kaizen, Toyota Production System). Almost all the world industry leaders – Boeing, Sikorsky Aircraft Corporation, Bell Helicopter Textron and others – build their production systems on the basis of Lean Production. As part of the business agenda of HeliRussia 2009, Centre Orgprom conducted a presentation seminar Lean Helicopter Manufacturing: Leadership Potential, where it explained the philosophy and methodology of Lean Production using the examples of foreign and Russian companies and presented instruments that help to achieve quick and effective results.





Seminar named Program and Project Management: Industry, Objectives, Implementation Methods organized by PM Expert was dedicated to the optimization of corporate management methods.

It was allowed to demonstrate military products at the exhibition; and for this target group the Military Academy of the Central Command of Armed Forces and the Military and Scientific Committee of the Military Aviation Forces conducted the round table "Development of the State Helicopter Aviation: Problems and their Solutions".

The third day of the exhibition was totally dedicated to the presentations of the educational institutions. Seven training institutions, including the Moscow Aviation Institute and the Helicopter Design Department, held presentations and MAI presented the developments of its design office at the exhibition stand.

The newspaper ShowObserver HeliRussia 2009 was published during the exhibition.

Over three days the exhibition was visited by more than 7 thousand people, including prominent political leaders and public officials of the Russian Federation and other countries, representatives of foreign military departments, businessmen and helicopter amateurs. The exhibition was visited by a big number of families with children who enjoyed exploring the helicopter cabins of different producers.

It should be noted that one of the honoured guests of the exhibition – Head of

the Federal Security Service Aviation Nikolay Gavrilov – came to see the exposition in an Ansat helicopter that landed close to the entrance of the exhibition pavilion.

Already now one can come to a helicopter exhibition in a helicopter and for that one does not need to own a helicopter or use the company one – one can use the helicopter taxi services.

The international helicopter industry exhibition is an integral part of the growing market where a manufacturer can showcase their product and a consumer can view it with their own eyes, place an order or make a purchase.

HeliRussia not only gives a chance to show the achievements of Russian industry but also attracts the best companies of the world to the Russian market,

thus contributing to the development of international cooperation in helicopter industry across the world. It gives the perfect opportunity to meet industry leaders, company CEOs and discuss cooperation matters.

In his welcoming letter to the guests and participants of HeliRussia 2009 the President of the Russian Federation Dmitry Medvedev said, 'Such expositions help exchange advanced ideas and latest technologies, boost international cooperation...Russia is a unique and perspective platform for trade and economic development in this area.'

We are confident that it will be even more interesting and diversified.

We look forward to welcoming you at the HeliRussia 2010!

JJ-PRIN AERO

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Ka-32

A BREAKTHROUGH IN EUROPE



This fall the helicopter community of Russia enjoyed a remarkable event: the Russian helicopter Ka-32A11BC, our only rotary-wing certified by tough American regulations FAR29, cleared another height. Now it owns the type certificate of the European Agency of Security in Aviation (EASA) meaning “green light” in Europe. The competition on the world market of civil helicopters being extremely powerful, such recognition inspires nothing but respect and admiration...

The way to become a star...

Far away in 1981, when the experiment of using the helicopters Ka-32, Mi-8 and Mi-6 for timber removal was carried out, the results proved to be a nice surprise for many experts: a heavy-medium of “Ka” brand went almost head-to-head with the heavy-weight Mi-6. This was not the case of surprise of the Ka-32 engineers: they knew what they had created.

The 32nd was designed with the stake placed on the maximal usage of the coaxial idea – small hull and high manoeuvrability. And they produced a real “flying crane”. Moderate dimensions, absence of tail rotor and amazing manoeuvrability in the vicinity of buildings and various obstacles made it indispensable not only in moving timber, but in building and construction works.

Further on, during many tests the helicopter implacably kept proving its right for existence, and finally its official certification became the issue. To increase the demand for the “product”, the designers decided to upgrade it making modern flight security requirements and operation costs the corner-stone idea. The result of the designer and development works was the improved Ka-32A machine which appeared in 1990.

The new rotary-wing was equipped with the state-of-the-art navigation and avionics units and a good locator that enhanced reliability of performance at day and night time, in adverse weather and even in possible icing. But one of the undoubtful bargaining chips turned out to be the option of pilotage only by one rotorhead, for all operators have been famous for their cost calculation abilities...

No wonder that pretty soon the success of Ka-32A awoke interest of the foreign customers. However, in order the western companies could freely purchase the Russian machinery, the mandatory certification of Federal Aviation Regulations (FAR) or Joint Aviation Requirement (JAR) of Europe was necessary. This became possible after the Aviation Registry of the Interstate Aviation Committee (IAC) commenced the airworthiness codes of the U.S.A and Russia recognition procedure.

For almost three years in tough economic conditions the members of the development design office exerted mountain of efforts to implement the issue. Finally, in May 1998 the company had big amount of certification and testing works of the helicopter and engine (TB3-117BMA) successfully completed. The labors were not vain, and that year Transport Canada obtained the type certificate for the modification of the Ka-32A11BC machine to be operated by the VIHLogging company, and the aviation authorities of Switzerland certified Ka-32A12 to be operated by Heliswiss.



