

UDR

NEW ANTONOV'S AIRCRAFT

An-178

AMBITIOUS PROJECT
BY ANTONOV

№2 [APRIL-JUNE 2013]



FOR THE **An-70** IS READY GLOBAL MARKET



P-18 RADAR SYSTEM

Ukraine Expanding
the Horizons
of VHF Radiolocation



AIR-TO-AIR GUIDED WEAPONS

The evolution of Ukrainian
defence capabilities

OFFSET PROGRAMS IN UKRAINE

Changes and
new requirements



UKROBORONPROM

The State Concern

State Concern “Ukroboronprom” is the state owned holding company for 134 enterprises of Ukrainian defense industry.

Main goals of “Ukroboronprom” are improving the state management system of Ukrainian defense industry, enhancing the effectiveness of activity and controlling the operations of enterprises of the Ukrainian defense industry, development of new types of Ukrainian armament and enlargement of products markets.

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“Ukroboronprom” is a reliable partner in the sphere of military-technical cooperation for more than 80 foreign countries.

**For more information you may visit our web-portal
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hot topic

12 SHARP TURNS OF FRIENDSHIP

The current status of Ukraine-Russia project to set up production of An-70 military transport aircraft. Ukraine would press ahead with production project for the An-70 even without Russia's assistance.



markets and risks

20 AN-178 AMBITIOUS PROJECT BY ANTONOV

SE "Antonov" is about to bring its new product – the A-178 – to the densely populated market segment for military transport aircraft. As conceived by its designers, this transport, which is being developed within a very tight timeframe, should occupy the currently vacant niche for 18-ton payload category of aircraft.

guided weapons

26 AIR-TO-AIR GUIDED WEAPONS

The Su-27 and MiG-29 fighter aircrafts represent the main combat power of Ukraine. But even with all the upgrade projects of the Defense Ministry implemented they might prove inefficient in fighting typical air targets. After all, aircrafts are only the carriers for weaponry and guided airborne weapons, particularly air-to-air, which is one of the most critical areas of the domestic fighter aviation.

technologies

32 ANTIDOTE FOR MISSILES. UKRAINIAN RECIPE

The Ukrainian Armed Forces (UAF) has commissioned the optical-electronic jamming systems Adros KT-01AV and Adros-KT-03-UE. They are designed to defeat all of the currently-existing infrared-homing threats, including MANPAD missiles, by confusing or 'blinding' missile seekers and therefore diverting these from their courses.

helicopter update

36 NEW HELICOPTERS CAPABILITIES

Motor Sich JSC is well known as the manufacturer of several thousand turboshaft engines TV3-117 for medium-class military and civil helicopters like Mi-14, Mi-24/Mi-25/Mi-35/, Mi-8MT/MTV, Mi-17, Mi-28, Ka-27, Ka-29, Ka-31, Ka-32, Ka-50, Ka-52 and their modifications. Today company presents new the most powerful engines for helicopters TV3-117VMA-SBM1V and AI-450M.

all-seeing eye

38 P-18 RADAR SYSTEM

Upgrading a number of Soviet-vintage radar designs has become a common trend recently – due to both substantial reductions in defense budgets in many countries throughout the world. The R-18 is one of the most common radar designs that has been upgraded and improved nowadays. UDR attempted to sort out what the P-18 is attractive for and what makes the upgrades different from the original design.

capabilities

44 UAV TECHNOLOGIES IN UKRAINE

The UAV requirement issue was not raised among Ukraine's military establishment until 2006, and two years later, in 2008, the MoD and the Armed Forces General Staff issued joint documents that determined overall approaches – projected into up to 2025 - to providing the Armed Forces with unmanned drone capability. A brief review of the topic.



importantly to know

48 INDUSTRIAL OFFSET PROGRAMS IN UKRAINE

A number of substantial changes have taken place in Ukrainian legislation on industrial offset deals during the past several years. Based on global trends, Ukrainian authorities appear to have seen, at least on paper only, the broad opportunities offset agreements can provide for countries with tight budgets in terms of acquiring relatively current-generation equipment, improving the abilities of own defense industries and, finally, tapping into foreign investment for the development of sectors other than defense and national security.

UKRAINIAN DEFENSE REVIEW ARMS EXPORT AND DEFENSE INDUSTRIAL COMPLEX OF UKRAINE

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UKRAINIAN GOVERNMENT RAISES DEFENSE INDUSTRY INVESTMENT

Ukrainian Government Plans to raise UAH 7.12 billion (\$890 mln) for the formation of a rational structure of the Ukrainian defense industry. Provisions to this effect are included in Cabinet of Ministers Resolution 187 on "Approval of State Program on Economic Development Stimulation for 2013-2014", the Government web-portal said. Ukrainian Government intends to provide UAH 4.649 billion in funding for R&D on the development and upgrade of weapons as well as for arms procurement programs.

DEFENSE MINISTRY NEEDS \$15.6 BLN FOR REARMAMENT IN 2017-2025

Ukrainian Defense Ministry needs To Spend UAH 125 Billion (\$15.6 bln) On Armed Forces Rearmament Programs in 2017-2025.

Ukrainian Defense Minister, Pavlo Lebedev told this to reporters at a news briefing on April 3, 2013. The Defense Ministry has currently been approving these figures at the Finance Ministry. According to the minister, the Finance Ministry's estimated figure is UAH 98 billion. But, according to Lebedev, the final decision will be made by the Ukrainian president. "I think that the president will put an end in this regard in favor of the Defense Ministry," Lebedev said.

UKRAINE - THE PROSPECTIVE PARTNER FOR NATO

Ukrainian Defense Industry Potential are of Interest of NATO countries. This came in a statement by Ihor Dolhov, Ukraine's permanent representative to NATO, as quoted by Defense Express on April 8, 2013. "Ukraine has all the capabilities it needs for becoming a partner to European countries in a number of areas relating to building a rational defense industry. Our partners in the Visegrad Four have shown a sustainable interest in Ukrainian-produced military hardware," Dolhov said.

UKRAINE CAPABILITIES AT IDEF-2013

The State defense industry concern Ukroboronprom was representing Ukraine at the 11th edition of international arms show IDEF-2013 in Istanbul, Turkey, from May 7 to 10.

On view at Ukroboronprom's Pavilion were replicas of guided missiles Falarick 90, Falarick 105, Stugna, Komбат; 120 mm rockets and related weapons systems, in addition to mock-up anti-tank guided mis-

sile systems R-3, R-2S, R-2V and R-2V with related storage/transport launch canisters. The Ukrainian pavilion furthermore exhibited actual pieces of anti-tank missile weapons system Skif and optical-electronic active jamming system ADROS, as well as replicas of precision gun round KVITNYK, Project 958 Landing craft air cushion (LCAC) vehicle, BTR-4 APC, BTR-3E APC and MT-LB lightweight multipurpose armored prime mover.

NATO IS READY TO ASSIST REFORMING UKRAINIAN ARMY

NATO is ready to assist Ukraine in reforming the country's Armed Forces, NATO's Assistant Secretary General for Political Affairs and Security Policy, Ambassador Dirk Brengelmann said at a meeting with Ukrainian Defense Minister Pavlo Lebedev in Kyiv on April 25, 2013.

According to the press service of the Defense Ministry, Brengelmann said that NATO is open to assisting Ukraine in implementing its Armed Forces reform. He thanked Ukraine for its active role in international peace support and security operations. He also said Ukraine's decision to contribute its Hetman Sahaidachny frigate with a special detachment and a Ka-27 helicopter on board to fight piracy as part of the Ocean Shield Operation, and its further participation in the Operation Atlanta under the aegis of the EU, proves the country is cooperating fully with the EU and NATO.

UKROBORONPROM EXPECTS GROWTH OF ARMAMENTS EXPORTS IN 2013

The State Concern Ukroboronprom said that it expects a 30% rise in revenues from the export of armaments and mili-

tary hardware year-on-year in 2013. In 2012, Ukroboronprom earned USD1.024 billion from the export of products and serv-

ices to customers in more than 70 countries worldwide, and signed new contracts worth a total of USD 1,130 billion. For 2013, the

Concern expects a 30% growth in revenues – to USD 1,330 billion, Ukroboronprom said. An analysis of the outcome of internation-

al cooperation in defense industry shows a sustainable trend for growing proceeds from exports, the Concern said. Top customers for

Ukrainian armaments and military hardware in 2012 included India, Iraq, China, Kazakhstan and Russia among others.



GOVERNMENT TO REORGANIZE SE ANTONOV

Ukrainian Government is planning to reorganize SE Antonov into namesake state-owned holding company. The measure, which is envisaged in the State Economic Stimulation Program for 2013-2014, is aimed at ensuring financial rehabilitation of the domestic aircraft building industry and creating the conditions for boosting production rates of Antonov-family aircraft. Authorized share capital of the would-be holding company will be set up from government stakes in corporatized state-owned business entities that currently make up the SE Antonov – Civil Aviation Plant #410, Antonov and Kharkiv State Aircraft Manufacturing Company. Beyond that, State-owned enterprise “Antonov-Finance” (leasing company for aircraft built by SE Antonov) will be made subordinate to the Ministry for Industrial Policy. This measure is designed to streamline sales of aircraft and related systems.

ANTARES ROCKET WITH UKRAINIAN STAGE HAS SUCCESSFULLY LAUNCHED

22 April the successful test launch of private launch-vehicle Antares of Orbital Sciences Corp took place in the US, RBC-Ukraine reported on April 22, 2013. The launch-vehicle Antares is equipped with two stages, first of them was designed and produced by Design Bureau Pivdenne (Dnipropetrovsk, Ukraine).



AN-158 AIRCRAFT PASSED TO CUBA

The first An-158 new-generation regional jet airliner, built at Antonov State Enterprise, has been handed over to Cuban airline Cubana de Aviacion, Antonov’s press office reported on April 18.

The aircraft, built in a 97-seat configuration, was commissioned by Russian leasing company Ilyushin Finance Co. (IFC) which supplies An-158 airplanes to the Cuban airline on leasing terms. The An-158 was the first of the three such

aircraft contracted by Cubana de Aviacion. It flew to Cuba on April 21, piloted by a mixed Ukrainian-Cuban crew. The second and third airplanes have been scheduled for delivery in June and July 2013, respectively.



ANTONOV PLANS TO MANUFACTURE 24 AN-148/AN-158 ANNUALLY

Kyiv-based Antonov State Enterprise plans to hit the annual production target of 24 aircraft of the An-148/An-158 family within three years. Vice President and Deputy General Designer of SE Antonov Oleksandr Kiva announced this at a round table meeting on commercial aviation in Kyiv. This year, we plan to manufacture at least twelve aircraft in Kyiv, although the customer is pushing us to make

it fifteen,” Kiva said. Antonov’s order book comprises firm contracts for 41 An-148 and 39 An-158 airplanes, and the Company has been negotiating potential contracts with a good deal of countries worldwide, including NATO states, according to Kiva. Beside this he emphasized: “Brazil, Argentina, Colombia and Peru have expressed willingness to purchase An-148/158-series aircraft and to have their An-32 aircraft fleets upgraded”.



BANGLADESH AIR FORCE MIG-29S UNDERGOING AN UPGRADE IN UKRAINE

State-owned Lviv Aircraft Repair Plant is doing a major overhaul and upgrade of a number of Bangladesh Air Force MiG-29 9-12 multipurpose fighter aircraft, Ukraine Industrial online

publication reported on April 21, 2013. The upgrade will stress the addition of new combat performance capabilities and an improvement of the aircraft's performance parameters by way of integrating a satellite navigation system

and improving the optoelectronic sighting system as well as by adding a digital map navigation mode. The USD 124 mln contract includes the fighters that were delivered in 1999 and added to the Bangladesh Air Force fleet in March 2000.

KAZAKHSTAN GOT NEW AN-74TK-200 AIRCRAFT FROM UKRAINE

Kazakhstan's Internal Security Force has taken delivery of a new An-74TK-200 transport aircraft built by the State Aircraft Manufacturing Enterprise in Kharkiv, Ukrainform reported citing company managers on April 15, 2013. The Ukrainian aircraft was selected as a result of a contract competition held by Kazakhstan's Internal Affairs Ministry in 2011-2012. Kharkiv's aircraft factory intends to continue with aircraft supplies to Kazakhstan. The An-74TK-200 was developed in 1993 as a derivative of the An-74 transport aircraft.

UKRAINE WILL REFURBISHMENT KAZAKHSTAN'S S-300 SAM SYSTEMS

Ukraine has won tender for repair of surface-to-air missile systems S-300 (SA-10 Grumble) in the interests of Kazakhstan.

It was reported by Voice of America in the interview with Mr. V. Badrak Head of Center for Army, Conversion and Disarmament Studies (Ukraine). According to him, Ukraine implements

project on repair of S-300 systems for Kazakhstan, what can be considered as a success of Ukrainian defense industry. The details of this agreement were not announced.

JSC "MOTOR SICH" INVESTS \$30MLN IN HELICOPTER BUILDING PROGRAMS

The public joint-stock company Motor-Sich has invested about USD 30 mln in setting up production of MSB-2 helicopters with takeoff mass of 4 tons and helicopters, named preliminary as Otaman, with takeoff mass of 5-6 tons. Total investment in both of the projects will amount to about USD 150 mln over the next few years. Motor-Sich expects that certification trials to qualify the helicopters for service will be completed before the end of this year for the MSB-2 and two years later for the Otaman. The approximate cost of an MSB-2 will be USD 1.5 mln, and the cost of the Otaman – around USD 6 mln.

GERMAN COMPANIES WANT TO UPGRADE AN-124 "RUSLAN"

German companies would participate in a potential program to resume production and upgrade to modern standards the An-124 "Ruslan" heavy-duty transport aircraft, Oleksandr Kiva, Vice-president at Antonov State Company has said. German partners offer cooperation in terms of the introduction of new processes and technologies, and supplies of new equipment and systems, Kiva said. He said that Antonov believes it necessary to resume assembly-line production of the An-124 Ruslan airlifter and its derivative modifications, saying the Company has time and again received expressions of interest from potential customers of An-124 aircraft from third countries.





NEW MI-24V FOR UKRAINIAN ARMY

Motor-Sich expects that it would be able to complete the upgrade of the first of the Mi-24V helicopters in the Ukrainian Armed Forces' fleet by the end of this year, Ukraine Industrial reported quoting the Company managers as saying on May 14, 2013.

The upgrade package includes the integration of two TV-3-117VMA-SBM1V engines

developing 2,500-3,800hp as against 2,200hp for the baseline engine TV3-117VMA. The Mi-24V upgrade will provide improved performance capabilities, particularly in terms of time to climb and horsepower to weight ratio, allowing the helicopter to be operated with success in mountainous, high temperature and high humidity environments.

SPACE INDUSTRY IN UKRAINE POSTED \$537.5 MLN IN 2012

Ukrainian companies of the commercial spacecraft sector put out and sold almost UAH 4.3 billion worth of products in 2012, the press service of the State Space Agency of Ukraine reported on April 9, 2013. Reported combined industrial output and sales output of Ukraine's spacecraft industry companies grew 20% and 19%, respectively, YOY in 2012. Exports amounted to UAH 2.5 billion, showing a growth of 5%, and the percentage of exports in total sales output was 62%. Rockets and spacecraft make up three quarters of the exported products.

PLANT "FED" WILL SUPPLY AIRBORNE EQUIPMENT FOR INDIA

Kharkiv's Machinery Plant FED will supply equipment for military and commercial aircraft in use in India, Ukrinform reported on March 14, quoting chief engineer at the Company, Valeri Fadeev as saying.

