UKRAINIAN DEFENSE REVIEW APC BTR-4 MV DEBUT OF THE YEAR NEW TECHNICAL SOLUTIONS

FAIRWAY FOR VOLODYMYR VELYKYI progress of the Ukrainian corvette project

№1 [JANUARY-MARCH 2013]

AN-70 POINT OF NO RETURN current status and outlook

NATIONAL

UKRAINIAN HELICOPTER new possibilities for modernization of Mi-8T/Mi-17, Mi-24/Mi-35 and Mi-2 Defens

NEW PRODUCT





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 www.ukroboronprom.com.ua Contacts: State Concern "Ukroboronprom" 36, Dehtiarivska St., Kyiv, 04119, Ukraine Tel.: +380 44 4584681 Fax: +380 44 5862477

table of contents



8 UKRAINIAN DEFENSE INDUSTRY

Ukrainian defense industry is comprised of enterprises of various patterns of ownership which are subordinated to different government agencies, which already participate in government contracts relating to the State Defense Procurement Order, and which are directly involved in or perform sub-contracted works under Ukraine's international military cooperation programs.



16 UKRAINIAN DEFENSE RESULTS 2012

2012 was remarkable in that is saw a more direct and active involvement by the country's top officials in decision-making related with the defense-industrial complex. Some of these decisions have been laid down in militarytechnical, military-economic and militarypolitical policy components.

trends

22 IDEX-2013: CORNERSTONE OF NEW TECHNOLOGIES

IDEX-2013 showed that on the one hand, the exhibition has progressed itself as an increase in the amount of exhibition space and in the number of represented companies, on the other hand significantly increased requirements of local buyers and ambitions of Arab countries to organize production of their own Hi-Tech weapons.

matter of technology

28 BTR-4 MV — New Forms & Capabilities

New Ukrainian APC, the BTR-4MV has made its debut at the IDEX 2013 International Defense Exhibition in Abu Dhabi, the United Arab Emirates. The new military vehicle was showcased by Ukrspecexport, Ukraine's top arms dealer.

arsenal

36 FAIRWAY FOR Volodymyr Velykyi

The Defense Ministry jointly with ship builders, domestic and foreign suppliers of systems and units is implementing an ambitious program to build a series of corvette class ships for the Ukrainian Navy. Successful completion of the program is to give new energy to the fleet and the domestic defense industry.



42 AN-70 POINT OF NO RETURN

The last year of 2012 could be decisive for the future of Russian-Ukrainian project to build the military transport aircraft An-70, this being due to the three events as follows: the selection of Gorbunov KAPO aviation industry corporation in Kazan; the completion of the first phase of preliminary testing of the upgraded An-70 prototype; and, finally, completion of an assemblyline produced fuselage and the rolling out of the first production-standard An-70 designed for Ukraine's Ministry of Defense of an assembly line at the Kiev plant.



48 UKRAINIAN HELICOPTER: Dreams come true

Ukraine has a closed-type cycle of overhauling the Mi-8T, Mi-24 and Mi-2 helicopters family and has obtained own possibilities for accomplishment of modernization of these helicopters' types at various levels (from improving the operation performances to installing new-generation engines on them). MOTOR SICH JSC engages in a new branch of its activity concerning modernization and production of the helicopters.

UKRAINIAN DEFENSE REVIEW

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CENTER FOR ARMY CONVERSION & DISARMAMENT STUDIES Founder & Director – Valentyn BADRAK

Mews

GENERAL STAFF IS COMPLETING REFORM PROGRAM

Armed Forces General Staff is completing work on a comprehensive program for the Ukrainian Armed Forces reform and development during years through 2017. This came

in a statement at a Feb 21 news briefing in Kiev by Oleksandr Oliynyk, senior deputy Defense Minister of Ukraine."This programming document contains all the qualitative and quantitative dimensions relating to all aspects of the Ukrainian Armed Forces development and human resource acquisition policies. The program will be examined and approved by the Ukrainian Ministry of Defense someday next week. Afterwards, it will be submitted to the Government and the President of Ukraine for examination and approval". Regarding renovation of the Ukrainian Armed Forces' weaponry and military equipment inventory, the deputy Minister of Defense said that relevant programs would cover all types of equipment, most notably aeronautical equipment, air defense assets, armored military vehicles and munitions. Addressing the numerical strength of the Ukrainian Armed Forces, O. Oliynyk said: "Quantitative dimensions are currently being outlined. According to the troop level projections seen in the program, the strength of Ukraine's Armed Forces could amount to about 110,000 personnel as of the end of 2017, depending on the level of resource provision. Personnel reductions will take place in service/logistic support units but will not affect combat elements. Afterwards, once the comprehensive program for the Ukrainian Armed Forces reform and development in the period through 2017 is officially approved and enacted, troop levels for each respective year would be established by law, i.e. by Verkhovna Rada resolutions".



LAST CONSCRIPTION IN UKRAINIAN ARMY WILL BE IN 2013

On February 19, 2013, Ukraine's **Defense Minister**, Pavlo Lebedev approved a key action plan on transition to a contract-based method of Armed **Forces manpower** acquisition. This was announced by Col. Ihor Lysenko, interim/acting chief of the Human Resources Department at the Ukrainian Armed Forces General Staff. at

a news conference to present White Paper 2012 on February 21. The White Paper envisages that transition to fully professional armed forces will be a multiphase effort. "During the initial phase covering the period till July 1, 2013, about 7,000 volunteers will be recruited to serve in the armed forces under employment contracts, and another 7,500 men will be recruited by conscription in the spring of 2013. During the second phase covering the period till 1 December 2013, about 3,600 volunteers will be recruited to serve under employment contracts, and 7,500 men will be conscripted for military service in the fall of 2013. During each of the third and fourth phases in 2014, up to 3,000 volunteers will be recruited for military service", I. Lysenko said.

UKRAINE Should Focus on Weapons Programs

Experts from the Center for Army, Conversion and Disarmament Studies believe that Ukraine should focus its effort on the arms development programs of priority im-

portance which were announced

earlier. The director of the center, Valentyn Badrak, made a statement to this effect during a presentation at UKRINFORM on February 12 of a study entitled «Specific features of armed forces and defense sector reforms in CEE countries. Lessons for Ukraine.» «For now, Ukraine should focus primarily on the development of the previously announced arms development programs of priority importance,» the expert said. He said that Ukraine should concentrate on the naval corvette and An-70 military transport aircraft programs. «We furthermore recommend that good focus should be given to unmanned technologies. We believe that big steps forward should be made in the field of ammunition, steps should be made towards national helicopter construction, and it's necessary to focus on the modernization or creation of new anti-aircraft missile systems,» Valentyn Badrak said.

navy

J news

NAVY Concept — 2025

The Ukrainian Navy Headquarters is completing work to draft Navy development concept projected into up to 2025,

Vice-Admiral Yuri Ilyin, the Navy Commander, said speaking at an academic conference on main aspects of development concepts for the Ukrainian Navy.

The draft concept particularly outlines ways and methods for optimizing organizational and staff structures and the size of the Navy, improving managerial system, stationing naval assets and equipping the navy with most advanced models of weapons and equipment.

SEA EQUIPMENT For India

The SE "Gas Turbine Manufacturing and Research Complex Zorya-Mashproekt" has delivered a set of equipment contracted by an Indian Customer, the Company's press service reported on 22 February.

The equipment, intended for integration onto naval frigates, has been delivered under a contract signed in 2011. Zorya-Mashproekt is looking to increase the output of products for naval applications over the period from 2013 to 2017. The Company has been awarded a number of contracts for supplies of maritime power plants, e.g. under long-term deals with Indian shipyards.



CORVETTE PROSPECTS

Chernomorskiy Shipbuilding Plant Has Built 55% Of The Hull For Project 58250 Corvette First-Of-Class, And 75% Will Be Built By The End Of 2013. On 13th February 2013 told at an UKRINFORM conference Director of the arms development and acquisition department at the Ministry of Defense Andriy Artyushenko. The Plant was given the difficult task of launching the ship before 2016, and Artiushenko believes this task to be feasible. The issue of weapons options for the indigenous corvette has re-emerged on the agenda. Despite the fact that no decision on the refusal of Westernsupplied weapons systems has been taken, specialist are seriously considering the possibility of replacing them with advanced designs offered by domestic companies. High price tag and Ukraine's rejection of the prospect of NATO membership are the key factors behind this change. However, the absence of an approved decision on the weapons inventory for the indigenous corvette does not hinder construction, since the ship is built using section method allowing various weapons systems to be realigned as required

NEW OPPORTUNITIES FOR CHORNOMORSKIY PLANT

The Ukrainian Cabinet of Ministers has authorized the Chornomorskiy Shipbuilding Plant (Mykolayiv) to import military goods that it needs for the manufacture of corvette-class ships. Resolution to this effect was issued by the Cabinet of Ministers as #144 on March 6, 2013. "The PJSC Chornomorskiy Shipbuilding Plant (Mykolayiv) shall be granted the power to import military goods under entries ML2, ML4 and ML9, which shall be valid for the duration of the State purposeoriented program on construction of corvetteclass warships," the Cabinet of Ministers resolution reads. The document furthermore specifies that the import license covers goods necessary for production purposes, as well as goods incorporating State secrets, which are required for importation under State defense procurement order relating to the manufacture of corvette-class warships.



land

UKRSPECEXPORT WILL SUPPLY TANK POWER PLANTS TO PAKISTAN

Ukraine will deliver no tank power plants – engines and related parts – to Pakistan under a \$50 million contract, state-run arms exporter Ukrspecexport said on 18 February. The power plants will be manufactured at the Kharkivbased Malyshev Plant, a staterun enterprise specializing in armored vehicles and related components, under a four-year contract that was signed at IDEX-2013 international arms exhibition in Abu Dhabi," Ukrspecexport said. It did not provide any technical specifications. Ukraine previously delivered more than 300 power plants to Pakistan for its al-Khalid main battle tank, Ukrspecexport's acting deputy director general Vadim Kozhevnikov said in a statement. The statement cited Kozhevnikov as saying he believed Ukraine is in a good position to compete with the world's leading tank power plant manufacturers, in particular Germany."We are direct competitors of German engine manufacturers. Our models are every bit as good as theirs in terms

of technical characteristics but are significantly cheaper," Kozhevnikov said.

FIRST OPLOT For thailand Will be in May 2013

Ukraine will deliver its first batch of T-84 Oplot main battle tanks to the Thailand Army in May, the Bangkok Post reported on January 4, 2013, quoting army chief, Prayuth Chan-ocha as saying. Under the delivery schedule, five of the tanks will be delivered in May 2013, with another 50 tanks due by the end of 2015, he said. The army has ordered a total of 200 tanks.

The first shipment of five tanks will be used for training purposes, General Prayuth Chanocha said. Gen Prayth said he had inspected an Oplot tank during a recent trip to Ukraine and believed the army was getting good value for money in terms of firepower and combat capabilities. Most of the army's current armored vehicles were purchased from Western countries, where prices were comparatively high, he said.



SC «UKRSPECEXPORT» GOT PROFITS USD 1.024 BN IN 2012

"The amount of intermediate trade activities by the State-owned Company and all of its affiliated firms in 2012 topped out at USD 1.024 billion, which is almost USD 20 million up on the previous year and the highest figure ever in the 16 years of Ukrspecexport's existence," a press officer for the Company told Interfax. Geographic pattern of the Company's export structure includes markets in Asia (47 percent), Africa (23 percent), the former Soviet Union (21 percent), Europe (6 percent) and the Americas (3) percent. The Company's current portfolio includes customers from 78 countries worldwide.