Ka-32A11BC specifications

Takeoff weight, max., kg	11,000
Full load (standard specs.), kg	4,200
External load, kg	5000
Full with external load, kg	12700
Engine	TB3-117 BMA "Motor Sich"
Output	
- takeoff, h.p. (kW)	2x2200 (2x1619)
- cruising power, h.p. (kW)	2x1700 (2x1251)
- 1 eng. 2,5 min., h.p. (kW)	2400 (1766)
- 1 eng. 30 min., h.p. (kW)	2200 (1619)
Flight data:	
Operating ceiling, m	5000
Operating ceiling, 1 eng.:	
- IUA1, m	2000
- IUA1, +20 °C, m	500
Hover ceiling with ground effect:	
- IUA1, m	4300
Hover ceiling w/o ground effect:	
- IUA1, m	3700
- IUA1, +20 °C, m	2600
Ascensional rate, max., m/s	15,0
Speed, cruise H=0, km/h	230
Speed, max. (VNE), km/h	260
Flying range with standard fuel, km	670
Flying range with fuel in add. tanks, km	920
Flight duration with standard fuel, w/o reserve, h	4,4

In the den of competitors

It was as far as in 1992 when the Heliswiss owner Joe Reedy proposed Kamov company to make use of the Russian helicopters in moving timber and at other works. This was mainly due to the fact that, pressured by the green, the laws were passed in a few countries forbidding usage of tracked vehicles in timber logging, and forest operators willy-nilly had to remove timber by air. To do this, for example in Europe the helicopters of the European consortium Eurocopter were used. It turned out, however, that even the latest model of Eurocopter – AS 332 Super Puma – yields Kamov's machine the majority of points, to say nothing of the price. Astute Reedy had backed the right horse, and Kamov's team, in the toughest competition, managed to be both feasible with buyers, and demonstrated unrivalled skills of experienced negotiators, too.

When the Swiss first got Ka-32 its operation costs per hour were about \$2000. Thanks to maintenance benchmarking this amount lowered down to \$800! The developers kept moving in this direction and managed to extend the overhaul period of gear assembly from 500 to 2000 hours, and even more extension to 3000 hours was scheduled.

Of course, such approach went not without keen attention. This is understood in Canada, especially in the VIH Logging company, with their helicopters mainly engaged in timber logging – one of the most complicated type of operation for a rotary-winged aircraft. VIH Logging Ltd., the branch of VIH Aviation Group, is the second largest operator in the country having 49-year experience of helicopter operation. Indicative is the fact that these are our Ka-32A11BC helicopters that have been operated by the company for 11 years already. It could not have been otherwise, for during this period the Russian machines haven't had a single inflight accident or emergency landing.

Moreover, since 2002 the experts of Kamov company provide helicopter service maintenance for the sake of continuous airworthiness and compliance with the flight security regulations. Our helicopter is highly appreciated by the company itself with the emphasis that Ka-32A11BC has proved its ability for highest security levels and extended operation to perform unconventional tasks.

It has also been noted that the overall design of the helicopter was more secure than that of any helicopter type with the

tail rotor for rudder control, for absence of tail rotor leads to increased stability and manoeuvrability. So, it is no wonder that here it successfully competes with such brands as Sikorsky and Bell.

The sky is the limit

The Kamov team, however, is not about to bask in the sun. To maintain their leading positions they keep improving the Ka-32A model.

The program will be worked out in three main directions: increase of airlift capability, altitude performance and engagement of various equipment options.

To enhance airlift capability of the helicopter new main rotor blades are planned to be used that passed the tests and confirmed their specifications.

In the future it is planned to replace the TB3-117 engines for those of increased capacity – BK-2500, which would increase the airlift capability of the machine up to seven tons.

The helimen say that in that case the machine would have no rivals. See it yourself: a crop tree of fine wood weighs about 5-7 tons, so its removal without severing will yield boards of the length up to 8 m, and those are twofold more expensive than those of 6 m.



The increase of altitude performance will be implemented as on account of the engine replacement, so that of the currently used auxiliary power unit (APU) for more advanced APU TA-14.

All this would enable the helicopter to rocket up to the height of more than 4000 m. The developers also cared to increase flying range of the machine, especially with the external load sling system.

For this, two additional fuel tanks will be installed on a special frame on the helicopter (500 l each) which would increase the flying range from 800 to 1000 km, and the duration of up to 4,5 hours. By the way, one such helicopter is already built for an Irish company.

And the last but not least: today Kamov JSC negotiates a new variant with the potential customers – a helicopter airliner Ka-32-11 with the same engine unit, main rotor, main gear and other power-plants as on Ka-32A11BC but with the modified hull.

Such machine is intended to carry 20 passengers, it will be equipped with the WC and luggage compartment. Besides, all the inboard furnishings will be completely different.

Altogether, the future of this unique helicopter appears to be quite successful. Today, apart from Canada and Europe, this helicopter has been certified and operated in several more countries accepting the FAR 29 regulations – in Taiwan, Mexico, South Korea, China, Japan, Indonesia and Chile. And the developers still make (not ungrounded) plans of conquering the world!





Refitting Russian

The HeliRussia Exhibition should become a meeting point for the western consumer and refitted Russian helicopters

Helicopters

Some time ago certification and maintenance of Russian helicopters was a big problem for European operators. But then, little by little Russian helicopters started to obtain certificates in different countries.

However, the general problem of western operators continues to be the imperfection of the on-board equipment and security facilities of home-produced machines as well as the unbiased differences in the standards of certain types of equipment. Accordingly, very soon the refitting of Russian helicopters became problem number one for those companies that were impressed by our machines but were not happy about the level of navigation, safety and comfort.

Apart from their solid, reliable and simple structure Russian helicopters remain notably cheaper than their western counterparts, even despite their

renowned resource limitations; they are also cheaper in operation.

The best known example of such modernization of Russian aircrafts is a thorough refitting of Mi-8 helicopters with participation of the British Bristow Helicopters. Providing offshore transportation services, Bristow Helicopters first began its cooperation with the Mil Design Office in 2000 when it started a joint venture with an operator company in Kazakhstan that used Mi-8 developed by the Mil Design Office together with Russian crews when constructing a pipeline leading to the Black Sea. The participation in this project and the Mi-8 operating experience inspired Bristow for expansion of business contacts in 2003 – this time in Sakhalin. The Russian helicopter fleet that was deployed there included five Mi-8MTVs, two Mi-8Ts and three Dash-8airplanes, performing flights be-

tween Sakhalin and Korea and the continental part of Russia. The latter were leased to a local airline for servicing an oil and gas project on the island with participation of a joint venture created together with the Exxon Mobil oil company.

