UKRAINIAN DEFENSE REVIEW

№1 [JANUARY-MARCH 2016]

UDR

Defense express

IMPROVING THE CAPABILITIES

BMP-1UM from Zhytomyr Armor Plant

NEW HORIZONS FOR ANTONOV

THE KEYS TO THE SEA

New projects for Ukrainian Navy

MORTAR FIRE

Lineup of mortar guns from Ukraine

WEAPON FOUNDRY FROM THE CITY OF LION

UKROBORONPROM

Ukrainian Defence Industry

YOUR RELIABLE PARTNER IN GLOBAL DEFENCE

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DEFENSE PROCUREMENT AND ACQUISITION PROGRAM SHOULD PROVIDE STIMULI FOR UKRAINE'S ECONOMIC GROWTH – PRESIDENT POROSHENKO

Implementation of the Government Defense Procurement and Acquisition programs should provide stimuli for economic growth by innovation in Ukraine, President of Ukraine, Petro Poroshenko has said.

«Not only should Government Defense Procurement and Acquisition programs provide a boost to growing operational effectiveness of the Armed Forces and other security sector institutions, but it should also provide strong stimulus and direction to innovative economic growth in the country," Poroshenko said, speaking to a meeting of the National Defense and Security Council of Ukraine on 27 January 2016.

The President placed an emphasis on the facts that domestic arms manufacturing companies are operating based on medium-term and long-term strategic plans, and the Armed Forces technical modernization program has been well underway.

Poroshenko instructed relevant government agencies to expedite the process of developing and enacting the Targeted National Program on Armaments and Military Equipment (AME) Modernization through 2020, which he said is necessary"so we would know what specific armament types will be brought into production and delivered to the Armed Forces in each of the four years to come».

Regarding the Government Defense Procurement and Acquisition program for FY2016, Poroshenko said the value of the program has been increased by 34% in the national currency equivalent.

«In the past two years, the domestic defense industry was focused primarily on bringing available armaments and military equipment back to operational life; repairing combat damaged equipment; upgrading legacy AME types up-to-date and delivering them to the Armed Forces. But now, the Armed Forces, given the missions they are assigned and the dangers they face, require new equipment, meeting the highest standards of modern warfare», he said.

The government is strongly committed to procuring new indigenous AME types developed over the past two years, a few of which are set to be ready to be demonstrated in prototypes and put into production during the current year, the President said, adding, "We are increasing funding for R&D programs in order to extend significantly our range of indigenous military products".

Poroshenko placed a special emphasis on the need to provide the Ukrainian military with current-generation UAV capabilities (including armed unmanned aircraft systems), new-generation AFVs, C2 and communications capabilities, navigation support equipment, as well as space imaging technologies.

Capability enhancement plans for the Ukrainian Air Force include the development and procurement of upgrade packages for aircraft, both fix- and rotary-wing; indigenous development of a new medium-range SAM system; modernization of legacy SAM systems, radar technologies and electronic warfare capabilities. Planned procurements for the Navy include new naval armaments and, potentially, warships and armored gunboats.

UKRAINIAN MINISTRY OF DEFENSE REPORTED ON ITS ACHIEVEMENTS FOR 2015

The greatest achievements saw in 2015 are that Ukraine was able to make the enemy stop, and that its military restored its battle-worthiness, gained combat experience, boosted its operational effectiveness, and had been equipped and weaponed for homeland defense missions, a MoD official has said.

"Quite a lot had been done over the past year. In particular, a strategic defense review had been done as part of a broader security sector review. In May 2015, the President of Ukraine enacted the National Security Strategy, and, in September, Ukraine's Military Doctrine was officially enacted. Drafts had been developed of a Development Concept of Ukraine's Defense and Security Sector; a Strategic Defense Review; and a National Program on Armaments and Military Equipment Modernization through 2020. However, some of the aforesaid documents had not been officially and legally enacted in 2015 because of fast-moving, global and unpredictable events that occurred during the year", Ivan Rusnak, senior deputy Defense Minister said in a Defense Express interview.

In 2015, the Ministry of Defense proposed a new military-administrative division and strategic-operational division of the Ukrainian territory, and got it enacted by the President of Ukraine, and 15 newly organized brigades and regiments were added to the Armed Forces' personnel complement. «As part of a newly established comprehensive troop training system that approximates NATO force training system, 650 military training exercises and 225 operational training exercises were held in Ukraine and other countries during 2015. That year saw the fielding of 18 AME types and the procurement of some 4,700 military equipment items, in addition to over 400,000 missiles and other ammunition and projectiles; and 34,000 military equipment and arms had been brought back to operational status", the deputy defense minister said.

SCTV VEHICLES FOR THE UKRAINIAN ARMY

The US company Textron Systems and Ukroboronprom State defense industries holding group have signed a deal on establishing an industrial partnership to co-manufacture the Survivable Combat Tactical Vehicle (SCTV) or "hardy combat vehicle".

The SCTV will be manufactured as a configuration of the HMMWV vehicle upgraded with MRAP-level protection features.

The deal was signed between Textron Systems and SpetsTechnoExport, a subsidiary of Ukroboronprom. Details of the deal were released by the Ukrainian partner at the International Armored Vehicles 2016 Conference held in London on 25-28 January 2016, SpetsTechnoExport said in a press statement.

The deal includes the sale of three Survivable Combat Tactical Vehicles and subsequent delivery of production technology for SCTV vehicles to Ukroboronprom.

The monetary value of the deal and other details were not disclosed.

"The SCTV provides numerous protection and mobility enhancements. It features a fully-armored, monocoque v-hull crew survivability capsule designed to provide the highest levels of protection technology available in its class of vehicles. Additionally, engine upgrades and suspension enhancements provide for superior performance and mobility," the press statement says.

As previously reported, 260 HMMWV vehicles were delivered to Ukraine as part of the US aid program in 2015. Cooperation between Textron Systems and Ukroboronprom was announced at Kiev Arms and Security Expo of 2015.

MALYUK RIFLE SUCCESSFULLY COMPLETES TRIAL PROCESS

The Malyuk Automatic Rifle has successfully completed its trials, with excellent assessments of some of its performance parameters being trialed.

Following these key trials, a quantity of pre-production Malyuk rifles were subject to user testing with a special operations unit of Ukraine's Armed Forces, and, given the satisfactory completion of user trials, was approved for service with Special Operations units.

It is expected that rearmament of military units with new automatic rifles replacing the aging AK-74s and AKMs would improve their operational effectiveness, reduce the logistic footprint and lower total life-cycle costs.

A production line for the manufacture of the Malyuk rifle has been launched at Krasyliv Assembly Manufacturing Plant, a company incorporated with Ukroboronprom.

A commercial version of the weapon is being prepared for production at Krasyliv Assembly Manufacturing Plant and Lviv-based Elektron. It competes and even surpasses in some aspects many of the most popular domestic and international counterparts in its class such as TAVOR (TAR-21) (Israel), Fort 221 (Ukraine) or AUGZA2 (Austria), and is anticipated impatiently by sporting and hunting gun fans.

The Malyuk was developed by the Ukrainian company InterProInvest. Conceived initially as a bull-pup counterpart to the AKM and AK-74 automatic rifles, the Malyuk eventually evolved into a new rifle altogether after being tested in actual combat and completely redesigned with a number of performance improvements in terms of precision of fire, reliability and simplicity of operation.

UKRAINE, POLAND TO JOINTLY UPGRADE POLISH PT-91 MBTS

Ukraine's state-owned defense industrial holding UkrOboronProm, in January 2016, held several rounds of negotiations with Poland's Polski Holding Obronny (Polish Defence Holdings - PHO) on possible participation in an upgrade program centered on Poland's PT-91 Twardy (Hard) main battle tanks, Polish Radio reported.

A PHO delegation was expected to visit the Lviv Armor Vehicle Factory in western Ukraine, which undertakes a range of maintenance, upgrade, and modernization work on the T-72 tank.

The PT-91 was developed from the Russian-designed T-72M1, which was built under license in Poland until 1994. Poland has an estimated 232 PT-91/91M main battle tanks in service. Production of the PT-91 has since been completed, with manufacturer Zaklady Mechaniczne (ZM) Bumar-Labedy (now part of PHO), undertaking the manufacturing of the modernized PT-91M on a required basis.

Further to the discussions on the PT-91, UkrOboronProm subsidiary Kharkiv Machine Building Plant FED revealed that it would be looking to collaborate with Polish industry on aftermarket retrofitting and maintenance of the MiG-29 'Fulcrum' multirole fighter. The company produces a range of servos, thrust reversers, and hydraulic systems that are used in aircraft and aero-engines.

GERMAN "HEART" FOR THE BTR-4 APC VEHICLE

Ukraine's leading defense group Ukroboronprom has signed a contract with German producer Deutz AG to acquire engines for the armored personnel carriers (APC) used by the Ukrainian Armed Forces. The new engines will replace Russian gear, which are to be discarded.

With the latest contract, Ukroboronprom is aiming to cut spending on new engines and ensure that the equipment used by Ukraine's military complies with NATO standards, said an official at Ukroboronprom, as quoted in a statement.

The engines will be supplied to the Armed Forces' BTR-4 vehicles.

The procurement will allow Ukroboronprom to save about USD 25 million and use these funds to develop and produce new weapons and equipment, the statement said.

Ukraine has intensified efforts to replace Russian-made military gear with weapons and equipment supplied by NATO member states following Moscow's annexation of Ukraine's Crimean peninsula.

The BTR-4 is an eight-wheel-drive vehicle enabled with a maximum speed of 68 mph, according to data from Ukroboronprom.

ANTONOV EXPANDS ITS PRESENCE IN GLOBAL MARKETPLACES

The Ukrainian aircraft manufacturer Antonov, which is incorporated with the Ukroboronprom defense industries holding group, is looking to set up Antonov aircraft maintenance centers in countries in Latin America, Asia and Africa, according to a press statement released by Ukroboronprom on 13 January 2016.

The main purpose of these maintenance centers is to provide high quality maintenance servicing of Antonov aircraft and to provide follow-on support services through a single point of maintenance. The program aims to increase the marketing appeal of Antonov aircraft in the marketplaces in Asia, Africa and Latin America.

In January 2014, Antonov announced the signing of an agreement to establish its maintenance center in Lima, Peru. At the time, Antonov was looking for a site to build a maintenance center and a production facility to manufacture Antonov aircraft in Lima. The Peruvian authorities were particularly interested in the cargo versions in the AN-148/AN-158 aircraft family, which includes the AN-148T and AN-178.

Antonov announced it was planning to expand the presence of its AN-148/AN-158 aircraft in Latin American markets as Argentina, Bolivia, Peru, Nicaragua and Cuba expressed an interest in purchasing altogether about fife dozen such airplanes from Ukraine.

In April 2015, Antonov signed a MoU with King Abdulaziz City for Science and Technology (KACST) to design and construct a modern manufacturing plant to build the 9.2-tonne An-132 cargo aircraft in Saudi Arabia. The multilateral agreement involved Taqnia (Saudi Arabia), Ukrainian Scientific Research Institute of Aviation Technologies, Altis Holding (Ukraine) and Broetje–Automation (Germany).

Antonov predicts a market for about eight dozen An-132 airplanes and its special-purpose modifications in Saudi Arabia. The program is aimed to be a springboard to develop the Saudi' aerospace capability and industrial base. Ukraine will train Saudi nationals for the program.

On 9 October 2015 in Astana, Ukrspecexport, a subsidiary of Ukroboronprom, and Aviation industry Kazakhstan LLC signed a MoU on cooperation in the aviation sector. The planned cooperation includes an Antonov aircraft maintenance center to be set up on the premises of the KAI Aviation Technology Center in Astana, alongside an industrial partnership in the production of parts and subsystems for Antonov aircraft.

On 25 December 2015, Antonov signed a memorandum of understanding with Aeroneo, Industry, Commerce and Aeronautical services, LTD regarding cooperation in the promotion of commercial Antonov aircraft in markets in Europe and Asia, and in upgrading and developing new aircraft.

It also includes the lease and life-cycle servicing of Antonov aircraft in Africa, including the provision of rebuilding/upgrade and utilization services at the Aeroneo Aviation Technology Center based in the Beja Airport, Portugal.

POLAND DEVELOPING GROT-2 AIRPLANE WITH A MOTOR-SICH ENGINE

Development of the Grot-2 single-engined lightweight jet designed by the Warsaw-based Instytut Techniczny Wojsk Lotniczych (Air Force Institute of Technology: ITWL) is to proceed as a co-operative effort with Ukrainian industry, IHS Jane's reported on Jnauary 17.