"On the list of major partners of Ukraine in the military-technical cooperation area are India, Iraq, the PR of China. Thailand. Kazakhstan. the Russian Federation and Azerbaijan," the press officer said. According to statistics provided by the Company for 2011, Ukrspecexport an its subordinate entities posted a combined amount of export/import trade of USD 1.005 billion, a 5.2 % increase as compared to the previous year (USD 956.85 million). As reported, Ukrspecexport and its affiliated companies are provided with sustained business for the next three to five years, with the export portfolio amounting to more than USD 5 billion.

4 / UKRAINIAN DEFENSE REVIEW / JANUARY-MARCH 2013

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UKRAINIAN RUSLAN IN MALI

Antonov An-124-100 'Ruslan' jumbo transport aircraft of Ukraine's Antonov Airlines have been assisting in transportation of the French military contingent to Mali since mid-January under the NATO SALIS program, a source at the airline administration told Interfax on January 21, 2013. "After the UN had decided to support the French

military operation against

Islamists in Mali, our entire

"Ruslan" fleet was mobilized

within the limits of SALIS pro-

gram to transport the French military contingent to Mali," he said. "As of now, it is planned that our fleet will provide transportation services to the mission in Mali, which is being joined by other EU countries, until the end of the month," the official at Antonov Airlines said.

SAGEM' UAV IN UKRAINE

French company SAGEM has done work to set up co-production of its SPERWER Mk-II tactical drone system jointly with the SE"Chuhuiv Aircraft Repair Plant" (ChARP) located in Ukraine's Kharkiv Region, Ukrainian Defense Ministry's press service reported. In 2010 in Paris, SAGEM and ChARP signed a memorandum of agreement to set up co-production of various types of tactical drone systems in Ukraine.

"VOLGA-DNEPR" STARTS AN-124 PRODUCTION IN GERMANY

The Ukrainian-Russian cargo airline Volga-Dnepr intends to launch limited production of the An-124 "Ruslan" transport aircraft at its newly opened maintenance hangar at Leipzig/Hale Airport in Germany.

The carrier's president, Alexey Isaikin said the project would be fully privately operated. He justified the decision by saying "after ten years of fruitless attempts to do something in Russia, we want to secure support from a state that may become interested in this project." Isaikin estimated that Volga-Dnepr would have a requirement for about 60 An-124 Ruslans by 2030, and orders for 200 more such jets may come from other carrier airlines. According to sources, the limited production line for the An-124 "Ruslan" at Leipzig/Hale Airport is expected to become operational in 2017-18, with the fuselage and landing gear to be adopted from the An-124 and electronic equipment from the Boeing 747, while engines will be bought from General Electric.

SUDAN WANTS TO PURCHASE 5 AN-148/158 & AN-74

Sudan is likely to purchase five Ukrainian-built An-148/158 regional jet aircraft and an An-74 aircraft valued altogether at more than USD 100 million, Kommersant-Ukraine has quoted Oleksandr Kiva, CEO at SE Antonov as saying on 18 February.

"Sudan would like to have the first few of the aircraft delivered by the end of this year, yet everything will depend on what payment and financing options are offered for the contract," Kiva said. A preliminary deal on the purchase of the aircraft was signed with Ukraine by the government of Sudan in mid-February, Sudanese Minister of Transport, Roads and Bridges, Ahmed Babiker Nahar told Reuters. The contract is expected for signature during a visit by an official Ukrainian delegation to Sudan due in March.

"The new Antonov airplanes are very good and safe," Ahmed Babiker Nahar said. As reported, the aircraft are intended for the air carrier "Sudan Airways" that is living through difficult days because of the U.S. trade sanctions. The planned contract would not violate the embargo imposed on Sudan, SE"Antonov" maintains. Pre-contract negotiations with the Sudanese side have been supervised by Ukraine's State Service for Export Control, Kiva said.

CUBA BUYS AN-158

The president of the Cuban Aviation Corporation S.A. (Cacsa), Ramon Martinez Hechavarria, said Cuba would acquire six new airplanes for domestic flights.

The aircraft would be bought by Cuba on financial leasing terms, Mr. Hechevarria told RIA Novosti on 16 February. Martinez Hechevarria explained that the new aircraft are Russian-Ukrainian built AN-158 aircraft, with capacity for 97 passengers. Three of them will start operating in April, while the other three will fly next year."By so doing we will gradually replace the AN-24 airplanes that can fly to shorter ranges," he explained.

AN-148-300MP LOOKS FOR Potential contracts in India

State-owned enterprise Antonov intends to demonstrate its maritime patrol aircraft An-148-300MP in competitions for several contracts from India's defense department, the Company's press service reported on February 5, 2013. "The Company has plans to demonstrate the An-148-300MP in a number of contract competitions to provide a maritime patrol fleet for the Indian Ministry of Defense," the press service said. For the time being, the Company does not disclose details or time lines of the potential competitions.

The An-148-300MP is a planned maritime patrol version of Antonov's An-148-300 aircraft with a range of 7,000 kilometers, itself a version of the An-148 regional jet.

The An-148/150 family of newgeneration regional jets is being demonstrated by SE Antonov at the international aerospace exhibition AERO INDIA'2013 which is being held at Bangalore from February 6 to 10, 2013. As well as the An-148/158 family of aircraft, an integrated maintenance support system for the light transport aircraft An-32 is being demonstrated by Antonov to exhibitors and potential customers at Bangalore.

FIVE MORE AN-32 FOR INDIA

Another five An-32 military transport aircraft of the Indian Air Force fleet have departed Kiev for Kanpur, northern India, following completion of life-extension repairs, an official at Spetstechnoexport, the Ukrainian Contractor. has reported. With this delivery, a total of 25 An-32 aircraft have been given back to the Indian Air Force after undergoing life-extension and overhaul repairs in Ukraine. The USD 400 million deal, which provides for life-extension and reequipment of 105 An-32 military

Force fleet, was signed between the Indian Ministry of Defense and SE Spetstechnoexport in July 2009. Under the terms of the deal, 40 aircraft will undergo repairs and life-updates in Ukraine, while upgrades for the reminder 65 aircraft will be carried out at BDR 1 aviation plant of Indian Air Force in Kanpur.

Ukrainian contractors include SE Ukrspecexport and SE Spetstechnoexport, with SE Antonov, Civil Aviation Plant # 410 and Motor-Sich acting as





CMU APPROVES SPACE PROGRAM 2013-2017

The Cabinet Of Ministers of Ukraine Approves Draft Bill On The Adoption Of A National Purpose-Oriented Scientific And Engineering Space Program Covering The Period 2013 Through 2017. The key projects of the na-

tional space program for 2013-2017 include:

- the establishment of geoinformation support and monitoring emergency situations with the use of space information;
- the launch of three satellites (the Sich-2-1 Earth remote sensing satellite, the Microsat research and engineering satellite, and the UMC-1 universitydeveloped satellite);
- the creation of the Cyclone-4 space rocket complex at the Alcantara Launch Center (Brazil); the promotion of the Lybid national satellite communications system;
- the creation of advanced rockets and satellites and development of their manufacturing technology; the promotion of commercial operation of launch vehicles: Cyclone-4, Zenit 2SLB, Zenit 3SLB (the Land Launch), Zenit

3SL (the Sea Launch), Dnepr and the Lybid national satellite communications system.

The program furthermore provides for the development of international cooperation with Russia, the EU, Brazil, Canada, Belarus, the United States, Kazakhstan and expansion of cooperation with the European Space Agency (ESA). The program also regulates the guaranteed and rapid provision of satellite communications, data broadcasting and timing and navigation support services to executive agencies that implement state policy in the sphere of national security and defense. Other activities stipulated in the program include dissemination of information gathered by remote sensing satellites; basic space research in astrophysics, space biology and material science; the involvement of existing space infrastructure in international scientific research, and the implementation of scientific and educational programs. The approximate total funding under the program is UAH 2.58 billion, including UAH 1.12 billion to be

funded from the national budget.





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8 / UKRAINIAN DEFENSE REVIEW

CAPABILITIES AND SPECIFIC FEATURES OF THE UKRAINIAN DEFENSE INDUSTRY

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/ JANUARY-MARCH 2013 / 9

close-up



Ukrainian defense industry is comprised of enterprises of various patterns of ownership which are subordinated to different government agencies, which already participate or have the potential to participate in government contracts relating to the State Defense Procurement Order, and which are directly involved in or perform sub-contracted works under Ukraine's international military-technical cooperation programs. In Ukraine, the concept of "defense-industry" is not defined legislatively, except for Cabinet of Ministers resolution #1382 of 2008 which approves a list of enterprises included in the defense industry. That list has not been updated ever since, and it features some enterprises that have nothing to do with the realm of defense.

The Ukrainian defense industry includes companies from both the State sector and private sector. Based on official statistics available for 2012, seventy-five organizations with an aggregate work-







al Ministries and Government agencies. Presidential decree # 1085/2010 on "Optimizing the central government system" provided for structural reorganization of a number of entities responsible for developing and implementing state policies regarding the defense industry. Particularly the decree disbanded the Ministry for Industrial Policy and transferred the latter's responsibilities for running some of defense industry companies to the Agency for State Corporate Rights and Property Management (in 2012, the Ministry for Industrial Policy was reinstalled after being reorganized, again, from the aforementioned Agency). In 2011, the State-owned Ukroboronprom Concern was established to assist the central government in managing items of state-owned property in the defense industry. The Concern comprises over 130 companies and organizations, including the State-owned Company Ukrspecexport and its affiliated entities (Ukrinmash, Spetstechnoexport and Ukroboronservice that all deal with the export of defense products and services) as well as companies involved with R&D and production of weapons and military equipment, in addition to

the military repair plants that were previously subordinate to the Ministry of Defense. In addition to Ukroboronprom, responsibilities for managing companies of the defense industry are shared between the National Space Agency, the State Property Fund and the State Agency for Science, Innovation and Information Affairs.

Fifteen different government agencies and ministries, including the Ministry of Defense, act as Customers for domestic defense industry products. Ukrainian Armed Forces rearmament and re-equipment effort is being carried out under both ministerial purpose-oriented programs (such as the State Program on the Development of Weapons and Military Equipment 2012-2017) and three national programs - the indigenous naval corvette program, the An-70 military transport aircraft program and the multi-target missile system «Sapsan" program - which are being funded under separate budget plans.

The domestic defense industry is capable of producing in a closed-loop manufacturing process only about 1-2 percent of the total inventory of armaments and military equipment types required by the Ukrainian Armed Forces. Meanwhile, domestic companies have the potential to overhaul and upgrade most of the armaments and equipment types operat-

ees, including 39 governmentcontrolled and 38 privatesector entities featured on the national register of defense-related products and State secret items manufacturers, and about three hundred organizations hold licenses for the manufacture of military equipment in Ukraine. The country's annual defense-industrial output amounts to an average USD 2 billion.

force in excess of 250,000 employ-

There is no single 'control center' for the Ukrainian defense industry, with control being scattered among severDomestic companies have the potential to overhaul and upgrade most of the armaments and equipment types operated by the national military close-up

ed by the national military. Domestic contracts for the production, upgrade and overhaul of weapons and military equipment used by the Armed Forces and other uniformed services do not exceed five to eight percent of capacity of the national defense industry. Contracts related with the State Defense Procurement Order (SDPO) provide only limited business for companies of the defense-industrial cluster. The number of domestic companies that were involved in SDPO contracts for weapons and equipment supplies to the Ukrainian Armed Forces and other security sector organizations did not exceed 24 companies in 2010 and 20 companies (12 state-owned and eight privatelyowned companies) in 2011/2012. The number of domestic companies participating in SDPO contracts for upgrade and overhaul of weapons and military equipment amounted to 20 in 2010 (including 13 state-owned companies), eight in 2011 (including

five state-owned companies). Ukrainian market currently absorbs less than thirty percent of the domestic defense industry output. Analysts believe limited domestic market and limited consumption of industrial products to be restricting factors of economic growth in Ukraine. As

seven state-owned companies)

and as many in 2012 (including

consequence, Ukrainian defense industry is an export driven industry. The export of finished products and services provides the lion's share of revenues to domestic defense industry companies. Aggregate revenues earned by Ukrainian defense industry companies from the export of armaments and military equipment averaged at about USD 1-1.3 billion in each of 2011 and 2012.