To begin with, the cabins were equipped with seats with high backs and restraint harness as a safety improvement measure. Then Bristow Helicopters installed an on-board unified HUMS system, which now has become obligatory for the airplanes and helicopters used by the employees of Shell and other big companies. The selected system has two components: a vibration control system that was developed by the Central Institution of Aircraft Motor Industry (CIAMI named after P.I. Baranov) in Moscow and a trail control and rotary wing balance system ROTAB developed by the Meggitt Avionics Company. In Russia HUMS is

called an on-board control and diagnostics system (OBCDS). For the first time this device was installed at the Mi-8/17 type helicopters.

What impressed the management of Bristow Helicopters in Mi-8 was its trouble-free operation in extreme temperature conditions. The temperature may drop down to -40°C in Sakhalin and rise up to $+40^{\circ}\text{C}$ in the Caspian Sea area. After having a positive experience in Sakhalin with such an impressive scope of work the company decided that this helicopter should be used for socially useful purposes including search and rescue operations, patients' transportation and collaboration with UN.

Another good example of equipment customization is the employment of helibuckets produced by Simplex Manufacturing compatible with Ka-32. The employees of the Spanish company Helisureste were impressed by the Ka-32 helicopters during summer fires in Europe in 2005. Back then, the Kamov helicopters went through serious trials. Ka-32 brilliantly performed their tasks in the hot atmosphere and at high altitude, they did not create any problems for the pilots at the constantly changing side wind and

could simultaneously drop 4.5 tons of fire retardant. Now Helisureste works directly with the Kamov Experimental Design Office in order to develop an even bigger capacity to compete with Mi-26.

At the Second International Helicopter Industry Exhibition HeliRussia that took place in May last year in Moscow, there were represented a few western companies producing on-board helicopter equipment whose expositions were directly addressed at the Russian producers and specialized on-board equipment designers. Among them there were following companies: German EuroAvionics, the leading producer of digital maps and helicopter flight managements systems; Pall Aerospace, the leading developer and producer of safety filters for all aircraft systems from hydraulics to the cabin air; the most experienced producer and developer of passive security tools in the world, the Martin-Baker Company; and the French Semia, a company that specializes in monitoring devices for helicopter rotating components.

Apparently, the perspectives of this topic development are related to mutual developments. However the western operators admit that the exploitation of Russian

machines is still related to many problems which need to be resolved. One can hardly find more than ten non-Russian companies that could boast of a more than five year operating experience with these rotary-winged aircrafts. However, the number of such companies will grow every year.

The new European helicopter industry exhibition site located in Russia – HeliRussia – should make the life and work of such companies much easier. The Third HeliRussia 2010 exposition that will take place in Moscow in May this year will provide the professional exhibition participants with an opportunity to discuss and find solutions of similar problems within the business agenda, considering the successful experience of the last forum. The problem concerns not only the western consumer but it also becomes more and more vital for the internal Russian market. Here the leading world aviation equipment producers begin to see the perspectives for distribution development and cooperation. Certification and operation of Russian aircrafts in the western countries and familiarization with the successful experience of its refitting can become one of the important topics for the coming helicopter industry exhibition in Russia.

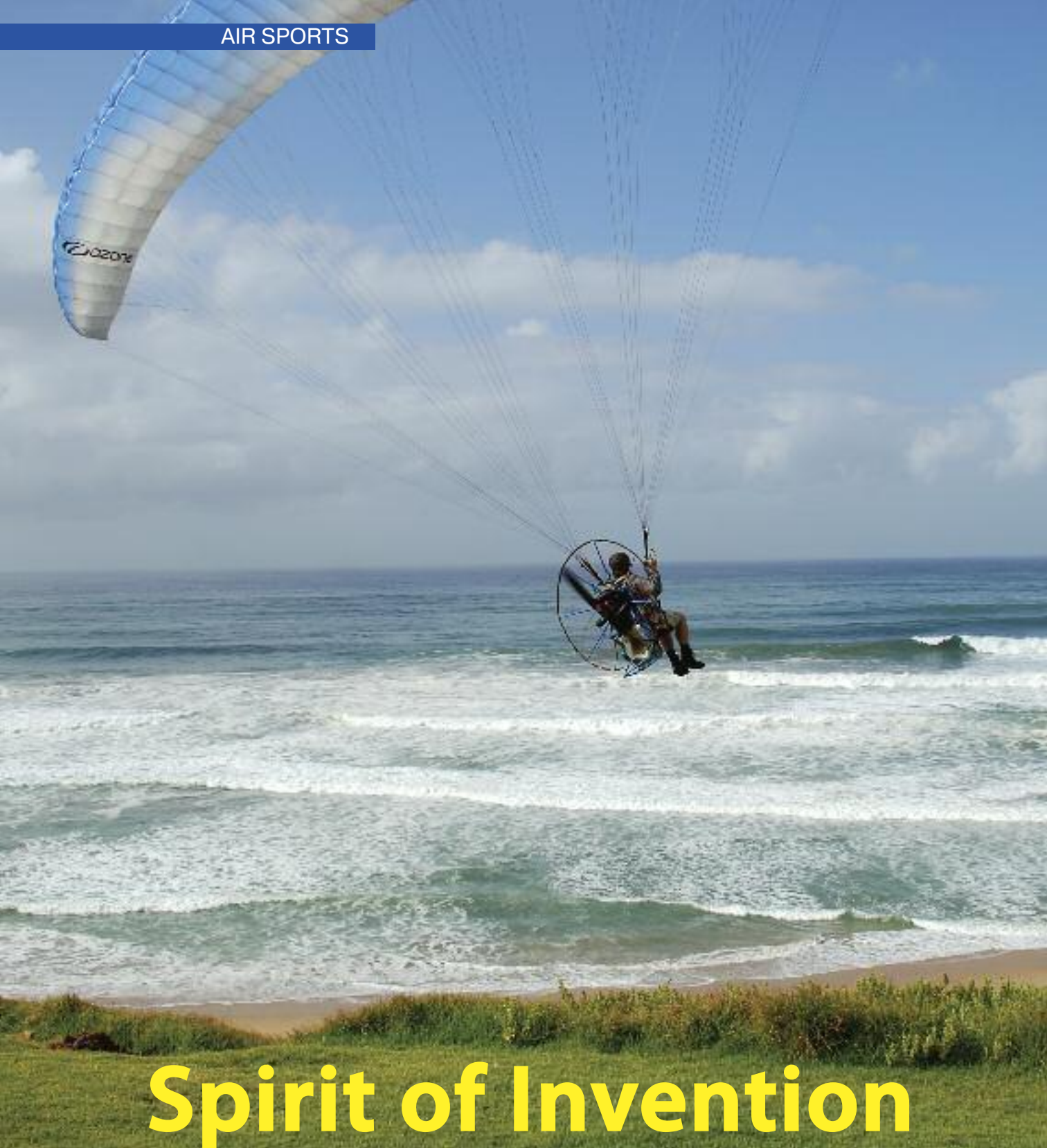
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Spirit of Invention