News of the collaborative teaming formed part of a presentation given in Warsaw on 13 January by ITWL director Colonel (retd) Ryszard Szczepanik during a day-long conference on military helicopter and aerospace programs. The conference, organized by the influential Narodowe Centrum Studiów Strategicznych (National Centre for Strategic Studies: NCSS) think-tank, was timed to coincide with a series of internal analyses and external negotiations on procurement programs being conducted by the new Polish government.

Szczepnik stated that the Grot-2 - intended to be a multimission military aircraft - will be powered by a Ukrainian Ivchenko/Progress engine built at the Zaporizhia Motor Sich aeroengine production enterprise. The decision by ITWL to adopt a Ukrainian engine as the powerplant for the Grot-2 comes after several years of design validation that involved wind tunnel tests and computational fluid dynamics modelling. The decision on an engine was left open for several years while ITWL considered several possibilities. Modelling of the Grot-2 design was conducted with a Honeywell/ITEC F124-GA-100 propulsion model.

Dr Vyacheslav Boguslayev, the general director of Motor Sich, was also present at the forum and told IHS Jane's that the engine intended for the Grot-2 program «will be the AI-222-28F design» developed at the Ivchenko/Progress design bureau. This engine is an updated, developed version of the AI-222-25 installed in the Chinese-built Hongdu Aviation L-15 jet trainer.

UKRAINIAN ARMED FORCES HAVE TAKEN DELIVERY OF NEW UAV SYSTEMS

The Ukrainian Armed Forces took delivery of new Fury-class UAV systems in January 2016, press-officer for the Ministry of Defense, Colonel Victoria Kushnir told a news briefing.

«Five units of the Fury unmanned aircraft system have been added to the Armed Forces inventory," she said. The Fury UAS is designed for airborne monitoring of the earth's surface and downlinking live imagery to a ground control station. The UAS consists of a mini UAV aircraft equipped with a gyro-stabilized optical camera module for daytime observation (it can

be optionally equipped with a gyro-stabilized thermal imaging camera module); a mobile ground control station with integrated display units, a charging station and video recording equipment; an integrated computer preloaded with GIS and other necessary software; a ground data transmit/receive station; and high-capacity batteries. The Fury UAS provides an endurance of two hours, and an operational range of up to 130 km.

ARMORED GIURZA GUNBOAT COMMENCES SEA TRIALS

In January-February 2016, Project 58150 Giurza-class armored gunboats built for the Ukrainian Navy commenced sea trials, Dumska.net reported.

The gunboats, built at a Leninska Kuznya shipbuilding yard, are undergoing sea trials in the Gulf of Odessa, Ukraine.

Even at this stage of factory sea trials, the gunboats are fully equipped with armaments and have a full complement of crew personnel.

The Giurza gunboat has been designed to operate in littoral waters of the Black and the Sea of Azov. It is suitable for policing rivers and sea areas out to 20 nautical miles offshore. In addition to policing border waters and coastal sea areas, these craft could do the tasks such as the protection against smuggling and trespassing at sea; engagement of point costal targets (armored fighting vehicles or bunkers); defense of waterside structures; tactical raiding support, as well as the provision of reconnaissance and logistics support.

The Giurza-M gunboat displaces 50.7 tonnes when fully loaded. It is 23.0-m long and 4.8-m wide, and has a water draught of 1.0 m. Ii is powered by two diesel engines enabling speeds up to 28 knots, a cruising range of 700 nm at 11 knots and a cruising capacity of five days. The crew is set at 5.

The armaments package includes two remote weapons stations BM-5M.01"Katran-M" (a naval counterpart to the BM-3"Shturm" weapons station designed for application on armored fighting vehicles) supplied by Mykolayiv Machinery and Repair Plant, as well as a MANPAD system with eight ready-to-fire missiles.

The gunboat is claimed by the designer to give the benefit of reduced observability in the infrared and radar spectrums.

The Ukrainian Navy is set to take delivery of 18 more Giurza-class gunboats by 2020.

UKROBORONPROM:

PERFORMANCE RESULTS FOR 2015

UKROBORONPROM Ukrainian Defence Industry released its Performance Report for 2015 and outlined plans and priorities for 2016.

In 2015, Ukroboronprom that employs, in all, about 80,000, returned to profitability, recording UAH 1.6b in profit and UAH 3.1b in taxes paid to government. Of 7,198 pieces of armaments and military equipment (AME) delivered to Ukraine's MoD and National Guard customers during 2015, 1,441 pieces were newly built or upgraded, 1,963 overhauled and 3,794 brought back to operational life. Those included 673 military armored vehicles, 275 motor vehicles, 135 refueling vehicles, 59 engineering vehicles, 3 radar

vehicle systems, 53 aircraft, 1,830 gun launched missile systems etc.

The Company showed a 131 percent growth in its arms export sales in 2015.

Among the industry clusters that witnessed the highest growth rates in 2015 are aviation industry with 12 percent, shipbuilding industry with 58 percent and armor industry with 61 percent.

Top four companies of the armor industry cluster delivered 197 armored vehicles, and recorded their first profit ever. Flagship products in this industry cluster include the Oplot MBT, the BTR-4E APC and the Dozor-B armored car.

A Dozor-B production line was launched at Lviv Armor Plant. Production of the first pre-series batch was completed in August, followed by several months of MoD testing and evaluation and official approval for service use in November.

A number of managerial decisions were taken to remove corruption schemes. The introduction of e-tendering alone saved the Company UAH 223 million and helped it find 6,800 new contractors and subcontractors.

The managerial decisions enabled a combined cost efficiency gain of UAH 375 million. Other gains from the decisions include more stable operation of constituent companies, as well as the provision of minimum required level of modernization to boost production and improve managerial infrastructure and coordination with subcontractors, Roman Romanov, CEO of Ukroboronprom said.

The Company is anticipating new contracts to meet the needs of the Ukrainian military.

Ukroboronprom is working on own R&D projects developed in collaboration with international partners. These projects particularly include a 120-mm mortar tailored for the BTR-4E APC platform, a 155-mm self-propelled gun based on the Oplot MBT chassis, weapons control and armored scout vehicles; a short-range, combat capable UAS; a next-generation radar system, the Korsar missile and launcher system and many more others.

Ukroboronprom is pursuing an import substitution strategy for over 8,000 Assembly Part and Subsystem products that Ukrainian military manufacturing companies subcontracted from Russian suppliers previously. Ukroboronprom has compiled a full catalogue of such products and distributed it among local officials in 11 oblast administrations. And it will now be the responsibility of oblast administrations (more specifically, their industrial departments) to propose companies under their respective jurisdictions to establish production of the Assembly Parts and Subsystem products that Ukroboronprom needs. Even as this effort has just been launched, as many as 114 companies not incorporated with Ukroboronprom, both state-run and privately owned, have initiated production and began delivery of 247 products.

Alongside import substitution effort, the Company is pursuing projects aimed at establishing joint venture production facilities with premier global defense companies. For now, Ukroboronprom has clinched joint venture deals with companies from the United States, France, Italy, Canada, Poland, the Czech Republic, Turkey, India and other countries. The portfolio of joint projects includes aircraft engines, early warning systems, first-aid and battlefield evacuation vehicles, a NATO-compatible self-propelled 155-mm gun system, as well as steel armor, AFV engines, weapons control systems and more projects.

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In Ukroboronprom's strategy for 2016 and onwards, development of new AME types is designated a priority line of business. New designs will be created both by domestic R&D companies and in collaboration with proven first-line suppliers from other countries. Plans for 2016 include not only production of new-generation Oplot MBTs and completion of R&D on a self-propelled gun on the Oplot MBT chassis, but also indigenous development of a heavy infantry fighting vehicle based on an all-new platform. Ukroboronprom is looking to demonstrate its own designs of robot aircraft and unmanned ground vehicles already in 2017. UDR

UKRAINIAN SHIELD

Made in Ukraine

PRODUCE IN UKRAINE TO SECURE THE WORLD'S PEACE

UKROBORONPROM IS OPEN FOR INVESTMENTS:

100+ PRODUCTION SUBSIDIARIES IN 7 MAJOR INDUSTRIES:

Aircrafts | Engines and Tourbines | Shipbuilding | Armored vehicles | Radar and Air Defense | Optics and Electronics | High precision armament and munitions

11 engineering, R&D centres

80 000 qualified personnel, including 10+% engineering

9 000 000 sq m equipped on 25 500 ha, available for production

New defence designs and ideas, waiting for investors

GOOD COUNTRY INDEX:

Science and Technology parameters reported to GDP, rank

United Kingdom	1
Hungary	9
Ukraine	13
Belgium	15
United States	26
Poland	32
Italy	38
Romania	48
India	56
Philippines	115

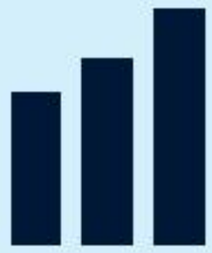
WORKFORCE:

Hourly wages in manufacturing industry in select countries, USD

US	35.7
Spain	26.8
Greece	19.4
Czech	11.9
Slovakia	11.3
Poland	8.3
China	2.1
Ukraine	1.2

TRADITIONS IN ARMS TRADE

Established and active Arms trading connections with 90+ countries



8th world largest arms exporter in 2009-2013

50%+ export growth between 2004-2008 and 2009-2013

WHAT WE OFFER:

Develop your ideas with our R&D centers

Invest in our new products and ideas

Combine your products with ours

Use our capacities and experience to produce your products

Use our trade experience to market your products

Bring your technologies to our production sites

ENGINEERING GRADUATES

per annum in European countries, thousand students

Ukraine	130
France	105
Germany	93
Turkey	75
UK	71
Poland	66
Spain	56

Source: World Economic Forum, Forbes, 2014,IVC,www.business-standard.com

XIII INTERNATIONAL EXHIBITION

ARMS AND SECURITY

11–14 OCTOBER 2016 / KYIV, UKRAINE

MAIN SUBJECTS:

- Weapons and military equipment for army and law enforcement
- Police equipment
- Military aviation
- Border security
- Military clothing, shoes, protection means
- Hunting and sporting arms, self-defense weapons

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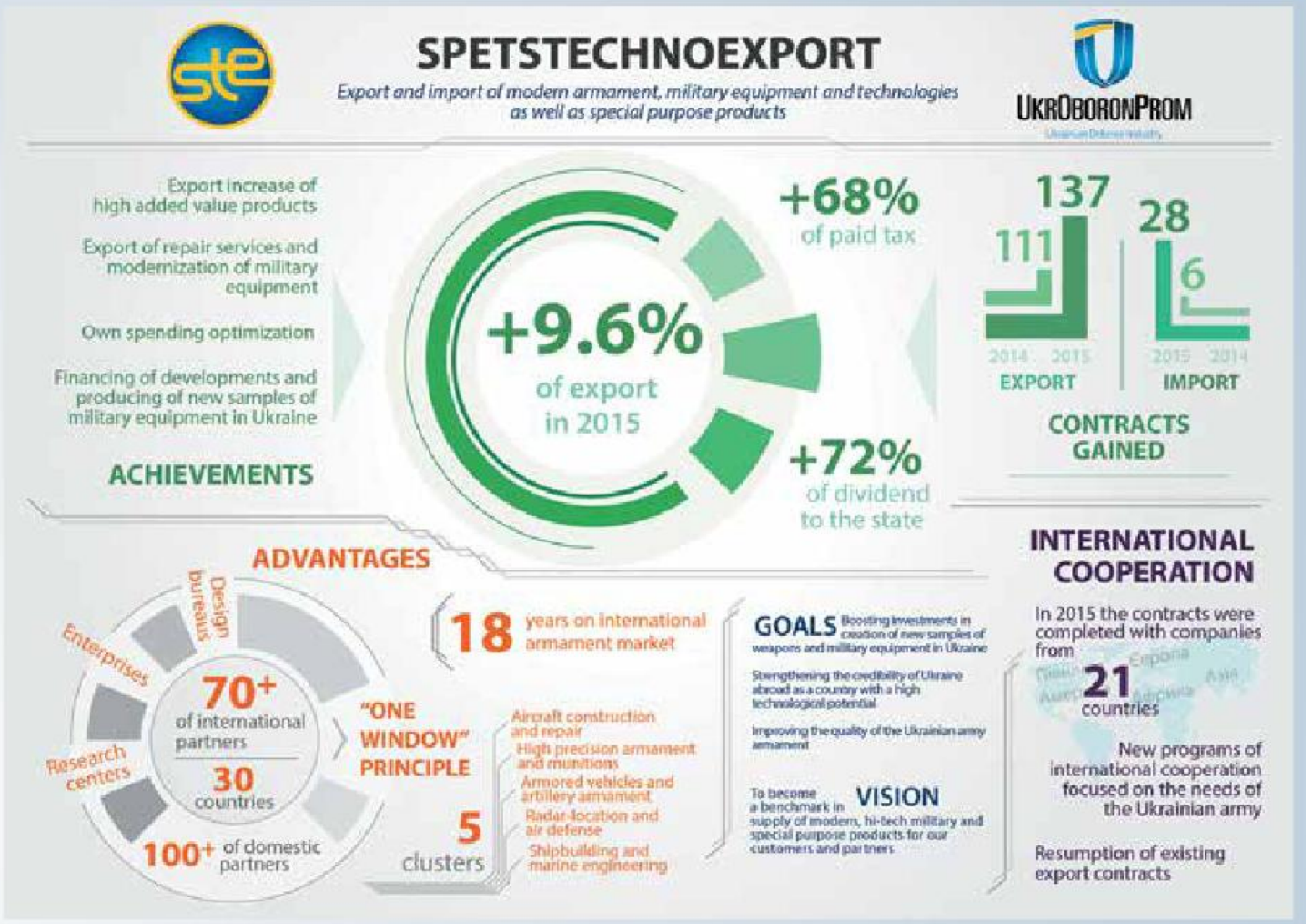
UKRAINIAN DEFENSE INDUSTRY PROVES ITS COMPETITIVENESS IN INTERNATIONAL MARKETS