Immediately after independence, the Ukrainian defense industry was comprised of 1,840 companies employing a combined workforce of 2.7 million. Military production was the main business for seven hundred of these companies employing altogether about 1.3 million people







TRANSFORMATION OF THE DEFENSE INDUSTRY

After the breakup of the Soviet Union, Ukraine inherited 30 percent of the USSR's defense industry and close to 20 percent of its defense-related research and development capabilities. Immediately after independence, the

Ukrainian defense industry was comprised of 1,840 companies employ-

ing a combined workforce of 2.7 million. Military production was the main business for seven hundred of these companies employing altogether about 1.3 million people. A gradual decrease in the number of defense industry companies has continued ever since, which was mainly due to the lack of orders from the Ukrainian Ministry of Defense. The defense industry has only managed to retain the manufacturing capabilities of priority importance which were able to withstand rivalry on the competition-sensitive global market for weapons, military-technical items and defense-related services, while the defense industry transformation is still under way.

Technological upgrade of the industry remains to be a key problem; fixed capital depreciation ratio in the defense industry hits 50 percent or higher, while 70 to 75 percent of all manufacturing facilities have become technically obsolete, have been operated for 20 years or longer and, therefore, cannot meet the up-to-date requirements in terms of production quality, working efficiency or labor productivity. A great deal of manufacturing facilities is in need of massive refurbishment and technical retooling. Deficient components, subassemblies and materials required by Ukrainian defense companies have been delivered by suppliers from 16 nations. Sixty-seven defense industry companies or more than 40 percent of the total number of companies engaged in Government-funded contracts depend on imported supplies. Most critical levels of dependence on

imports have been seen in the aeroengine industry, aircraft-building and defense electronics sectors of the defense industry. The Russian Federation accounts for more than 60 percent of overall imports required by Ukraine's defense industrial complex.

In Ukraine, more or less modern-standard R&D and manufacturing bases are operated by the defense industry sectors as follows:

- Design/development and manufacture of rockets and missile systems;
- Designed/development and building of specialapplication aircraft (military transport, patrol and fire aircraft);
- Design/development and manufacture of precisionguided weapons systems;
- Design/development and manufacture of radar technologies and opticalelectronic sensors;
- Design/development and building of aircraft engines;
- Upgrades on Aviation Materiel;
- Design/development and building of armored military equipment.

These are the sectors that have managed to produce a number of high-tech product types for military and dual-use applications.

close-up

UKRAINIAN **DEFENSE INDUSTRY**

krainian defense industry integrates more than 160 companies with an aggregate workforce in excess of 230,000 employees. The vast majority of defense companies have the status as Government property. There is no single 'control center' for

Ukrainian defense industry, with control being scattered among several Ministries and Government agencies - Ministry of Industrial Policy, Ministry of Defense, National Space Agency (NKAU) and State Property Fund. Ukraine's aggregate defense

industrial output for the 2006-2007 period made up an average \$1-1.5 billion annually. With the breakup of the Soviet Union Ukraine inherited around seven hundred defenseindustrial entities employing altogether more than 1 million workers.

* Only major players are featured in the table below

AIRCRAFT INDUSTRY

ANTK Antonov Aeronautical Scientific/Technical Corporation Civil Aviation Plant 410 SE 'Krasyliv Assembly Manufacturing Plant' SE'Novator' SE 'Flight-Test Enterprise 'Vzlet Kiev's State-owned Aircraft Plant 'Aviant' Scientific-Research Institute of Aeroelastic Systems Scientific-Research Center 'Vertolet' Kharkiv's Machine-Building Plant 'FED' Kharkiv's Assembly Design Bureau Kharkiv's State-owned Aircraft Manufacturing Enterprise SE '562 Odessa's Aircraft Repair Enterprise 'Odessaaviaremservice SE 'Yevpatoria's Repair Plant' SE "Zaporizhzhya's State-owned Aircraft Repair Plant MiGremont" SE "Konotop's Aircraft Repair Plant 'Aviakon' SE'Luhansk Aircraft Repair Plant' SE 'Lviv's State-owned Aircraft Repair Plant LGARZ' SE 'Mykolayiv's Aircraft Repair Plant 'NARP' SE 'Sevastopol's Aeronautical Enterprise'

Luts Novoguivinsk Chervonohrad Rivne **Zhytomy** 74 92 Shepetive Berezhany Krasvl Ternopil **Khmelnytsky** Vinnytsia Ivano-Frankov Uzhhorod Kamyanets-Podils Chernivtsi

ARTILLERY WEAPONS AND AMMUNITION

- SE 'Scientific/Technical Center for Artillery/Small-arms Weapons'
- State-owned Kiev's Design Bureau 'Luch
- State-owned Scientific Research Institute of Chemical Products
- SE "Horlivka's Chemical Plant' Donetsk-based FBS 'Chemical Items Factory'
- KGG 'Research/Production Corporation 'Iskra
- Rubizhne-based EBS Chemical Plant 'Zoria'
- Petrovsky Chemical State Association
- Shostka-based EBS Factory 'Zvezda'
- Shostka-based FBS Factory Impulse SE 'Znamyanka's Repair Base' (Arsenal 62)

AFV INDUSTRY

- SE 'Malyshev Plant'
- FBS Enterprise 'Kharkiv's Morozov Machine Design Bureau'
- SE'Kharkiy's Mechanical Repair Plant 115
- SE 'Zhytomyr's AFV Repair Plant 141'
- SE'Lviv's Mechanical Repair Plant 17 SE 'Mykolayiv's AFV Repair Plant 346'
- SE 'Kiev's AFV Repair Plant 7'

ENGINE INDUSTRY

- Zaporizhzhya-based 'Progress' Machine Design Bureau'
- FBS 'Kharkiv's Engine Design Bureau'
- OJSC 'Motor-Sich'
- SE'Lutsk-based Repair Plant'Motor NPKG 'Zoria-Mashproekt'

RADIO ELECTRONICS INDUSTRY

- State-owned JS Holding Company 'Kiev's Radio Manufacturing Plant'
- State-owned JS Holding Company 'Topaz' SE'Arsenal Plant'
- SE 'Design Bureau of Radio Communications' SE "Lviv's Scientific Research Radio-technical Institute'
- SE 'Research/Manufacturing Corporation 'Photoprybor' SE 'Scientific/Technical Corporation 'Fine Mechanics Factory'
- SE 'Scientific Research Institute 'NII Shtorm' SE "Scientific Research Institute of Radar Systems 'Kvant-Radiolocation'
- SE'Production Association 'Kievprybor'

SE'Ukrainian Radio-technical Institute' SE 'Kharkiv's Radio Manufacturing Plant 'Proton' SE'Central Scientific Research Institute of Navigation and Control SE'Generator' Plant SE "Radioprybor' Plant' SE 'Scientific Research Institute of Technology 'Temp' SE 'Scientific Research Institute 'NII Kvant' Zhuliany-based Machine-building Plant 'Visar Izium-based FBS Instrument-making Plant FBS Plant 'Radiovymiriuvach' Laser Technology Design Bureau FBS Enterprise 'Specialized Design Bureau 'Molniya' FBS Enterprise 'Central Design Bureau 'Arsenal Lviv's State-Owned Factory 'Lorta' Scientific Research Institute of Radio Systems Scientific Research Technological Institute of Instrument-making Scientific Research Institute 'N Buran' OJSC 'Krasnyy Luch Factory OJSC 'Kiev's Kvant Factory' OJSC 'Kiev's Radar Factory OJSC 'Kiev's Radio Manufacturing Plant' OJSC 'Elektron Corporation' OJSC 'Research/Manufacturing Corporation 'Kiev's Petrovsky Automatic Equipment Factory' OJSC 'Scientific/Manufacturing Corporation 'Kurs' OJSC 'Scientific/Manufacturing Corporation 'Elmis' OJSC 'Scientific Research Institute 'NII Tsentr' OJSC 'Rivne-based Factory of Radio Technology' OJSC 'Zmina' OJSC 'Radio-technical Instrument Design Bureau' OJSC 'Ternopil's Radio Manufacturing Plant'Orion' OJSC 'Ukrspetstechnika'

RADIO ELECTRONICS INDUSTRY

- OJSC 'Foton'
- OJSC 'Scientific/Technical Corporation 'Elektronprybor' Ukrainian State-owned Manufacturing Enterprise Isotope
 - Feodosia-based FBS Optical Plant
- Central FBS Design Bureau 'Proton' SE 'Radio Equipment Repair Plant 2'
- SE'Nizhyn-based Central Repair Plant 277'
 - SE 'Central Radio Equipment Repair Plant 437'
 - SE'Lviv's Radio Equipment Repair Plant'





EXPORT BEARINGS

For Ukraine's defense industry, 2012 had started with a very optimistic note. The media distributed an ambitious statement by an Ukroboroprom's official to the effect that "as a result of the successful conclusion of external contracts worth a total of USD 5 billion, the domestic defense industry will be provided with sustained business during the next three to five years". This seems to be proven by relatively active operations by some of Ukrainian companies.

In the armored military vehicles and motor vehicles sectors, Ukrainian manufacturers were busy performing a number of large export contracts, the implementation of which was of crucial importance for the defense industry. This is about contracts to deliver second batch of BTR-4 wheeled armored personnel carriers to Iraq, supply 200 upgraded T-72B main battle tanks (MBTs) to Ethiopia and build and deliver BTR-3E1 armored fighting vehicles and Oplot MBTs to Thailand.

In addition, there were a number of other projects, including the deployment of a five-year cooperative program with Egypt to upgrade BTR OT-62 "Topaz" armored vehicles.



to Thailand in 2012 under the contract for production and delivery of armored vehicles 2012 was remarkable in that is saw a more direct and active involvement by the country's top officials in decision-making related with the defense-industrial complex. Some of these decisions have been laid down in militarytechnical, military-economic and militarypolitical policy components. It wouldn't be fair to say that all existing problems have been resolved, but certain steps have been made, indeed. Defense Express decided to highlight some of the key events of the year.

Anton MIKHNENKO

EXPORTS AND

DOMESTIC SALES

UKRAINIAN

Relevant contract was signed with the Ministry of Defence of Egypt in January 2010. The contract envisages the upgrade of two hundred vehicles, of which 197 vehicles will be refurbished and upgraded in the Customer's home country using Ukrainian supplied knock-down kits.

R

AND W

At the same time, it is still unclear whether India would buy BTR-4 armored personnel carriers co-produced with Indian company Shrilakshmi



Defence Solutions Ltd (SLD-SL). As of to date, there is a memorandum of understanding signed with State-owned Corporation Ukrinmash to supply BTR-4 armored vehicles to the Indian Army units to be deployed with UN peacekeeping forces. It is unknown either how the USD150mn contract to supply one hundred BTR-4 APCs to Kazakhstan is proceeding.