"We signed two contracts with India four weeks ago. These contracts are long-run-

ning, meaning the equipment will be in production at the plant till 2015," V. Fadeev said. The FED's official explained that the contracts cover fuel-control equipment and hydraulic equipment for "Su" and "MiG" families of military aircraft, as well as commercial airplanes, and additionally include overhauls on India's aircraft.

UKRAINE AND INDIA CONTINUE JOINT "JASMINE" PROJECT

Ukraine and India are continuing with joint project called Jasmine to build a rocket engine for an Indian space launch vehicle. A statement posted on the Web site of the Ukrainian Ministry for Economic Development and Commerce on March 22 notes that the progress of bilateral space cooperation was discussed during a meeting between Ukrainian Deputy Economic Development and Commerce Minister Oleksandr Pinsky and Chairman of the Indian

Space Research Organization (ISRO) Koppilil Radhakrishnan, which was held on the sidelines of the second meeting of the intergovernmental commission on trade, economic, scientific and technical cooperation in India on March 19-22. During the meeting, the Indian side supported the idea of holding the International Congress of Astronautics in Kyiv in 2016. The ISRO chairman confirmed that the formation of the Indian part of the bilateral working group on space will be completed soon and that Indian experts will be sent to Ukraine to work out bilateral cooperation programs," reads the statement.





AVTOKRAZ CHALKS UP UAH 15.2 MLN (\$1.9 MLN) PROFIT FOR 2012 UNDER IFRS

Public joint-stock company Avtokraz (based in Poltava Region's Kremenchuh) in 2012 saw UAH 15.2 mln (\$1.9 mln) in net profit under International Financial Reporting standards (IFRS), reads a company report released on March 22, 2013. General Meeting of Shareholders in Avtokraz, which took place on March 21, 2013, resolved that 95% of the net profit earned in 2012 would be spent on covering losses from previous years, and the remaining 5% would go to the Company's Reserve Fund.

AVTOKRAZ WINS CONTRACT AWARD FROM THAI ARMY

PJSC AvtoKraz has won a contract award to supply a major shipment of KrAZ automobiles to the Royal Army of Thailand, the Company's press office reported on April 16, 2013.

Equipment fit for the trucks includes YaMZ-238DE2-33 (Euro 3) 330hp engine supplied by Yaroslavl Engine Works (Russia), 9J150TA-B transmission and MFZ-430 clutch. All of the vehicles will be supplied in right-hand drive configuration and equipped with hydraulic winch supplied by Sepson (Sweden), as required by the Customer. AvtoKRAZ has already commenced work under the contract. Under the terms of the contract, deliveries shall be completed in August 2013.



NEW KRAZ TRUCKS FOR AZERBAIJAN

AvtoKRAZ has delivered a number of KrAZ motor vehicles to Azerbaijan, the Company's press office reported on April 26, 2013.

These were KrAZ-7140N6 8x6 30-ton-pay-load chassis powered by 400hp YaMZ-6581.10 motors built in Russia's Yaroslavl. The chassis are intended for use as plat-



forms for heavy hoister equipment UP-80/UP-100 Ruslan to be used in maintenance and overhaul of oil and gas drills up to 5,000m deep. AvtoKRAZ is currently building three more same-class platforms that are scheduled for delivery to Azerbaijan before the end of May. Thirty KrAZ-series vehicles in various categories were delivered to Azerbaijan by AvtoKRAZ during 2012.

NEW UKRAINIANN ARMORED MILITARY PLATFORM



Kharkiv Armor Repair Plant has developed and built a new armored fighting platform that shares power plant and related servicing systems as well as transmission, chassis and electric equipment with the T-80 main battle tank and Oplot tank, Ukraine

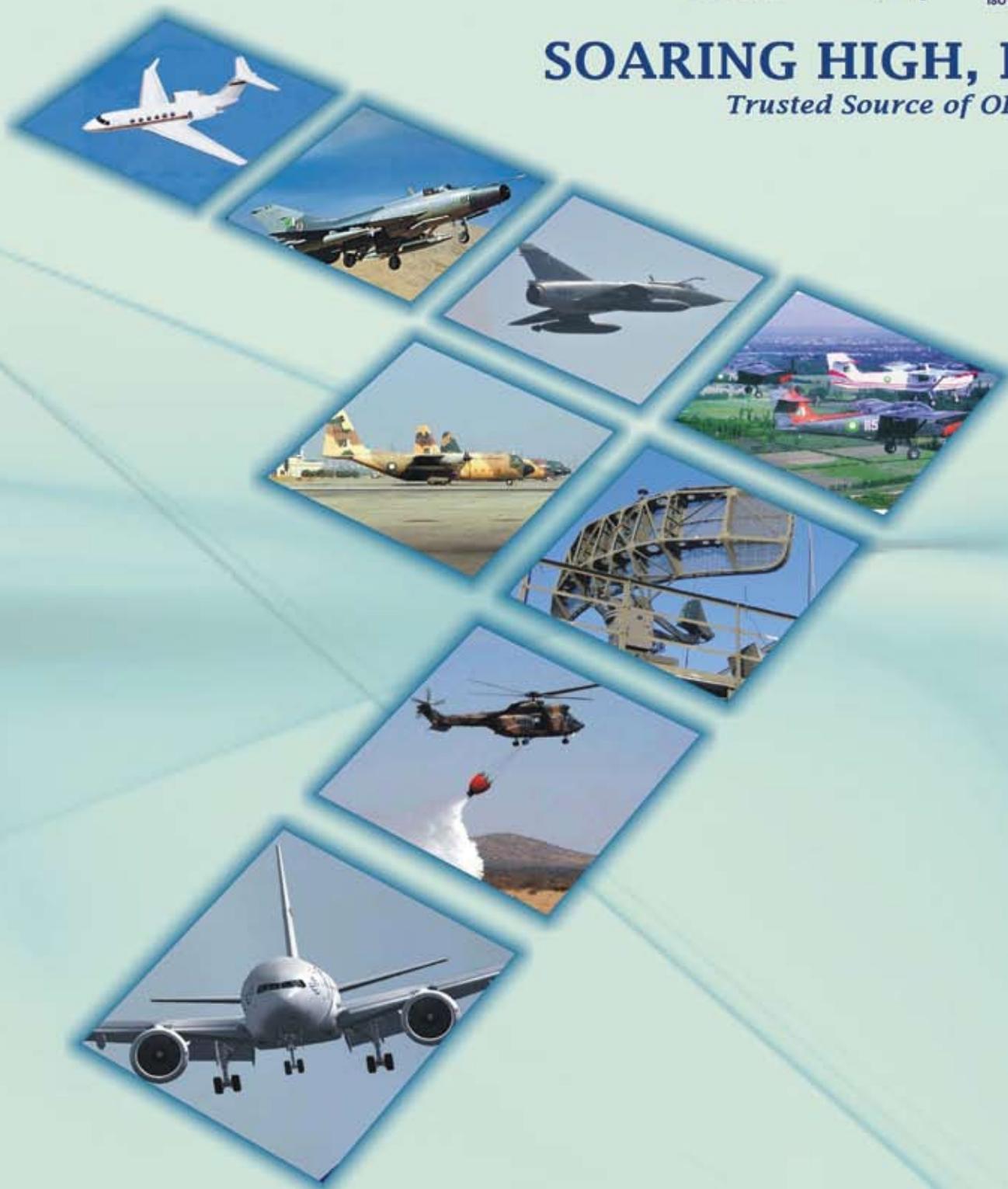
Industrial website reported on April 17, 2013. The platform is powered by a 6TD-2E engine developing 1200 hp, and provides high-level basic protection. In the armored personnel carrier configuration, the troop compartment is equipped with an armored capsule.



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GOVERNMENT INVOLVS A LOAN FOR CORVETTE PROGRAM

The Ukrainian Government is going to solicit UAH 1.27 billion in government assured loans to fund program on building of the corvette ship for the Ukrainian Navy. The projected amount of funding for the program in 2013-2014 is estimated at UAH 1.27 billion (USD 151 mln – \$159 mln), including UAH 642.6 mln (USD 76.5 mln – у меня \$80.3 mln) for development and UAH 632 mln (USD 75.2 mln – у меня \$79 mln) for construction. Of these, government funding is projected at UAH 380 mln (USD 45.2 mln – \$47.5 mln), including UAH 180 mln (USD 21.4 mln – \$22.5 mln) for development and UAH 200 mln (USD 23.8 mln – \$25 mln) for construction.

MOLNIYA-CLASS MISSILE BOAT WITH ZORYA-MASHPROEKT ENGINES LAUNCHED IN VIETNAM

A Project 1418 Molniya-class missile boat with a Zorya-Mashproekt gas-turbine power plant has been launched in Ho Chi Minh, Vietnam, press office at the Company reported on April 10, 2013. This is the second Molniya-class boat built at the Ho Chi Minh shipyard (the first was launched in March of this year). Both of the vessels have currently been in the completion stage. Zorya-Mashproekt is to supply power plants for integration with four more Project 12418 missile boats to be built at Ba Son Limited shipyards in Ho Chi Minh. The boats are intended for use by Vietnam Navy in policing national borders at sea.

ZORIA-MASHPROEKT EXPECTS 6.5% GROWTH IN 2013

Gas-turbine engine maker Zoria-Mashproekt is expecting a 6.5% growth in sales output for 2013, the press office at the Company said on May 15, 2013. Production rate currently amounts to 8.5 engines in each of the months beginning in January 2013. Product sales grew 5% in the first three months of 2013 year on year, and the overall growth rate is expected at 6.5% for the whole of the year. The Company fully honors its obligations under contracts with customers. Equipment types on the Company's portfolio for 2013 include 26% of natural gas-pumping equipment, 33% of maritime gas turbine engines and 35% of power industry equipment. Marketing department at Zoria-Mashproekt expects that the current up-trend in product sales would continue into 2014.



UKROBORONPROM SENT NAVY FIRST AIR CUSHION VEHICLE FOR CHINA

12 April in Feodosiya (Crimea, Ukraine) the new built 958 Project air-cushioned landing craft (Landing Craft Air Cushion, LCAC) was handed over to Chinese Navy at Feodosiya Shipbuilding Company More. Currently second 958 Project LCAC for China is being produced. According to the contract, Feodosiya Shipbuilding Company More should build two 958 Project LCAC for China. Two more ships will be build in China with the participation of Ukrainian specialists and using Ukrainian components. 958 Project LCAC is the biggest ship in the world in this class.

ZORYA-MASHPROEKT WILL SUPPLY GAS-TURBINE ENGINES FOR INDIA

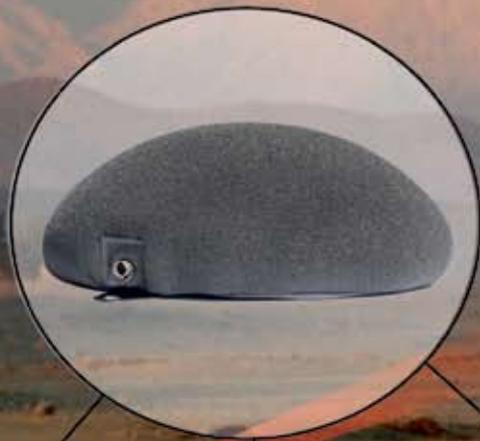
State Company Zorya-Mashproekt has signed a contract with an Indian customer to supply gas-turbine engines for vessels that will be built at a shipyard in Mumbai, the Company's press office reported on April 16, 2013. The contract was awarded after a competition that took place in 2012. Under the terms of the

contract, the Contractor shall provide gas-turbine engines for four Project 15B vessels in the period from 2016 to 2019. This is going to be the third series of such vessels for which Zorya-Mashproekt will supply its gas turbines. Especially for Project 15B vessels, the Company will build an upgraded gas-turbine engine with a microprocessor-based control system.

UKRAINE WEAPONS IN KAZAKHSTAN

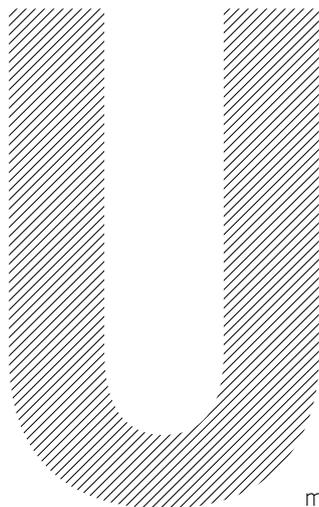
Ukraine has sold a shipment of naval weapons to Kazakhstan, an Internet blogger nicknamed eastua-milobs reported on his webpage on May 11, 2013. This included an Arbalet-K gun turret with Igla MANPAD missiles and Baryer-VK launching system with RK-2V antitank laser-guided missiles for an Orak-class missile-and-gun ship, as well as a Ukrainian built fire control system Cascade-250.

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DEFENSE EXPRESS IS YOUR SHERPA ON UKRAINIAN ARMS MARKET



Valerii Riabych
Director of Development, Defense Express Media & Consulting Company

Ukraine, being a powerful supplier to the international arms market, may also become a promising customer for weapons and military equipment in the near future. This is because the Ukrainian Armed Forces have a requirement for current-generation armaments and equipment. Moreover, Ukrainian defense industry companies enjoy broad opportunities for cooperation with the world's top defense companies. This will be facilitated by high intellectual and technological capabilities of Ukrainian defense enterprises, as well as low labor costs in Ukraine.

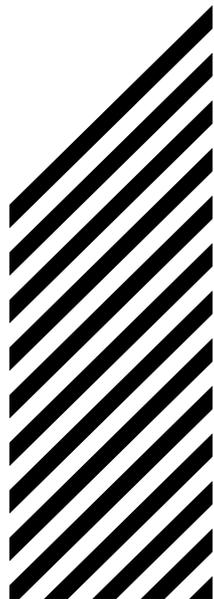
Analysts at the Defense Express Media & Consulting Company note new tendencies in Ukraine's international military-technical cooperation. These are as follows:

- the gradual break, for objective or subjective reasons, of cooperative links that were previously deeply rooted in the common past of the Soviet defense-industrial complex;
- the emergence of new opportunities for the production of high-tech products in Ukraine. These, according to Defense Express analysts, include precision-guided weapons manufactured by GKKB «Luch», aeronautical products (aircraft built by SE «Antonov»), aircraft assembly parts produced by SE «KhMZ FED»,

engines for armored military vehicles, aircraft and ships (Kharkiv's Engine Design Bureau, PJSC «Motor Sich», R&D Gas-Turbine Manufacturing Complex «Zorya-Mashproekt»), radar equipment, IRST assets and communication facilities (R&D and Manufacturing Complex «Iskra», Kharkiv's Radio Factory «Proton», SJSHC «Topaz», «Telecart-Prybor Ltd.»), space-borne technology («Pivdenne» Design Bureau, PO «Pivdenmash»), and many more others;

- The emergence of a number of private sector companies that operate in the defense sector and supply their highly competitive products to export markets (examples are Corporation «Aerotechnika» with radar systems, R&D and Manufacturing Firm «Adron» with aircraft missile protection systems, «Zbroyar» with small arms weapons, NCPP «Sparring-Vist Center» with modern radiological monitoring equipment, etc.);
- the preservation of the global market demand for a wide range of weapons and military equipment types produced in Ukraine and, on a parallel track, stiffening customer requirements regarding products' compatibility with current standards (being high-tech, the ability to be used as part of complex systems, etc.);

- Ukrainian Armed Forces' growing requirement for modern weapons types, this being driven by the network-centric nature of possible conflicts. Analysts at the Defense Express Media & Consulting Company furthermore note that, despite the wide range of weapons and military equipment types manufactured by defense-oriented enterprises in Ukraine, they can meet no more than 30% of the Ukrainian Armed Forces requirements. Having fully (or almost fully) closed-loop production chains for main battle tanks and armored military vehicles, as well as leading positions in the transport aircraft domain and in the manufacture of High-precision weapon, Ukraine's defense industry does not have the expertise or capabilities necessary for the production of, inter alia, fighter aircraft or air defense systems. The analysts also note that Ukraine is lacking domestic capabilities for the production of individual ammunition types, electronic equipment, hardware components and weapons control equipment, which it has to purchase from foreign suppliers. Ukrainian companies in many defense industry sectors cannot operate other than in production cooperation with foreign manufacturers. Particularly as regards State program on the building of indigenous naval corvette, Ukrainian enterprises can only provide 55-60% of the work required.