PAVLO BARBUL
DIRECTOR OF SFTE "SPETSTECHNOEXPORT"

The last year was a challenge for Ukrainian defence industry. Due to the war in Donbass, Ukrainian enterprises greatly increased supplies of military products to the Armed Forces of Ukraine; some restrictions on the export of defense items were implemented. Nevertheless, the amount of sales to foreign partners, generated by "Ukroboronprom" subsidiary companies, has not diminished due to refocussing from supplying surplus arms to exporting new equipment with high added value, providing services as well.

In particular, "Ukroboronprom" special exporter, the state foreign trade enterprise "SpetsTechnoExport", in 2015 has increased the volume of dispatched goods and services by almost 10%, compared to 2014. Summarizing the results of all the enterprises of the SC "Ukroboronprom", export of arms and military services in 2015 amounted to $600 million. In the meantime, all the export contracts for supply of military and special purpose products and services, signed in 2015, are estimated at $ 1.334 billion.

It would be not possible to achieve these results without the trust of our foreign colleagues and partners. The new management team revived a number of frozen contracts, substituted components, supplied by Russia for a long time; sig-



nificantly increased the number of agreements, regarding implementation of research and development projects in Ukraine; established or improved cooperation with companies from the US, Canada, Europe, Israel, Turkey, India. These steps are indicators of strengthening the credibility of Ukraine abroad, as a country with high technological potential.

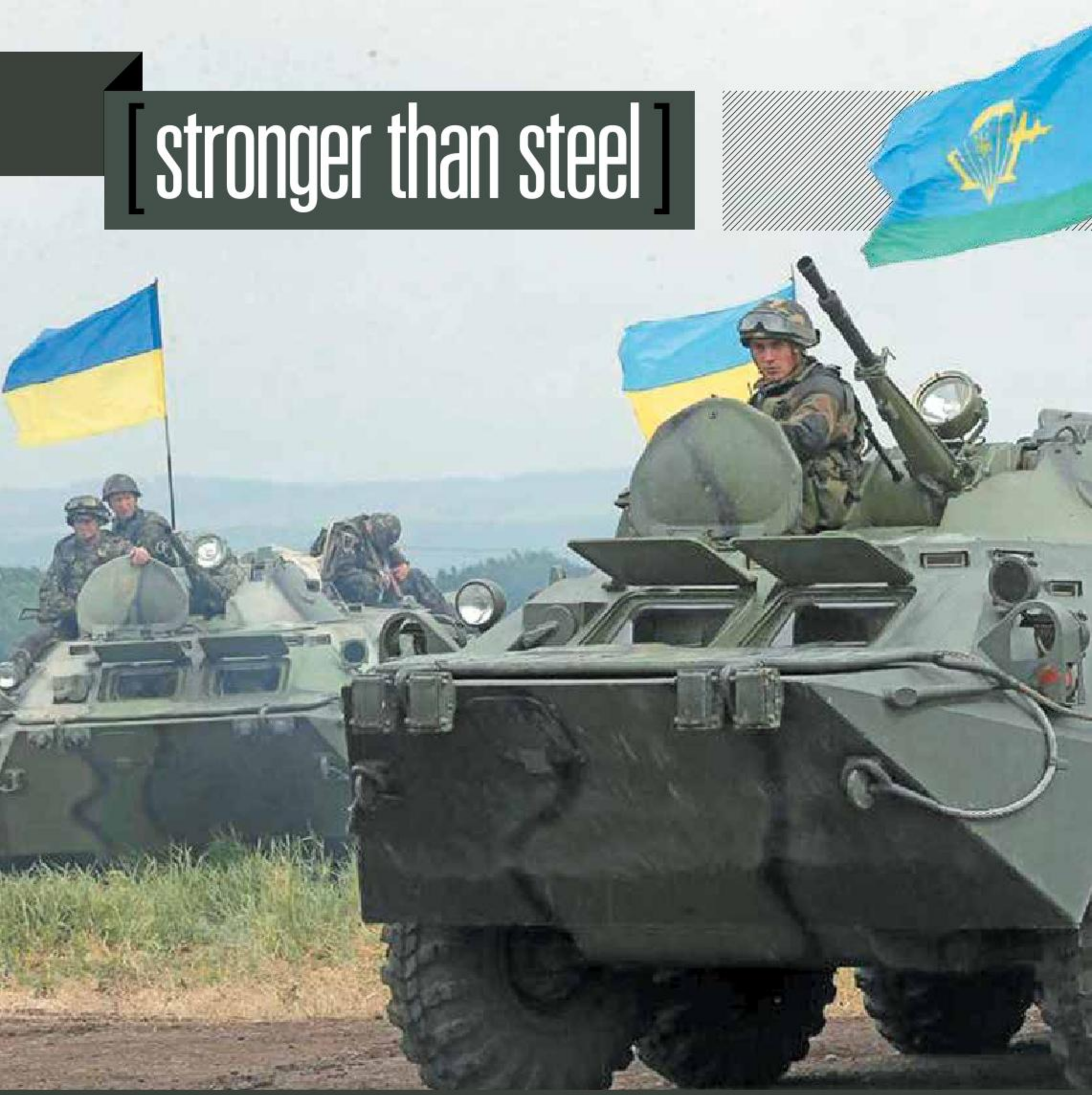
In 2015 "SpetsTechnoExport" successfully completed one of the most important export contracts for modernization of 40 military transport aircrafts AN-32 for Indian Air Force, upgraded and supplied components for aircrafts Su, MiG and Il types, helicopters Mi type, exported modern gas turbines for warships and high technology radar systems.

Behind this, we do expect to increase production and export of new aircrafts in Ukraine. Great prospects, particularly, has the new AN-178, which aroused great interest during the international exhibitions, and AN-132 that is currently under completion. Private Ukrainian companies, led by "SpetsTechnoExport," designed and created a series of unmanned aerial vehicles, which successfully perform their functions for the Ukrainian army purposes, and will be also supplied for export.

But today's approach for doing business should not consist only in buying and selling, but also in forging different types of cooperation, including joint ventures. This will significantly streamline and accelerate the development and production of military products for both Ukrainian and foreign sides. The first significant result in this direction was signing the contract between "SpetsTechnoExport" and Textron Systems Marine & Land Systems on supply of Survivable Combat Tactical Vehicles (SCTV™) to Ukraine and technologies for upgrading Humvees at UKROBORONPROM enterprises.

In 2016 we are about to further improve these achievements, as there is good scope and potential for cooperation with foreign partners, going up to starting new joint ventures, to produce and supply modern military products and provide our partners with comprehensive solutions. UDR

[stronger than steel]



ARMED FORCES

OF UKRAINE MODERN REALITIES

[stronger than steel]

Russian annexation of Crimea and "concealed" military intervention in parts of Donetsk and Luhansk oblasts obliged Kiev to commence modernization of its armed forces. The Ukrainian military saw a massive transformation and took on a substantially new look during 2015.

WITH AN 'AIDED' EYE

As part of its national security and defense reform effort in 2015, Ukraine developed and enacted two strategic documents – the National Security and Defense Strategy and the Military Doctrine.

The Strategy defines that "the Russian threat and other external and internal changes in Ukraine's security environment necessitate the creation of a new national security system". It identifies as key national policy priorities the restoration of the territorial integrity of Ukraine within its internationally recognized borders, the establishment of an effective and efficient defense and security sector and the boosting of the country's ability to defend itself, particularly through deeper collaboration with NATO and EU member countries in defense-industrial production and technology development and achieving full independence from Russia in arms and military equipment production.

The Military Doctrine of Ukraine sets out approaches, principles and methods of countering military threats to national security. A significant portion of the document deals with the recognition of Russian aggression and the adaptation of Ukraine's defense capabilities for confrontation with Russia.

A number of measures have been undertaken since early 2015 in the context of these documents and as part of a military reform concept proposed by the General Staff (its key provisions are expected to be incorporated into the National Program on Optimization and Restructuring of the Ukrainian Armed Forces).

The Military Doctrine of Ukraine sets out approaches, principles and methods of countering military threats to national security. A significant portion of the document deals with the recognition of Russian aggression and the adaptation of Ukraine's defense capabilities for confrontation with Russia.

1 In January 2016, President of Ukraine Petro Poroshenko enacted the new military-administrative division of Ukrainian territory. As a result, Ukraine's land territory is divided into four military zones of land and a separate military district, which are the area of responsibility of the North, South, West and East operational commands.

Ukraine's airspace is split into three military air zones and one separate military district, which are the area of responsibility of the West, South and Center air commands.

Given the legal status of the temporarily occupied territories of the internal sea waters and territorial sea of Ukraine around Crimean peninsula and parts of Donetsk Oblast, the country's maritime space is divided into the Black Sea and Azov naval zones of responsibility of the Navy command of the Armed Forces of Ukraine.

2 Ukraine has greatly increased the size of its military forces and other security sector agencies. Particularly the strength of the Armed Forces of Ukraine was raised to 232,000 personnel by late 2014, from 168,000 personnel (including 43,000 civilian contractors) in early 2014, and was boosted further to 250,000 personnel (including 46,000 civilian employees) as of late 2015. The increase in personnel was due to the need to organize a number of new units and formations, primarily within the structure of the Ground Forces which play a key role in operations to localize and neutralize Russian-backed insurgents and to counter Russian aggression in East Ukraine. The previous structure and strength of the Ground Forces were inadequate to the level of the tasks being tackled and the potential threats being faced.

In 2015, the increase in the strength of Ukraine's force group-

ing was effected by the formation of a dozen new brigades and reorganization and restructuring of the existing ones, the set-up of a number of independent units and the establishment of new combat training standards of troops and command and control bodies throughout the vertical, leveraging the lessons learned from the anti-terrorist operation in East Ukraine.

At the end of 2015 the Ground Forces of Ukraine included two armored brigades; nine mechanized brigades and four mounted infantry brigades; two mountain-infantry brigades; a missile brigade; five artillery brigades; three artillery units (a rocket artillery brigade and two independent rocket artillery regiments); two air defense (SAM) regiments; four Army Aviation units (three brigades and one regiment); as well as combat support forces providing intelligence, communications, engineering, NBC and EW support etc.

The Air Force of Ukraine (that is comprised of frontline and transport aircraft units, air defense (SAM) units and radar units) is the one that hasn't seen any significant boost to its personnel or equipment inventory. The Air Force's responsibility area will be divided between the West, East, South and Center air commands (it is current divided between the West, South and Center air commands).

Air commands have under their command tactical aircraft brigades, SAM brigades and regiments as well as radar brigades. SAM forces include about 50 S-300 and Buk-M1 SAM battalions.