An impressive amount of work under contracts with foreign states has been done by enterprises of the aeronautical sector. In 2012, SE Antonov manufactured eight airplanes, including five Antonov An-32s and three An-148s. There was continuation of work under a



contract to supply six transport aircraft An-32B to Iraq. Overall, two An-32B airplanes were delivered to Iraq in 2011 and another three were delivered in the earlier half of 2012. Furthermore, the SE Antonov continued with upgrades and overhaul repairs on the Indian Air Force's fleet of An-32 aircraft. Of the 105 aircraft contracted, 25 had been finished as of the end of last year.

Special mention should be made of the An-70 military transport aircraft project. In 2012, factories contracted to produce systems and parts for the aircraft had been selected. In Russia, Gorbunov KA-PO located in Kazan will assemble the aircraft for the Russian military. That same year, flight test program for the An-70 continued, and, in December, the first airplane was delivered to the Russian Federation for joint tests. Research and development works for the An-70 have been scheduled for completion in May 2013.

The shipbuilding sector had received focused attention from the government in 2012. In January 2012, Zorya-Mashproekt carried out the delivery of an M35 gas turbine engine for the Bizon-



AvtoKrAZ

were

nanufactured vehicles for domestic

and foreign

customers

class landing craft air cushion (LCAC) vehicle that was being built by OJSC Feodosia Shipbuilding Company Morye for the Chinese Navy. Overall in 2012, Zorya-Mashproekt manufactured and delivered to customers 94 engines for different purposes, as compared with 87 engines in 2011.

In May 2012, Shipbuilding Company Morye, after winning a tender, signed a contract with Russian company Gorizont-Radio-Service to install, start-up and adjust equipment of the Gorizont-25 navigation system on two landing craft air cushion vehicles.

FOCUS ON THE ARMED FORCES

2012 was a landmark year for the Ukrainian Armed Forces. Strategic decisions had been made on restoring operational status of major weapons and military equipment types. This work will proceed along two lines:

a) the development and delivery of new and upgraded models of weapons and military equipment to the Armed Forces (under State purpose-oriented program on the development of weapons and military equipment, which covers the period from 2012 to 2017) and

b) overhaul repairs and service life extension of the existing inventory of weapons and military equipment (in 2012, that work was conducted under Ukrainian Armed Forces Maintenance and Development program 2012). The President and Cabinet of Ministers of Ukraine approved a set of measures to ensure the domestic defense industry's restructuring and reforming in line with the national Armed Forces' requirements.

2012 saw a threefold growth in the level of government finding for overhaul repairs to weapons and military equipment, with priority given to aeronautical technology, surface-to air missile systems, air defense assets and naval ships. Weapons and military equipment overhaul repair schedules for 2012 particularly covered 53 aircraft, 30 helicopters, 14 surface-to-air missile systems, 14 warships and 274 units of joint armaments and military equipment. It remains unclear at the moment whether or not those schedules had been met. Some of the events that became known to the media are mentioned below.

Defense industry companies specializing in the aeronautical sector had done a solid amount of work under contracts with the domestic defense department. Aircraft units of the Ukrainian Air Force were scheduled to take delivery of about five dozen refurbished and upgraded aircraft before the end of 2012. There is credible information proving that repairs and upgrades had been performed on Su-27, MiG-



29 and L-39 airplanes. The airplanes, which underwent repairs and upgrades at domestic factories, entered service with the Air Force's combat aircraft brigades based at Ivano-Frankivsk, Mirhorod, Starokostyantyniv and Sevastopol. In December 2012, for the first time in many years, the Air Force obtained a fully equipped combat aircraft squadron.

Ukroboronservice continued work under Program on "Bringing back to operational status equipment inventory of the Ukrainian Armed Forces' Air The level of funding or the corvette program will grow year after year Force' SAM Troops in the period up to 2017". The program envisages that four S-300PS and one BUK M-1 SAM systems should undergo repairs and overhaul every year up to 2017. As of September 2012, Ukroboronservice had performed overhaul repairs on six S-300PS SAM systems under contracts with Ukraine's Ministry of Defense, and repairs on two S-300PS and one BUK M-1 SAM systems were to have been completed by year's end.

2012 saw a definite breakthrough in restoring fighting capacity of the Ukrainian Navy fleet. Ship repair programs had a combined budget of UAH 172 million, and about two dozen ships and craft had been put under repairs last year. This allowed the Navy to set up the core combat fleet by the start of 2013, according to the Ukrainian Navy commander, Vice-Admiral Yuri Ilyin.

The Ukrainian Navy's submarine Zaporizhia put to sea on 25 April after 20-year-long repairs, which was a landmark event for the Navy last year. During that same year, the submarine underwent trials but





has not been added to the Navy's combat fleet yet.

Ukrainian President Viktor Yanukovych, commenting on the construction of Volodymyr Velykyy, the first current-generation corvette-class warship being built for the Ukrainian Navy at Black Sea Shipyards, said in a statement in the fall of 2012: "The level of funding for the program will grow year after year. Particularly in FY12, the program's budget was set at UAH 300 million and will further increase to UAH 400 million in FY13. Despite that, de-



cisions on weapons inventory and the level of cooperation with foreign weapons suppliers under the Indigenous Corvette program are still pending.

In a ceremony in December 2012 at Balaclava (Sevastopol), first-of-class boat Orlan and four UMS-1000-project boats were put in service with Sevastopol's Sea Guard Unit. All the five boats were built at domestic shipyards under a relevant national purpose-oriented program.

As regards rearmament of the Ukrainian Armed Forces' Army, it has not received much of the media coverage, this being most likely because there has been too little to boast about in recent years, except for improved levels of combat training.

The commissioning of the army helicopter gunship Mi-24-PU1, the RLS P-18 Malachite radar system, the BTR-4 wheeled 8x8 armored personnel carrier, the 30-mm gun ZTM-1 and the precision kill weapon system Kvitnyk were all landmark events for the Ukrainian Armed Forces in 2012.

Certainly, the data presented in this article -- due to the closed nature of Ukraine's defense industry -- is not comprehensive, but enough for one to see that 2012 was a remarkable year for part of Ukraine's defense-industrial complex and for the Armed Forces alike. Yet despite the vigorous effort being made by the country's leadership toward restoring the national Armed Forces' fighting capacity and changing the defense-industrial complex situation for the better, the level of the country's defense budget for FY13 does not allow one to hope that the current year would be as successful as last year in terms of providing the national military with more capable, current-generation armaments and military equipment.



IDEX-2013



CORNERSTONE OF NEW TECHNOLOGIES

Serhiy ZGURETS, Valerii RIABYKH, Abu Dhabi-Kyiv



FOTO: YURIY SCHOKOV

IDEX-2013 showed that on the one hand, the exhibition has progressed itself as an increase in the amount of exhibition space and in the number of represented companies, on the other hand significantly increased requirements of local buyers and ambitions of Arab countries to organize production of their own Hi-Tech weapons.

krainian exposition at IDEX represented those areas of domestic manufacturers' activity, which can compete with European manufacturers, that means – to cause real interest in consumers from Asia, Africa and MENA region in particular. First of all – it was tanks and APVs, precision weapons and radiolocation stations.

THE INTERNATIONAL DEFENCE EXHIBITION AND CONFERENCE. IDEX-2013 was held from 17 to 21 February 2013 in Abu Dhabi, the capital of United Arab Emirates, under the patronage of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE and Supreme Commander of the UAE Armed Forces. The event was organized by the Abu Dhabi National Exhibitions Company (AD-NEC) in association and with the full support of the UAE Armed Forces. This exhibition worthily opened of all such international events that are scheduled for this year. IDEX is organized every two years and covers almost all areas in the military sphere. This event is becoming increasingly important among world producers of weapons and equipment. Thus, 1112 companies from 59 countries introduced their products and services on the IDEX-2013. 64 companies took part in this event for the first time. In 2013, an exhibition progressed significantly not only on the number of participants but also on the magnitude of the event and exhibition areas involved. Exhibits were placed in 38 national pavilions on a total area of 124 thousand sqm. The exhibition stands' net area was 43.2 thousand som, UAE pavilion, where 147 Emirati companies displayed their military products, was the largest at the show, having the area of 12.5 thousand square meters. The IDEX's naval and maritime security section NAVDEX also was held this year, having over 3000 sqm of exhibition space. The UAE Navy heavily supports NAVDEX and contributes to the content of this international exhibition. Since its launch in 1993, IDEX has recorded steady year-on-year growth to become the biggest regional exhibition of land, sea and air defence systems. "We are pleased to announce the exhibition has nearly doubled in size since the previous edition," said IDEX director Saleh Al Marzooqi on the exhibitions opening ceremony.

According to organizers, IDEX-2013 visited a record number of exhibitors and foreign delegations. The exhibition was visited by about 80 thousand of people. The total amount of contracts signed at the IDEX-2013 estimated to over \$4 billion.

This Emirates event of defense technologies was opened with Gulf Defence Conference 2013, which took place for the second successive time on February 16, 2013. The event was held at the Armed Forces Officers Club in Abu Dhabi, being organized by The Institute for Near East & Gulf Military Analysis (INEGMA). The forum focused on regional technology development. Represen-



tatives of the defense ministries of many countries of the World also discussed the main security challenges in the region of Middle East and North Africa and suggested possible ways to withstand them.

Especially should be noted harmonious work of organizers who created perfect conditions for exhibitors and the media, and for visitors of this wonderful exhibition as well.

THE NEW ROLE OF ARAB STATES. MOVE FROM IMPORTERS TO EXPORTERS OF MILITARY PRODUCTS

IDEX-2013 was a bright reflection of The Gulf Cooperation Council's countries approaches and long-term priorities.

The Cooperation Council for the Arab States of the Gulf (CCA-SG), also known as the Gulf Cooperation Council (GCC), is a political and economic union of the Arab states bordering the Persian Gulf and located on or near the Arabian Peninsula. Established in Abu Dhabi on 25 May 1981, the original Council comprised the 2,500,000 square kilometers Persian Gulf states of the United Arab Emirates. Bahrain, Saudi Arabia, Oman, Qatar and Kuwait. The unified economic agreement between the countries of the Gulf Cooperation Council was signed on 11 November 1981 in Abu Dhabi. GCC countries own 40% of all the oil reserves in the world. In addition, this group of countries since 1982, holds enough coordinated policy for the development of their countries, which lately is increasingly ex-



tended to defence and security segment, military and militarytechnical projects.

According to the reports of military manufacturers and specialized organizations that were announced at the IDEX-2013, during the last two years, Arab countries military spending exceeded \$300 billion. It means that the group of the countries is on the one of the first places in the world considering ratio of military spending comparing to GDP. According to the Arab Monetary Fund, for the past 10 years, most of Arab countries spend more than 7% of GDP per year on defense and arms. Interesting fact is that from 2002 to 2010 the countries of the region spent \$ 680 billion on the needs of their defense industries. On average it amounted to \$ 75 billion per year. However, in 2011 and 2012, the average annual rate was \$ 161 billion.

GCC countries are spending on military purposes 2/3 of all Arab countries spendings amount. Total expenditure on defense in Gulf countries amounted to about \$ 460 billion in the period from 2002 to 2010 and more than \$ 200 billion during the years 2011-12.

Having such a background, approaches of the GCC states to ensuring of their security and defence have a significant impact on regional and global trends in production and procurement of military products. First of all



it happens because these countries do not actually have limitations in financial resources and are able to ensure the implementation of any project, no matter how ambitious it is. IDEX-2013 demonstrated that the GCC states begin to move to the next level - from importer to a fullfledged participant of joint projects with leading foreign Armory leaders. In further their plans-to ensure their safety of relying on their own defense industry and to meet the demand of their own and other regions of its products.