Meanwhile, Ukraine's Strategic Defense Bulletin stipulates that the national Armed Forces should increase the percentage of new and upgraded armaments in their arsenal by 2014. In future, the Ukrainian Armed Forces should be routinely provided with new weapons and military equipment types in line with their growing requirements. To date, Ukraine's military-technical policy is being carried out pursuant to the State Purpose-oriented Defense Program on the Development of Weapons and Military Equipment of the Ukrainian Armed Forces during 2012-2017, which received Cabinet of Ministers of Ukraine approval on February 1, 2012. The budget of the program has been set at UAH 16.714mn (or over USD 2bn). In future, we should expect a significant growth in the amount of government funding for programs to provide the Ukrainian military forces with current-generation weapons and military equipment types.

All of the above may indicate that, in the medium term, Ukraine could become an attractive customer for weapons, military equipment and military technology.

A separate note should be made of the capabilities for developing cooperation between Ukrainian defense industry enterprises and the world's leading defense companies. Due to this cooperation, the partners could get new opportunities in terms of building competitive weapons types and selling them on export markets. An example is the experience of cooperation between Ukrainian defense enterprises and Belgian company Cockerill Maintenance & Ingenierie. The use of Ukrainian Falarick-series missiles could significantly improve market potential of Cockerill Maintenance & Ingenierie products, and, the other way around, the Belgian Company's weapons stations could improve market potential of the Ukrainian armored personnel carrier BTR-3E. Also of interest is experience of cooperation between Sagem of France and aircraft repair plant "Aviakon" in Konotop, Sumy Region, regarding the upgrade of the Ukrainian Armed Forces' fleet of Mi-24 helicopters. A separate mention should be made of the joint Ukraine-Brazil "Alcantara" project to build a spaceport in Brazil, from which payloads will be delivered into space using Cyclone-

4-class carrier rockets provided by Ukraine. This project could expand dramatically the horizons of commercial use of satellites for various purposes. These are only a few examples of mutually beneficial cooperation between Ukrainian defense-oriented enterprises and their foreign counterparts. With its 12 year-long experience of cooperation with both domestic and foreign defense industry entities, as well as Ukraine's Ministry of Defense, the Defense Express Media & Consulting Company is ready now to become for foreign companies a "Sherpa" on the Ukrainian arms market.

Specializing in defense-industrial problems, global and regional security issues, as well as some aspects of tactical employment of weapons and military equipment, Defense Express can offer potential customers the range of services as follows:

- carrying out complex advertising campaigns aimed at the promotion of products and services, by using direct and indirect advertising, and providing information of interest during dedicated public events, as well as in publications produced by the company;
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- market supply research and evaluation of the products available on the market in terms of their compatibility with Ukraine's national defense requirements;
- representing the interests of foreign customers in Ukraine and Ukrainian customers' in a number of foreign countries.

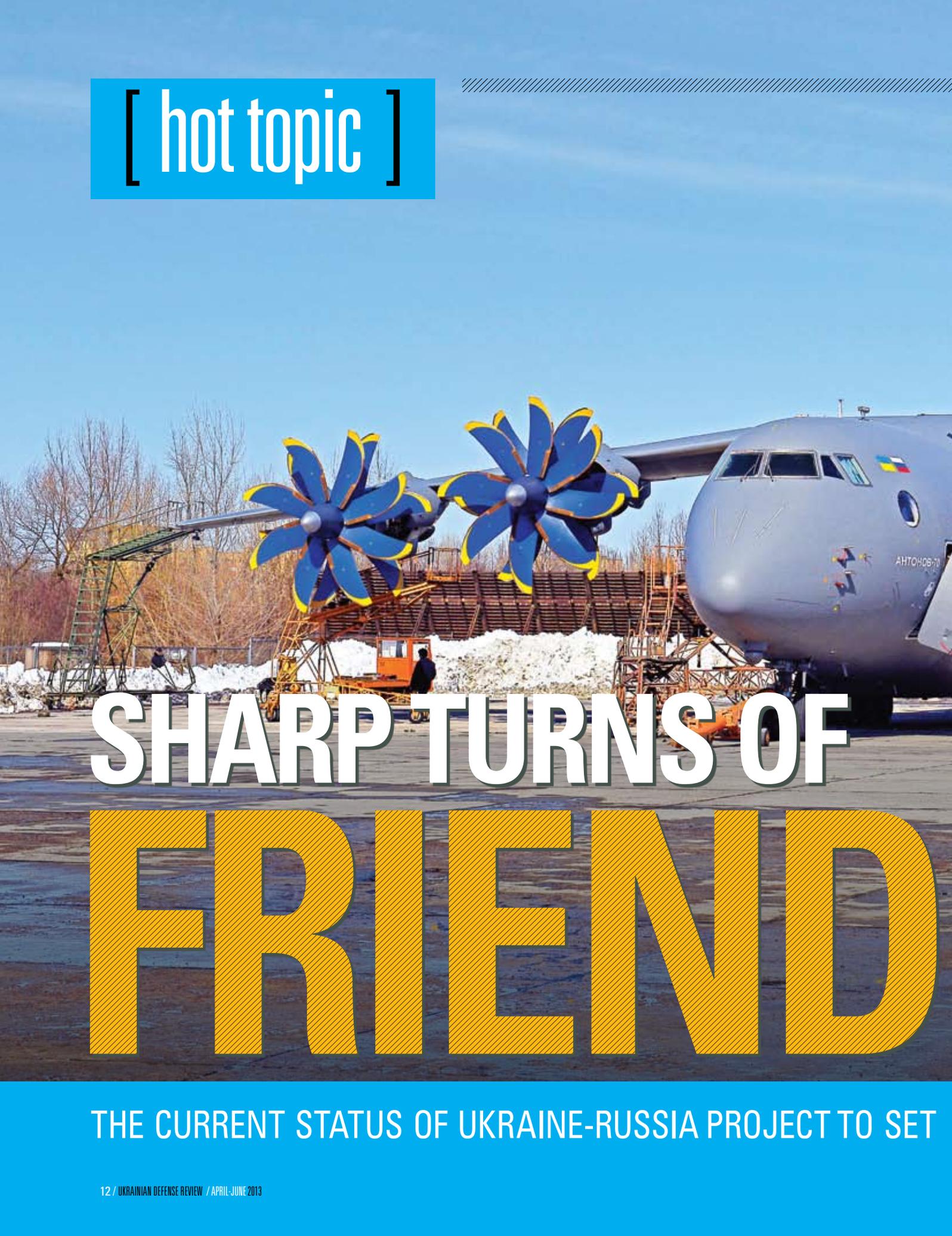
Defense Express Media & Consulting Company works in this sphere since the year 2001 and has a great experience of cooperation with the majority of Ukrainian and some European Defense companies, special exporters of Ukraine, the Ministry of Defense, Ministry of Industrial Policy and other officials of Ukraine. Foreign embassies accredited in Ukraine are the constant consumers of our products. Results of our studies, consulting information, articles are used by the heads of the above-listed structures. We are also actively covering issues of domestic defense industry, Ukraine's participation in the global arms market and so on.

In addition, Defense Express is publisher of a number of information products:

- Monthly journal «Arms export and defense industrial complex of Ukraine» (available in Russian language version; the journal is forwarded to subscribers, who include leading officials of a number of government agencies in Ukraine, CEOs of defense industry enterprises in Ukraine and other CIS countries, as well as military attaches of foreign countries accredited to Ukraine);
- Bi-monthly newsletter «Ukrainian Defense News» (available in English-language version; forwarded to subscribers from among news agencies, specialized publications and top managers at international defense companies);
- Daily News Wire delivering news, analysis and expert commentaries (available in Russian-language version by subscription at <http://www.defense-ua.com>);
- The «Ukrainian Defense Review» quarterly journal (available in English-language version; distributed free of charge to our subscribers, and through our partners abroad, as well as through Ukrainian diplomatic missions in foreign countries. The journal is also available in electronic form at http://issuu.com/ukrainian_defense_review).

Defense Express Media and Consulting Company provides advice and assistance based on deep analytical skills of personal and knowledge of the conditions and characteristics of Ukrainian military market to companies, government bodies and intermediaries in the implementation of their strategy, relating to finding new partners and interests promoting. Defense Express Media and Consulting Company has positive experience of cooperation with French companies CIFAL, DCNS, ESDT, MBDA, EuroTorp; Italian group Finmeccanica; Czech companies MESIT-PRISTROJE sro, Glomex MS, sro; Pakistani company Soaring High, Inc; and Russian company "Oboronitelniye Sistemy" (or «defense systems»). Defense Express can be your reliable partner in Ukraine and put at your disposal its multiyear experience and the knowledge of doing business in Ukraine. So, we have all necessary capabilities to be your Sherpa in Ukrainian arms market. 

[hot topic]



SHARP TURNS OF FRIEND

THE CURRENT STATUS OF UKRAINE-RUSSIA PROJECT TO SET



Volodymyr Tkach,
Exclusively for UDR

SHIP



UP PRODUCTION OF AN-70 MILITARY TRANSPORT AIRCRAFT



Antonov An-70 is a tactical-and-theater-level short take-off and landing (STOL) military transport aircraft which is doubly unique. On the one hand, the An-70 could be regarded a long laster among the most promising high-tech developments in the aircraft sector. Began to be developed by Antonov Design Bureau twenty-five years ago, the An-70 was to replace the obsolete An-12 turboprop. Yet the airplane has not been put into assembly-line production to date but, instead, is still being prepared for service use approval by the militaries of Ukraine and Russia.

An-70 has unique performance capabilities that still remain unattainable to any other military transport aircraft in the medium-payload category. The An-70 can provide air transportation for almost any of weapons and equipment types used by a motorized infantry brigade.

On the other hand, the An-70 has unique performance capabilities that still remain unattainable to any other military transport aircraft in the medium-payload category. This latter – and main – unique feature of the An-70 is what gives hope for the future of this aircraft, both in market and military terms.

Developed by the Antonov Design Bureau headquartered in Kiev, the An-70 was originally engineered with an eye to meeting the number-one requirement – that is to take off from and land on unpaved unequipped airstrips as short as 600 meters. Even after taking off from an airstrip that short, the An-70 can carry a 20 ton payload to 3,000 kilometers – a task of which none of the currently existing aircraft is capable. If operated from a concrete airstrip 1,800 meters long, the airlifter is able to deliver a payload of 35 tons to as far as 5,100 km. In exceptional instances, when permissible g load level is 2g (2.5 g standard or 3 g for takeoffs from unpaved runways), the airplane can carry a 47-ton T-80U MBT to 3,000 kilometers.

The high capabilities are, to a great degree, ensured due to the use of a unique Uk-





rainian-Russian power package integrating Motor-Sich D-27 engines with Aerosila SV-27 propfans, respectively. This combination allows for high cruising speeds, simultaneously reducing fuel consumption by 20-30 percent compared to current-generation turbojet counterparts.

The An-70 can provide air transportation for almost any of weapons and equipment types used by a motorized infantry brigade. Simultaneously, in true Soviet fashion, the aircraft was given a considerable excess margin in terms of both cross section area of the cargo bay (4x4.1m, which makes it as capacious as Antey's, as against 3.1x2.6m for the An-12) and airlift capacity (30 tons as against 20 tons for the An-12). This brought the An-70 closer to the IL-76, which the An-70 surpasses in terms of the cargo bay's cross-section area, hence the dimensions of the cargoes being airlifted, but is inferior to it in terms of payload capability and the length of the loading ramp.

Maiden flight of the first prototype An-70 – which was to become the core of air transport fleets for the Ukrainian and Rus-

sian militaries and to cement existing cooperative ties between aircraft designers and manufacturers in the two countries – took place in December 1994 at Kiev. However, it was lost in a mid-air collision with an Antonov 72 chase aircraft two months later. Flight testing of the second prototype began in 1997. State commissioned testing program for the An-70, which is known as “Adept” in the Ukrainian Armed Forces, has yet to come to completion, both because of a lack of funding and due to persistently troubled cooperation in that project with the Russian Federation – Ukraine's sole partner in the An-70 project and the biggest potential market for the aircraft.

The situation became particularly complicated in 2006, when the Russian Air Force commanders said that “a plane like this is not necessary to Russia”. It was maintained, among other things, that “the An-70 has effectively transferred to the category of heavy airlifters, one of which, the IL-76, is already available to Russia”. Yet the latter was is no rush to legalize its pullout from the An-70 project officially, because

the withdrawal would mean that Russia has to pay Ukraine a penalty that would surpass by an order of magnitude the amount of funding required for completion of the state commissioned testing program. When a five-day conflict broke up between Russia and Georgia in 2008, Russian air force commanders quickly and clearly saw that they badly need the An-70-class airlifter since it provides a valuable combination of the two key capabilities – specifically, a spacious cargo bay and the ability to operate from unequipped, unpaved airstrips. Cargo space in the An-70 accepts 19 key types of large-size military equipment specified in the target specification document, while cargo hold in the IL-76 can barely accommodate a half of the range of equipment types. In addition to this, the Ukrainian-Russian An-70, unlike the Russian IL-76, is capable of a range of tactical theater missions, including takeoff from/landing on small airfields and paratropping at extremely low speeds.

As a result, Ukraine and Russia once again agreed to continue cooperation on the An-70 project. It was officially stated that government customers, designer companies and manufacturer organizations would assume responsibility for the quality of their assigned assemblies and equipment they provide for the An-70/An-70T air-planes and D-27 engines. “Each of the parties have equal rights to the design, technological and maintenance engineering documentation on the An-70/An-70T aircraft, the D-27 engine and relevant components”.

The new agreement did not contain any provisions that would make the parties responsible for future assembly-line production of the aircraft. Yet in late 2009, Russian Defense

Ukraine and Russia once again agreed to continue cooperation on the An-70 project. It was officially stated that government customers, designer companies and manufacturer organizations would assume responsibility for the quality of their assigned assemblies and equipment they provide for the An-70/An-70T air-planes and D-27 engines.

Ministry resumed funding for the An-70 project. Antonov, for its part, expected that in 2012 it would be able to complete the second (and final) phase of state commissioned testing program and the building of the two prototypes upgraded after the initial phase of the testing. However, that deadline was, again, pushed back to a later time due to a number of reasons.

The An-70 military transport aircraft in its heavily revised version made its first flight on September 27, 2012. Now the upgraded cockpit includes, e.g., new LCD screen monitors and current generation avionic equipment (including the PrNPK-77 navigation system and Kotlin-Novator Kupol-III-76M radar). An optical-electronic system equipped with infrared and television cameras is now installed in the nose section of the aircraft. The crew was reduced from five to four (two pilots, flight navigator and panel operator; previously the crew additionally included an equipment operator).

The airframe remained intact, yet the power package underwent a considerable upgrade. The D-27 engines are now equipped with full authority digital engine control (FADEC). Experts say that Russian company Aerosila located in Stupino redesigned the SV-27 propfans with an eye to improving reliability performance and reduce noise output. Each propfan has two propellers (eight blades on the forward propeller and six blades on the aft propeller); the distance between the two propellers has been increased from 600mm to 900 mm, and the original TA12-60 airborne auxiliary power unit has been replaced with more current generation TA18-200-70 design.