Ukraine's army aviation capabilities include five fighter aircraft brigades, a bomber aircraft & reconnaissance brigade and an air assault brigade. The Air Force command also has under its direct subordination three transport aircraft brigades, an aviation training brigade and an independent UAV regiment.

The aircraft that comprise the core of Ukraine's military aircraft inventory (Su-24M, Su-24MR, Su-25, Su-27 and MiG-29 fighter aircraft) have been in operation during 20 to 25 years. Ukraine's frontline aircraft inventory amounted to 208 aircraft as of early 2014. It is estimated that Ukraine has lost 10 rotary-wing and 8 fix-wing aircraft over the time of the anti-terrorist operation in Donbas.

> Ukraine has increased its defense and security spending-to-GDP ratio to higher than 5 percent. The MoD is eligible for half of this amount (2.54% of GDP), the remainder being shared between other security sector agencies -- the Ministry of Internal Affairs, the State Border Guard Service, the State Emergency Service, the Security Service, the Foreign Intelligence Service and the State Guard Directorate.

Over 200 equipment items from the Air Force's inventory, including 72 fixed-wing and 42 rotary-wing aircraft underwent repairs or overhaul over the time of the ATO as of 7 April 2015.

Air Force's medium-term programs for upgrading its combat aircraft fleet will be focused on MiG-29 and Su-27 fighter aircraft, Su-24MR tactical reconnaissance aircraft and Su-25 combat fighters. The planned enhancements will feed in lessons learned with the use of both production aircraft and their upgrades/modifications (particularly the MiG-29MU1 and Su-25MU1) in the anti-terrorist operation in East Ukraine.

Ukraine's Naval Forces have shrunk significantly both in terms of strength and combat ability as a result of Russian annexation of the Crimean peninsula. The Naval Forces have lost the core of their combat fleet as well as their sole submarine, the Zaporizhia. Russian seizure of Ukraine's naval fleet and bases has affected the plans of the Ukrainian Armed Forces to enhance and modernize the naval component of their combat power and capabilities. The Ukrainian Navy has been left with extremely limited combat ability following the relocation of its headquarters, fleet and training institutions from Crimea to Odessa.

Ukrainian naval complement retained as few as three warships (the Frigate "Hetman Sahaidachny", the missile boat "Pryluki" and the Corvette "Vinnytsia"), the medium landing craft Kirovohrad and a few dozen auxiliary vessels as of mid-2015. The independent 36th Marines Brigade was set up on 11 July 2014

and placed under the Ukrainian Navy's command following the redeployment to mainland Ukraine of what has remained of the 1st and the 501st marine battalions that were based respectively in Feodosia and Kerch prior to the annexation of Crimea. The independent 36th Marine Brigade had achieved its fully operational capability by June 2015.

Chances are very low that Kiev would be able to enhance its naval capability any time in the short term. A concept on creating a mosquito-craft fleet is being considered as an interim measure in rebuilding the Naval Forces of Ukraine. The concept particularly calls for the integration of two Project 58155 Gurza-M-class armored gunboats into the Navy's inventory. Altogether the Naval Forces are scheduled to receive 18 gunboats by 2020, and about a dozen Centaur-class armored assault and landing craft will be delivered to Special Operations Forces by that time.

The equipment of coastal defense units with current-generation anti-ship warfare capabilities, indigenously built or imported from other countries, represents a special issue.

3 In December 2015, Special Operations Forces were set up comprised of the independent 140th special operations center and information/psychological warfare units.

Ukraine held six rounds of mobilization during 2014 and 2015 to bring army units up to full strength and to procure personnel to man newly organized brigades of the Armed Forces and units of other security sector institutions. From 30,000 to 50,000 men were mobilized to serve in the Armed Forces in each of the mobilization periods, which were timed to correlate with the release of those soldiers called up for service during previous rounds of mobilization.

4 Ukraine has increased its defense and security spending-to-GDP ratio to higher than 5 percent. The MoD is eligible for half of this amount (2.54% of GDP), the remainder being shared between other security sector agencies -- the Minis-

ARMED FORCES BUDGETS OF UKRAINE (BILLION UAH)

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
9.061	9.5	8.3	10.5	12.7	17.4	15.3	36.6	44.6	55.5
200 152	200 149	200 150	200 150	192 144	184 139	165 120	168 125	250 204	250 204

* Personnel strength of the Armed Forces of Ukraine (with a numerator showing the total strength, and a denominator showing the total strength minus civilian employees), thousand

try of Internal Affairs, the State Border Guard Service, the State Emergency Service, the Security Service, the Foreign Intelligence Service and the State Guard Directorate.

This is only a little part of what had been achieved over the past years.

Ukraine's Ministry of Defense is now busy drafting a Strategic Defense Review, which would provide strategic guidelines for the defense and security sector reform. It is based on new approaches to state preparation for potential military threats and the use of military force for protection of the state sovereignty and territorial integrity of Ukraine, reflecting the standards and principles adopted in NATO member states.

The defense sector reform will be implemented in three phases:

- Phase I (up the end of 2018) - reform of the Ministry of Defense, the General Staff and other command and control authorities;
- Phase II (up the end of 2020) – the acquisition of certain new capabilities by the Armed Forces and other defense agencies; upgrading them to NATO compatibility and so they meet NATO membership criteria; the establishment of an integrated, unified military logistics system;
- Phase III (up to 2025) – incremental capability enhancement of the Armed Forces and other defense agencies, effected through technical modernization and professionalization.

The ultimate goal of this reform is to achieve a clear-cut division of labor between the Ministry of Defense and the General Staff, with the former being responsible for exercise of military-political authority and the latter for military command over defense forces.

The reform also calls for a clear-cut division of responsibilities with regard to combat training and tactical command of forces; those two responsibilities will be divided between branches of the Armed Forces and the Joint Operations Headquarters respectively.

The Armed Forces of Ukraine will be subdivided into special operations forces, rapid reaction forces, supporting forces, reserve forces and stand-by forces.

Ukraine's planned reforms are ambitious given primarily the military threat posed by Russia and her backed separatist parts of Donetsk and Luhansk oblasts of Ukraine. The Ukrainian government therefore has to do very quickly now what it should have done during all years of Ukrainian independence. UDR

IMPROVING THE CAPABILITIES

In 2015, Zhytomyr Armor Plant developed a modernization package to upgrade the BMP-1M Infantry Fighting Vehicle (IFV) to the more capable BMP-1UM standard by installing the Shkval turret weapons module among other things.

The loss of a significant number of armored equipment used by government forces fighting separatist rebels in eastern Ukraine once again emphasized the need for completing development of an upgraded modification of the BMP-1 IFV. The BMP-1UM is the result of long-protracted effort that kicked off back in 2001, under a R&D program code named "Blindazh". It was foreseen, at the time, that the BMP-1 would be upgraded to the BMP-

1U (the "U" standing for Ukrainian) configuration by mounting a Shkval multipurpose modular weapon station being developed Kyiv-based Artillery Design Bureau, but with virtually no improvements made to the vehicle's mobility and protection.

After completion of preliminary testing and evaluation process in 2004, it was announced that three motorized infantry brigades of the Ukrainian Army would get their combined fleet of 400 BMP-1 vehicles replaced with BMP-1U upgrades armed with Shkval turrets by 2012. But of all the vehicles upgraded, only 12 were delivered to Ukraine's Armed Forces, while 30 were exported to Georgia (some of them were seized by Russian forces during war in South Ossetia in August 2008), and three were exported to the Republic of Chad.

Based on lessons learnt from BMP-1 IFV operations in theater in eastern Ukraine, Zhytomyr Armor Plant, in 2015, developed a modernization package to improve the performances of the vehicle in terms of protection, survivability, mobility and operational comfort for the crew. The upgrade, which is based on the BMP-1M configuration fitted with Shkval turret, was given designation BMP-1UM and made debut at Kyiv Arms and Security expo in 2015.

Fire control. The KBA-105TB "Shkval-A" integrated modular weapon station seen on the BMP-1UM represents a follow-on design to the KBA-105 "Shkval". It features the same set of weapons as found in the KBA-105 "Shkval", but differs in that it has the allowance of ATM rounds increased to six, and integrates a new electro-optical situational awareness (SA) and weapons control system Tandem-2 produced by PJSC Chernihiv Radio Factory (otherwise known as PJSC CheZaRa). In natural night conditions, it has the detection range of an MBT-size object of 1,000 meters or longer. The turret is stabilized with the SVU-500-3Ts system produced by Kyiv Petrovsky R&D and Manufacturing Company. In the event of failure of the targeting system or vehicle power supply system, the turret operator can use a TV camera for SA and targeting, and the ZTM-1 gun can be fired using a backup mechanical trigger. Zhytomyr Armor Plant partners with a number of Ukrainian and international companies in upgrading weapons control system on the BMP-1UM, and plans are considered to equip the vehicle, in the medium term, with a new, more up-to-date turret.

Protection and Survivability. Protection of the BMP-1UM is improved by several additions and alternations. One of pre-prototype BMP-1UM vehicles is fitted with 4S20 explosive reactive armor (ERA) plates on its sides. Further prototypes will be equipped with shorter-length ERA plates "Nizh" configured for application on light-to-medium weight armored vehicles, and those will be further replaced with Microtech Nizh-L or Raketka ERA systems designed specifically for application on light armored vehicles (both Nizh-L and Raketka were still awaiting official approval for service use as of the end of 2015). Further modernization plans include the addition of an active protection system among other things.

Steel skirts fitted to the sides of the hull have increased water-displacing capacity as compared to the original BMP-1 design, improving the vehicle's amphibious capability and adding protection to sidewalls of the hull that are already protected with internal spall liner from Aramid Fibers. Crew survivability is enhanced through the use of blast attenuating seats and blast mitigating flooring under the troop compartment.

Infrared signature of the vehicle is reduced by 60 percent due to the use of paint coating absorbing thermal radiation from the engine compartment. A two-part exhaust deflector is used to reduce the chances of thermal infrared detection.

Mobility and Maneuverability. The BMP-1UM is powered by

a 400 hp 3TD-2 diesel engine produced by Malyshev Plant, in place of the original 300hp UTD-20 six-cylinder four-stroke diesel engine seen on the baseline BMP-1 vehicle, enabling enhanced maneuverability on a variety of terrains. A BMP-1UM was found capable in factory tests of mounting a thirty-degree slope in third gear. The 3TD-2 shares parts commonality with MBT diesel engines of the 5TDF and 6TD series, which simplifies the logistics considerably and shortens the learning curve for maintenance personnel, while indigenous production of the engine makes users independent of imported parts supplies. One disadvantage that the 3TD-2 diesel has compared to the UTD-20 is that it needs ten-minute preheating to operate in cold weather.

Situational awareness. Communications and situational awareness are provided through the use of radio sets (of Ukrainian or foreign manufacture), as well as the CN-3003 "Basalt" satellite navigation support system produced by Smila, Cherkasy Oblast-based Orizon-Navigation. The SN-3003 Basalt provides the capabilities for determination of position, measurement of current geographical coordinates, route calculation with multiple waypoints displayed on an electronic map (with the possibility of route deviation control), and real-time position tracking of and coordination with slave vehicles.

Layout Solutions. The layout design of the BMP-1UM allows for an increased ceiling depth of the troop compartment. A rear-mounted wide ramp can be seen in place of two outward opening doors in the BMP-1, providing advantages in terms of troop egress/ingress while on the battlefield, ease of evacuation of casualties on stretchers and loading/unloading of heavy loads. Fuel tanks between the benches in the troop compartment, and two fuel tanks contained in rear doors have been dispatched and replaced with tanks mounted behind inward looking seats along sidewalls.

A rear-mounted wide ramp can be seen in place of two outward opening doors in the BMP-1, providing advantages in terms of troop egress while on the battlefield

Roof hatches over the troop compartment and the rear turret can be fixed toward each other while open, providing a relatively protected space that the turret operator can use for dealing with weapons stoppages and reloading the ATGM launcher. Unlike with the original BMP-1 where the gunner could not access his workstation other than via a turret roof hatch, he can now get to the troop compartment or be evacuated if wounded or otherwise disabled while remaining under the protection of the armor.