Today, Arab companies whose development is actively supported by governments become active partners in the development of weapon sysUkraine is demonstrating its achievements in the field of military technology, displaying the great possibilities of the National Defence and Industrial Complex. Among the key exhibits of the national exposition were one of the best modern main battle tanks Oplot, and the latest development of Ukrainian designers – the BTR-4MV armored personnel carrier, which was presented to the world community for the first time

tems to suit local needs. So, only in the UAE were established a number of powerful scientific, industrial and venture capital groups. The leading positions among them are occupied by International Golden Group, Mubadala, Tawazun, Abu Dhabi Autonomous System Investments (ADASI, the Tawazun holding subsidiary), Emirates Advanced Research and Technology Holding (EARTH), Abu Dhabi Shipbuilding (ADSB).

All these companies are responsible for the "localization" of scientific and technical support and industrial production for European and American weapons and technology to create new projects based on existing systems and platforms. And, as IDEX-2013 evidenced, the Arab countries especially interested to learn complex technologies that significantly affect the combat capabilities of troops in modern conditions. This trend is evident in all segments, which can distribute the products presented at the exhibition, namely aircrafts and unmanned systems, armored vehicles, munitions, Marine Technologies and so on.

UKRAINE DEMONSTRA-TED ITS ACHIEVEMENTS WITH DIGNITY

Participating every IDEX events since the year 1995 Ukraine is demonstrating its achievements in the field of military technology, displaying the great possibilities of the National Defence and Industrial Complex.

This time Ukraine, having national pavilion and open demonstration stand, increased the size of the National exhibition space twice comparing with the privies IDEX-2011.

Oplot tank and the new BTR-4MV armored personnel carrier and many other modern developments of 20 Ukrainian defense enterprises were showcased on the event. They were represented by the Ukroboronprom State Concern and the state-owned company Ukrspecexport.

During the event Ukraine's state arms exporter Ukrspecexport signed a contract with Pakistan for the supply of 110 engine units for tanks. The value of the contract, which will be implemented at the facilities of Kharkiv's Malyshev Plant for over four years, exceeds \$50 million.

Acting Director General of Ukrspecexport Vadym Kozhevnikov said that the Ukrainian manufacturers of tank engines could get a significant share on the international market, taking into account the high scientific and industrial capacity of the country, which is unachievable for many competitors.

Among the key exhibits of the Ukrainian exposition were one of the best modern main battle tanks, Oplot, and the latest development of Ukrainian designers – the BTR-4MV armored personnel carrier, which was presented to the world community for the first

Oplot tank 4MV armored and many oth ments of 20 Uk terprises were event. They w

trends

time. Designed by Kharkiv Morozov Machine Building Design Bureau BTR-4MV has a number of improvements over the original BTR-4, which has been produced for home and export markets.

In the original production version of the BTR-4, the eight dismounts left the vehicle via two doors in the rear, but in the latest BTR-4MV, these have been replaced by a large poweroperated ramp. This feature not only means quicker entry and exit for the dismounts, but also eases loading of cargo.

The dismounts are provided with seats that hang from the sides and roof for a higher level of survivability, in case the vehicle runs over a mine or is hit by an improvised explosive device. The hull has been redesigned, which makes it easier to install additional passive armour, explosive reactive armour (ERA) or bar/slat armour.

Various weapon stations can be mounted on BTR-4MV; the version being shown at IDEX has a remote turret armed with a 30mm ZTM-1 cannon, a 7.62mm coaxial machine gun, a 30mm KBA-117 or AGS-17 automatic grenade launcher and two Barrier laser-guided missiles on the right side of the turret.

BTR-4MV is powered by a Model 3TD two-stroke diesel developing 500hp, although other engines can be fitted. The engine is coupled to an automatic transmission with five forward and one reverse gears. This powerpack gives the BTR-4MV a maximum road speed of 110km/h and a range of 700km. The vehicle retains its full amphibious capability.

Combat weight depends on the level of appliquéarmour, but the prime contractor is currently quoting a maximum gross vehicle weight of up to 25 tonnes when fitted with ceramic armour and ERA. Ukrainian Design Bureau "Luch" presented the great range of precision weapons. Among them newly designed "Falarick 90" and welltried systems like "Falarick 105", "Stugna" and "Combat"



A prototype of the armored vehicle created on the basis of the Ukrainian BTR-3E1 and Belgian turret CSE 90LP was presented at IDEX 2013 for the first time too. This project is a result of cooperation between Ukraine's SE Ukroboronservis and SMI (Belgium), and was presented among the exposition of the Belgian company Cockerill.

According to Ukroboronservis Director Yevhen Holubenko, a bilateral memorandum on cooperation with the Belgian company was signed in 2012. The purpose of the





document is joint development and mass production of armored vehicles adapted to NATO standards, as well as search for new promising markets. Yevhen Holubenko noted that BTR-3E1 produced by Kyiv's armor factory served as a basis for the joint project.

Specialists of Ukroboronservis and Kyiv's armor factory adapted the basic BTR-3E1 for installing the Belgian turret. This combat module allows the use of 90-mm-caliber military projectiles meeting the NATO standards. The project also provides for the possibility to use guided missiles "Falarick 90", that was designed by Ukrainian state-owned Luch Design Bureau in Kiev.

The purpose of the adaptation is the creation of a joint with the European manufacturer product and entry into new markets where European manufacturers are traditionally strong, for example, in South America and the Middle East.

This example of effective cooperation between Ukrainian enterprises and the leading European companies indicates a high level of design ideas of Ukrainian developers and po-



Ukrainian company PJSC AvtoKrAZ offered an interesting solution in Ukraine's armored vehicles sector, in particular, KRAZ-ASV/APC/2013 which was presented in cooperation with Ares Security Vehicles LLC (Dubai, UAE

tential manufacturers, which meets the most stringent international standards.

Ukrainian state-owned Luch Design Bureau presented the great range of precision weapons. Among them newly designed "Falarick 90" and well-tried systems like "Falarick 105", "Stugna" and "Combat", a model of the anti-missile system "Skif", models of anti-tank guided missiles R-2M, R-2B. Antitank missile systems "Skif" and "Barrier" are in a great demand in the countries of Southeast Asia and Latin America.

There were some privately owned Ukrainian military companies presented on IDEX-2013 too. First time exhibitor Zbroyar company demonstrated Konev Z-008 Gen II rifle for the first time at the exhibition. The rifle incorporated time-tested practice of the design and has acquired a number of significant differences, to make the Ukrainian rifles more attractive for potential customers. Time-tested Konev's bolt group and modular approach was unchanged. The base version of sniper rifles is fit to 7.62x51 (.308 Win) NATO cartridge. There are also modifications of the rifle which are fit by such popular cartridges as the .300 Winchester Magnum and .338 Lapua Magnum. Effective range is 800-850 meters for .308 Win, 1100 meters for .300 WSM and about 1.5 km for .338LM. Patterning is guaranteed no worse than éMOA.

Another privately owned Ukrainian military company PJSC AvtoKrAZ offered an interesting solution in Ukraine's armored vehicles sector, in particular, KRAZ-ASV/APC/2013 which was presented in cooperation with Ares Security Vehicles LLC (Dubai, UAE). This MRAP- class armored vehicle is based on the all-terrain-vehicle KrAZ-5233NE 4x4 and has a 330-strong Russian diesel engine JAMZ-238-DE2 and Chinese transmission Shaanxi 9JS150TA-B (possible with a variety of models, engines and transmission on demand).

Lviv-based privately owned "Sparing-Vist Center" enterprise, beingpermanentexhibitor of IDEX. displayed broad range of its products from well-known in the whole World MKS-05 "TERRA" dosimeter-radiometer till newly designed "ECOTEST" TM device "Gamma Sapiens" intellectual gamma radiation detector. Company presented devises for military purposes as well as those which could be used in everyday life. DRG-T radiation survey device could be used in special-purpose vehicles for continuous control and measurement of exposure dose rate (EDR) of gamma and X-ray radiation, as well as for providing audio and visual alarm of its dangerous levels and for issuing commands to start the actuators of protection equipment. On the other hand another device FoodTester-G Analyzer of cesium isotopes activity in food could be used by housewives.

In general, interest in the products of the Ukrainian defense industry in the world is not falling. This was proved, in particular, by a visit to the national pavilion of Ukraine at IDEX 2013 of General Sheikh Mohamed bin Zaved Al Nahvan. Crown Prince of Abu Dhabi, Deputy Supreme Commander of the UAE Armed Forces. He thanked Ukraine for its large-scale participation in all IDEX exhibitions, and stressed that this year he is planning to personally visit our country and see the prospects for cooperation.

So, we hope that Ukraine time-tested and new technologies will find its customers in United Arab Emirates and ME-NA region on the whole.

matter of technology

BTR-4MV ARMORED PERSONNEL CARRIER MAKES ITS INTERNATIONAL DEBUT AT IDEX-2013 ew Ukrainian armored personnel carrier, the BTR-4MV has made its debut at the IDEX 2013 International Defense Exhibition in Abu Dhabi, the United Arab Emirates. The new military vehicle was showcased by Ukrspecexport, Ukraine's top arms dealer.

BTR-4MV, an improved and upgraded version of the internationally sold BTR-4 APC, incorporates several significant departures from the original design. The new deign of the vehicle was dictated by the

Ukrainian Defense Ministry's operational requirements and the ambition by domestic designers and manufacturers to become viable competitors to European counterparts on the market for light armored military vehicles.

As is well known, the BTR-4MV's older sibling – the wheeled armored per-

Serhiy ZGURETS

sonnel carrier BTR-4E - was adopted for service with the Ukrainian Armed Forces in July 2012. R&D on the BTR-4E was launched as a private financing initiative project by Kharkiv's Morozov Engineering Design Bureau in 2007. The layout of the BTR-4E represents a dramatic change compared to the Soviet-designed BTR family of armored military vehicles, including the BTR-60/70/80/90, and the Russian BTR-90. In case of the BTR-4, the vehicle hull is divided into three compartments, with the driving compartment in the front hull, the power pack compartment in the mid-center left hull and the fighting and personnel compartments at the rear of the hull. The BTR-4 layout design -- which allows its fighting and troop compartments to be easily reconfigured without the need

of rearranging the enginetransmission block — could be used as baseline configuration for a comprehensive





family of armored fighting vehicles. The baseline BTR-4 design can form a basis for a family of specialist vehicles, including fire support vehicle, command/staff vehicle, armored medical evacuation vehicle, self-propelled anti-aircraft gun system, reconnaissance and observation vehicle and repair/recovery vehicle.

matter of technology

Even after having approved the wheeled APC for service use, the Ukrainian Defense Ministry continued to be interested in further improving the baseline BTR-4 as the core APC type for future equipment of Ukrainian Army units. Improvements of interest included ballistic armor and anti-mine protections and more comfortable mount/dismount for the infantry squad. These requirements were met within a tight timeframe by engineers at Morozov, and the international exhibition in the Arab Emirates became a suita-

THE BTR-4MV IS THE YOUNGEST SIBLING IN THE BTR-4 FAMILY OF ARMORED PERSONNEL CARRIERS. IN ITS BASELINE CONFIGURATION, IT IS DESIGNED FOR BATTLEFIELD TROOP TRANSPORT AND TO PROVIDE FIRE SUPPORT TO DISMOUNTED TROOPS

squad (including both armored personnel carrier/APC and infantry fighting vehicle/IFV variants) or to provide a suitable platform for a variety of weapons systems. Lighter 4x4 and 6x6 vehicles weighing less than 10-12t are increasingly regarded as no longer suitable for APC roles and rather restricted to specialized missions such as armored recce, military police patrol, protected carriers and so on. This well explains why a number of recent international competitions for the procurement of wheeled AFVs do specify an 8x8 configuration.