Later in 2012, Kiev and Moscow agreed on the workshare element of the An-70 program.

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It was announced that the aircraft would be built in Russia with assistance by SE Antonov in Kiev. Kazan Aircraft Production Corporation, which is also involved in the upgrade of long-range bombers Tu-22M and strategic bombers Tu-160, has been selected as assembly-line manufacturer of the aircraft in Russia. As partner in the An-70 project, the Kazan's company will be responsible for the building of fuselage, final assembly and flight testing. Antonov will manufacture wings, horizontal and vertical tails, and engine pods and pylons, and deliver them to Kazan. Nose section of the fuselage will be the responsibility of a factory in Russia's Novosibirsk. Panels will come from Ulyanovsk and composite elements from Voronezh. Russian firm "Gidromash" will provide landing gear, and Ukrainian company "MotorSich" will be responsible for the production of engines in cooperation with "Saliut" of Moscow. According to preliminary schedules, production rate of 12 airplanes per year is to be ensured in 2019. The Russian party insisted that SE "Antonov" should digitize the entire set of work design documents for the An-70 as soon as practicable in order to enable that production is set up according to current standards.





New discrepancies regarding cooperation in the

An-70 military transport aircraft project began to arise between Ukraine and Russia since the start of 2013. In a statement in April 2011, Dmytro Kiva, president and chief designer at SE Antonov, said that trials of the upgraded Ukrainian-Russian Antonov An-70 military transport aircraft have been suspended through the fault of the Russian partners in the project: "Russian representatives have not participated in An-70 trials since November 2012. We have many times officially invited them to take part in the trials, but never got any official response from the Russian party. In view of this circumstance, Ukraine suspended the testing of the An-70 to avoid a situation where Russian partners in the program could doubt the outputs of the testing if it is conducted single handedly by the Ukrainian party. All the previous Russian-Ukrainian agreements regarding the production of the An-70 at the aircraft factory in Kazan are not observed either. I believe that this will do most harm to the Russian army, which, as we were told recently, urgently needs such an aircraft."

As is known, in December 2010, the then Russian President Dmitri Medvedev signed State Program of Armaments projected into 2020, which covered the purchase of at least 60 An-70 airplanes for the Russian Armed Forces in the period from 2014 to 2020. However, certainty that this

number of planes would be purchased began to fade as time went closer to 2013 when some of high-ranked Russian government officials resumed rhetoric on Russia's possible refusal of the An-70. Kiev gave a response. "We hear statements that the Russian Defense Ministry will purchase sixty aircraft first, then seventeen aircraft, then two. Now they say they don't need even a single one. They now need the IL-476. Because of statements like these we are going to lose the advantage that we still have," Ukraine's Ambassador to Russia said in a statement in April. In so saying he noted that the An-70 project involves 135 companies from the Russian Federation and only six companies from Ukraine. For his part, Ukrainian Prime Minister, Mykola Azarov said that Ukraine would press ahead with production project for the An-70 military transport aircraft even without Russia's assistance. "Individual Russian officials are saying that they are about to build their own military transport aircraft. In this situation, Ukraine will have to continue with the works, continue to bear the expenses, but we will build that aircraft, indeed. It is currently undergoing flight testing, which is the final phase in developing that aircraft," Azarov said.

However, Ukrainian aircraft industry officials, at a meeting in Kiev, said that bringing the An-70 project to fruition will be simply impracticable without Russian participation – both in terms of deep-going cooperative ties and the need to have a market for the aircraft once it enters into full-rate production. Ukraine's Defense Ministry itself originally intended to purchase ten An-70s, but eventually reduced that to two aircraft to be purchased for the Ukrainian Armed Forces in 2014, as envis-



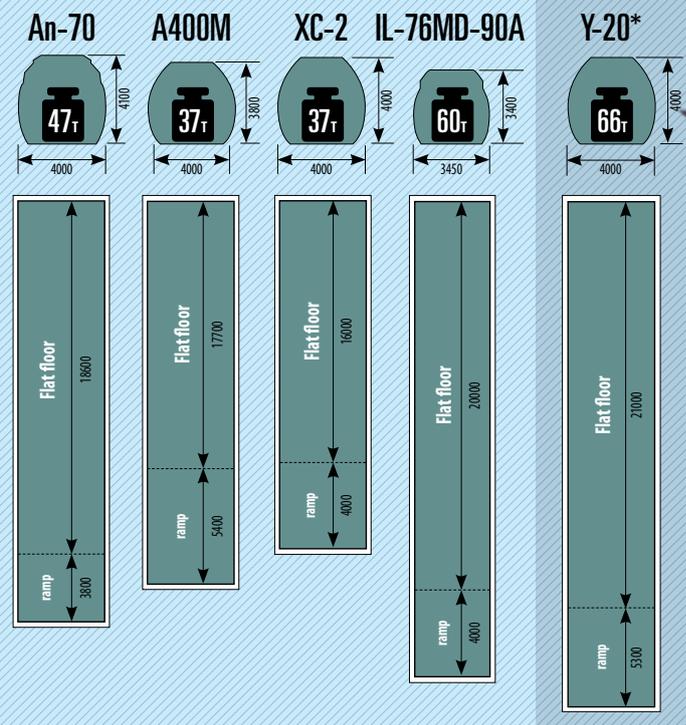
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As things stand now, two unfinished fuselages of military transport aircraft An-70 are awaiting completion at Antonov's facility in Kiev. Indeed, there is a probability that the two aircraft will be finished in an updated configuration, approved for service use and delivered to the Customer (which one – Ukrainian or Russian – is still unclear) as early as in 2014. Meanwhile, as the controversy around the An-70 continues, Europe's A400M military airlifter has been launched into assembly-line production, the first prototype of heavily upgraded Russian IL-476 transport has taken flight, and Japan's XC-2 and China's Y-20 airplanes have opened out their wings. UDR

BATTLE OF THE TITANS. AN-70 AND OTHERS

The beginning of the XXI century saw a fresh round of competition developing among designers and manufacturers of new military transport aircraft. This competition now involves Ukraine with the An-70 project, Europe with the A400M, Japan with the Kawasaki XC-2 military transport (which will have dual use as commercial freighter), and the PR of China with the "dark" but very ambitious "horse" named military transport aircraft Y-20. It is notable that all of the new military transport aircraft designs are in the categories of either high-medium payload or true heavy-duty freighters. As is known, aircraft with payload capacities from 10 to 40 tons are categorized as "light", and those capable of carrying from 40 to 100 tons are "heavy-duty" airlifters. But as things stand now, when assessing military transport aircraft, most account is taken of an integral assessment of their capabilities – made both through the prism of economic realities, cost effectiveness of production, as well as purely military requirements. To put it in simple words, this means the ability to deliver the maximum possible amount of equipment and personnel to a destination within the shortest time possible using fewer aircraft which are capable, if necessary, of operating from short runways or even unpaved airfields. For example, Russia, which partners with Ukraine to assist with the implementation of the An-70 military transport aircraft project, has embarked on extensive modernization of its heavy Il-76MD freighter to the Il-76MD-90A (or Il-476) capability. However, the modernization will not change the limited cross section of the cargo bay in this heavy-duty freighter. The Il-476 can accommodate only 63% of inventory types of major weapons and military equipment, while the An-70 can accommodate 98%. A corollary of this is that a mission requiring a number of Il-476 aircraft can be done with only half that number of An-70s, even though tactical-and-theater range An-70 has a takeoff mass of 125 to 140t as against about 210t for the strategic-range Il-476. But Ukraine, unlike Russia with Il-476, Europe with A-400M, Japan and China with XC-2 and Y-20, cannot ensure singlehandedly cost-effective production of its unique An-70 – this despite the fact that the market for new military transport aircraft is in place today and will remain in place tomorrow. By average estimates, more than 60% of the current global fleet of medium to heavy military transport aircraft will be withdrawn from service by 2025, which will generate a market for 440-500 new aircraft worth a total of USD 50 billion. The battle for the market has already begun...



* For now, there are no official reports confirming most of specifications and dimensions data on the cargo bay in the Y-20 military transport aircraft



- FERRY RANGE, km
- PRACTICAL RANGE, km
- PROCUREMENT COST, \$, mln
- NUMBER OF AIRCRAFT ordered

YEAR OF MAIDEN FLIGHT
2010



YEAR OF MAIDEN FLIGHT
1994



YEAR OF MAIDEN FLIGHT
2012



YEAR OF MAIDEN FLIGHT
2013





[markets and risks]

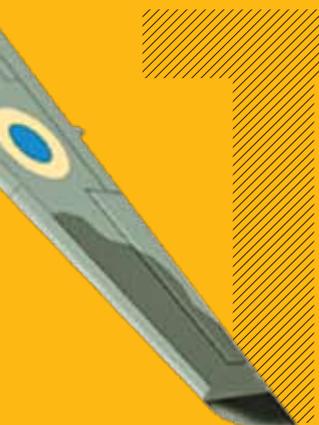
SE “Antonov” is about to bring its new product – the An-178 – to the densely populated market segment for military transport aircraft. As conceived by its designers, this transport, which is being developed within a very tight timeframe, should occupy the currently vacant niche for 18-ton payload category of aircraft. Even if this market niche is unoccupied so far, does this mean there will be no competitors to the An-178?

Volodymyr Kopchak, Mykola Tabellenko, Exclusively for UDR



An-178

AMBITIOUS PROJECT BY ANTONOV



The Ukrainian An-178 is the most recent development in the military airlift domain. The idea to build the airplane was first spoken out in 2010. In 2012, Antonov aircraft designer unveiled that it has worked developing the multimission cargo aircraft dubbed An-178 and setting up production of the plane. The new aircraft is expected to take flight as early as in 2014, Antonov said.

PREMIUM PLACED ON MULTIFUNCTIONALITY

Those aggressive deadlines should not raise any doubts about their attainability; the ambitious plans of Ukrainian engineers are resting on a reliable technological and industrial base. The maximum possible level of commonality with the already flying commercial airliner An-158 gives every reason to expect that the An-

178 would be got prepared for assembly-line production within the shortest timeframe possible. Hence the high level of multifunctionality envisaged for the new airplane. Specifically it is foreseen that the aircraft will be used as tactical military transport for airlifting military supplies, equipment or personnel with their assigned weapons, and will have dual use as commercial cargo aircraft.



The designers do not rule out the possibility that the An-178 would form a basis for a family of specialist airplanes ranging from air ambulance to patrol or command and control aircraft. In its militarized configuration, the An-178 will be able to carry 18 tons of cargo or 99 fully equipped personnel, or to support parachuting of 80 armed paratroopers. It is furthermore

payload category than the An-74 or Europe's C-27J and C-295. The predecessor of the An-178, the An-12, has been flying for a few decades now; so Antonov will not be a newcomer to the military airlift domain.

The An-178 will be propelled by two turbojet engines instead of four turboprops seen on the An-12. However it will far surpass the latter in terms

only 64 m³ in the C-295. In its cross section, the cargo bay in the An-178 is 2,746mm wide and 2,750mm high, which is clearly optimized for standard 2,440 x 2,440mm shipping containers. If compared to the An-158 on which basis the An-178 was designed, the latter will have its center wing section enlarged and expanded. This will provide enough space for three Humvee vehicles (13.3 tons), or as many Land Rover jeeps (9.7 tons), or two ZIL-131-class trucks (13.4 tons). The aircraft would allow for autonomous operation during 30 days. Meanwhile, labor intensity of maintenance personnel will be reduced substantially – down to 2.5 personnel per each flying hour – this all against the background of possible dual use as military/commercial airlifter.

Antonov is currently working on two versions of the An-178 transport: one with a side door and the other with a loading ramp. Alternative sources of avionic equipment being considered for the An-178 include suppliers such as Honeywell and Collins.

The cockpit is designed for a crew of two pilots. The An-178, as with any of Antonov-series military transport aircraft, will be able to operate both on unpaved and concrete runways no shorter than 915 meters. Cruising speed is set at 825 km/h. The aircraft will have a range of 1,000 km with full load and 4,000 km with a 10-ton load. A configuration with additional fuel tanks is being considered, allowing for cargoes up to five tons to be delivered to 6,000 kilometers. By way of comparison, the An-12 can deliver a 10t load to 3,200 kilometers at a cruising speed of 600 km/h.

THE AN-178 DESIGN PROVIDES THE KEY ADVANTAGES AS FOLLOWS: CAPACIOUS CARGO BAY ALLOWING FOR ACCOMMODATION OF STANDARD IATA SHIPPING CONTAINERS; DIGITAL AVIONIC EQUIPMENT; "GLASS" COCKPIT; PRESSURIZED CARGO HOLD, POSSIBLE DUAL USE AS MILITARY/COMMERCIAL AIRLIFTER

envisaged that the airplane will have inner volume allowing for accommodation of shipping containers and individual military equipment types.

Antonov estimates the current market for An-178-class airplanes at 380 units. By developing the An-178, the Ukrainian firm decided to fill the market niche for transport aircraft with a payload capacity of up to 18 tons, which effectively remains unoccupied today. The An-178 is designed for transportation of medium to maximum payloads from 15 to 18 tons. This segment of the marketplace is virtually vacant thus far, except for aging or obsolete An-12 and C-160 airlifters which all need a replacement. The new aircraft will find itself in the heavier

of fuel burn rate. The An-178 design provides the key advantages as follows:

- capacious cargo bay allowing for accommodation of standard IATA shipping containers;
- digital avionic equipment;
- "glass" cockpit;
- pressurized cargo hold.

The An-178 has a cargo bay cross section that is larger than that of the An-12's, as claimed by the designer. Cargo compartment floor area will amount to 40 m² with loading ramp or 33 m² without it, and inner volume of cargo bay with or without loading ramp will be 125 m³ and 112m³, respectively. By way of comparison, cargo bay volume makes up 110 m³ in the An-12, 65 m³ in the C-27J and

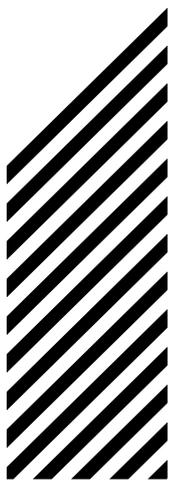




TABLE 1

Key performance specifications of the An-178 against the background of main «indirect» competitors

			
	An-178	C-130J-30	KC-390
Country of origin	 Ukraine	 USA	 Brazil
Designer company	SE "Antonov"	Lockheed Martin	Embraer
Year of maiden flight	Expected in 2014	1996	Expected in 2014
Practical range (with payload), km	4,000 (10.0 t) 1,000 (18.0 t)	3,150 (16.329 t) 2,222 (20.4 t)	4,815 (14.7 t) 2,593 (23.0 t)
Ferry range, km	5,400	5,250	6,019
Procurement price, \$mn	40-42.2	67.5-80	50-60
Number of aircraft ordered	-	80 (including C-130J)	60
Max. Payload capacity, t	18.0	19.958-21.772	23.0
Cargo bay dimensions (W/H), m	2.75x2.75	3.12x2.74	3.35x2.94
Full length of cargo bay (plus loading ramp), m	16.65 (12.85+3.8)	20.01 (16.76+3.25)	18.54 (12.68+5.86)

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DECEPTIVE VACANCY

Development of the An-178 is currently being funded with own money of SE Antonov. Even before the aircraft enters into production, its designer intends to set up reliable partner ties needed for the airplane to be marketed more aggressively.

However, there is uncertainty with regard to this prospect. Indeed, an order from Ukraine's Defense Ministry could give a strong boost to the development of the An-178 and help advance its service entry day, but the situation in this regard is hard to predict so far.