In February 2015, Ukroboronprom, the mother company of Zhytomyr Armor Plant, said that the the Plant had been set the tasks of completing development of the BMP-1UM modification, setting up its production and delivering 50+ vehicles to the Ukrainian military by year's end to "improve mobility, firepower and protection of government forces involved in the antiterrorist operation in the east of Ukraine". But this has never happened, given that the BMP-1UM cannot be formally included into the State Defense Procurement Order and got certified for production before and until it completes the State Trials process and is officially accepted by the Armed Forces. But until this is the case, it is difficult to predict when and at which rate the Armed Forces re-equipment with upgraded infantry fighting vehicles will occur. But first steps to creating an indigenous family of medium-weight armored vehicles have been made already. UDR

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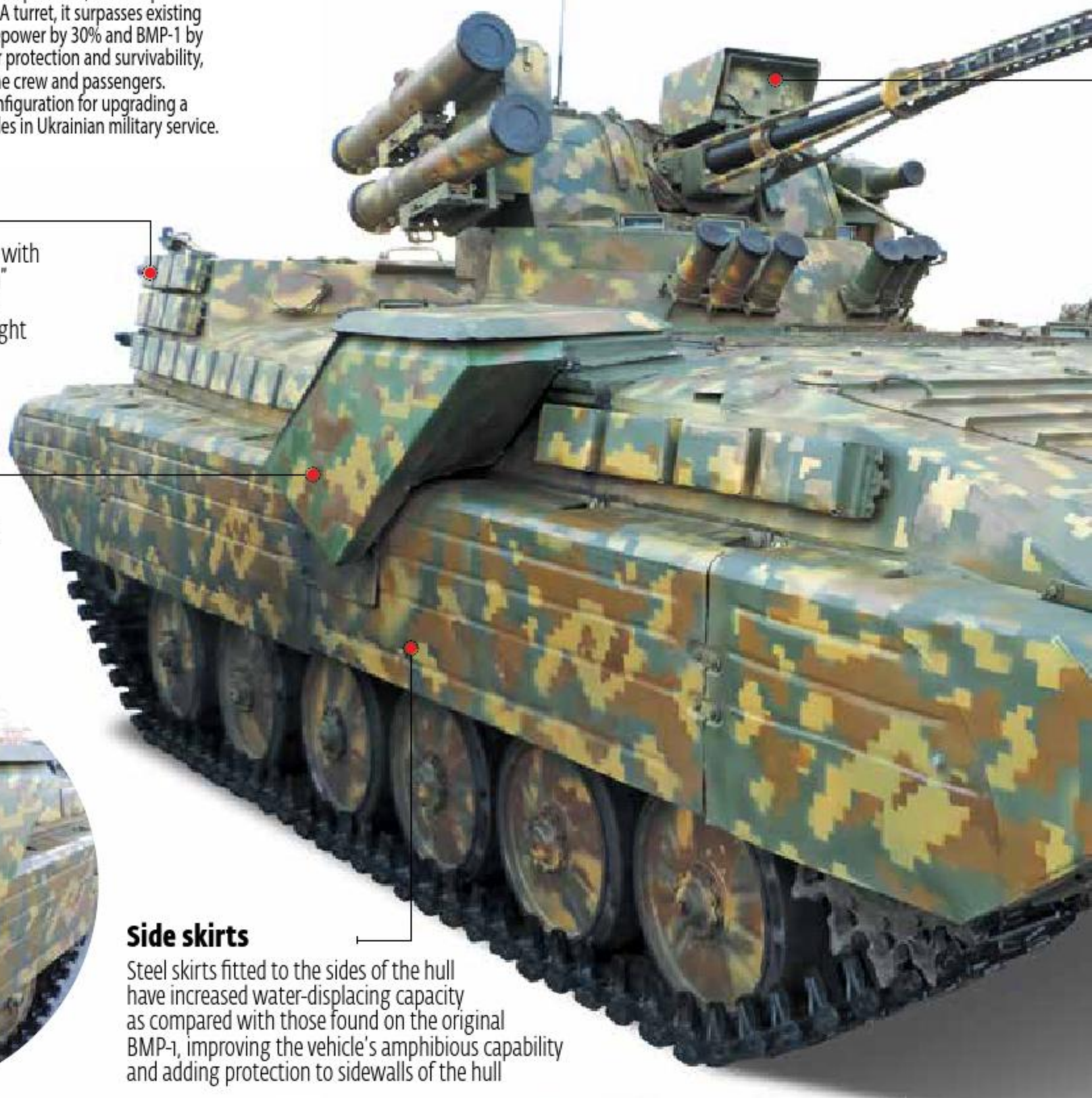
BMP-1UM

INFANTRY
FIGHTING VEHICLE

Based on lessons learnt from BMP-1 IFV operations in theater in eastern Ukraine, Zhytomyr Armor Plant, in 2015, developed a modernization package to improve the performances of the vehicle in terms of protection, mobility, survivability and operational comfort for the crew. The upgrade, which was given factory designation BMP-1UM, is a follow-on design to the BMP-1M configuration that was demonstrated for the first time in 2001.

Designers. Base Chassis
Zhytomyr Armor Plant

The BMP-1UM is a tracked, armored, amphibious, air-transportable IFV vehicle. Armed with the Shkval-A turret, it surpasses existing counterparts (BMP-2, BMD-2) in firepower by 30% and BMP-1 by 50%. Other improvements include better protection and survivability, and enhanced operational comfort for the crew and passengers. The BMP-1UM is offered as a baseline configuration for upgrading a considerable number of BMP-1 IFV vehicles in Ukrainian military service.



Protection

Applique ERA plates will be loaded with shorter-length ERA elements "Nizh" or "Nizh-L" or "Raketka" developed specifically for the application on light armored vehicles – Kyiv-based Base Center for Critical Technologies "Microtech"

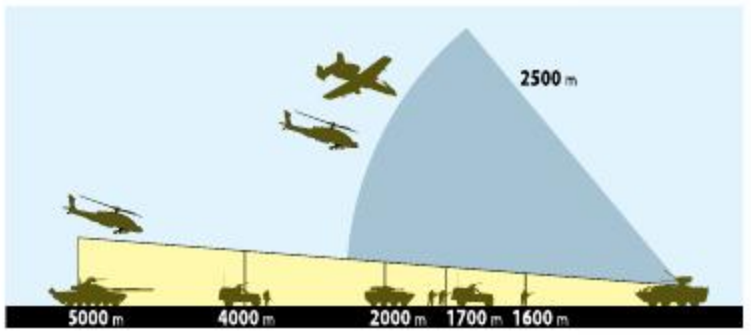
Two-part exhaust gases deflector

Deflects exhaust gases downward, thus reducing the chances of thermal infrared detection

Side skirts

Steel skirts fitted to the sides of the hull have increased water-displacing capacity as compared with those found on the original BMP-1, improving the vehicle's amphibious capability and adding protection to sidewalls of the hull

2,85 / 2,94 м – Seating capacity



SA, Targeting and Weapons Control System Tandem-2 (Chernihiv-based CheZaRa)

Integrates TV and infrared cameras and an electro-optical sensor module into a single system to provide day/night target detection and weapons control capabilities. In natural night conditions, it has the detection range of an MBT-size object of 1,000 meters or longer. A PZU-7M optical iron sight can be used as a backup sight.

Turret Weapons Module
Kyiv-based Artillery Design Bureau

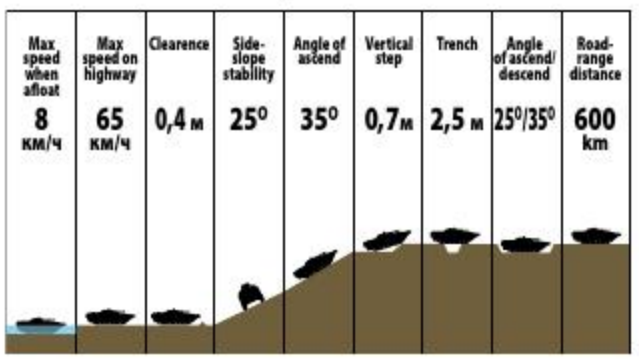
KBA-105TB "Shkval-A" Weapons Turret Module

The one-man turret accommodates a ZTM-1 30mm cannon, a KT-7.62 7.62mm coaxial machine gun, an AG-17 30mm automatic grenade launcher, and a Barrier anti-tank missile launcher

SN-3003 Basalt Satellite Navigation Support System

provides the capabilities for determination of position, measurement of current geographical coordinates, route calculation with multiple waypoints displayed on an electronic map (with a route deviation control capability), and real-time position tracking of and coordination with slave vehicles.

Maneuverability



600 km – Road-range distance with the main fuel tanks

Engine

400 hp 3TD-2 diesel engine produced by Malyshev Plant is used in place of the original 300hp UTD-20 six-cylinder four-stroke diesel engine seen on the baseline BMP-1 IFV vehicle, enabling enhanced maneuverability on a variety of terrains

13,6 t Gross vehicle weight

Hatches

Roof hatches over the troop compartment and the rear turret can be fixed toward each other while open, providing a protected space that the turret operator can use for dealing with weapons stoppages and reloading the ATGM launcher

Rear ramp

A rear-mounted wide ramp can be seen in place of two outward opening doors in the BMP-1, providing advantages in terms of troop egress/ingress while on the battlefield, ease of evacuation of casualties on stretchers and loading/unloading of heavy loads

3 crew

8 passengers

SOTRUDNICHESTVO

Ukrainian Spalakh Flare Saves Soldier's Lives whilst Contributing to Victory

SPALAKH-1 FLARE MINE

www.sotrudnichestvo.eu

Ukrainian Spalakh Flare Saves Soldier's Lives whilst Contributing to Victory

There are many ways and means used to alert troops when an area has been entered. Surface flare (or flare mine) is one such and most commonly used means of detecting intruders. Perimeter-deployed flares can be used as an effective means to detect enemy intrusions into protected areas and deter the would-be attackers by letting them know they no longer can reap the benefits of surprise. A final advantage is that friendly forces, protected from surprise attacks, will be able to perform their assigned mission effectively and without undue losses.

Private-sector company ***Sotrudnichestvo***, which holds a leading position among engineer explosive item manufacturers in Ukraine, offers its flare mine product designated "Spalakh-1" (meaning "flash").

Having taken the soviet produced SM-320 signal mine as a template for developing its own flare mine system, ***Sotrudnichestvo***, in close engagement with members of Ukrainian combatant units, has developed its Spalakh-1 flare product that boasts some unique features.

Sotrudnichestvo's Spalakh-1 flare mine is distinguishable by the following product f eatures that set it apart in the marketplace:

1. Being of Polymer construction weighing 170 grams, the Spalakh-1 has a metal content of only 4.5 g, which makes the deployed mine difficult to detect even with standard metal detectors.

2. Thanks to its Polymer construction, the mine can be colored such that to be obscured against the background colors, ensuring it can be deployed covertly and discreetly. That's what makes the Spalakh-1 unique in its marketplace.

3. Optionally, the Spalakh-1 flare mine system can come complete with universal mine fuses such as MUV 1 (of tripwire or pressure type) and MUV 2 (initiated by motion sensors), also built of Polymer materials. ...

4. The Spalakh-1 is a non-lethal means of intrusion detection, and in this capacity it could be used with an eye to reducing the level of human casualties in military conflicts, and especially in the event of "intrusion" by friendly forces.

Alongside the Spalakh-1, ***Sotrudnichestvo*** offers its flare mine systems Spalakh-2 and Spalakh-3.

The Spalakh-2 is used to alert troops when an area is entered by illuminating it for a sufficiently long time so that troops could sight their weapons and prevent enemy infiltration with precision fire.

The Spalakh-3 is the Ukrainian counterpart of the Russian MSK-40 surface flare. When triggered, it ejects a bunch of audible alarm flares as high as up to 100 meters, alarming troops within a radius of at least 1,000 meters.

The Spalakh-1 flare mine has been fielded with Ukraine's National Guard forces.

User feedback suggests that flare products delivered by ***Sotrudnichestvo*** are viewed positively in terms of reliability, effectiveness and conformity to modern warfare requirements.

Sotrudnichestvo is set to help you win a victory and save your soldier's lives at that!

Sotrudnichestvo Company was founded in 1993.The Company has in-house R&D unit and tool-making facilities used in preparation for production of the products being developed. With its modern machine tool capabilities, the Company is well equipped to tackle tough technological tasks related to design of new products, manufacturing of prototypes and preparing new products for production.

Company's products are certified according to UkrSEPRO standard

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[production]

WEAPON FOUNDRY FROM THE CITY OF LION

Igor Fedyk, Defense Express

Lviv Armor Vehicle Factory (LAVF) belongs among the most stable and effective companies in Ukraine's defense industry, dealing primarily with the manufacture, maintenance and upgrading of military equipment both for the Ukrainian Armed Forces and export customers. The combination of high product quality and affordable prices has become the calling card of Lviv Armor Plant.