The BTR-4MV is the youngest sibling in the BTR-4 family of armored personnel carriers. In its baseline configuration, it is designed for battlefield troop transport and to provide fire support to dismounted troops. It is intended to support Army units operating in various battlefield

> environments and conditions, including NBC environments, and could become the core vehicle type in APC inventories of rapid reaction forces and marine corps. It has been designed to operate on road and cross country, in extreme climates and adverse weathers, at day and night. The BTR-4 can carry a squad of seven to ten personnel (depending on the weapon station's configuration and size), in addition to its three-man crew (commander, driver and gunner).

The baseline BTR-4MV is differentiated from its older siblings by virtue of providing a far higher level of ballistic protection in its front arc. The armor protection of the carri-

ble opportunity to demonstrate the outcome design to potential international customers.

It will be recalled that combat platform's design criteria, and in particular the required internal volume and payload translate into certain specific minimum hull geometric dimension. In turn, these dictate the size of the external surfaces to be protected by armor and, thus, the minimum vehicle's weight. It could easily be seen that this minimum weight necessarily demands a 8x8 configuration if adequate mobility is to be maintained.

As a result of the above considerations, a broad consensus appears having been reached among manufacturers and users alike to the effect that an 8x8 configuration represents the ideal solution for wheeled armored fighting vehicles in the 15-30t (and beyond) combat weight range, these being intended to either carry an infantry er's body has been increased from Level 3 (12.7mm bullets over the frontal arc) in the original configuration to Level 5 (25mm rounds fired from 500m) according to STANAG 4569 (a He 4269!). As consequence, configuration of the frontal hull has changed substantially. Bullet-resistant windows and side doors for commander and driver have been sacrificed for the sake of increasing armor protection of the front hull. Additional armor protections (including explosive reactive armor and ceramic armor plates) are optional.

Anti-mine protection level of the BTR-4E was given as Level 3 according to STANAG 4569, which means the ability to withstand under-wheel detonation of 8 kg HE mines (the level of anti-mine survivability in case of an explosion under the hull has not been disclosed by the designer). An additional anti-mine floor protec-



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- Monotube tower design and supply



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Easat Antennas Ltd. Goodwin House, Leek Road, Hanley, Stoke-on-Trent ST I 3NR, United Kingdom Tel: +44 (0) I 782 208028 Fax: +44 (0) I 782 208060 Email: info@easat.co.uk Website: www.easat.co.uk tion is optional. For enhanced anti-mine survivability of the infantry squad, their seats are suspended from the ceiling rather than being bolted to the floor as in previous designs. The layout of BTR-4MV, as is the case with the BTR-4E, allows for adding slat armor for enhanced protection against thin-walled RPG-type threats.

Accurate weight figures for BTR-4MV have not been disclosed other than that the weight will be in the region of 17.5+3% t with standard bullet-proof armor protection kit and increase to 21.9+3% t with additional protection. It would be expected with a high degree of probability that the vehicle will be in the 19t category.

The vehicle has three options for powerplant -- indigenous 3TD-series diesel, German Deutz and Italian Iveco. The BTR-4E, as is well known. is powered by 400hp three-cylinder 3TD-2 diesel engine integrated with an automatic hydrokinetic transmission, allowing for speeds of up to 90 kmph on smooth off-road terrains. The BTR-4MV showcased at IDEX-2013 is equipped with a six-cylinder Deutz BF6M1015CP diesel engine rated at 450hp/330kW that allows the vehicle to travel at up to 110 kmph to the maximum range of 670 kilometers per charge. In terms of maneuverability and cross-country performance capabilities, the BTR-4MV is not too much dissimilar from the BTR-4E. Furthermore, as claimed by the designer, the BTR-4MV, even with heavier armor protection than seen in the BTR-4E, still retained its swim capability at <10 km/h. The global market offers a very limited selection of amphibious APC types with corresponding armor protection levels. However, it can well be expected that with armor protection levels rising further, preservation of the vehicle's swim capability will become highly problematic if possible at all. It should be noted that amphibious ability is much less of importance to customers as compared to characteristics such as survivability of the vehicle, its crew and passengers both on the battlefield and during combat/peace support mission performance in lowintensity conflict environments.

The BTR-4MV will offer a substantial amount of firepower. It would mount multipurpose abovehull weapon stations of various types designed for infantry armored fighting vehicles in lightweight categories. The proposed selection includes the Ukrainian-designed weapons modules BAU-23, SHTURM, GROM and PARUS, in addition to foreign-supplied models depending on specific customer needs. The BTR-4MV displayed at IDEX 2013 features a weapon station PARUS that integrates



30-mm 3TN-1 automatic gun defeating ground targets out to 4,000 meters; a 7.62-mm coaxial machinegun; a 30-mm AG-17 automatic grenade launcher capable of effective ranges of up to 1,700 meters; and antitank guided missile system BARYER with maximum launch range of 5,000 meters.

This arsenal is controlled remotely from the gunner's or commander's workstations using sophisticated organic fire control equipment, including optical/electronic (low level television) sensors. The commander's workstation is additionally equipped with 360-degree situational awareness system PANORAMA-2P plus a control console linked to the gunner's sight mount.

The weapons module does not accommodate the allowance of ammunition except for rounds for the 30mm gun. The machinegun and the AG-17 grenade launcher are belt-fed from ammunition containers. The gunner has beside his seat three ammo containers for each of the machinegun and the AG-17 grenade launcher. The gunner's station with a collapsible control console for above-hull weapons is located in the depth of the troop compartment in the left aft section of the hull.

With Parus weapons module, the troop compartment can accommodate seven personnel. The commander and driver can enter and exit the vehicle by side doors or roof hatches, or via aft door to troop compartment. The crew compartment is linked to the troop compartment via a right-side passageway. Visibility and observeability for the driver and commander are provided through triplexes. For an improved situational awareness, the commander can additionally use a 3600 fieldof-view camera installed on the roof of the weapon station, from where video is relayed to a blackand-white display screen in front of his seat.

One more dissimilarity with the previous model is a fully redesigned rear hull in the BTR-4MV design. In contrast to the BTR-4E with its two-part door (upper and lower parts which open outwards), the rear hull in the BTR-4MV is fitted with a ramp that not only allows for easier troop egress/engress, but also enables transportation of bulk cargoes of various types, including additional ammunition allowances, spare parts, etc. The ramp has an additional door for mount/dismount of the infantry squad.

Price-tag for the BTR-4MV will be on a par with the BTR-4E's and vary with the number of vehicles contracted for delivery under each specific deal, as well as with required equipment fits and armor protection levels. On an average, perunit price-tag may vary between USD 1.2 million and 1.5 million.

BTR-4MV WHEELED 8X8 ARMORED PERSONNEL CARRIER

Price-tag for the BTR-4MV will be on a par with the BTR-4Es and vary with the number of vehicles contracted for delivery under each specific deal as well as required equipment fits and armor protection levels. On an average, per-unit pricetag may vary between USD 1.2 million and 1.5 million.



Designer Federal budget-supported enterprise «Kharkiv's Morozov Engineering Design Bureau», Kharkiv

he BTR-4MB is the youngest sibling in the BTR-4 family of armored personnel carriers. In its baseline configuration, it is designed for battlefield troop transport and to provide fire support to dismounted troops. It offers increased protection levels and more comfortable operational environment for the infantry squad as compared to its older sibling, the BTR-4E.

Commander -

For an improved situational awareness, the commander can use a 3600 field-of-view camera installed on the roof of the weapon station, from where live video is relayed to a black-and-white display screen in front of his seat.

Driver ----

Steers the vehicle during mounted combat, using a periscope for visualization. During travel, viewing is through an open hatch





17,5 t + 3% with standard bullet-proof armor protection kit, and 21.9+3% t - with additional armor protection

10



In contrast to the BTR-4E with its two-part door (upper and lower parts which open outwards), the rear hull in the BTR-4MV is fitted with a ramp that not only allows for easier troop egress/engress, but also enables transportation of bulk cargoes of various types. The ramp has an additional door for mount/ dismount of the infantry squad.



BTR-4MV. Rear view











The Gunner

The gunner's station with a collapsible control console for abovehull weapons is located in the depth of the troop compartment in the left aft section of the hull. Passengers' seats are suspended from the ceiling for minimizing the shockwave impact from a HE mine detonation.

Remote weapon station Parus

Is accessible for control by both the gunner and commander. The proposed selection of abovehull weapon stations for the BTR-4MV includes BAU-23, SHTURM, GROM and PARUS

930



Waterjet Propels the vehicle when afloat at 10 km/h.

Powerplant

German-supplied six-cylinder Deutz BF6M1015CP diesel engine rated at 450hp/330kW that allows the vehicle to travel at up to 110 kmph to the maximum range of 670 kilometers per charge.

THE BTR-4MV WOULD WITHSTAND THE EXPLOSION OF 8 KG OF TNT UNDER ANY OF THE WHEELS Wheels are of the Central Tire Inflation System (CTIS) type with Michelin 335/80 R20 or Kormoran 295/80 R22,5 tires or newly designed Ukrainian tires

Frontal view

Bullet-proof windows and side doors for the commander and driver have been sacrificed for the sake of increased armor protection over the frontal arc. The BTR-4MV is protected against 25mm rounds fired from 500 meters over the frontal arc. The BTR-4E withstands attacks with 12.7mm weapons over the frontal arc.

BTR-4MV with remote weapon station Parus. Frontal view







The Defense Ministry jointly with ship builders, domestic and foreign suppliers of systems and units is implementing an ambitious program to build a series of corvette class ships for the Ukrainian Navy. Successful completion of the program is to give new energy to the fleet and the domestic defense industry. This article by Defense Express examines key aspects of the program and the outlook for its successful implementation.



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Serhiy ZGURETS



PROJECT

The new ship project ordered by the Defense Ministry was designed by engineers of the government-run Research and Design Center for Shipbuilding in Mykolayiv. The index of the project to create a new multipurpose corvette class ship is 58250. Its major characteristics are as follows: standard displacement – 2,500 t; length – 111.8 m; width – 13.5 m, draught – 3.7 (6.5) m; maximum and economic speed -32 and 15 knots; cruising range -4,000 miles; crew - 108 persons; sea endurance – 30 days.

The project 58520 corvette's attack capabilities will enable her to hit surface and coastal tar-

gets, ensure anti-submarine defense, be able to carry out air-defense tasks (to defend herself and ships, vessels and convoys under the corvette's protection against air strikes) and to use active and passive jamming against enemy air defense and laser homing systems. In fact, her ability to carry out these tasks rank this future Ukrainian corvette among frigate class ships with a displacement of 4,000-4,500 t.

PROGRAM

Originally, the General Staff of the Ukrainian Armed Forces had the ambitions to build 10 corvettes for the Ukrainian Navy. They were divided into two subseries. In December 2009 the Ukrainian Defense Ministry signed a contract with the Chornomorskyy [Black Sea] shipyards [in Mykolayiv] for the supply of the first four corvettes. As was announced earlier, their launches were scheduled for 2012, 2014, 2016 and 2017. As regards the fifth, sixth and subsequent ships to be built during the period starting from 2018, it was planned that a regular technology generation change will have taken place by that time and the ships of the second subseries would be furnished with new hardware and equipment. This is what the optimistic scenario looked like.



Yet in fact the declared deadlines for building the first battleships were broken because the Defense Ministry's budget funds earmarked for work on the corvettes were scanty and a number of key issues remained uncertain for a long time. The issues include building international cooperation as well as approving a final list of weapons and systems which in turn was holding up the drawing up of design and technical documentation. Ministers of Ukraine issued its resolution No 1150 approving the State defense program to build corvette-class ships. The program implementation is spread over the period until 2021.