It is widely known that Russian inventors made a great contribution in the helicopter industry. Besides famous constructors - Igor Sikorsky, Mikhail Mil, Nikolay Kamov and Frank Piasecki, parents of whom were Russian immigrants – there are thousands of Russian engineers who took part in the helicopter designing.

However, many people think that the reason of that fact is not in helicopters

themselves. Spirit of Invention is used to be an important part of “mysterious Russian soul”. Aero 2010 participant Vasily Uvarov from JSC PP Flag-Man and his “Paraportator” proves it.

Paramotor is the system of paragliding canopy and engine with a propeller located on pilot’s back. Many people might have seen pilots of such devices at different air shows. Construction of

paramotor is well known and has a variety of modifications. But in spite of the fact that paramotor is one of the most compact and easy flying devices such a machinery is quite heavy and needs a complicated assembly.

That’s why a fan of extreme sports, aviator-inventor from Moscow Vasily Uvarov decided to develop and construct the most compact paramotor in the



Foldable frame design

The unique frame design allows the paramotor to be folded forming a compact and strong container structure. This 75*42*34 cm provides protection to all sensitive parts of the engine that is usually sufficient for common transportation means.

Convertible harness

When the paramotor frame is folded for transportation the harness is wrapped and zipped around the frame in such a way that all its important elements - straps and buckles get inside the package and well protected.

Delta-shaped attachment system

An innovative low hang point attachment system allows to adjust the motor inclination in flight and has lower total weight and better pitch stability than PAP-style straight bars.

Harness bars folding backward

The original construction of the harness suspension system allows the harness bars to rotate 180 degree and pack into the frame for transportation without detaching any harness elements and using any locks.

Compact and fast to assemble cage

Due to patented fast locks assembly and disassembly of the protection cage are fast and error-free. The cage is strong and rigid enough when mounted while its elements are extremely compact when disassembled.

Ergonomic one-finger throttle

The one-finger operated throttle makes easier handling during take-off and gives more control and comfort in flight.



world, which would have needed minimal pre-start preparation. "Not more difficult that to arrange a folding bike!"

Convenient and fancy bag weights approximately 20 kilograms and holds practically the whole "aircraft" – frame, engine and fuel tank. Only light wooden propeller and "the wing" (which is the common name of paraglide itself) stay out the bag.

**ВЕРТОЛЕТНАЯ
ИНДУСТРИЯ**



Mi-28N



Leader of the Russian helicopter industry

* -UUAZ – Ulan-Udensky Aviatsionny
Zavod (Ulan-Ude Aviation Plant)



Ulan-Ude Aviation Plant is a traditional rival of Kazan Helicopter Plant on the foreign market. UUAZ* manufactures Mi-8 helicopters and their upgraded version Mi-171 which is one of the most widely used helicopter models. In addition to helicopter products, UUAZ has also manufactured such combat aircraft as Su-25UB and Su-39.

Ulan-Ude Aviation Plant is one of the leading enterprises of Russia's aircraft-building industry and military-industrial complex. The company was founded in 1939 for repair services of I-16 fighters and SB bombers. During the World War II it produced La-5 and La-7 fighter airplanes. In 1956 the factory stepped into the epoch of helicopter production. A considerable part of the factory's history is devoted to manufacture of the most selling Mi-8 helicopter, started in 1970. The factory has produced over 4000 of Mi-8 helicopters altogether.

An important stage of the factory's history was mastering the production of Mi-171 helicopter in the first half of the 90-s. Mi-171 helicopter is a deep modernization of Mi-8 helicopter. When producing Mi-171 helicopters, Ulan-Ude Aviation Plant started cooperating with western companies, manufacturing avionics and special equipment, which was introduced on this helicopter.

Now Mi-171 helicopter is one of the most intensively operated medium/heavy helicopters in the world.

In the latter half of the 90-s the factory started the production of Mi-171Sh military-transport helicopter, equipped with missiles, rockets, and guns. The helicopter has passed the series of tests, and starting from 2002 its first deliveries began. Within a short term Mi-171Sh helicopter was put into military service in a





ВНУТРИ АГРЕГАТА
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number of countries in South-East Asia, Near East, North Africa, Western Europe (including the NATO countries), CIS.