FLAGSHIP COMPANY OF THE ARMOR INDUSTRY

LAVF, which is incorporated with Ukroboronprom State Company, ranks among the flagship enterprises in the armor industry of Ukraine, being a specialist in repair and overhaul/upgrade of the T-72 main battle tank (MBT), BRM-1 armored recovery vehicle, IMR-2 obstacle clearance vehicle and BMR-1 mine-clearing vehicle. LAVF also has expertise in repair of MBT engines, 1A40 sighting equipment and T-72 MBT parts.

LAVF's claim on leadership in its segment is confirmed by a wide range of products manufactured and repaired, as well as stable performances. In 2015, the Company fully executed its obligations under military equipment repair

contracts from the Ministry of Defense of Ukraine.

Particularly in the third quarter of 2015, LAVF overhauled and delivered to MoD customers over five dozen military armored vehicles, including T-72 MBTs, mine-clearing vehicles and obstacle clearance vehicles, and performed repairs on MBT engines as well as TPDK and 1A-40 sighting equipment.

LAVF performs high quality repairs on an average of 18 military vehicles per month.

NOT BY REPAIR ALONE

In addition to its military equipment repair business, LAVF is also dealing with the manufacture of new and upgrade of legacy military vehicles, the Dozor-B being undoubtedly the best know product boasted by LAVF.

The Dozor-B light armored 4x4 vehicle, developed by the Morozov Engineering Design Bureau, is well armored to protect the crew, passengers and internal equipment from NRBC attacks, the effects of small arms fire, shell fragments and mine threats, precisely 7.62-mm AP bullets fired from 30 meters, and fragments of 150-mm HE shells detonated 50 meters away. Special operations units of the armed forces and internal security services can use the Dozor-B as a transport vehicle or a mounting platform for different weapons systems and military equipment.

The baseline Dozor-B design can form a basis for a family of specialist vehicles, including command vehicle, scout car and medical evacuation vehicle, as well as a mobile platform for antitank weapons or a fire support squad armed with 120-mm mortar.

Today the Dozor-B vehicle in being produced in two configurations: armored personnel carrier (APC) and light armored personnel carrier (LAPC).

Both of the configurations are powered by DEUTZ BF 4M1013FC four stroke four cylinder turbocharged 190hp diesel engine mated to Allison LCT-1000 automatic transmission. Suspension is of independent type with A-type control arms, with torsion springs integrated with hydraulic buffers on each of the four wheels.

Baseline equipment set on both configurations includes HVAC, communications equipment, a GNSS receiver, a 6.8t self-recovery winch and a smoke grenade dispenser system.

The design of the hull allows the installation of slat armor to protect against larger caliber munitions and heavier mines. The level of additional protection will be defined by specific customer requirements.

The Dozor-B LAPC vehicle is armed with a turret-mounted 12.7-mm NSVT-12.7 antiaircraft machine gun which is aimed and fired remotely via optical monocular periscope sight with rotating head PZU-7. The Dozor-B APC features the BPU-12.7 machine gun turret. The targets that can be engaged with this machine gun turret are hostile armored vehicles as well as aerial targets (helicopters) at ranges up to 2,000 meters, at day or night. A non-stabilized turret that can run autonomously, the BPU-12.7 is controlled remotely from operator's station. Related fire control system is comprised of a color TV camera, thermal imaging camera and laser rangefinder.

The manufacturer did not disclose the estimated price tag for the vehicle, other than to say that the Dozor-B would be four times cheaper as compared to international counterparts

The Dozor-B has fully completed the State Trials process and has been approved for service use by a decision issued by a MoD and agreed with the Design-

KEY DOZOR-B APC AND DOZOR-B LAPC

SPECIFICATIONS	Dozor-B APC	Dozor-B LAPC
Dimensions	5600 x 2400 x 2700 mm	5800 x 2450 x 2700
Crew	3+6	3+7
Engine	DEUTZ BF 4M1013FC	DEUTZ BF 4M1013FC
Weight	8450±250 kg	8550±3%
Maximum Speed	120 km/h	120 km/h
Capacity of fuel tanks	146 l	180 l

FIRE FIGHTING PANZER GPM-72

SPECIFICATIONS	
Platform	T-72 MBT
Gross vehicle mass	55 t
Crew	3
Dimensions	8,265-mm x 3,560-mm x 3,900-mm
Water tank capacity	20 m3
Foam generator tank capacity	2 m3
Onboard pumping system	FPN Ziegler-6000-2H
Hydro-foam master stream	MME-100
Master stream control mode	Remote
Horizontal length of the master stream	Water stream – 100 m Foam stream – 60 m
Radio equipment	Motorola GM-360
Equipment complement	- Medium foam generator GPS-600 - Fire educator G-600 - Hand fire nozzle RS-70 - Hand fire nozzle RS-50 - Water intake system BS-125 - Three-section telescopic ladder - Self-contained breathing apparatus - Omega-S

er Organization and other stakeholder agencies.

To make the Dozor-B NATO compatible, it is set for an upgrade to be performed through collaboration with V.O.P. CZ s.p., the Czech Republic. A Memorandum of Understanding to this effect was signed in a ceremony held in last mid-December in Lviv.

The upgrade package includes, inter alia, NATO-compatible radio equipment and armor protection, as well as NATO-standard caliber armaments.

In addition to the Dozor-B armored car, LAVF offers its armored GPM-72 fire truck based on the T-72 MBT chassis, which made debut at KADEX-2014 expo in Kazakhstan. The GPM-72 has been designed to perform the tasks that include extinguishing fires of different types using water and air-mechanical foam as extinguishing agents; transporting firefighters with fire extinguishing tools to fire areas; emergency cleanup and rescue operations at arsenals, warehouses, ammunition depots and oil wells; clearance of access routes to fire areas.

The GPM-72 fire truck is fully armored, allowing it to be used in fire extinguishing operations at hazardous facilities.

"This is our recent development. Previous fire engines designed based on the T-55 MBT chassis provided a limited supply of water with which to fight the fire, and had a shorter-range deluge gun, and that was the idea that caused us to develop what is now the GPM-72", one of the design engineers has said.

The GPM-72 fire engine carries a water tank of 20+ tonnes, compared with some 9-t tank found in the predecessor vehicle, while the horizontal length of the master stream was extended from 60 to 100 meters, and per-second water consumption increased from 60 to 100 liters. What's more, the T-72 MBT platform is more up-to-date in that it allows ease of operation and is electronically equipped to enable speedier arrival at incident scenes and allow the firefighting process to be performed more effectively and efficiently.

The LAVF has launched a promotional campaign to make the GPM-72 fire engine known on potential export markets, first of all, in countries that already operate legacy inventories of tracked military vehicles supplied by Ukrainian factories.

In the vehicle repair and overhaul domain, LAFV is particularly famous for its upgrade package for the general-purpose BTS-5B prime mover vehicle.

This tractor truck is intended to operate in the frontline and recover damaged tanks from the battlefield; perform battlefield reconnaissance; recover stuck or sunk tanks; perform load carrying, excavating and welding operations, and provide technical support to armored units in the field.

The BTS-5B is similar to the BREM-1 armored repair and recovery vehicle in terms of capabilities and equipment complement, but is dissimilar in that, during upgrade, it is built on the overhauled and upgraded chassis of the T-72A MBT.

LAVF proposes the BTS-5B tractor truck both on the domestic and export markets. Particularly in 2012, 14 BTS-5B tractors were exported to Azerbaijan and, at an earlier time, to Iraq and some African countries.

It should be noted that LAVF has capabilities for upgrading foreign-built vehicles as well. U.S. Textron Systems and Ukroboronprom have agreed to establish industrial partnership to modernize U.S. HMMWVs at Lviv Armored Vehicle Factory to the Survivable Combat Tactical Vehicles (SCTV) standard with improved anti-mine and ballistic protection similar to that of MRAP (Mine Resistant Ambush Protected) protection. The total HMMWV's inventory amounts to about 280,000 vehicles operated worldwide.

The upgrade package additionally includes reinforced chassis and improved performance capabilities.

Three pre-prototypes will be built by year's end, with production set to begin in 2017. UDR

UNIVERSAL MULTIPURPOSE TRACTOR BTS-5B

SPECIFICATIONS

Platform	T-72 BMT
Mass	41 t
Crew	3
Dimensions	7,890-mm x 3,460-mm x 2,687-mm
Engine	V-84
Max engine power	840 kWt (hp)
Max road speed	60 km/h
Armaments	NSV-12.7 machinegun
Specialized equipment	- 250/25 kN/tf winch with 200 m rope; - 5/0.5 kN/tf auxiliary winch with 400 m rope - hydraulically-operated spade - hydraulically-operated 120/12 kN/tf crane; - 300 amp ESA-1 welding apparatus - 1.5-t cargo bed (1,700-mm x 1,400 mm)

COMBAT MODULE "VIY"

Remotely controlled Combat Module

Can be mounted onlight armored vehicles (LAV) such as "DOZOR-B" and intended to destroy medium armored targets, firing points, manpower and enemy air targets. LAV with CM "Viy" are designed for patrol, reconnaissance and combat missions.

CM "Viy" has a simple steel constructions without stabilization, which significantly reduces its cost. The structure of CM "Viy" is based on commander hatch of the tank T-64, which ensures the reliability of the structure of CM "Viy", simplifies the manufacture and therefore reduces its cost

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"DB "Caliber" Ltd.

+380444830379
designbureaucaliber@gmail.com

CM "Viy" SPECIFICATION:

GSh-23L specification:

CALIBER
23 mm

RATE OF FIRE
3..3400 rounds/min

MUZZLE VELOCITY
700 m/s

DESIGNED RESOURCE
4000 shots

FIRE CONTROL
electric, 27 V

WEIGHT	ANGLE OF ROTATION
50 kg	**Y:-5⁰ — 60⁰ X: 360⁰**

OVERALL DIMENSIONS (not more, mm)

Length	width	height
1387 (1537)	**165**	**168**

Tank hatch is equipped with vertical and horizontal targeting drives, bracket for mounting gun carrier and other mechanisms and electric equipment.

For storage and loading of ammunition CM "Viy" is quipped with box-type ammunition mechanism with capacity of 250 pcs of 23mm ammunition. It has a rigid welded construction and is attached to the back wall of the CM "Viy".

For collection of used cartridge belts CM "Viy" is equipped with a box type cartridge belts collector.

23 mm double-barreled aircraft gun "GSh-23L" designed for firing at air and ground targets with fragmentation high-explosive, armor-bursting and armor-piercing incendiary shells.
Automation work is based on usage of energy of powder gases. GSh-23L is equipped with a localizer, which are used for the directed removal of powder gases and reduce recoil force.

[aggression]

THE THREAT FROM CRIMEA

During two years of its occupation of Crimea Russia has explicitly revealed to both the Ukrainians and the world community that its true intentions behind the annexation of the Ukrainian peninsula were to make Crimea into a strong fortress on the Black Sea and into a base for militarily threatening the European Union countries. For the Kremlin, "protection of the Russians" has never been a priority but, rather, a pretext to secure its self-interests and satisfy imperial ambitions.

Since the first days of its military aggression in eastern Ukraine, Russia has been deliberately "stuffing" the peninsula with personnel and military equipment. While at the end of 2013 the Russian Federation had some 14,000 military personnel, over 30 warships and vessels moored at leased berths, 20 Su-24M and Su-24MR and An-26 aircraft and up to a dozen Ka-27 helicopters (based at Kacha and Hvardiyske airbases) deployed in the Crimean peninsula, those numbers increased to 24.500 military personnel, 30 MBTs, 260 armored fighting vehicles, 80 aircraft; 40 helicopters; 80 cannon artillery systems (both self-propelled and towed); 40 MLRS launcher units and 24 S-300 SAM systems as of

August 2015, according to data from the Information Resistance volunteer group.

Russian Black Sea Fleet Commander Admiral Alexander Vitko, in a statement released in July 2015, said Russia now has a self-sufficient force grouping deployed in Crimea, including newly organized coastal defense units, an anti-ship missile brigade, a logistics support brigade, air defense (SAM) and artillery regiments, an independent naval engineering regiment, an NBC regiment, two aviation regiments and others.

The Russian military authorities redeployed to Crimea a battery of Pantsir-S1 Air Defense Missile-Gun vehicles that were delivered to the Russian Army as early as a few years ago. Designed to engage aerial targets and light armored vehicles, they could also be used to target military and industrial facilities [in mainland Ukraine].