The Russian market looks clearly promising. By the same

token, as is traditional with Antonov aircraft, the An-178 will have to be manufactured in close cooperation with Russian companies. Some advances to that end have been made already. Back during MAKS aircraft exhibition and air show in September 2011, SE Antonov and Russian air carrier Volga-Dnepr signed an agreement on



the latter joining the An-178 development project. The situation has almost not changed ever since, so it's hard to say anything certain about the outlook [for that partnership]. The agreement envisaged that a separate airline will be set up within the structure of the Russian company to handle the market segment for light-payload aircraft. The An-178 could well complement Volga-Dnepr's fleet of An-124 and IL-67 transports. The Russian company announced being ready to invest own cash in bringing R&D works to completion and setting up production with due regard for own requirement. Incidentally, medium payload An-12s are the oldest military transport aircraft in the Russian Air Force service, with most of the aircraft being operated for 40 years or longer and need to be decommissioned in the nearest future. Meanwhile it has become clear today that Russia's national IL-214 aircraft program led by Ilyushin has terminally failed.

Strained relations between Moscow and Kiev are one more impediment to the project with the Russians. True enough, those relations are so fast changing...

In addition to the Russian Federation, Ukraine offered the cargo ramp An-178 aircraft to India for use as medium transport aircraft under the latter's MTA program. India demanded that the airplane with full load should be able to fly to destinations out to 2,500 kilometers as against 1,300-1,700 kilometers previously demanded by Russia. A configuration in the 20-ton payload category, capable of ranges of up to 2,500 km when fully loaded, was developed by Ukrainian engineers and demonstrated to the Customer. So probability is high enough that the delays faced by the Russian-Indian program to build a medium-payload military transport aircraft derived from the Russian IL-214 will make New Delhi opt for the An-178.

Given the uncertainty about potential contracts, vacancy of the market niche for the An-178 should not be deceptive to designers of the aircraft. Even though this market niche is currently vacant, with sufficient demand this niche will not remain unoccupied for long, and it can be filled by so called "indirect' competitors.

Today, many countries are trying to meet their require-

ment for military airlift capabilities with one or two multifunctional airplanes regarded as most suitable for attaining their own or collective objectives. For example, the A400M was originally intended to replace the aging and lighter payload-category C-130 and C-160 aircraft operated by air forces of some European countries. For example, in the French Air Force, the entire range of aircraft with payload capacities in between the A-400M's and the C-295's can be ousted altogether with the advent of the A400M. For the French, the A-400M alone may well be sufficient to meet their requirement for military airlift capabilities. India, for its part, is actively purchasing U.S.-built C-130J aircraft as the national MTA project faces serious delays. To add to this, Brazil's KC-390 is scheduled to take flight in 2014, as is the case with the An-178.

That is why the American C-130J and Brazilian KC-390 both can pose a certain market threat to the lighter An-178 as well as to the An-70. However, this is another story which will be discussed in a dedicated article in our journal... **UDR**

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[guided weapons]



AIR-TO-AIR GUIDED WEAPONS



THE EVOLUTION OF UKRAINIAN
DEFENCE CAPABILITIES: FROM SOVIET
HERITAGE TO ADVANCED
TECHNOLOGIES

Ukraine is facing an urgent need for achieving combat effectiveness of front-line fighter aircrafts which is considered to be one of the main capabilities for fighting hostile aircrafts and unmanned weapons. The Su-27 and MiG-29 fighter aircrafts represent the main combat power of Ukraine. But even with all the upgrade projects of the Defense Ministry implemented they might prove inefficient in fighting typical air targets. After all, aircrafts are only the carriers for weaponry and guided airborne weapons, particularly air-to-air, which is one of the most critical areas of the domestic fighter aviation.



Sergiy Zgurets, Exclusively for UDR

As of 2013 the actual age of all the guided air weapons installed on fighter and attack aircrafts of the Ukrainian Air Forces accounts for 20 to 35 years assuming that initially Soviet designers determined the service life of these weapons at 8-10 years. Therefore Ukrainian de-

sign bureaus and enterprises jointly with the Defense departments are now facing the task of maintaining the combat capabilities of guided air weapons till 2030.

In Soviet times the development and production of guided airborne missiles were conducted jointly by Ukrainian and Russian design bureaus and defense enterprises. After

the collapse of the Soviet Union previously joint technological and industrial capabilities in the missile production created a complicated picture of Russia-Ukraine relations.

Even in 2013 Ukraine and Russia remind of conjoined twins when it comes to a serial production, technical maintenance and upgrade of missile munitions deep-rooted in the

Soviet past. However both countries seek to minimise the co-operation dependence on each other when developing brand new models of air-launched missiles. It was especially noticeable in 2008 when the Russian JSC 'GosMKB 'Vypel'' named after Toropov producing airborne missiles initiated the development of advanced air-to-air short, medium and long-range munitions gradually increasing their combat capabilities for installation on five generation fighter aircrafts.

That's why Ukraine is making efforts to develop its own air-to-air short range missile 'Gran' for close air combat referred. The development of this Ukrainian missile is conducted by Kyiv State Design Bureau 'Luch' with the involvement of 'Arsenal'. The missile composite, warhead and fuze are also being developed by domestic specialised enterprises. The State Joint Stock Holding Company 'Artem' will become the manufacturer putting the 'Gran' missiles into operational service. In June 2006 the model of this guided missile was presented at the 5th International Aerospace Exhibition 'AVI-ASVIT-XXI' as part of the stand of its primary developer - Kyiv State Design Bureau 'Luch'.

It is commonly known that the R-73 design features a canard aerodynamic configuration. The 'Gran' guided missile uses a simple aerodynamic design with four square long narrow wings and four cross trapezoidal aerodynamic controllers on the tail section. The maximum launch range of the missile will be 40 km to the front semi-sphere and up to 20 km to the rear semi-sphere. According to the information initially provided by the developer the missile is extremely maneuverable



Ukraine is manufactured R-27 missiles at the facilities of the State Joint Stock Holding Company 'Artem' (Kyiv). Country is a large exporter of this type of guided missiles.

and responsive to command which makes it effective against targets flying at heights over 20 meters with up to 12 g overload along pursuit course as well as collision course attacking targets with the best curve of pursuit. Each course causes significant missile overload.

In addition to combat aircrafts and operational trainers the 'Gran' guided missile can be installed on upgraded Mi-24 and Mi-35 fighter helicopters allegedly capable of carrying up to 4 'Gran' missiles. It is planned to equip the missile with a non-contact millimetre range proximity fuze. This greatly improves the missile's resistance to countermeasures providing a reliable target destruction without direct contact with a target itself. The 'Gran' missile has a core-type warhead like the majority of missiles of this class.

For now the problem lies in non-systemic financing of the

'Gran' project by the Defense Ministry. The development of a new composite for the missile by Pavlograd Chemical Plant also takes too long. A whisper goes round that the Plant demands more financing than the Ministry can actually provide. As of the middle of 2013 there is still no information on the time of manufacture and official acceptance tests of the 'Gran' missile.

Also Ukraine is manufactured R-27 missiles at the facilities of the State Joint Stock Holding Company 'Artem' (Kyiv) which was the main enterprise for the assembly of airborne missiles in the Soviet Union. Ukraine is a large exporter of the R-27 guided missiles. The major customers for this medium-to-long range missile are countries with Su-27 and Mig-29 fighters in service. For the past 5 to 7 years Ukraine has exported over 3 thousand of such mis-



a contract on the supply of R-27 airborne medium-range guided missiles to India: «We are working under the contract on the supply of R-27 missiles for the Ministry of Defense of India worth of 246 mln USD which has engaged all our labour and production capacity for the whole 2012-2013 period», reported Stanislav Smal, CEO of 'Artem'. The first deliveries were scheduled for the third quarter of the year 2012. He also mentioned that the contract provides for the supply of equipment required for the maintenance of products covered by the contract and training of the personnel of the Indian Air Forces.

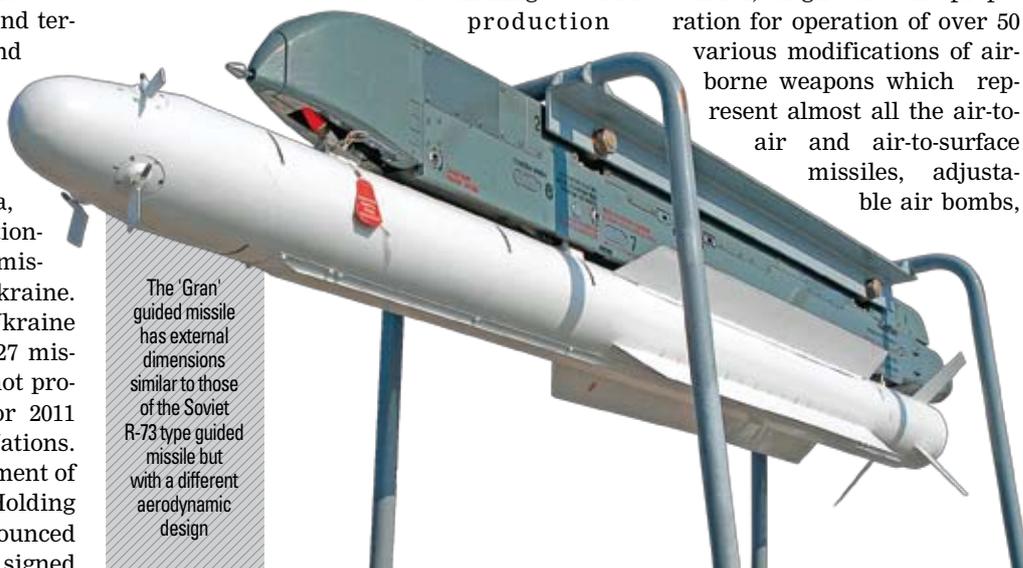
After the collapse of the Soviet Union up until now the Russia-Ukraine relations in the area of medium- and long-range guided weapons have been tense and sometimes especially difficult. The cooperation between two countries have been successful only in respect to a couple of versions of R-27 missiles. There have been no projects on the development of new airborne guided weapons. Russia is seeking to reduce the dependence on 'Artem' Company by establishing a serial production

of new guided weapons at the facilities of enterprises of the JSC 'Tactical Missiles Corporation'. At the same time 'Artem' Company receives many key elements and blocks of equipment for the assembly of R-27 missiles from Russia, particularly solid fuel missile engines and gas-generators for airborne missiles (supplied by the Russian JSC 'Iskra' Design Bureau), and radar fuse 'Strizh-M' 9-G-1103 (supplied by the Russian JSC 'Vladimir Production Association 'Tochmash'').

Ukraine also has a monopoly on the production of test equipment for the maintenance of R-27 and other airborne guided weapons. This equipment is produced by the State Kyiv Design Bureau 'Luch'. 'Gurt' type automatic testing systems provide the control and diagnostics of the condition of airborne guided weapons, securing timely maintenance and repair if needed of complex and expensive airborne weapons including the repair and testing on the site of aviation units. In 2002 the Design Bureau 'Luch' initiated the production of upgraded 'Gurt-M' system providing control, diagnostics and preparation for operation of over 50 various modifications of airborne weapons which represent almost all the air-to-air and air-to-surface missiles, adjustable air bombs,

siles in various configurations. But the last couple of years saw a significant reduction in the export of air-to-air missiles.

Ukraine has been actively exporting 27 class air-to-air guided missiles in various configurations. The volume of export of airborne missiles depends on the numbers and territories where MiG-29 and Su-27 fighters and their versions were exported by the Soviet Union and Russia. Algeria, Azerbaijan, Burma, India, China have been traditional customers for R-27 missiles manufactured in Ukraine. Between 2004 and 2010 Ukraine exported nearly 1400 R-27 missiles. Ukraine has still not provided the same data for 2011 and 2012 to the United Nations. In May 2012 the management of the State Joint Stock Holding Company 'Artem' announced that the Company had signed



The 'Gran' guided missile has external dimensions similar to those of the Soviet R-73 type guided missile but with a different aerodynamic design

produced by the Soviet Union, Russia and by a joint Russian-Ukrainian cooperation, and advanced airborne weapons.

As for missile seekers JSC Kyiv 'Radar Plant' manufactures semi-active radar homing RGS-27 (industrial number 9B1101K) providing the lock-on range of 25 km and used for the assembly of R-27R missiles in Ukraine. Radar versions of R-27 are homed against the beam reflected from the target and generated by the airborne radar N019/N019M 'Sapfir-29/29M' as part of the radar fire control system RLPK-29 (manufactured by the Ukrainian State Enterprise 'Novator' based in Khmelnytsk, Ukraine) installed on light MiG-29 fighters or 'Mech' airborne radar of N001 type (manufactured also by 'Novator' Enterprise) which is the part of the radar fire control system RLPK-27 installed on heavy weight Su-27 tactical fighters.

The R-27T and R-27ET missiles are equipped with 'Mayak-80M' (MK-80M) IR seeker with single-block one-channel photodetector developed and manufactured by the Ukrainian

State Enterprise 'Arsenal'. Unlike many classic (non thermal) IR seekers, MK-80M secures a long-lasting (up to three hours) and reliable operation. Besides, with a reduced lock-on range MK-80M can fully operate for a relatively long period of time without cooling.

The Ukrainian State Enterprise 'Arsenal' Design Bureau (Kyiv) completed the design of an improved 'Mayak-80M' IR Seeker for the R-73 with 60° angle of target designation (compared to 45° angle of the standard R-73). In 2006 and 2008 'Arsenal' presented the MM-2000 new generation optical seeker in addition to the Mayak-80M IR Seeker at the 'Aviasvit' Exhibition in Kyiv. The new seeker was designed specifically for new sort-range and close air combat manoeuvring missiles as well as for the upgrade of existing missiles. The MM-2000 Seeker features a high-resolution multicomponent du-

The MM-2000 Seeker features a high-resolution multicomponent dual-spectrum IR detector, re-programmed anti-jam algorithms allowing to operate effectively against new generation targets and countermeasures as well as to aim at targets with a helmet-mounted system and optical radar station

al-spectrum IR detector, reprogrammed anti-jam algorithms allowing to operate effectively against new generation targets and countermeasures as well as to aim at targets with a helmet-mounted system and optical radar station. The Seeker has got 60° target designation angle and provides the lock-on range of 15-20 km.

In 2012 at the International Aerospace Exhibition 'Aviasvit-XXI' 'Arsenal' presented two IR seekers that could be adjusted for R-27 missiles and new models of guided missiles. The dual spectrum MR-2000 IR Seeker has got the following declared performance characteristics: lock-on range - up to 30 km; field of view - ±50; target designation angles - ±40; target tracking angular rate - maximum 40 deg/s; calibre - 200-230 mm.

Thus, as you see after the Soviet Union collapse, Ukraine is trying successfully develop own capabilities in the sphere of guided missiles creation and seekers for them. The time will show how successful will be these initiatives in the future. **UDR**





FOR **75 YEARS** WE'VE BEEN LOOKING **BEYOND THE HORIZON**

In 1937, it was clear that Europe was on the brink of a major conflict. In Sweden, neutral and at peace for more than a century, government and industry decided to prepare for the worst. Saab was founded with the mission to secure the nation's supply of military aircraft as part of our drive to maintain our national security and sovereignty.

The first Saab aircraft took off back in 1940, and ever since then Saab has created a stunning series of aircraft, unique in capability and affordability. What is more, we have been able to do so at a fraction of the cost you would expect. This comes from the fact that Sweden as a small country simply had to find another way to create high-performance equipment from a very limited budget.