In 2005 Ulan-Ude Aviation Plant started production of Mi-171A cargo-passenger helicopters. This helicopter was developed on the basis of Mi-171 helicop-

ter. The helicopter has successfully passed the certification procedure at the CTA Aviation Register of Brazil, the requirements of which comply with FAR-29 aviation regulations.

As of 2009 its main products include Mi-8T, Mi-171, Ми-171Sh helicopters,

and Su-25UB and Su-39 attack aircraft. The company also produces household items.

In 2008 the company was given the annual "Russia's best exporter of the year" award by Ministry of Economic Development and Trade of Russian Federation.



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XXI Century Electro-Items Design Office JSC (XXI Century EDO JSC)

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Alone to the ends of the Earth Robinson R22 flight record

On 4 August 2008 Russian Air Sports Federation (RASf) registered a new national record. A single flight from Moscow to Yakutsk performed by amateur pilot Sergey Ananov who piloted a light two-seater Robinson R22 was successfully completed in the airport of settlement Magan, Republic of Sakha (Yakutia). Sergey Ananov's flight became a record flight for this type of helicopters.

Told by Sergey Ananov:

- It started about 7 years ago. The desire and opportunity to rise above the little things of life turned me into a passionate traveler. I began going on expeditions mainly by an offroader always with a purpose of exploration. It's more interesting this way. However, the main thing for me has always been the space crossing process itself.

29 July. On the starting date I quickly shove my things in their usual places on board the helicopter at the Bunkovo site. Then I hear someone shouting that I can take my time: they have introduced a closed mode for 2 hours.

There is nothing I can do about it. I check everything all over again: tent, sleeping bag, satellite communication, packed lunch, water, motor oil, octane-selector, funnel, filter, ignition plugs, tools, octanometer, flight charts, two GPS-plotters, test GPS-logger, video-camera.

At last at 13:30 I am allowed to start. I null the logger and the computer. It's time to take off. The countdown starts. The route lies up to the Moscow Ring Road, then through Chelobityevo into the Chkalovsky area. Here I experience the first agitation, but it's a standard situation: "Mostik" let me pass through Noginsk, Larionovo towards BAROK. In three hours I will land for topping up in Podnovye (Nizhny Novgorod).



The rain presses me to hurry up to get the fuel. I am also very short of time: it's only 3.5 hours before the sunset. I hardly manage to make it to Kazan because of the two-hour flight delay in the morning. The Volga stays behind. I am skirting Cheboksary from the south.

There are very beautiful flood flows, flood basins of bizarre forms and water reservoirs in Tatarstan. At the sunset I am nearing Kazan. Before I reach the Kurkachi airdrome I have to make an inconvenient detour around the city from the south. I calculated the point at 20:32. I can make it until the end of the flying day (20:45). When I reach the place I cannot see any airdrome!

It turned out that the coordinates on the map were wrong. I request bearing on the radio. Everything is near but sideways. The landing is at 20:43 (!). The computer shows the mileage: 941 kilometers. And immediately I have to meet the local personnel.

30 July. The target of the second day is to reach Yekaterinburg having passed the Urals. That is 740 kilometers more. It would have been more logical to fly via Chelyabinsk. It would have been shorter. But the mountains are higher there as well. The average difference is about 500 meters. They may prohibit me to go there because of the weather conditions. Therefore I head more to the north and go through Neftekamsk. On the outskirts of Pervouralsk, 30 kilometers to the west of Yekaterinburg, I find the Aerocity landing site. I get a hearty welcome. I am escorted to a hotel in town, which is a definite three star hotel by European standards.

31 July. On the third day I am supposed to be in Omsk. I go to the south through the Kurgan area and get topped up at a navitop near a lake. Generally speaking, the whole way to Omsk consists of lakes, round and apparently shallow. They are just craters filled up with water. There are almost no forests.

The on-board ultra-short wave radio station catches the signal at 100 km, even at the flight level. There is no connection at the responsibility zones of the local dispatcher point. "Upper" boards always come to help. The airplanes at the level of 10,000 meters can hear everybody.

Near Nazyvevsk the local air line runs 50 kilometers away from the Kazakhstan boarder. The Maryanovka airdrome is straight ahead. I can see an unpaved runway, a few AN-2 and people beside them looking after the old machinery. That day I "scored" another 903 kilometers.

There is no aviation gasoline in Marianovka.

For the first time during the flight I have to use the fuel that I will be able to get at a normal fuel station instead of 100LL. Fortunately, it turns out that there has been opened a new fuel station that has A98 gasoline. I take a car and get my fuel by the evening using oilcans.

1 August. In the morning I, as usual, go through stamps in the documents, requests, conditions and then Lycoming ta-



stes the petrol from Omsk. Getting prepared for the flight I have certainly foreseen topping up with contingency fuel. To my order there has been developed and manufactured a device for engine detonation control. At the first detonation signs the lamp and the voice in the headphones won't let me to be carried out by the flight.

There are no problems with the A98 petrol from Omsk. I go to Koshkul via Tatarsk along the railway which goes the same way. I get fuel two hundred meters from the railroad body. The train greets me with a honk. I can imagine how astonished the passengers are. After Barabinsk I cross the Novosibirsk water reservoir. I approach to land in Yevsino from the south.

This is the ROSTO airdrome. Things are humming – flights, parachute jumpers, glider pilots – it feels great! I have lunch in the cafeteria and a quick filling. They have brought 100LL specially for me. Dmitry Rakitsky from Moscow sent me a text message warning me not to miss the solar eclipse. Today is the total solar eclipse and its center is right in Novosibirsk. Well, there are still two hours before the eclipse and I still have a plan to go to Krasnoyarsk.

I witness the eclipse during the flight!

It's hard to believe. It's a pity that the sun is behind my back – it's not convenient to watch it and the sky is covered with clouds. It has become very dark. Everything around has turned dark-red, both the clouds and the mountains. It's like being on Mars. Very impressive!