The program envisages the construction of four project 58240 ships, the purchase of five units of fire, including small and medium caliber guided artillery rounds, anti-submarine and anti-ship torpedoes and missiles for the air defense system. It is also (USD 350m) and the lead ship at EUR 325m (30 per cent costlier than a serial ship). In FY 2012, UAH 433.6m was allocated for these purposes, including UAH 276.2m for design work and UAH 157.4m for construction.

According to specialists' estimations, Ukraine's companies have a share reaching 62-65 per cent in the project. The Research and Design Center for Shipbuilding based in Mykolayiv is in charge of draw-



In 2011, the ministry's corvette program got status as a state program. The government issued a directive on 9 March 2011 approving the concept for the State purpose-oriented defense program drawn up by the Defense Ministry to build project 58250 corvette-class ships. Keel laying ceremony for the Volodymyr Velykyy corvette, the lead ship of a series, was held with the participation of the Ukrainian president on 17 May 2011. On 9 November 2011, the Cabinet of planned to create ship basing infrastructure (two moorings).

Meanwhile, the financial resources for the program have been cut from UAH 20.51bn [USD 2,567m] to UAH 16.21bn by finalizing the list of weapons and technical facilities for the ships and minimizing the purchase of foreign-made weapons and technical facilities. Of this amount, only about UAH 11bn will be spent on building the ships proper. The average cost of a serial ship was estimated at EUR 250m ing up the work design documents for the ship and major Ukrainian-made facilities. The Chornomorskyy shipyards also based in Mykolayiv is in charge of the construction. The master construction schedule for the lead corvette has been harmonized and approved. It envisages the completion in 2013 of the manufacture and preliminary testing of domestic samples of technical facilities such as, in particular, radar and hydroacoustic systems, electrooptic stations for reconnaissance and weapon control and the like. It is planned to complete the formation of the ship's hull and superstructure in 2014 and supply domestic technical facilities and foreign-made weaponry and launch the ship in 2015.

CHOICE OF WEAPONS

Ukraine saw four defense ministers replaced over the period of the corvette project's preliminary development and initial implesible, co-produced with leading European companies, given that Ukraine has no artillery, missile, mine and torpedo, anti-ship and anti-aircraft weapons. The cost of the weapons together with their electronic equipment would account for up to 60 per cent of the battleship cost.

A new revision of the project took place in mid-2012 after which the leadership of the General Staff of the Ukrainian Armed Forces declared that there was absolute clarity as regards the shaping of the metall guns of Swiss-German make before 2012.

The developers originally planned to use Exocet MM40 anti-ship missiles from the European consortium MBDA as the Volodymyr Velykyy's «long arm». Yet MBDA received a letter from the Ukrainian government in 2012, reading that the purchase of the European missiles would be postponed as efforts were under way to streamline the funds for the corvette project.

Since 2012, Ukraine's defense industry enterprises have also





mentation by 2012. The top team reshuffles at the Defense Ministry have had an obvious impact on the progress of the shipbuilding program and the shaping of the battleship's appearance especially as regards her weapons. Thus for instance, under defense ministers Oleksandr Hrytsenko and Yuriy Yekhanurov, Ukraine's would-be corvette was said to be «European-oriented». In practical terms, it meant that the crucial systems for the ship would be bought from or, if posship's hull, hull structures and general ship systems. At the same time, it was announced that the composition of the corvette weaponry would be finalized and some weapon samples on the first and the subsequent corvettes might be different. The corvette is going to have three guns: one of medium– and two of small caliber. It was planned to buy a 76-mm OTO Melara Super Rapid gun from Italy and two 35-mm Millennium-Oerlikon and Rheinstepped up their own activity to create an indigenous anti-ship weapons system. The locomotive in these future-oriented efforts is the Kiev-based state design bureau Luch. In terms of its tactical characteristics, the missile is supposed to be no worse than the Russian Kh-35. The possibility must be ensured to launch the new weapon from sea-, groundand air-based platforms.

The 2009 technical project envisaged the installation on the Ukrainian corvettes of a

arsenal

SAAM air-defense missile system with Aster 15-type anti-aircraft guided missiles from MB-DA. Yet it became finally clear in 2012 that Ukraine would not purchase Aster 15 missiles both because the system's exorbitant price and the difficulties involved in matching it to Ukraine's future three-dimensional radar. An economical interim solution has been approved which envisages the possibility to purchase an airmade helicopters in the future. The NH90 has been considered as an option.

To control the undersea situation, the corvettes will be complete with a subkeel hydroacoustic station in the fore part of the ship. The station developed by the Kiev-based Hidroprylad (Russian: Gidropribor) research institute seeks underwater targets in the near zone. The far zone will be surveyed by a tugged hydroacoustic station

THE FINANCIAL RESOURCES FOR THE PROGRAM HAVE BEEN CUT FROM USD 2,567M TO UAH 16.21BN BY FINALIZING THE LIST OF WEAPONS AND TECHNICAL FACILITIES FOR THE SHIPS AND MINIMIZING THE PURCHASE OF FOREIGN MADE WEAPONS AND TECHNICAL FACILITIES. OF THIS AMOUNT, ONLY ABOUT UAH 11BN WILL BE SPENT ON BUILDING THE SHIPS PROPER



defense missile system using Umkhonto missiles from the South African company Denel.

Two B-515-type 324 mm threetube torpedo launchers from the EuroTorp concern (France, Italy, Germany) will be installed on the ship. Light torpedoes of the A2448 mod.3 or the most advanced MU-90 Impact type will also be bought from this concern. Torpedo weapons may also be used from an anti-submarine helicopter. The first corvettes will use Ka-27PL helicopters currently in service with the Ukrainian Navy. It is planned to purchase foreignfrom Thales Underwater Systems, France. The Kiev-based Kvant research institute state enterprise is making an multifunction general-purpose onboard radar, the MAARS, for automatic detection, tracking and trajectory generation of various targets: surface, aerial, low-flying, supersonic and others.

Given the wide range of integrable foreign weaponry, the French company DCNS as well as Thales Nederland and Italy's SELEX SI (Finmeccanica) were ready to supply a CICS for the Ukrainian corvette. However, with the «nationalization» of the corvette arsenal, there is no need for a foreign «brain». Now the full responsibility for the development of the ship's automated battle combat control system lies with the Kiev-based Kvant research institute, which earlier just coordinated work with foreign partners.

The corvette's power plant is based on the CODAG (Combined Diesel and Gas) scheme. It is a symbiosis of gas turbine and diesel units. The corvette is to reach a maximum speed of 32 knots, or nearly 60 km per hour.

At high speeds, the ship will be powered by gas turbine engines from the Zorya-Mashproekt scientific production complex. The main C280-16 diesels and C32 ACERT diesel generators will come from the US company Caterpillar. Controllable pitch screw propellers and shafts will be supplied by Italy's Fincantieri.

INTERIM RESULT

The military and political leadership of the state is convinced that the program to build a series of corvettes is an utterly urgent task for the state which. having a weak navy, will just be unable to defend its interests in its exclusive economic zone. On the other hand, for Ukraine's defense industry, making the corvette is one of the most ambitious projects throughout the history of independent Ukraine. In alliance with large European companies, our arms makers and industrialists can acquire basically new experience. These are the strengths. As regards arms making practices, there is one regularity. It holds true for any country: «Any military project takes twice the time it was supposed to, it is twice costlier and yields only half the effect».

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VODOMYNY KOPCHAR STOLED AND STATUS AND OUTLOOK CURRENT STATUS AND OUTLOOK BROJECT OF UKRAINE'S

NO RETURN FOR THE NUMBER-ONE AERONAUTICAL SECTOR



The last year of 2012 could be decisive for the future of Russian-Ukrainian project to build the military transport aircraft An-70, this being due to the three events as follows: the selection of Gorbunov KAPO aviation industry corporation in Kazan as assembly-line manufacturer of the aircraft for the Russian Customer; the completion of the first phase of preliminary testing of the upgraded An-70 prototype; and, finally, completion of an assemblyline produced fuselage and the rolling out of the first production-standard An-70 designed for Ukraine's Ministry of Defense of an assembly line at the Kiev plant.

> In Russia, the An-70 will be assembly-line produced at an aircraft factory in Kazan. For now, it looks like the decision is final.

The transfer of engineering documentation and manuals for the An-70 from SE Antonov to KAPO has been in progress from last autumn. Work to digitize the documentation received has either begun or will soon begin at Kazan. According to plans, a separate assembly line with shops for assembly manufacturing and final assembly of the aircraft will be set up at KAPO "from the ground-up", in addition to a logistics warehouse. The first An-70 aircraft will be built by KAPO in late 2015 or early 2016. Setting up production of the An-70 at Kazan will cost RUR 20 billion, as announced by top managers of the Kazan's company. However, Russia's Ministry for Industry and Commerce said the project to set up production of the An-70 at Kazan would have a budget of RUR 9 billion. The difference in the cost estimates might be due to what the concept of "setting up production" means for the Russian government and the future manufacturer of the aircraft. In any case, the budget of setting up production has not been officially approved yet. Meanwhile, SE Antonov and Gorbunov KA-PO have agreed a scheme of cooperation, with assistance from members of the Russian United Aircraft Corporation. In Kiev, a training program regarding the An-70 will be launched for members of Gorbunov KAPO, among other things.

Last year saw completion of the first phase of preliminary testing of the upgraded An-70 prototype, and flight test program for the aircraft

resumed in September 2012. Overall, 652 flights had been performed as of the end of the year. Specifically on 20 December. 2012, the aircraft carried out preliminary flight # 19 and was officially demonstrated to the Customer - the Ukrainian and Russian Ministries of Defense for further rounds of joint testing and evaluation. Previously, the aircraft underwent upgrades and improvements carried out by aeronautical companies in Ukraine and Russia. Fatigue testing has been completed: it confirmed that the aircraft will be able to fly a total of 15,000 hours and carry out 7,000 landings during its life in service. In addition, official bench tests of the aircraft's engine and propfan have come to completion.

And now, a few words about the upgrade of the only airworthy flying An-70 existing so far. The aircraft has had its avionic equipment fully replaced. Now the upgraded cockpit includes, e.g., new LCD screen monitors. The EDSU-70M fly-by-wire flight control system retained its previous architecture, but has had its parts and subsystems replaced with newer ones. Overall, the upgrade resulted in weight savings up to 500 kg. An optical-electronic system equipped with infrared and television cameras is now installed in the nose of the aircraft. Propfans SV-27 underwent significant changes. Russian company Aerosila located in Stupino redesigned the propfans with an eye to improving reliability performance. Particularly the distance between the two propellers has been increased from 600 to 900 mm for reduced noise output. The D-27 engines remained intact, but they are now equipped with full authority digital engine control (FADEC), while the original TA12-60 airborne auxiliary power unit has been replaced with more current generation TA18-200-70 design.

Recall that the upgrade of the single airworthy AN-70 is carried out in the interests of the Russian Defense Ministry. According to current plans, the airplane will have to perform another 75 flights to complete the state joint testing program. It's not until this is done that there will be a government decision on setting up assembly-line production of the An-70, which will define the location of final assembly facility (Kazan?) and production rate. This is expected to happen some day in May of this year.

As regards fuselages of the two productionstandard aircraft being built for the Ukrainian Defense Ministry, the situation is not so certain, albeit, technically, much has been done already. Assembly-line assembly of fuselage of the first production-standard An-70 was completed on New Year's eve 2013. Fuselage # 01-04 was rolled out of assembly line in a ceremony that took place at one of shops at SE Antonoy. On the production side, plans seem to go as scheduled, but some questions regarding the Ukrainian Defense Ministry still remain unanswered. Fuselage # 01-04 that was recently rolled out of assembly line still remains property of Ukraine's Defense Ministry as long as relevant contract remains valid. Meanwhile, the Russian defense department still longs to buy it (as well as fuselage # 01-05 that is under construction at an assembly line nearby).