Today, Saab is active in the areas of air, land and naval defence, as well as civil security and commercial aeronautics. Our heritage of innovation and efficiency applies to all these spheres and we can definitely benefit from this broad-based background, as the defence industry increasingly has to work under normal commercial conditions.

More than half of us are engineers. More than one fifth of our revenues are set aside for R&D. We foster a culture and a working climate whose cornerstones are competence, teamwork, ethics and values. Ingenuity, loyalty and dedication are essentials in an organisation where the seemingly impossible is a constant challenge.

In order to learn and to find new ways of working we seek partnerships and co-operation opportunities all over the world. This often takes the shape of a joint venture where we assist in the development of the partner nation's development of its own defence and security industry. And as part of the result we help create jobs on a long-term basis, as well as additional export income.

We take our role in society very seriously. Our vision is that everybody should be able to feel safe and we seek ways to envision what the future may bring. Looking ahead and being prepared can help eliminate problems and reduce threats. That's why we strive to anticipate tomorrow.

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SAAB

[technologies]

ANTIDOTE FOR MISSILES. UKRAINIAN RECIPE

CAPABILITIES AND
POTENTIALITIES OF THE
ADROS OPTICAL-ELECTRONIC
JAMMING SYSTEM





The Ukrainian Armed Forces (UAF) has commissioned the optical-electronic jamming systems Adros KT-01AV and Adros-KT-03-UE, a chief executive at the company that designed the technology told Defense Express. They are designed to defeat all of the currently-existing infrared-homing threats, including MANPAD missiles, by confusing or ‘blinding’ missile seekers and therefore diverting these from their courses, Oleksandr Aleshyn, deputy director general of privately-owned research-and-production firm Adron in Kyiv, said. The Adros has been integrated into the UAF service under a directive from Defense Minister Anatoliy Hrytsenko.

By Ihor
Kravchenko,
Exclusively
for UDR



The Adros KT-01AV, developed and patented by Adron, is being manufactured by the Progress research-and-production complex in Nizhyn, near Kyiv. The 20-kilo system is designed to equip MI-24 and MI-8/MI-17 helicopters. This has been tested on board MI-8 and MI-24 helicopters. Ukraine also offers potential buyers an export configuration of the system, designated Adros KT-01AVE.

HUNTING FOR AIR TARGETS

The entire history of weapons' development provides the best graphic illustration of the philosophic category of unity and conflict of opposites. The advancement of attack weapons is stimulating weapons designers to create adequate means of defense. This never-ending duel continues both on the ground and in the air – where aircraft and helicopters are being hunted for using handheld anti-aircraft missile systems.

That day in August 1969 became the evil day for the Israeli Air Forces, when six fighter bombers never came back to their home base after an assault on Egypt's army positions. The Air Force Command was perplexed, because the jets were piloted by highly-professional pilots with a vast experience in combat operations. In addition, the bulk of the enemy's air defense weapons had been destroyed by that time, at least in the regions where the jets were missing. The Israelis would have been comforted to consider what had happened to be a tragic accident. But this was not the case, which they saw very soon, having lost 23 warplanes in just 17

days. Moreover, the fighters were downed while attacking seemingly defenseless truck convoys or Arab positions outside air defense umbrellas. As the Israelis seemed to believe, a fighter aircraft, guided by air-, ground- and radio intelligence, attacks a trench line, where the hazard can only come out from machine guns. But if a plane ignites and explodes in the air, there is no way how this can be caused by fire from small-caliber weapons. Soon the army intelligence found out that the planes had been downed using Soviet-made MANPAD (man-portable air defense) missile systems Strela (Arrow). That was one of the first times when that system was employed in a combat operation.

Americans, in turn, had developed a MANPAD missile system of their own, known as Stinger, which was first applied in combat in Afghanistan in 1986 to down Soviet military airlifters and helicopters. This prompted warplane designers to equip aircraft with JPS jamming systems and "thermal traps", and pilots had to hurriedly learn how to fly at very low altitudes. It had not taken long for MANPAD missile systems to become the number-

one anti-aircraft weapon for an array of rebel, revolutionary and national liberation movements – in a word those to whom more powerful weapons were unavailable because of the lack of cash and, more importantly, adequately-trained operators.

MANPAD missiles are equipped with guidance units, allowing the missile to fly unattended after launch. Operator's job is only reduced to sighting and pressing the "fire" button once the target is locked on by the guidance unit. Reasonably, you are not required to be an expert to handle that kind of a weapon. The development of MANPAD systems, along with guidance units' becoming increasingly sensitive, helped resolve the problem of hitting incoming airborne threats using JPS jamming equipment and "thermal traps". The incorporation into guidance units of not only infra-red but also ultra-violet sensing elements allowed it to enhance countermeasures resistance and to effectively engage low-flying targets in the presence of intense smoke content from ground fires. The employment of multi-spectral sensitive elements, combined with simultaneous data procession turned out even more productive. And, finally, they took to fit MANPAD weapons with "friend-or-foe" identification system to discriminate targets from friendly aircraft.

ANTIDOTE FOR MISSILES

Protection of both military and civil aircraft from IR-guided MANPAD weapons like Sidewinder, Red Eye, Chapparel, Piton, Xiuning-5 or Stinger is normally provided using false thermal targets and electronic-optical active jamming systems. Operation of electronic-opti-



cal active jamming systems for the protection of military and civil aircraft depends on the principle of modular jamming of infrared radiation. This type of protection does better than the elimination of false thermal targets, as the latter implies an expendable protection reserve which is limited. Conversely, electronic-optical active jamming systems provide reliable protection as long as the flight continues, while remaining virtually non-sensitive to the target discrimination devices employed by IR seekers. Field testing and the use of electronic-optical active jamming systems in combat operations demonstrated their high performance and operational reliability. The systems effectively defeat a few types of IR-guided missiles, providing an ade-

quate protection against multiple threats flying from many directions all at once, and eliminating the need for the use of special missile attack warners. The systems are easy to operate and suitable to maintain even in field conditions. Light and compact, these are easy to integrate onto helicopters from various manufacturers.

quise and Ukraine. Russia, for example, has developed and commercialized several types of jamming systems for the protection of aircraft. In one of the systems, infrared signals follow modulating voltage and are identified by the missile's optical system as self-infrared-radiation from the protected object, and, when processed in the electronic section, generate a spurious control signal. Another such system uses an infrared flashtube as a source of IR radiation.

Ukraine offers potential buyers the Adros-KT-01AVE electronic-optical jamming system, intended for active protection of helicopters and Adros-KT-03UE for protection of An-26 and An-32 aircraft from IR-guided missiles. The system's operation depends on a new electron-

Ukraine offers potential buyers the Adros-KT-01AVE electronic-optical jamming system, intended for active protection of helicopters and Adros-KT-03UE for protection of An-26 and An-32 aircraft from IR-guided missiles.

ic-optical jamming principle. The technology incorporates a newly-designed electronically-controlled modulator with programmable processors.

The mass of the existing jamming systems are known to be primarily designed for defeating the missile guidance units using amplitude-phase modulation. To mislead the missile guidance unit and divert the missile from its course, the electronic countermeasure signals generated by the system should be 1.5-2 times (sometimes even 20 times) stronger than the signal emitted by the object under protection. The exclusive forte of the Adros-KT-01AVE and Adros-KT-03UE, according to its designers, is that they are equally efficacious against guidance devices using amplitude-phase modulation, phase-frequency modulation, or pulse-position modulation of target-emitted signals, as well as against guidance units with high noiseproof factors. This is the first thing.

The second thing is that the Ukrainian technology, unlike its foreign-made equivalents, does not require the intensity of the electronic countermeasure signal to differ much from that emitted by the target proper. The Adros-KT-01AVE and Adros-KT-03UE are particularly efficacious against the missiles such as Stinger, Stinger-POST, Magic, Sidewinder, Mistral and more.

It should be emphasize that the design of the Adros-KT-01AVE allows it to be adjusted to helicopters of all types. The Ukraine's research and manufacturing potential, along with an experience in maintaining the system allow it to adjust the system to military equipment and military/civilian installations of various types, as well as to develop new electronic-optical countermeasure technologies. **UDR**



quate protection against multiple threats flying from many directions all at once, and eliminating the need for the use of special missile attack warners. The systems are easy to operate and suitable to maintain even in field conditions. Light and compact, these are easy to integrate onto helicopters from various manufacturers.

UKRAINIAN SOLUTION

Electronic-optical jamming systems are designed and manufactured in the U.S. and some European nations, as well as Rus-

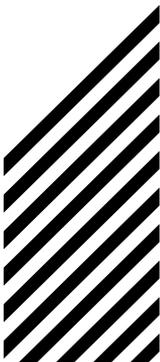
TABLE	
The likelihood of defeating guidance unit of a Stinger-type missile	0.7 – 0.8
Time needed to divert a Stinger-type missile from its course	0.5 – 0.8 sec
Selectivity	The system is efficacious against IR-guided missiles of various types, and does not need to be readjusted
Airborne line-operated	
Three-phase – 200 V, 400 Hz; Single-phase – 115 V, 400 Hz; Direct voltage – 27 V.	
Mass	Up to 26 kilos

[helicopter update]

Today Motor Sich JSC is well known as the manufacturer of several thousand turboshaft engines TV3-117 for medium-class military and civil helicopters like Mi-14, Mi-24/Mi-25/Mi-35/, Mi-8MT/MTV, Mi-17, Mi-28, Ka-27, Ka-29, Ka-31, Ka-32, Ka-50, Ka-52 and their modifications. The company produces the most powerful engines in the world D-136 for the heaviest lifter Mi-26 and its modifications.



NEW HELICOPTERS CAPABILITIES



Motor Sich engines fly aboard helicopters manufactured in Russian Federation in more than 60 countries worldwide. For further improvement of helicopters flight performance and efficiency during hot and high operation, in September 2007 Motor Sich accomplished work on helicopter engine TV3-117VMA-SBM1V incorporating continuous takeoff rating that provides, when necessary, continuous operation of both engines at take-off for more than 5 (up to 30) minutes. As regards performance, this engine complies with up-to-date technical requirements, and in 2007 was issued Type Certificates of IAC Aviation Register and State Aviation

Administration of Ukraine. In 2009 the TV3-117VMA-SBM1V engine was put in service in MoD of Ukraine. In the course of tests in 2010 at Konotop aviation repair plant 'Aviacon', the Mi-8MTV helicopter equipped with TV3-117VMA-SBM1V gained record height of 8100 m. In 2011 the TV3-117VMA-SBM1V successfully passed state bench tests in Russia and confirmed compliance with requirements of MoD of Russian Federation. In 2012 the TV3-117VMA-SBM1V engines successfully passed preliminary flight tests on Mi-8MTV-5-1 helicopter at MIL helicopter plant. On accomplishment of tests the helicopter was transferred to the Ministry of Defense



**Vyacheslav A. Boguslayev,
President Motor Sich JSC**

of the Russian Federation and now is being tested in flight. Today Motor Sich is busy with helicopter projects. The company organized

MOTOR SICH JSC DEVELOPS AND IMPLEMENTS PROGRAM ON OVERHAUL AND UPGRADING OF MI-2 HELICOPTERS IN MSB-2 VERSION



New MSB-2 helicopter

of upgrading Mi-8 helicopter in Mi-8MSB version does not require installation of auxiliary power unit (APU), which considerably reduces the time and cost of modernization as compared Mi-8MTV helicopters. Maximum weight of cargo carried inside the Mi-8MSB cargo compartment is 4000 kg, and that on external load sling system is 3000 kg. The Mi-8MSB helicopters can be delivered in transport,

passenger, search and rescue, fire-fighting, agricultural and military versions. In September 2012, at International Air Show 'AVIASVIT 2012', the Mi-8MSB helicopter powered with new generation engines TV3-117VMA-SBM1V, Series 4E, gained 8250 m attitude, setting a new world record in E-Ig class (FAI category for helicopters with takeoff weight of 6000 to 10000 kg).

design bureau and helicopter manufacturing facilities carrying out development, designing, upgrading, repair, and re-engining of helicopter products. The company received the Certificate from State Aviation Administration of Ukraine recognizing Motor Sich JSC as the designer of aviation products. For improvement of performance characteristics, reliability as well as extension of Mi-8 helicopters operating life and increase of their efficiency, Motor Sich developed and incorporated the program of their upgrading in Mi-8MSB version providing for installation of TV3-117VMA-SBM1V 4E engines of own manufacture in place of obsolete TB2-117s which are not manufactured any longer. The engine inherited the best design solutions tested on basic engine TV3-117VMA-SBM1V, which allowed to establish a new assigned life of 15000 hours/cycles, introduce 2.5-minute and 60-minute emergency ratings (equal to 1700 hp) with one engine inoperative, which were not available in the TB2-117, and 60-minute rating equal to that of takeoff. The new engine is equipped with electrical starting system, thus the process

Maximum weight of cargo carried inside the Mi-8MSB cargo compartment is 4000 kg, and that on external load sling system is 3000 kg. The Mi-8MSB helicopters can be delivered in transport, passenger, search and rescue, fire-fighting, agricultural and military versions.



The TV3-117VMA-SBM1V series 4E turboshaft engine for Mi-8 helicopter

facilities in Vinnitsa, the company's subsidiary since 2011. If necessary, avionics equipment of overhauled helicopters can be upgraded and compartment conversion carried out. As the main disadvantage of Mi-2 helicopters, powered with GTE-350 engines, is poor reliability and insufficient power of engines, Motor Sich JSC develops and implements program on overhaul and upgrading of Mi-2 helicopters

In 2012 Motor Sich organized overhaul of Mi-2 helicopters with standard build-up. The helicopters are overhauled by qualified employees at specialized overhauling fa-

in MSB-2 version.

At present the experimental work is underway on MSB-2 helicopter, in which the GTE-350 engines will be replaced with up-to-date and cost-efficient engines AI-450M. The upgrading will considerably improve its flight performance. As compared with Mi-2 helicopters, the MSB-2 are expected to

- save fuel consumption per hour by more than 30 %;
- increase static and dynamic ceiling;
- considerably improve helicopter hot and high performance.

Motor Sich gained great experience with CIS and non-CIS countries and offers the market a wide range of promising new engines for helicopters. **UDR**



AI-450M engine for Mi-2 helicopter

[all-seeing eye]

Anton Mikhnenko,
Exclusively for UDR

P-18

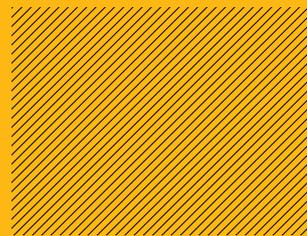
UKRAINE
EXPANDING THE
HORIZONS OF VHF
RADIOLOCATION

RADAR

Upgrading a number of Soviet-vintage radar designs has become a common trend recently – due to both substantial reductions in defense budgets in many countries throughout the world and the upgrade capacity of the Soviet-designed radar technologies. The P-18 is one of the most common radar designs that has

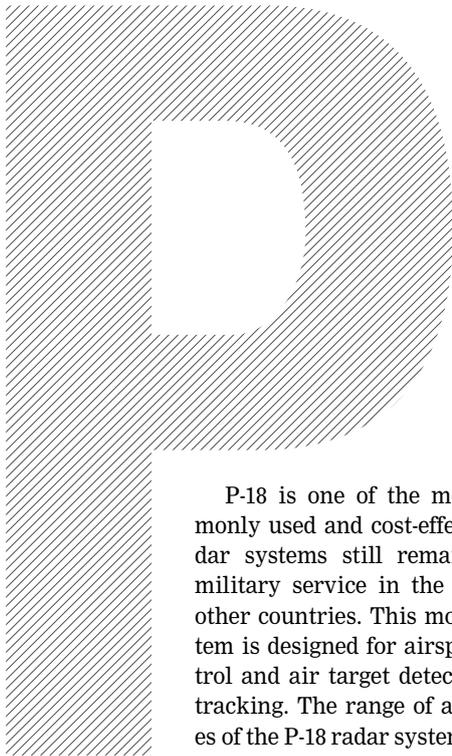


SYSTEM



been upgraded and improved nowadays. The arms export market currently offers a wide range of P-18 radar upgrades developed in Russia, Belarus, Ukraine, Kazakhstan and several other countries. Defense-Express attempted to sort out what the P-18 is attractive for and what makes the upgrades different from the original design.