I fly in the dusk for about 20 minutes through the Kemerovo zone, Mariinsk and Achinsk. I crossed the Yenisei and reported on my landing in Kouznetsovo. I made another 1,303 km that day. "Terra incognita" was expecting me after Krasnoyarsk.

There exists some invisible border: it is all known before Krasnoyarsk and many people have flown there, but after it there is a completely wild territory and nobody knows anything. The Aviakominfo maps stopped being supplied in Novosibirsk. Area-by-area local air lines schemes were very handy. Although they don't have a topographic pad and coordinated, they reflect all positions and preserve the scale. Having such schemes it's easier to find points on electronic maps and lay the route.

2 August. The objective of the next day is the town of Kirensk with the only airdrome. Having taken on board 220 liters of some "Finnish" A98 gasoline (40 Rubles per liter) I skirted the Yenisei Range (688 m) and reached Bratsk via Kansk. A nextensive thunderstorm with black clouds and a characteristic rainfall center hung above it. I should have passed the airdrome on the route but requested alignment due to weather conditions and got the permission. I cut down about 20 kilometers over the Bratsk Sea.

The topping up is planned at the Zheleznogorsk airdrome. I was warned that the facility was not functioning. When approaching it my heart sank. The wide conc-



rete helicopter deck was covered with grass. Air sheds, tanks, and engineering facilities – everything was in their places, even a two-level passenger terminal. But everything was empty, not a single person, not a single equipment unit. I recalled Will Smith in I Am Legend, when he found himself in the desolated New York after a cataclysm. Having topped up the tank using my fuel supplies, sneaking towards me, being very tense... My guileless smile and two arms that I stretched out to greet him dissipated the tension. I was his first guest for many days.

The end of the way lies through Ust-Kout and Vekhne-Markovo with a high point of 726 meters. The daily run is 1,027 kilometers.

The Kirensk airdrome seems quite big and crowded in spite of the weekend. I

was warned immediately that I won't get any gasoline at the airdrome. I had to take the cans and by a passing car going through security service to bring A92 motor fuel from the only fuel station operating in town.

3 August. In the morning I paid 5,322 Rubles for "handling the flight" with my side number. I am taking off, the destination point is the town of Olyokminsk. On the way I notice a black spot in the open forest. After looking more closely I recognize a bear! I can't resist the temptation to let down and chase the bear for a few circles. Having passed half the way I get refueled from the cans right on the bank of the Lena. I feel very positive but only for a while. I was informed that the weather conditions in Olyokminsk were below my minimum (the

lower edge is 150 meters). One can't argue with that. I decide to fly to the alternate airfield in Lensk, that very Lensk, which experienced unprecedented floods in 2001.

Nobody expected me or anybody else to appear at the airdrome on Sunday – it was a day off. As my unexpected appearance at the airdrome was not my whim, they sent for the flight supervisor who met me personally. Touched by such an attitude I was more willing to pay the sum of 5,882 Rubles for the "flight handling". Plus I managed to get the right gasoline B91/115.

4 August. Having not reached Olyokminsk I realized that I had to catch up if I want to finish the day in Yakutsk. I had an early start and by 17:00 I landed in "Magan" (Yakutsk), overcoming the last 860 kilometers. The meeting was well-deserved: 30 reporters, 3 TV cameras, and officials waiting for me on the apron. The press-conference was organized right at the board...

That was the end of my marathon – six and a half days, 39 flight hours, 7,000 kilometers. This is the record flight registered by the Russian Air Sports Federation. Of course, if you don't make stops anywhere and fly 10 hours a day you can make it in 4 days. It is realistic from the technical and physical point of view. But it will be next time.



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Русские «крокодилы» в Африке



За десятилетия участия в боевых действиях в небе Черного континента советский боевой вертолет Ми-24 (по натовской классификации Hind) превратился почти в такую же легенду, как знаменитый автомат Калашникова. Вертолет сыграл заметную роль как в истории так называемых национально-освободительных движений 1970–80 годов, так и в масштабных гражданских войнах в постсоветскую эпоху.



В XXI веке спрос на милевского «хищника» у воюющих режимов и движений по-прежнему очень высок. Даже если заказчик не может себе позволить приобрести новейший экспортный российский Ми-35М, многочисленные торговцы подержанным оружием из стран бывшего СССР и Восточной Европы предложат приобрести по сходной цене вполне боеготовый секонд-хенд.

Вместе с тем и сегодня на многочисленных аэродромах – от южноафриканских саванн до ливийской пустыни – по-прежнему базируются сотни потрепанных в боях, но живых винтокрылых ветеранов, проданных Москвой дружественным правительствам еще в разгар холодной войны.

Сделано в СССР

Эксперты потенциального противника не раз отмечали удивительную приспособленность милевской машины к работе в экстремальных климатических условиях. После затяжных

муссонных дождей на Мозамбике и в Экваториальной Африке стоящие вне специальных ангаров вертолеты легко запускались и отправлялись на задания. При этом сложная авиационная техника часто обслуживалась и эксплуатировалась местными специалистами не самого высокого профессионального класса в условиях примитивной аэродромной инфраструктуры.

Среди африканских летчиков ходит немало легенд о неуязвимости и выдающейся огневой мощи русского «летающего танка». Приходилось слышать историю про пятидесятилетнего юаровского пилота-наемника, который в 90-е воевал на стороне одного местного диктатора и смог на своем Ми-24 чуть ли не в одиночку остановить наступление многотысячных повстанческих отрядов на столицу своего работодателя, причем партизаны были вооружены отнюдь не копьями и отравленными стрелами, поэтому к концу маленькой победы-

носной войны Hind отважного бура имел весьма потрепанный вид и тем не менее продолжал летать и наводить ужас на врагов. В эту историю вполне можно поверить, ведь на Ми-24М, как и на легендарном самолете Ил-2, применена знаменитая ильюшинская схема увязки бронирования кабины и основных жизненно важных систем штурмовика с силовой конструкцией фюзеляжа. Благодаря этому планер не утяжелен сверх меры накладными бронеплитами и вертолет сохраняет исключительную маневренность.