Alongside this, Russia deployed to Crimea its Bastion anti-ship missile systems that are capable of engaging different classes and types of surface ships, as well as ground-based targets. A single Bastion battery armed with Oniks anti-ship cruise missiles is able to provide cover protection to a 600-km long coastline. Having an advantage of full autonomy of combat use ("fire and forget"), not only is this missile capable of independently changing its assigned altitude and flight path, thus confusing counter measures, but it can make its active radar seeker completely mute, thereby making its detection and tracking even more difficult.

Russia deployed to Crimea its Bastion anti-ship missile systems that are capable of engaging different classes and types of surface ships, as well as ground-based targets

Russia has also redeployed to the peninsula a number of coastal defense missile systems BAL (SSC-6 Sennight) that were deployed with its Caspian Flotilla previously. A BAL missile battalion was subsequently relocated to the city of Sevastopol and included into the complement of the newly organized 15th Independent Coastal Defense Missile Brigade. With this addition to its missile component, the Russian Navy now has three fully operational BAL missile battalions, two deployed with its Black Sea Fleet and one with the Pacific Fleet. (The BAL, designed for ensuring territorial waters security, is a vehicle-based system carrying Kh-35/Kh-35E and Kh-35U/Kh-35UE anti-

ship missiles (ASM) housed in storage/transport-launch canisters. Kh-35E and Kh-35U missiles have effective ranges of 120 km and 260 km respectively, and can be fired at a rate of 3 seconds between launches, from distances no longer than 10 km off the coast.

Unconfirmed reports have it Russia also deployed to Crimea a battalion of Club-K cruise missile systems. The container-looking weapon system can be fired from a container ship, a train cart, or a container truck. By appearing externally as a simple container, the Club-K (known by NATO as the SS-N-27 "Sizzler") can be positioned covertly, ready to unleash a surprise attack, probably firing simultaneously from more than one container. It can destroy both sea-based and ground based targets from ranges up to 300 km.

What's more, the Russians reinforced the Peninsula's defenses with batteries of S-300 SAM systems which are capable of intercepting and destroying aerial as well as space-based targets.

Finally and most importantly, the Kremlin is looking to deploy a Tu-22M3 strategic bomber regiment and other aircraft units to Hvardiyske airfield 18 km north of Simferopol, and to make upgrades to the already deployed inventories of combat aircraft, including Su-27 fighters, Tu-142 and Il-38 antisubmarine warfare patrol airplanes as well as Ka-27 and Ka-29 helicopters, this all scheduled for 2016. The planned deployment of Tu-22M3 aircraft is perhaps most worrying given its operational radius of approximately 2,400 km and the ability to carry Kh-22 cruise missiles that can fly to 500 km at 4,000 km/h as well as Kh-15 missiles that are capable of speeds of up to 6,000 km/h and operational ranges of up to 250 km. Both missiles can carry nuclear warheads. The combat range of and the range of cruise missiles carried by the Tu-22M3 bomber effectively give it the ability to attack targets anywhere in Europe.

Russia has also redeployed to the peninsula a number of coastal defense missile systems BAL (SSC-6 Sennight)

If the rumors were true that Vladimir Putin, in August 2014, approved the deployment of short-range nuclear capable Iskander missile systems to Crimea, this would make Ukraine and Eastern European countries several times more insecure, given that the Iskander can effectively engage weapon emplacements, missile defense and air defense infrastructures, airplanes and helicopters on ground, command posts and communications nodes, as well as high value civilian targets at ranges up to 500 km. It's anyone's guess which of the Iskander modifications Moscow is going to deploy to the peninsula, but we should not exclude that this might well be the Iskander-K version that fires R-500 cruise missiles. The R-500 is autonomously guided up to impact, and it has the capability to follow the curvature of the terrain while flying at extremely low altitudes. This, combined with its ability to deliver its lethal payload to a 2,000 km range, makes it a potential threat to Western European countries.

The deadly combination of Tu-22M3 missile carrying bombers and R-500 Iskander-K short-range ballistic missiles deployed to Crimea gives the unpredictable Kremlin a powerful strike force that threatens or is likely to put in jeopardy peace and quiet of the Black Sea region and all of Europe.

The Kremlin justifies its military buildup by NATO's eastward expansion, the deployment of US missile defense batteries closer to Russian borders, NATO's redeployment of some of its military capabilities to direct vicinity of western fringes of Russia (particularly to the Baltic States), increased number of NATO military drills in Eastern Europe, and other excuses. But Moscow, however, is playing with facts when it doesn't say anything about the military threat coming from itself and is reluctant to accept that Europe is doing this all in an attempt to defend itself from perceived Russian threat. The following examples explicitly reveal which direction military aggression can be expected from, and who is really in defense.

In September 2014, Russia staged its biggest post-Soviet military drills in the Far East, dubbed "Vostok-2014," involving about 150,000 personnel, up to 10,000 AFV vehicles, over 600 fixed-wing and rotary-wing aircraft, and over 80 naval ships. In 2015, also in September, the Russian military held large-scale drills that took place at 20 sites across the country's Central Military District, involving overall

95,000 personnel, about 7,000 military vehicles, over 150 aircraft and 20 naval vessels. NATO, for its part, held Trident Juncture 2015 from 28 September to 6 November, its largest military exercise ever since the end of the Cold War. The drills involved as few as 36,000 personnel from over 30 NATO and partner nations, spanning Western and Northern Europe, the Mediterranean Sea, the Atlantic Ocean and Canada.

WHERE IS THE THREAT REALLY COMING FROM?

This all is taking place at the time when Russia has done virtually nothing to improve the lives of average civilians in Crimea and to turn the peninsula into a "Russian Las Vegas" dreamed of by so many Crimean residents who voted in the secession "referendum" in March 2014. The reality turned far worse for Russian-annexed peninsula, with roads deteriorating quickly in absence of care, and Western businesses, money and technology outflowing from the region because of Russian occupation. Well-established, long standing supply chains from mainland Ukraine that used to supply the peninsula with 80 percent of its fresh water, food and electricity needs have been disrupted. Russian authorities are grumbling that Crimea has become one of the largest recipients of the federal budget resources, with 85 percent of its budget needs being provided by the Russian government, as Novaya Gazeta reported. This compares with Chechnya at 82 percent and 87 percent for Ingushetia, Russia's most subsidized region.

All projects aimed to make Crimea more self-sufficient in terms of budget remained unmaterialized desires with no probability of being materialized any time soon in the future. Yet military personnel are not among those neglected. A new-project garrison town is now being built for members of the Black Sea Fleet's personnel not far from Simferopol. The town project takes account of modern trends in terms of the military's accommodation and housing conditions, social infrastructure, vehicles' accommodations etc, and 2,109 apartments in a newly built 50-house neighborhood in Cossacks' Bay, Sevastopol, are now ready for immediate occupation.

Kremlin is looking to deploy a Tu-22M3 strategic bomber regiment and short-range nuclear capable Iskander missile systems in Crimea

The facts therefore speak for themselves. Crimea has been made into a Black Sea fortress, and a base for westward expansion of the Kremlin's imperial ambitions and for ensuring Russian presence in the Mediterranean. The population of the peninsula, stupefied by Russian propaganda, have now returned to a Soviet-style nation for which they are so nostalgic, but the one in a far worse state than they thought and with bleak prospects for the future. UDR

MALYUK
AUTOMATIC RIFLE

MORE PRECISE
MORE RELIABLE
MORE ERGONOMIC
THAN THE KALASHNIKOV RIFLE

INTERPROINVEST

MALYUK AUTOMATIC RIFLE

The Malyuk rifle has a bullpup design. The weapon features three Picatinny-style rails for mounting a different variety of optical and mechanical devices, such as sights, grip handle, bipod etc. A quick-detachable suppressor is also available.

The magazine is mounted within a dedicated shaft, which not only facilitates better fixation, but is designed so that to allow the magazine to fall down under its own weight with a press of the release button located next to the trigger, and it is easy to load into the receiver from whatever position the shooter chooses to take.

The weapon's design makes an optimal use of the energy of the combustion gases. The barrel is cooled by air convection, resulting in a longer barrel life, which is twice that of the Kalashnikov rifle.

The Malyuk automatic rifle is designed to be ambidextrous

Parametric comparison of the Maluyk bullpup rifle vs similar-class international counterparts




Physical characteristic/ performance parameter	Malyuk (Ukraine)	TAVOR (TAR-21) (Israel)	Fort 221 (Ukraine)	AUGZA2 (Austria)
Mass without magazine, kg	up to 3.8	3.27	3.9	3.8
Full length of the rifle, mm	710	720	645	805
Length of the barrel, mm	415	460	375	508
Caliber of cartridge used	5.45x39 mm/ 7.62x39 mm/ 5.56x45 mm	5.56x45 mm	5.56x45 mm	5.56x45 mm
Firing patterns	Single-shot/ automatic	Single-shot/ automatic	Single-shot/ automatic	Single-shot/ automatic
Rate of fire, rds/min	660	750	500	600
Muzzle velocity, m/s	900 / 715 / 940	850-900	890	
Effective range of fire, m	500	500	500	
Magazine capacity, rounds	30/45	30	30	30/42
Standard sight	as required by Customer	Red-dot	Red-dot	1.5 power optical
Type of sight mounting	Picatinny (length 315)	-	-	
Underbarrel grenade launcher	Mounting possible	Mounting possible	Not available	Mounting possible

INAUGURATES

for both right-hand and left-hand shooters. The ergonomic bolt handle doesn't move when firing to preclude finger or chin injuries.

The Malyuk has had its recoil reduced by almost 50 percent as compared to that in the Kalashnikov rifle, and its design allows the key operations – unlocking, firing, removing and replacing the magazine and reloading – to be done with a single hand.

A production line for the manufacture of the Malyuk rifle has been launched at Krasyliv Assembly Manufacturing Plant, which is incorporated with Ukroboronprom (Ukrainian Defense Industries) State Corporation.

A commercial version of the weapon, that competes and even surpasses in some aspects many of the most popular domestic and international counterparts, is being prepared for production at Krasyliv Assembly Manufacturing Plant and Lviv Elektron, and anticipated impatiently by sporting and hunting gun fans.

MORTAR FIRE

Anton Mikhnenko

The ongoing military conflict in eastern Ukraine has seen large-scale use of artillery, mortar guns being particularly effective in engaging enemy forces and targets. Ukrainian companies have developed a lineup of mortar guns in various caliber sizes, leveraging the international experience and lessons learnt from Ukrainian army operations in eastern theater.

Mortar today is a smoothbore, high-angle-of-fire weapon used to engage enemy targets in defilade positions and to destroy field fortifications. Due to their compact dimensions, low weight and special nature of the tasks being dealt with, mortars are typically carried by artillery and infantry units as part of their standard weapons complement, but in modern combat environments they can be found with almost all combat capable units of ground, airborne and amphibious forces.

Mortars are grouped into five broad categories depending on the way they are transported: 1) man portable (medium mortars (wheeled) are traditionally categorized as man-portable); 2) vehicle portable (carried in a cart/carts, vehicle, or armored personnel carrier); 3) man/vehicle portable; 4) towed and 5) self-propelled (on a tracked, semi-tracked or wheeled platform).

Mortar weapons provide advantages in terms of high amount of projected firepower relative to the weight of the weapon, high enough rate of fire, relatively low weight, simplicity of construction and operation, and constant availability for use with minimal preparations. Mortar shells, due to their very high angle of flight (the tube is generally set at an angle of between 45 and 85 degrees to the ground) are able to effectively engage enemy targets concealed in natural and man-made trenches, behind escarpments on hillsides and other obstacles, without the risk of being targeted by enemy weapons.

Artillery Design Bureau (ADB), which is incorporated with Ukroboronprom State Company, developed and brought into production its 60-mm (M60) mortar and 82-mm KBA-48M mortar.

Mortar bombs, due to their lower muzzle velocity compared to heavier artillery or howitzer rounds, do not have to withstand high overloads, and they would also provide a more suitable platform for a built-in control system, which doesn't have to be made rugged and consequently more expensive.

Perhaps most importantly, as shown by warfighting experience in eastern Ukraine, mortars, being highly effective in urban and short-range engagements, remain indispensable in counter-terrorist operations.