The works that made possible the roll-out of the first production-standard An-70 had been carried out with funds provided by the Ukrainian Ministry of Defense, but more money will be needed for completion of construction. Particularly the purchase of the wings and engines as well as system integration etc. will cost about UAH 300 million. The fist production standard aircraft is scheduled to be handed over to the Customer in 2014. It is further financing of works by the Ukrainian Ministry of Defense where most questions remain. It is possible that there is political pressure on that issue being brought by the Russian side on the level that is higher than the level of SE Antonov's top managers. Excuses like «the country is short of money» or «funding will be provided when available» are no less than just diplomatic comments ...

The wings for the first production-standard aircraft have been partly built by the longsuffering Chkalov Tashkent Aircraft Manufacturing CorCompleted the first phase of preliminary testing of the upgraded An-70 66552 flights had been performed as of the end of 2012 poration. They are expected to arrive in Kiev following a relevant decision by authorities in Tashkent. In the future, as envisaged by the approved scheme of cooperation with Russia, SE Antonov will manufacture wings (both for itself and for the Russian partner). Software for the aircraft (programs, algorithms and mathware in general) will be of Ukrainian origin; components and subsystems will be of Ukrainian and Russian origin, but, for example, equipment of inertial navigation systems will be provided by western suppliers. Previously, demands in this respect used to be hard, especially in relation to the aircraft intended for the Russian Air Force. Now the approach is more "creative" - it's clear to everyone that premium should be placed on quality in the first place.

Funding from the Russian Federation will be so far limited to completion of the test cycle and finishing the second airworthy aircraft at Kiev (valued at about USD 150 million).

Factors favorable to implementation and continuation of the An-70 program: current certainty with the location of assembly-line production of An-70 in Russia (KAPO looks the best option in terms of spare capacity, cooperation with Ukraine and political support on the part of the Republic of Tatarstan's leaders); SE Antonov's technical readiness to do its part of the work on due time; the Russian Defense Ministry does have a requirement for transport aircraft in the An-70 category.

Threats and challenges: Ukrainian Ministry of Defense has not yet defined its position on the An-70, which results in problems with the provision of funding for the project (which



THE ASSEMBLY OF THE FIRST PRODUCTION – STANDARD AN-70 INTENDED FOR UKRAINE'S MINISTRY OF DEFENSE HAS BEEN COMPLETED. FUSELAGE # 01-04 WAS ROLLED OUT OF THE ASSEMBLY LINE AT ONE OF SHOPS AT SE ANTONOV IN DECEMBER 2012

contrasts with the position of the Russian side who fulfils its obligations): the absence of a final decision on the purchase of the An-70 for Russia's Defense Ministry (no decision is expected pending completion of the current round of testing); delayed decision on the provision of funding for setting up production of the aircraft at Kazan; yet another shift in favor of purely domestic armament projects after Sergei Shoigu's appointment as Russian Defense Minister (and, as consequence, growing opposition to the An-70 project in Russia); a fresh spiral of Russia politicizing all kinds of bilateral projects with Ukraine.

The fight for the An-70 continues.





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[production]

Valerii RIABYKH

s of today, Ukraine has a closed-type cycle of overhauling the Mi-8T, Mi-24 and Mi-2 helicopters family and has obtained own possibilities for accomplishment of modernization of these helicopters' types at various levels (from improving the operation performances to installing newgeneration engines on them).

The worldwide known Zaporozhye-based MOTOR SICH JSC engages in a new branch of its activity concerning modernization and production of the helicopters. The corresponding Helicopter Designer Certificate dated November, 2011 has been granted to the factory by the State Aviation Administration of Ukraine. In addition, the Cabinet of Ministers of Ukraine has awarded the authorities of the Helicopter Chief Designer to Vyacheslav Boguslayev who is the head of the MOTOR SICH JSC within many years.

The MOTOR SICH JSC is one of the worldwide leading enterprises in the aviation industry and supplies its products to more than 120 countries worldwide.

The engines manufactured at the MOTOR SICH JSC are installed almost on all the helicopters developed by the Kamov JSC and Mil MVZ JSC and manufactured in Russia as well as on the aircraft manufactured in Russia, Ukraine, Czech Republic and China.

Today, the own helicopter production has been created and functions successfully at the MOTOR SICH JSC; it comprises the following:

- the certified development design office engaged in the matters of modernization and development of the helicopters;
- two special-purpose factories in Ukraine and Belar-

us which accomplish overhaul and modernization of the Mi-2, Mi-8, Mi-17 and Mi-24 helicopters;

two production facilities in Ukraine and United Arab Emirates which accomplish modernization of the Mi-8Ttype helicopters.

Today, the MOTOR SICH JSC offers services concerning modernization of the Mi-8T-type helicopters and its Mi-17 export modification as well as the Mi-8MTV and Mi-24L helicopters.

So, when replacing the engines installed on the Mi-8T and Mi-8MSB helicopters, it is proposed to mount the modern TV3-117-SBM1V4 Series engine of the MOTOR SICH JSC self-design project. This engine has the same power of 1500 hp as compared with the old TV2-117 engine, maintains the takeoff power rating under the tem-





Ukraine has a closed-type cycle of overhauling the Mi-8T/ Mi-17, Mi-24/Mi-35 and Mi-2 helicopter family as well as own possibilities for accomplishment of their modernization

DREAMS COME TRUE

[production]



perature of +55 deg instead of +15 deg and allows climbing up to 4600 m instead of 1500 m. The service life of the new engine till first overhaul (5000 hrs instead of 1500 hrs) and assigned operation service life equal to 15000 hrs instead of 12000 have prolongated substantially too.

In addition, use of the newgeneration engine on the helicopters decreases fuel consumption substantially and, at the same time, increases the flight

50 / UKRAINIAN DEFENSE REVIEW / JANUARY-MARCH 2013

Today, the MOTOR SICH JSC offers services concerning modernization of the Mi-8T-type helicopters and its Mi-17 export modification as well as the Mi-8MTV and Mi-24L helicopters. range by 20% and improves the possibility of climbing up to the service ceiling of 7300 m, respectively. The Customer will also be permitted to start the engine easily under the high-mountain and high-temperature conditions, operate the engine with high stability under the heavy smoke and dust content conditions, simplify maintenance and ensure low cost of the operational life as an extra option. Safety of operation of the helicopters equipped with the Zaporozhye engines is enhanced appreciably due to use of new technologies.

Those units and systems of the helicopter only which are associated with new engine operability assurance are subject to reworking during modernization. This allows not only to decrease appreciably the helicopter cost but also to minimize necessity of additional retraining of the flight and engineering personnel as well as to exclude necessity of purchasing the additional ground equipment used for operation of the helicopter in such airline companies and public entities where the Mi-8Tand Mi-17-type helicopters are already operated.

At the same time as the new engines are mounted, the following accessories are installed on the helicopters in addition:

- airborne flight data recorder;
- emergency location transmitter;
- digital central instrument panel with GPS navigation system, meteorological radar, ground proximity warning system, altimeter, range-metering device, general-purpose communication box installed.

The activities concerning the casing, control systems and airborne equipment are also accomplished at the facilities of the MOTOR SICH JSC in Zaporozhye and Orsa (Belarus) when modernizing the Mi-8T helicopter. The Mi-8MSB-named modernized helicopter is manufactured as passenger-transport and mixed-class versions and can be used for accomplishment of search-and-rescue and firefighting operations, for medical purposes and people landing. All the design advantages of the modernized helicopter have been confirmed during the certification tests in the Republic of Tajikistan in August 2012. The tests have been carried out at two various climatic zones: in the desert with the air temperature up to +45 degrees Celsius and mountains of Pamir where the helicopter was based on the area located at the height of 4 200 meters and accomplished flights at altitudes up to 7 300 meters.

In September 2012, the Mi-8-MSB helicopter has established the world flight altitude record for this type aircraft which is equal now to 8 200 meters.

The tests have confirmed the ability of this modification of the helicopter to accomplish up to 90% of missions intended for transportation of cargos and passengers performed by the Mi-171 helicopters and be even in advance with respect to such characteristics as flight altitude, economical efficiency and safety.

Based on the results of the work done by MOTOR SICH JSC, the Supplementary Type Certificate has been issued by the State Aviation Service of The MOTOR SICH JSC is one of the worldwide leading enterprises in the aviation industry and supplies its products to more than 120 countries worldwide Ukraine for the Mi-8MSB helicopter and approval of production of this helicopter version has been obtained.

MOTOR SICH JSC is also capable of overhauling the Mi-24 helicopter, extending its service life and upgrading the helicopter into Mi-24MSB version, which houses the TV3-117VMA-SBM1V new-generation engines as a part of the powerplant instead of the TV3-117V (VMA) engines.

Installation of new engines at this type of helicopters makes it possible to improve their flight performance when operated in





high-mountainous, dusty and high-temperature conditions.

As compared with the basic version, the Mi-24MSB helicopter equipped with new engines has the following advantages:

- maintenance of the takeoff power in a wide range of ambient temperatures and altitudes above sea level (up to 50°C and 3000 m);
- improved climbing capacity
- higher parameters of engine acceleration;
- essentially higher static and dynamic ceilings;
- high flight safety in case of failure of one of the engines due to introduction of emergency power rating (2800 h.p. within 2.5 min.) and possible usage of continuous power rating with one engine inoperative for 60 minutes without interruption;
- lower fuel flow rate;
- twice-increased TBO.

Apart from application of the new-generation engines the Mi-24-MSB helicopters are also equipped with a modern airborne equipment package incorporating.

- global positioning system SRBMAR 695;
- USB radio stations KU-196V;
- flight data recorder BUR-4-1-07-01;

emergency location transmitter AJTEH S-406-1NM.

To successfully fulfill operational missions the Mi-24MSB helicopters are furnished with:

- unguided missile units B8B20;
- gun JAkB-12,7;
- optoelectronic countermeasure station "Adros" KT-01A;
- thermal trap jettison automatic unit ASO-2B;
- exhaust units;
- external fuel tanks PTB-450. Motor Sich JSC is the own-

er of the Vinnitsa aircraft overhauling plant at which the work is under way to upgrade the Mi-2 helicopter; the above work comprises refurbishment of the fuselage for enlarging a passenger cabin and mounting of up-to-date flight control equipment.

The future plans comprise the installation of new turboshaft engine AI-450MS in this helicopter making it possible to increase the efficiency of its usage in various climatic conditions. Such helicopter (named Mi-2MSB) can be successfully used in civil and medical aviation, for monitoring the territories and for other special purposes.

Moreover, MOTOR SICH JSC always takes responsibility for ensuring a high quality level and operational reliability of the products, and offers to its Customers a complete package of services relating to warranty and aftersales service of the helicopters.

For the warranty period the Company sends its service engineer on a mission trip to the helicopter operating site and it enables to track the situation in due time performing all types of scheduled maintenance, organize uninterrupted provision of the helicopters of the Customer with spare parts and materials.

The specialists of MOTOR SICH JSC also provide full package of services including technical maintenance of the whole fleet of the Mi helicopters, current repair and overhaul of the helicopters. Thus, the Customers of the Company can decrease the number of companies responsible for quality of supplied equipment and rendered services, exclude unscrupulous suppliers and decrease the cost of the work.

There can be no doubts in this respect because these ambitious plans are based on the rich history of MOTOR SICH JSC, modern design-and-production basis and team-oriented like-minded personnel of the Company.

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