Все эти качества давно создали вокруг этой машины героический ореол в глазах африканских военных. Уже несколько десятилетий здесь практически ни одно серьезное боестолкновение не обходится без грозных русских винтокрылых БМП.

В 1980-х в гражданской войне в Анголе на стороне просоветского режима воевало несколько эскадрилий Ми-24/25, которые пилотировали местные, а также кубинские и советские экипажи.

Со времен СССР мощным собственным флотом Ми-24 и Ми-25 (экспортная модификация Ми-24Д, предназначенная для стран, не входящих в Варшавский договор) обладает Эфиопия. Первая партия из 6 Ми-24А была поставлена режиму Менгисту Хайле Мариама в конце 1977 года (чуть позже сюда прибыла эскадрилья из еще 10 «вертушек» вместе с советским персоналом). Эти машины приняли активное участие в боевых действиях между Эфиопией и Сомали за спорный регион Огаден. Примечательно, что в той войне вертолеты советского производства сражались с обеих сторон, так как в 1974-м СССР и Сомали заключили договор о дружбе и всестороннем сотрудничестве (со временем отношения с сомалийцами испортились, и Москва сделала ставку на их противников).

В более позднем конфликте между Эфиопией и Эритреей 1998 года «двадцатьчетверки» массово использовались обеими сторонами. По некоторым данным, поставщики подержанного оружия здесь заработали до полумиллиарда долларов. В Африке вообще обычное дело, когда противники воюют одинаковым оружием, как правило советского образца.

Эфиопы и сегодня ориентированы на покупку нашего оружия. Например, 5 боевых вертолетов Ми-35П ВВС этого

африканского государства приняли участие в миротворческой миссии в суданском Южном Дарфуре.

Несколько десятков «крокодилов» ВВС Конго, Руанды, Намибии и Зимбабве участвовали в поистине общеафриканской Второй конголезской войне 1998–2002 годов.

А во время гражданской войны в Кот-д'Ивуаре (2002–2004 годы) действия правительственных войск поддерживали 5 Ми-24, пилотируемых наемниками. Впоследствии эскадрилья «солдат удачи» была уничтожена французами в ответ на нападение на их военную базу, в результате которого погибло девять европейских солдат.

Ливия, поставки в которую начались в 1980 году, активно использовала вертолеты данного типа в войне с Чадом, где несколько машин было сбито, а еще два борта захвачено противником в качестве ценных трофеев и переправлено для изучения во Францию и США.

И на сегодня список африканских государств, имеющих собственный флот Ми-24/25/35, весьма значителен. Например, Либерия, по некоторым данным, вдобавок к уже имеющемуся у нее небольшому парку таких машин приобрела в 2000 году через подставные компании у Кыргызстана два отремонтированных в Словакии стареньких Ми-24.

Наши «крокодилы» давно прижились в Конго, Гвинее, Зимбабве (в 2001 году японская фирма модернизировала ее парк Ми-35 по части авионики), Йемене (большая часть машин советских поставок потеряна в военных переворотах и гражданской войне, однако с начала 90-х годов местные ВВС периодически пополняются подержанными вертолетами из стран СНГ).

Засада на «крокодилий тропе»

Впрочем, нельзя забывать и о том, что места былых боев основательно усеяны обломками наших «вертушек». Один такой эпизод до сих пор служит предметом гордости пилотов ВВС ЮАР.

Осенью 1985 года один из полевых командиров повстанческого движения УНИТА, чей отряд действовал в районе базы правительственных ВВС Анголы Квито-Кванавале, передал своим южноафриканским союзникам и покровителям ценную информацию. По сведениям партизан, с этого аэродрома к передовым позициям правительственных войск регулярно летает караван снабжения, состоящий из одного-двух транспортных Ми-8, следующих в сопровождении конвоя из нескольких Ми-25, причем из-за того, что ангольские летчики имели слабую штурманскую подготовку, они постоянно летали по одному и тому же маршруту, используя в качестве ориентиров над однообразной местностью речные русла и дороги, к тому же экипажи совершенно игнорировали правила безопасности при ведении радиопереговоров между собой.

В такой ситуации идея организовать засаду на беспечных «летунов» напрашивалась сама собой. Конечно, проще всего это было сделать с использованием ПЗРК, но в этом случае можно было рассчитывать лишь на частичный эффект. Вот тогда-то в штабе ВВС ЮАР и родилась смелая идея послать на перехват вражеских вертолетов легкие штурмовики «Импала». После принятия решения было организовано несколько учебных боев. В качестве тренировочных мишеней для реактивных самолетов выступали вертолеты «Пума». Самой большой проблемой для южноафриканских пилотов была необходимость приблизиться на расстояние выстрела к тихо-



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ходной цели, не проскочив ее и не подставившись под удар со стороны «крокодила», который обладал достаточно мощным арсеналом для контратаки. В итоге оптимальной была признана тактика подхода к вертолетам со стороны задней полусферы на минимальной скорости, близкой к критическому режиму сваливания.

Первая атака произошла вечером 27 сентября. Реактивные перехватчики, как на учениях, расстреляли застигнутые врасплох вертолеты. Днем позже бойня повторилась вновь. Лишь после потери 6 вертолетов ангольское командование наконец приняло адекватные меры...

Подобное избиение все-таки оказалось исключительным случаем в успешной африканской карьере Ми-24. Гораздо больше известно эпизодов, когда выдающаяся выносливость и живучесть винтокрылого штурмовика изумляли врага.