P-18 is one of the most commonly used and cost-effective radar systems still remaining in military service in the CIS and other countries. This mobile system is designed for airspace control and air target detection and tracking. The range of advantages of the P-18 radar system, which operates in the meter wave-length region, includes the ease of operation, reliability and all-weather capability, in addition to an enhanced coordinate measuring capability for range and azimuth.

Still its major advantage is the ability to classify and identify at long ranges targets in various categories and sizes, including small-size ones, and the ability to do reliable tracking of detected targets in severe weathers. The USSR's choice of the meter wave-length region as the band of priority for radar designs has, surprisingly, turned into dividends for designers of VHF-band radar technologies. It so happened that these radar designs came as a response to the 'stealth' technology in which development the United States has invested billions of dollars. The radar cross section reduction measures taken the Americans proved to be ineffective in the meter wave-length range. This became particularly evident during the NATO-led campaign in Yugoslavia in 1999, when an F-117A



«Nighthawk» Stealth Fighter was successfully identified and destroyed based on target data provided by a P-18 radar system. There are no invisible targets for a metric-band radar.

The P-18's technological sophistication furthermore manifests itself in the design's upgrade capacity that allows for the most newest achievements in science and technology to be integrated into the design.

These features led to the emergence of different projects to upgrade the P-18 radar technology in Ukraine, Russia, Belarus, Kazakhstan, Hungary and Poland. All of the P-18 upgrades are similar in some respects, but still there are favorites among them (see Table 1 below).

As a matter of fact, maker companies have tried to build fundamentally new designs based on system solutions implemented in the recent past. Most of the upgrade efforts for the P-18 radar system are largely aimed at en-

hancements that include detection range capability, improved performance reliability, enhanced capabilities against passive or active countermeasures, automation of radar output data handling and air target trajectory generation procedures, adding capabilities for the collection, processing and displaying of air situation data, the use of current-generation component technology and creating a new PC-based operator workstation.

One more important aspect of modernization is a reduction in the number of carrying platforms needed to accommodate the system. The original system requires two Ural-375/4320-type truck chassis plus as many trailers to transport. Russian, Kazakh and Belorussian upgrades are accommodated on KamAZ-type cross-country 6x6 truck chassis while their Ukrainian counterpart fits into a KrAZ chassis-based vehicle. The upgrade package additionally includes new diesel generators and



tion Enterprise “NPO Aerotechnika-MLT”. The first two upgraded units of the system were delivered for service with the Ukrainian Air Force’s radio-radar troops in 2008. Aerotechnika-MLT was responsible for upgrading P-18 to the P-18MA configuration and Ukrspetstechnika to the P-18MU configuration. At the time, the cost of upgrading the system to the P-18MA or P-18MU standards was estimated at UAH 5 to 7 million per unit.

Ukrspetstechnika has developed a family of radar technologies based on the P-18 design – including the P-18MU, P-18MM, P18OU and Malachite – and gained a great deal of experience working in this particular area of expertise. Each of the designs differs by the degree of upgrading, thus allowing potential customers who aim to select a high-quality and cost effective solution for their respective military to choose an option that suits their requirements best. A disadvantage of the original P-18 design was that it required as many as four vehicular platforms to transport. By way of comparison, the “Malachite” radar well fits into one single truck chassis plus one towed platform. As explained by Mykhailo Prokhorenko, deputy CEO at HC “Ukrspetstechnika”, “One of achievements [implemented] in this item is economy of operation and reduced size. Diesel engines consume almost three times less fuel than was the case with the original design. Previously, the P-18 system was accommodated on Ural-type truck chassis with gasoline powered engines that consumed one liter of fuel per kilometer traveled. The upgraded version is housed on a KrAZ high mobility truck chassis with a multi-fuel diesel turbine engine and diesel power supply units.”

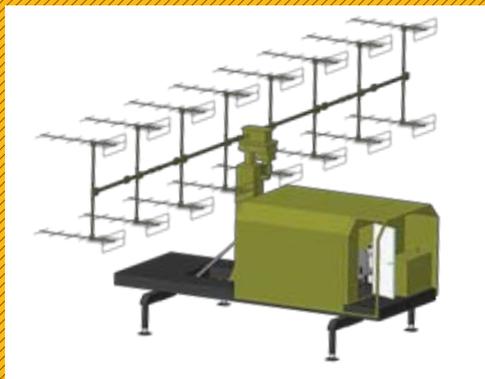
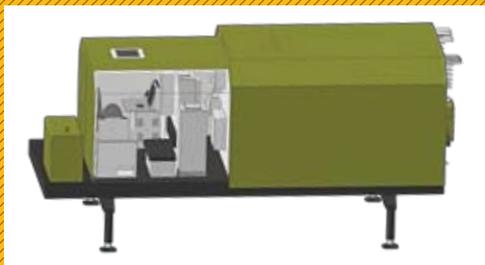
The hardware compartment with computerized workstations for two operators is installed on a

diesel engines offering enhanced efficiency and fuel economy.

As UDR was told by an official at Belorussian company ‘Agat’ which deals with upgrades on the P-18 technology among others, “Most of these designs (P-18 upgrades – DE note) are all similar since they are based on same physical principles. In this respect, they don’t differ from each other. They differ in nuances such as digital processing of return signals. The difference is in quality of return signals and in how qualitatively the signals are filtered out, retrieved and reproduced. This is where each country has its own know-how which is not disclosed”.

Ukrainian projects for upgrading the P-18 radar system stand out among numerous export market counterparts by virtue of the level of qualitative improvements and the degree of sophistication.

In Ukraine, upgrades on the P-18 radar system have been dealt with by the holding company “Ukrstektchnika” and R&D and Produc-



The Malachite-M will be accommodated on one single truck chassis. It will feature a newly designed automatically rotating antenna» system»

towed platform. The upgrade introduces digital signal processing allowing echo signals from targets to be filtered out and discriminated against the background of noise, interference and jamming signals. The introduction of color display units for displaying radar output data contributes to operator's work productivity owing to a much better picture quality and the absence of information losses. The upgraded radar is interfaced with the PRV-16-type (IRL132) heightfinder via a data link, enabling functions such as the generation of requests for altitude measuring of the target being tracked, receiving the heightfinder's output data and recording this in the target label to be performed automatically without operator's interference. The radar output data transmitted to the radar control post can be associated with terrain using an electronic map of the terrain of interest.

One more feature offered by the Malachite radar design is reduced minimum detection threshold. The upgrade developed by Holding Company "Ukrspetstechnika" is unique in that it has had minimum detection threshold reduced to 2.5 kilometers as compared to about 6 kilometers for counterpart designs by other companies. One more special feature characterizing the Malachite is a capability to determine all three coordinates — the range, azimuth and m/s radial velocity — of the target of interest.

In the original P-18, the antenna array could be turned $+15 \div -5$ degrees to the horizontal. With the antenna array elevated 15 degrees to the horizontal, the upper detection threshold amounts to about $40 \div 42$ degrees. This mode of operation is mostly employed when the radar is used in conjunction with other radars. With the antenna array elevated $5 \div 10$ degrees, visibility, hence the target tracking ability is improved in an arc of ± 5 to 12 degrees. Turning the an-

tenna array down to the horizontal allows for reduced ground reflection from steadily sloped terrains. Of all the P-18 upgrades existing to date, the Malachite is the only one to have had its antenna tilt changed to plus or minus 15 degrees to enhance its detection and tracking performance capability against low-flying targets.

Another new capability implemented by Ukrspetstechnika in the Malachite design is a capability to control surface situation. During Perspektiva-2012 training exercises that took place in September, maritime variant of the Malachite station was installed on the cape of Meganom in the Crimean Peninsula where it performed with success detecting warships and other vessels to prevent them from entering the restricted sea area assigned for live-firing phase of the exercise.

More, the Malachite has a capability to support the short-range surface-to-air missile (SAM) system S-125. If integrated into the structure of the S-125 SAM battalion, the Malachite could enhance its performance capabilities in detecting targets and providing target track data.

The promise held by Ukrspetstechnika's Malachite design is illustrated by the fact that Russian specialists who recently held a monitoring of the P-18 upgrades being developed in the Russian Federation, Belarus and Ukraine found the Ukrspetstechnika's design to be the best suitable option for use by the Russian military.

In 2012, the HC "Ukrspetstechnika" was commissioned by the Ukrainian Defense Ministry to supply two units of the Malachite radar system, and there is an intention to include the system in the State Defense Procurement Order for Fiscal Year 2013, as well, since the Malachite has been found an optimal solution in terms of cost/capability trade-offs.

Ukrspetstechnika is not satisfied with what has already been achieved, however. Vera Koshevaya, CEO at the Holding Company said that trials of Malachite's younger sibling, the Malachite-M, have been scheduled for 2013. The Malachite-M will be accommodated on one single truck chassis. It will feature a newly designed automatically rotating antenna system and have its deployment/stow time reduced to 25 minutes. The Malachite-M would become a viable competitor for the Belorussian-designed VHF radar system Vostok-E, being cheaper to buy, albeit a little bit inferior in terms of emplacement time (see Table 2 below).

CONCLUDING REMARKS

The ease of operation, reliability and high performance capabilities of the P-18 radar system have shown for the whole world to see the promise of upgrading that system, both from financial and technological perspectives. Despite the diversity of P-18 upgrades developed in the CIS countries, there are no rivals to designs by Ukrainian companies. In the field of upgrading the P-18 radar system, a special place is held by the Open Joint-Stock Company "Holding Company 'Ukrspetstechnika'" who has been successful both on the domestic and export markets with its Malachite radar technology. This design, developed by Ukrspetstechnika's engineers, offers a range of advantages in terms of performance capabilities and areas of application over rival designs developed in the Russian Federation, Belarus and Ukraine. This opens broad possibilities for the Company entering new markets in countries that are looking at value for money. 

TABLE 1

Defense express

	Baseline P-18, prior to the upgrade	P-18MA/ P-18U, NPO Aerotechnika»	P-18M, NPO LEMZ	P-18MU, HC Ukrspets-technika	RLS Malachite, HC Ukrspets-technika	P-18M, OJSC Tetraedr	P-18M, SDB "SKTB Granit"
Operating frequency range, MHz	150-170	140-180	150-180	150-170	150-170	150-180	—
Target coordinates being determined	Azimuth, range	Azimuth, range	Azimuth, range	Azimuth, range	Azimuth, range, radial velocity	Azimuth, range	Azimuth, range
Automatic handling of radar output data	—	+	+	+	+	+	+
Frequency tuning method	electro-mechanical	electronic	electronic	electronic	electronic	Electronic	electronic
Pulse transmitted power, kW	300	8	5	8	8	—	—
Fighter-type target detection range, H>10 km, km	250	360	360	360	400	360	360
Small-size low-flying target detection range at H=100/1000 m, km	28/75 km	30/80 km	30/80 km	30/80	30/80	30/80	—
Minimum detection threshold, km	—	7.5	—	6	2.5	—	—
Resolution for range, m	2,000	1,100	—	450	—	—	—
Antenna tilt	+15 ÷ - 5°	+15 ÷ - 5°	+15 ÷ - 5°	+15 ÷ - 5°	+15 ÷ - 15°	+15 ÷ - 5°	+15 ÷ - 5°
Accuracy of target coordinates determined:							
range, m	1400	180	70	Up to 200	Up to 100	180	Up to 250
azimuth, degrees	1.5	0.4	0.4	0.4	0.4	0.4	0.4
radial velocity,	—	In relative terms	—	—	Up to 10 m/s	—	—
Transmitter type	Vacuum tube	transistorized	transistorized	transistorized	transistorized	transistorized	—
Maximum number of targets being engaged simultaneously	10	—	—	256	256	—	Up to 100
Ground clutter suppression ratio	—	> 40 dB	52 dB	40+ dB	40+ dB	—	—
Sea-target handling capability	unavailable	unavailable	unavailable	unavailable	Available	Unavailable	unavailable
Heightfinder automatic control capability	—	up to one heightfinder	—	up to one heightfinder	up to two heightfinders	—	—
Warm-up time, min.	3(5)	3 min	1 (1) min	1 (1) min	1 (1min	2.5 min.	—
Power demand	Up to 10 kW	Up to 6 kW	10 kW	Up to 8 kW	Up to 6.5 kW	Up to 8 kW	—
Number of vehicular platforms required for transportation	4 (2 vehicles + 2 towed platforms)	2 vehicles	—	2 vehicles	1 vehicle plus 1 towed platform	2 vehicles	—
Time required for deployment by a five-man crew	< 60 minutes	< 60 minutes	< 60 minutes	< 60 minutes	< 60 minutes	< 60 minutes	< 60 minutes
Capability to estimate mean square error for range measurements	unavailable	Unavailable	Unavailable	Unavailable	Available	Unavailable	Unavailable

TABLE 2

Defense express

		Malachite-M, HC Ukrspets-technika	Vostok-E, DB Radar
1	Target coordinates determined	Azimuth, range, radial velocity	Azimuth, range, radial velocity
2	Frequency tuning method	electronic	electronic
3	Fighter-type target detection range, H>10 km, km	400	350
4	Small-size low-flying target detection range at H=100/1000 m, km		
5	Range, m	Up to 100	150
6	azimuth, degrees	0.4	5-5
7	radial velocity, m/s	10	10
8	Maximum number of targets being engaged simultaneously	256	>120
9	Ground clutter suppression ratio	> 40 dB	> 40 dB
10	Sea-target handling capability	available	unavailable
11	Number of vehicular platforms required for transportation	1 vehicle	2 vehicles
12	Into-action time, min	25	8

[capabilities]

Unmanned Aerial Vehicles have already become a fixture for weapons arsenals of modern armed forces. To date, about 120 types of robotic aircraft have been operated by military forces in 40 countries worldwide, whilst demand for “flying robots” is ever rising. All in all, research & design organizations and aerospace companies throughout the globe are developing and manufacturing more than 250 designs of Unmanned Aerial Vehicles (UAVs or drones) and Unmanned Aircraft Systems (UAS, UAV + control infrastructure).

The fashions in UAVs have not affected Ukraine too much. While all branches of the Ukrainian Armed Forces are in dire need of new unmanned aerial capabilities, they have to content themselves with the UAV/UAS inventory they inherited from the Soviet Army – with all the associated risks and extremely limited performance capabilities. The Ukrainian Air Force (UAF) has within its structure a separate UAV Regiment operating ‘Strizh’ and ‘Reis’ families of UAS’s. If they are well suited for employment as Target Systems for training air defense and air

force units, they are well behind modern-day standards when used as reconnaissance and intelligence gathering assets due to poor capabilities in terms of operational range, fuel endurance, transmission of live video footage to operational rooms at all command levels, and, finally, parachute-assisted descent (which is too slow, making the spy aircraft too much of an easy target for enemy fire). Reconnaissance payload options for the ‘Strizh’ or ‘Reis’ are only limited to one single system whose capabilities rule out detection of well camouflaged targets.