Миротворческие миссии

В постсоветскую эпоху кардинально изменился характер российского военного присутствия в Африке. С 1990-х годов российские вертолетчики работают здесь от частных компаний, в том числе по официальным контрактам ООН, а также выполняют миротворческие задачи. Так, с августа 2000 по 2005 год российский воинский контингент в составе 100 пилотов, штурманов, специалистов инженерно-технического состава и 4 Ми-24 поддерживал мир в Сьерра-Леоне, затем в Республике Чад.

В настоящее же время небольшой



вертолетный отряд российской армейской авиации решает миротворческие задачи в Судане. Пять Ми-24 присоединились здесь к уже имеющейся авиационной группировке сил ООН, в которую, в частности, входит и украинское подразделение. Кстати, начиная с 1996 года украинские миротворцы на своих «крокодилах» принимают активное участие практически во всех миротворческих миссиях ООН на Черном континенте: в Анголе, Сьерра-Леоне, Кении, Эфиопии, Либерии, Мозамбике и т.д. Более того, Украина благодаря наличию на ее территории сети действующих предприятий, специализирующихся на ремонте милевской техники, занимается коммерческим обслуживанием вертолетов, работающих по контрактам ООН, причем речь идет

не только о собственно украинских машинах, но и о «двадцатьчетвертых», принадлежащих другим странам СНГ и бывшего Варшавского договора, принимающим участие в программах ООН.

Не рискуйте, асы, в Африке летать!

Судя по всему, эта часть света еще долго будет оставаться территорией многочисленных межплеменных, неокOLONиальных и просто криминальных войн. Хотя смутные 1990-е годы и позади, когда боевые вертолетчики готовы были браться за опасную работу за скромную по сегодняшним меркам плату, боевых летчиков из стран СНГ в африканских заварушках меньше не стало. Даже в самых беднейших регио-

нах заказчики готовы неплохо оплачивать труд квалифицированных пилотов. «Русские» летчики по понятным причинам здесь в особой цене, поэтому отставники продолжают летать за тридевять земель на заработки, тем более что завербоваться на такую работу благодаря Интернету и разветвленной сети вербовщиков-соотечественников гораздо проще, чем действующему армейскому пилоту пробить себе «валютную» ооновскую командировку.

Но высокие по российским меркам гонорары связаны с огромным риском. Африканский авиационный рынок труда всегда имел у профессионалов репутацию дикого. Американские и западноевропейские экипажи не заманишь сюда никакими пряниками. Только авиационные ле-

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гионеры из стран СНГ, не обращая внимания на предупреждения своих дипломатов, готовы работать, несмотря на желтую лихорадку и малярию, летать на допотопной технике, наземное обслуживание которой обычно далеко от цивилизованных стандартов, ежедневно рисковать быть сбитым.

Особенно рискуют те, кто подписывает контракт с небольшими фирмами, работающими вне правового поля, – так называемыми *casuors*, владеющими 2–5 машинами с выработанным ресурсом. Пилоты нужны таким работодателям лишь до тех пор, пока они способны приносить дельцам прибыль в кабине воздушного танка. Обычно в типовых контрактах, которые предлагаются потенциальным наемникам, не прописаны компенсации, например, в случае их гибели или получения тяжелого увечья при выполнении профессиональных обязанностей. Судьба сбитых, пропавших без вести или пока-

лечившихся летчиков в этом бизнесе мало кого волнует.

Другое дело – частные военные компании. В последние годы заинтересованные в доступе к экономическому потенциалу африканских стран (прежде всего сырьевому) бизнес-структуры предпочитают доверять обеспечению безопасности своих проектов небольшим, мобильным и прекрасно экипированным частным армиям.

Когда после развала Советского Союза ангольское правительство осталось без мощной военной поддержки со стороны Москвы, оно было вынуждено обратиться за помощью к своим бывшим противникам – юаровским наемникам. Был организован конкурс среди частных спецслужб, а получившая подряд небольшая южноафриканская фирма Executive Outcomes при поддержке правительства ВВС Анголы, в том числе нескольких Ми-24, быстро вытеснила отряды УНИТА из порта Сойо, где рас-

положен крупный нефтеперерабатывающий комплекс, и взяла под контроль алмазные месторождения, до этого контролируемые повстанцами.

Южноафриканские военные, которым в 1980-е приходилось воевать в Анголе с русскими вертолетами, с большим уважением относятся к Ми-24. И, хотя наша страна никогда не поставляла боевые вертолеты в ЮАР, они здесь есть, добытые в качестве трофеев или выкупленные у африканских режимов. Примерно 50 машин поддерживаются в хорошем состоянии и регулярно принимают участие в местных авиашоу. Несколько местных фирм занимаются модернизацией «двадцатьчетверок»: оснащают их новейшей авионикой, системами для ночного пилотирования, современными прицелами, адаптируют под новое вооружение. В частности, несколько лет назад на выставке African Aerospace & Defence южноафриканская компания Advanced Technologies and Engineering представила свой модернизированный Ми-24 с новой, специально разработанной кабиной экипажа улучшенного обзора. За счет того, что ее стальное бронирование заменено на кевларовое, значительно снижена масса машины и, следовательно, улучшены и без того неплохие маневренные характеристики вертолета.

По оценкам многих специалистов, потенциал, заложенный в милевского «хищника», столь значителен, что с определенными доработками позволит успешно эксплуатировать штурмовики этого семейства, в том числе в Африке, еще не одно десятилетие.

Антон Кротков

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Olga Sheveleva

«Helicopter Industry» magazine is a publication Helicopter Industry Association of Russia (HIA)

English editor
Olga Sheveleva

Translator
Alex Bondarenko

Publisher



E-mail: mike@helisystems.ru
URL: www.helisystems.ru

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Photos by
Dmitri Kazachkov, Dmitri Lifanov, Alexei Mikheev, Alexei Nagaev, Sergei Ananov



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