UAV TECHNOLOGIES IN UKRAINE



СТРЕПЕТ
STREPET

1938

ЧУГУЕВСКИЙ АВИАЦИОННЫЙ
РЕМОНТНЫЙ ЗАВОД
CHUGUEV AIRCRAFT REPAIR PLANT
АЭРОИНЖИНИРИНГ
AERODENGINEERING

Such a deep gap is a result of Ukrainian (and previously Soviet) military leaders ignoring the value of unmanned drone assets. The UAV requirement issue was not raised among Ukraine's military establishment until 2006, and two years later, in 2008, the Ministry of Defense and the Armed Forces General Staff issued joint documents that determined overall approaches – projected into up to 2025 – to providing the Ukrainian Armed Forces with unmanned drone capability. A brief review of the practical returns of this initiative is following.

The Ukrainian Armed Forces requirement of short-range and tactical UAVs might be categorized in three groups:

1. Battlefield reconnaissance UAV systems operating to 10-15 km ranges to provide motorized infantry and tank battalions, artillery battalions and airborne battalions with reconnaissance UAV capability in support of their situational awareness requirements within their operational range. Missions assigned to UAVs in this category include loitering, search and detection of enemy sabotage-reconnaissance groups, target reconnaissance as well as support for peacekeeping and special-force troops. This capability is vital in that it facilitates tactical decision-making and helps provide valuable intelligence without exposing own soldiers to a risk. Ukrainian military's requirement for UAVs operating to 10-15km ranges is roughly set at 40-50 units.
2. Tactical UAV systems with effective ranges of 60 to 80 kilometers. UAF's requirement is roughly estimated at some 10-12 systems. UAV systems in this category are needed for detailed intelligence gathering



The tactical UAS 'STREPET-L' has a maximum take-off mass of 80 kg, including a 20kg payload. Effective range is put at 80 km and practical ceiling at 4,000m. Fuel endurance is enough for up to four hours in the air at a cruising speed of 130 kph.

3. Operational-tactical UAVs that can fly out to 200-300km, performing observation and reconnaissance missions at low to medium altitudes – day and night, in all weathers, in complex air defense environments and in the presence of substantial jamming. One more requirement is a secure datalink capable of transmitting live video footage during 10+ hours. The range of missions for operational-tactical UAV systems includes detailed reconnaissance to support situational awareness requirements of task forces of corps and higher echelon levels, providing reconnaissance and target acquisition

for aerial weapons platforms and pre-strategic missile assets such as the 'Sapsan' multi-target 300-km range missile system being developed by a team of Ukrainian defense companies.

The Ukrainian MoD conducted a capability analysis of domestic UAV designers and makers – among them UAVia Ltd. (Kiev), Chuhuiv Aircraft Repair Plant (Defense Ministry-controlled organization affiliated with the Aviavoenremont Corporation), N.Zhukovski National Aerospace University's Scientific Research Institute for Physical Simulation of Aircraft Flights (SRIPSAF) in Kharkiv and Ukrtechno-Atom Ltd. (Kiev) – to find out that none of them is mature enough to independently cater for the Ukrainian military's UAV/UAS requirements. A range of UAV system designs from suppliers such as Sagem of France, EMT of Germany and IAI of Israel were demonstrated to Ukrainian military representatives in 2007. Afterwards, separate meetings with representatives of Malat Division (an IAI's branch) and Sagem Defence Securite took place in Kiev. A decision was made to the effect that tactical-level UAV/UAS systems with operational ranges of 10-15 and 60-80 kilometers should better be acquired from foreign suppliers, at least at the initial stage needed for Ukrainian operators to become familiar with the capabilities of this type of equipment and to streamline tactics

for employing UAV/UAS assets in standard missions.

In 2008, the General Staff selected Israel's IAI as supplier of one unit of the battlefield reconnaissance UAV system 'Bird Eye 400' to support Task Force operations. Relevant contract worth UAH 6.2 million (including UAH 1.44mn VAT) was implemented on MoD's behalf by UkrSpetsExport (military and dual-use equipment import/export State Company) later the same year. The Bird Eye 400 acquisition package included three UAVs, a ground remote control unit, Ground Data Terminal (GDT) unit, a man portable receiver unit, three gyrostabilized platforms, two daylight cameras plus one IR camera, associated training facilities, replacement parts, a repair kit and charging devices. The intention was for the MoD to acquire three such systems in each of the three following years to equip Rapid Reaction Operational Force's and Special Operations Force's battalion-size units.

In 2009, MoD announced its intention to additionally acquire one tactical reconnaissance UAV/UAS system with a 60-80km operational range for familiarization purposes. The system, if found by the General Staff to be suitable to meet the Ukrainian Armed Forces' requirements, was then to be acquired in sufficient numbers to enter service with mechanized infantry and armored units of brigade to corps levels. Regarding an operational-tactical UAV/UAS system with 300km flight range, the intention was to build it domestically in close cooperation with top international designers.

This notwithstanding, Ukrainian companies, both Government-controlled and privately-owned, continue with the development and production of UAV

designs. True enough, these are largely targeted to the commercial market, albeit with an eye to coming someday to the attention of potential customers such as the MoD, Police or Emergency Management Agency. It may be noted that, according to Ukrainian legislation on licensing selected business activities, weapons and military hardware (and by default UAV technologies) cannot be designed or manufactured other than by companies holding relevant licenses issued by the Ministry of Economic Policy. Therefore, from purely legal standpoint, none of Ukrainian companies can do business in the military UAV domain except for Chuhuiv Aircraft Repair Plant who has been involved in this field for five years now. The MoD has selected Chuhuiv Plant as its authorized central organization responsible for the complete range of works relating to manufacture, repairs and providing in-service support (and maintenance) for the Ukrainian Armed Forces' inventory of UAV/UAS systems, including coordination of all relevant contacts with domestic and international UAV market players.

Chuhuiv Aircraft Repair Plant is funding a series of its own UAV technology projects. One such is for the development of the 'STREPET' Unmanned Aircraft System incorporating a ground control station, a transport system and a catapult launcher (if required), in addition to UAVs of four configurations:

The STREPET-M is designed for battlefield reconnaissance missions. With a take-off mass of 15 kg, including a 3-kg payload, it can fly out to 15 km at a cruising speed of 100 km/h. Practical ceiling is set at 8,000m and fuel endurance is enough for up to 2 hours in the air;

The battlefield reconnaissance UAS 'STREPET-K' has a

maximum take-off weight of 20 kg, allowing for payloads of up to 8 kg. Effective range is put at 15 km and practical ceiling at 3,000 m. It can cruise at 100 km/h during 4 hours.

The tactical UAS 'STREPET-L' has a maximum take-off mass of 80 kg, including a 20kg payload. Effective range is put at 80 km and practical ceiling at 4,000m. Fuel endurance is enough for up to four hours in the air at a cruising speed of 130 kph.

The tactical STREPET-S uses classical aerodynamic design. With a take-off weight of 180kg, it allows for payloads of up to 50kg. It offers a cruising airspeed of 150kph and a practical ceiling of 4,500m, and can fly during 12 hours to ranges of up to 150 km.

The Ukrainian MoD requires not as much a robot aircraft proper as a remotely piloted aircraft system design allowing for self-contained take-off/landing, UAV control, maintenance and, most importantly, live video data transmission capability. Chuhuiv Aircraft Repair Plant, with scientific support from State Research Institute of Aviation and in cooperation with State Design Bureau Luch in Kyiv, drew up a technical design specification draft to address the Ukrainian military's UAV reconnaissance capability requirement. Luch is currently working on the ground control station and airborne navigation suite to enable the UAVs to be remotely controlled via wireless links. An UAV automatic control system has been developed and subjected to test and evaluation.

Remarkably, in 2013 French company SAGEM Agrees to Open Ukrainian Production Line for Its SPERWER Mk-II Tactical drone system jointly with the SE "Chuhuiv Aircraft Repair Plant" (ChARP) located in Ukraine's Kharkiv Region. 



[importantly to know]

INDUSTRIAL
OFFSET
PROGRAMS
IN UKRA

CHANGES AND NEW REQUIREMENTS IN THE FIELD OF LEGISLATION ON INDUSTRIAL (OFFSET) COMPENSATIONS

A number of substantial changes have taken place in Ukrainian legislation on industrial offset deals during the past several years. Based on global trends, Ukrainian authorities appear to have seen, at least on paper only, the broad opportunities offset agreements can provide for countries with tight budgets in terms of acquiring relatively current-generation equipment, improving the abilities of own defense industries and, finally, tapping into foreign investment for the development of sectors other than defense and national security. In view of the importance of the subject, Ukrainian Defense Review found it appropriate to get its readers familiar with selected aspects of Ukraine's offset policies.

LEGISLATIVE FRAMEWORK

Work to build a policy of offset operations in the field of defense and national security did not begin in this country until 2010. Of course, much of this delay was due to some features specific to the national bureaucratic machine that is too slow in “digesting” current tendencies amidst rapid changes taking place in neighboring countries. Actually, however, this might be for the better, since the government now has at hand all the information about the experiences of other countries in the field of offset operations – with all their advantages and disadvantages. Nevertheless, even now Ukrainian legislation contains certain “messages” for potential foreign suppliers.

In 2010, a concept of ‘compensation (offset) deals associated with foreign defense acquisitions’ was introduced into the Law of Ukraine on the “State Defense Procurement Order”. Soon afterwards on April 20, 2011, the Cabinet of Ministers adopted Resolution # 432 to approve “Procedure for the signing of compensation (offset) deals and types



Anton MIKHENKO,
Ukrainian Defense Review

LINE

of compensations that might be provided under compensation (offset) deals” (hereafter referred to as “Procedure”).

«The “Procedure” explains in specific terms selected aspects of the Ukrainian offset policies and establishes basic concepts and procedures for offset operations. It envisages, e.g., that requirements concerning offset goods [2] procurement

monitoring of offset contracts implementation shall be performed by an offset commission within the Ministry for Economic Development and Commerce. Offset commission was set up for the first time by a Ministry for Economic Development and Commerce resolution issued on January 12, 2012. The commission was set up with a mandate to coordinate foreign suppliers’

man (director of department of defense and security economy at the Ministry for Economic Development and Commerce at officio), secretary (chief of the sub-department of cooperation in defense and security, department of defense and security economy at the Ministry for Economic Development and Commerce at officio) and commissioners representing the Ministry of Finance, Ministry of Defense, Security Service of Ukraine (SBU), State Border Service, State Department of Special Communications and Information Protection, Ministry of Internal Affairs and National Space Agency (on agreement with heads of respective executive authorities). Representatives of other government institutions might be included in the commission as required.

The procedure for the signing of compensation deals provides for both direct and indirect offsets [6]. In other words, Ukrainian legislation allows foreign suppliers to supply offset goods that are not directly used in the defense industry (as was previously the case in Turkey and Malaysia).

Offset requirements shall be defined with account taken of proposals from state-owned companies acting as advisors to government on defining offset requirements and selecting successful bidders. In such a case, a list of state-owned companies that could be invited by government to provide advice in defining offset requirements and selecting successful bidders is subject to approval by the offset commission.

The government will personally supervise implementation of offset deals. Particularly an offset beneficiary shall prepare quarterly reports on the use of compensations under relevant

IN 2010, A CONCEPT OF ‘COMPENSATION (OFFSET) DEALS ASSOCIATED WITH FOREIGN DEFENSE ACQUISITIONS’ WAS INTRODUCED INTO THE LAW OF UKRAINE ON THE “STATE DEFENSE PROCUREMENT ORDER”. SOON AFTERWARDS ON APRIL 20, 2011, THE CABINET OF MINISTERS ADOPTED RESOLUTION # 432 TO APPROVE “PROCEDURE FOR THE SIGNING OF COMPENSATION (OFFSET) DEALS AND TYPES OF COMPENSATIONS THAT MIGHT BE PROVIDED UNDER COMPENSATION (OFFSET) DEALS

shall apply to foreign defense procurement contracts worth in excess of €5 million.

It furthermore specifies that cost calculation of a defense procurement contract shall include the cost of services, goods and works supplied to Ukraine’s customs territory by the same suppliers if they carried out international transfers within three years prior to the corresponding bidding day.

Coordination of customer activities [3] with respect to the signing, implementation and

activities relating to the signing, implementation and monitoring of offset contracts; develop and improve national rules and regulations in the field of offset operations; coordinate the selection of and activities by offset beneficiaries [4]; develop recommendations for government customers with respect to offset policy priorities.

The offset commission is composed of chairman (senior deputy Minister for Economic Development and Commerce at officio), vice-chair-

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TABLE 1

Defense express	Industrial sector	Offset coefficient*	
		goods	services
	Aircraft building	100	95
	Shipbuilding	100	95
	Aerospace industry	100	95
	Topography and Geodesics	65	60
	Electronics	100	90
	Ecology	80	70
	Automatic and Robotronic Equipment	90	80
	Engineering	70	65
	Construction industry	70	65
	Fiber Optic Materials	90	65
	Biotechnology	90	85

* as a percentage of the cost of the main contract

offset deals and to submit the reports to the offset commission not later than the fifth day following the period under review.

One important specific feature of Ukraine's offset policies is the size of compensations (offset coefficient [7]) which varies from sector to sector. Particularly for the aeronautical sector, the offset coefficients are set at 100 percent of the cost of goods and 95 percent of the cost of services supplied under the main contract (see Table 1 below).

At the same time, Ukrainian legislation explains to potential foreign suppliers in most explicit terms what kinds of compensation could be provided under offset deals. The Procedure provides for the types of compensation as follows:

- the provision of works associated with maintenance and repairs of military and special-purpose equipment and military property;
- the provision of advanced training services for defense and national security personnel;
- transition of intellectual property rights;
- implementation of applied research & development projects in Ukraine;
- the provision of investment support;
- the procurement of Ukrainian-supplied goods or services worth the full or partial equivalent value of the goods exported under relevant defense contracts (counter trade);



- the provision of additional export opportunities for Ukrainian manufacturing companies;
- the provision of technical assistance in defense and security sector reforms.

Internal political realities remain to be an important factor in the signing of offset deals in Ukraine. Some analysts believe that nonaligned status gave the low-down on the development of the country's military-technical cooperation with the Western world. After all, Central and Eastern Europe (CEE) countries acquiring NATO membership was a contributing factor to the growth of offset operations. For most of European countries, the CEE states joining NATO is equivalent to joining a group of like-minded countries or the so-called 'trust circle'. Experiences of Poland, the Czech Republic and Hungary are illustrative. However there is an alternative expert opinion that nonaligned

status is no obstacle to a country developing its international cooperation under offset programs. Notable examples of this are European countries such as Austria, Switzerland, Sweden and Finland which, being neutral or nonaligned states, have actively pursued offset projects.

Against this backdrop, one thing is obvious: for Ukraine, whatever the status – in order to reduce the cost of imported military equipment in conditions of chronic defense budget shortfalls – it is necessary to use opportunities provided by already effective legislation in force, while the Ministry of Defense and Ministry for Economic Development and Commerce should develop direct offset options and immediately launch negotiations with Western companies and, in the future, ensure both the acquisition of modern armaments and the transfer of technology.

There can be no doubt that the provision of the national Armed Forces with domes-

tically produced weapons and military equipment is a justified policy. But this is only partially so. One should keep in mind that the domestic defense industry is unable to provide all types and amounts of weapons and military equipment required by the national armed forces and – with persistent budget shortfalls, the lack of money for technical retooling and the aging workforce – it will likely become unable to manufacture anything at all.

Ukrainian leadership must change the very ideology of its military-technical cooperation policy, end its current policy of foreign defense procurements and adopt experience of CEE countries in the field of offset operations. Ukraine's defense industry has many areas to develop and offer attractive opportunities for foreign investors both in co-production and individual projects, but this issue needs to be dedicatedly addressed and effectively managed. **UDR**

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