Appreciating all the advantages mortar weapons can provide, mortar designers create new products with an eye to enhancing their capabilities in terms of versatility of use, mobility and first-round hit accuracy. A number of important tendencies are observed here:

- increased mobility of mortar crews by accommodating them on light wheeled platforms;
- ever increasing use of innovative materials in barrels and auxiliary equipment;
- mortar weapons tend to be more versatile due to the use of interchangeable barrels that can be quickly and easily replaced under field conditions;
- the use of ballistic computers enabling target coordinates to be determined with a higher precision and faster;
- reduction of exposure to external effects (such as crosswind) when firing at high angles due to the use of state-of-the-art computing technologies;
- the use of new precision-guided munitions providing a high probability of first-hit success.

Ukraine is trying to keep up with the times in this fast-paced industry. Domestic companies have developed and put into production a full lineup of mortars available in various caliber configurations.

Artillery Design Bureau (ADB), which is incorporated with Ukroboronprom State Company, developed and brought into production its 60-mm KBA-118 (M60) mortar and 82-mm KBA-48M mortar.

The 60-mm KBA-118 mortar has been designed for infantry use to engage enemy troops and vehicles. Though classed as a light mortar, 60-mm mortar still remains the most common caliber for an infantry support mortar. The weapon was used by the U.S. Army and Marines throughout WW II and during the Vietnam War, and is still used as an infantry support weapon.

The KBA-118 offers a weapon that is light, yet possesses high accuracy and firepower to provide the infantry as well as special operations forces with effective close fire support against a variety of targets at ranges of up to 1,500 meters.

At a lighter weight than U.S. counterparts, the new Ukrainian mortar will be indispensable in infantry operations.

The KBA-118 mortar made debut at Arms and Security 2013 expo in Kiev. Its construction utilizes titanium alloys, which makes it much lighter than the Soviet Army's standard 82-mm mortar while retaining technical characteristics and combat capabilities (ballistic performance, dimensions and firing range) of the mortar currently fielded with Ukrainian Army's infantry units. The rugged, KBA-118 construction is lighter weight without compromising strength or durability, this accomplished through the use of a titanium-alloy barrel (titanium is two and a half times stronger, but half as light as stainless steel). The main benefit of being lightweight is obviously the ease of transportation and the resulting gain in time needed to get the weapon ready to fire, which is not the least advantage on the modern battlefield. The use of titanium barrels can be considered as being a "pioneering" innovation by ADB.

The mortar consists of a smoothbore tube, a baseplate, a bipod, a double load prevention device, a sighting device and an ammunition allowance, and can fire NATO 81 mm rounds.

Kiev-based Mayak Factory has developed a 120-mm mortar, which is currently known as M-120-15 "Hammer". It was demonstrated for the first time at the Kiev Arms and Security Trade Fair of 2015.

Property	KBA-118	KBA-118-48M	M-120-15 «Hammer»
Caliber	60 mm	82 mm	120 mm
Max firing range	1,429 m	100-4,000 m	7,100 m
Rate of fire	20 rpm	10-15 rpm	12 rpm
Elevation	40° – 85°	40° – 85°	40° – 85°
Mass of the mortar	12.5 kg	35 kg	210 kg
Mass of HE round	1.33 kg	3.0 kg	15-16 kg
Crew	1-2	3	Up to 5

Kiev-based Mayak Factory, another company incorporated with Ukroboronprom, has developed a 120-mm mortar, which is currently known by its designation as M-120-15 "Hammer" and was demonstrated for the first time at the Kiev Arms and Security Trade Fair of 2015. The M-120-15 utilizes advanced alloy materials in its barrel construction, making it 45 kg lighter than the Soviet-era design on which it is based. At 210 kg, it has a durable barrel offering 1.5-time longer lifetime as compared with the parent design.

The M-120-15 has been developed and built using Ukrainian materials and parts only.

The mortar features the MUM 706M sighting system and a double load prevention device in its front barrel. It can fire any of the HE rounds used in 120mm mortars.

The M-120-15 completed its field testing in late 2015 and early 2016, with initial delivery scheduled for February 2016.

Keeping pace with current trends, Kiev Armor Plant, which is also incorporated with Ukroboronprom, developed its BTR-3M2 APC upgrade equipped with a 120-mm mortar and the 12.7-mm NSVT machine gun.

News about the development of a 120-mm mortar for application on upgraded BTR-3 armored personnel carrier broke in 2011. In November 2013, the first BTR-3M2 upgrade performed a live fire demonstration at a training range. Having completed its trials successfully, it was exported to Thailand under a contract signed with Ukraine's government, with four vehicles delivered in 2013 and two in 2014.

In July 2014, the BTR-3M2 APC vehicle was demonstrated to top Ukraine government leaders at the National Guard's training center, and Roman Romanov, CEO of Ukroboronprom announced the BTR-3M2 self-propelled mortar ready for production and subsequent delivery to defense and national security customers in Ukraine.

Kiev Armor Plant developed BTR-3M2 APC upgrade equipped with a 120-mm mortar and the 12.7-mm NSVT machine gun.

It is noteworthy that the 120-mm mortar was designed with account taken of ample choice of ammunition options available in Ukraine, including particularly an indigenously developed laser-guided ATG missile.

As seen from the above, Ukrainian companies can offer a wide range of mortar weapons in different calibers and with different capabilities to meet the most demanding customer needs. JDR

[aviation

Igor Fedyk, Defense Express

NEW PROSPECTS FOR

2015 was a landmark year for the Ukrainian aircraft industry leader, Antonov, which became a part of SC Ukroboronprom. The Company has unveiled its most recent developments, including the An-178, An-148-300MP and An-132 airplanes, which have already found potential customers.

The latest development by Antonov Design Bureau – the An-178 military transport aircraft – was unveiled on 16th April 2015, and made its maiden flight on 7th May. Inauguration ceremony for the An-178 took place at Gostomel airfield, near Kiev; after about an hour in the sky, the airplane made a successful landing.

Antonov estimates the current market for An-178-class airplanes at 380 units. By developing the An-178, the Ukrainian firm decided to fill the market niche for transport aircraft with a payload capacity of up to 18 tons, which effectively remains unoccupied today.

The An-178 is designed for transportation of medium to maximum payloads from 15 to 18 tons. This segment of the marketplace is virtually vacant thus far, except for aging or obsolete An-12 and C-160 airlifters which all need a replacement. The new aircraft can find itself in the heavier payload category than the An-74 or Europe's C-27J and C-295. The predecessor of the An-178, the An-12, has been flying for a few decades now, so Antonov will not be a newcomer to the military airlift domain.

The An-178 is propelled by two Ivchenko-Progress turbojet engines instead of four turboprops seen on the An-12. How-

UKRAINIAN AIRCRAFTS

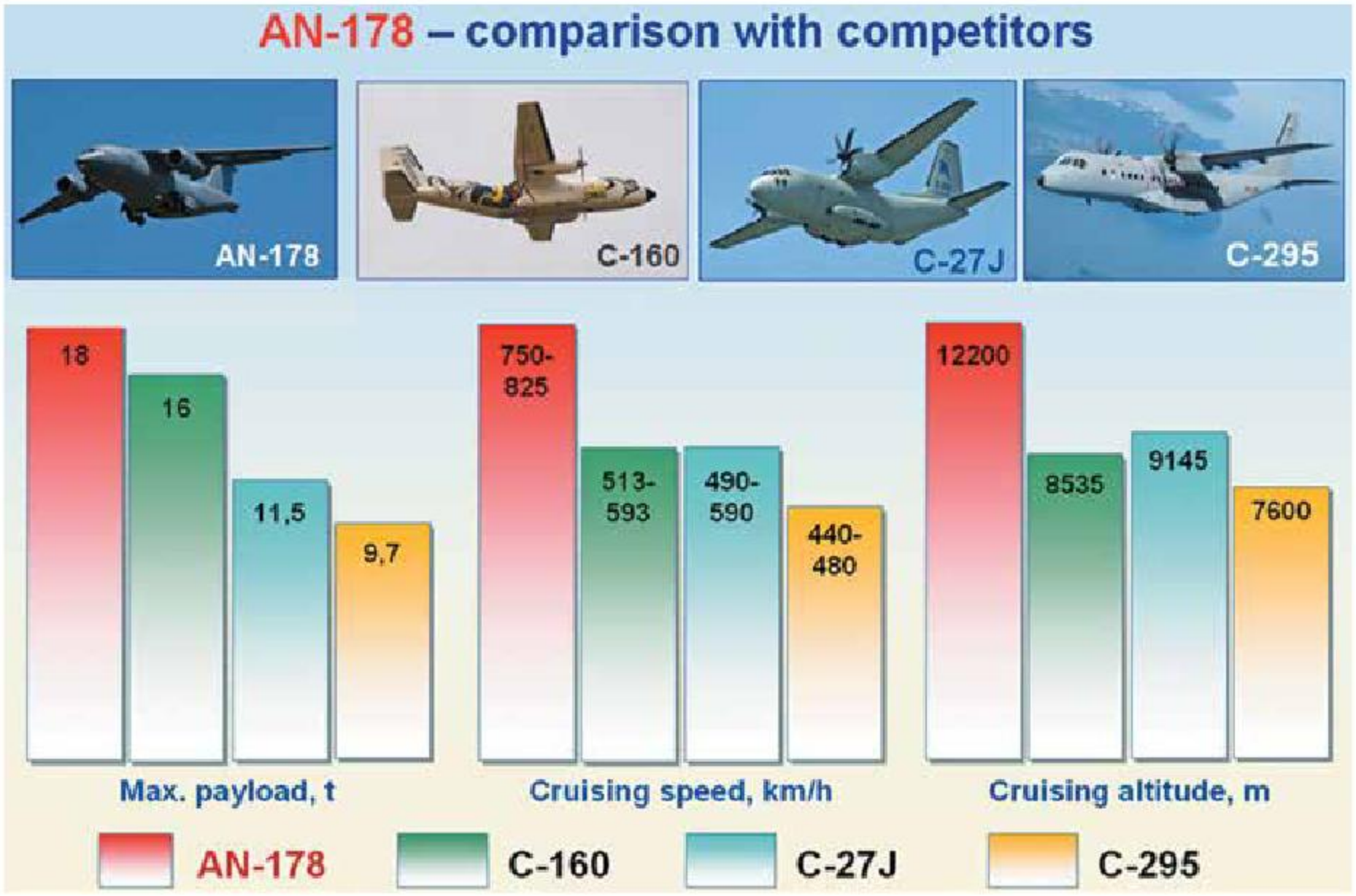
ever it will far surpass the latter in terms of fuel burn rate. The An-178 design provides the key advantages as follows:

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

The An-178 has a cargo bay cross section that is larger than that of the An-12's, as claimed by the designer. Cargo compartment floor area will amount to 40 m2 with loading ramp or 33 m2 without it, and inner volume of cargo bay with or without loading ramp will be 125 m2 and 112m2, respectively. By way of comparison, cargo bay volume makes up 110 m2 in the An-12, 65 m2 in the C-27J and only 64 m2 in the C-295. In its cross section, the cargo bay in the An-178 is 2,746mm wide and 2,750mm high, which is clearly optimized for standard 2,440 x 2,440 mm shipping containers. If compared to the An-158 on which basis the An-178 was designed, the latter will have its center wing section enlarged and expanded. This will provide enough space for three Humvee vehicles (13.3 tons), or as many Land Rover jeeps (9.7 tons), or two ZIL-131-class trucks (13.4 tons). The aircraft would allow for autonomous operation during 30 days. Meanwhile, labor intensity of maintenance personnel will be reduced substantially – down to 2.5 personnel per each flying hour – this all against the background of possible dual use as military/ commercial airlifter.

The An-178 is designed for transportation of medium to maximum payloads from 15 to 18 tons

Antonov is working on two versions of the An-178 transport: one with a side door and the other with a loading ramp.



Alternative sources of avionic equipment being considered for the An-178 include suppliers such as Honewell and Collins.

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

There are preliminary orders for some 100 An-178s, according to Dmytro Kiva, the chief designer at Antonov. Among the potential customers are Saudi Arabia and some of the Gulf states. Cargo carrier Silk Way Airlines of Azerbaijan ordered ten An-178s just on the day the aircraft made its maiden flight. There is also an agreement concluded with China on the delivery of two An-178 aircraft and the establishment of an industrial partnership for production of the aircraft in China.

The new Ukrainian military transport aircraft was inaugurated to the public at the 51st International Air Show Le Bourget 2015 in June, and raised a lot of interest among the visitors to the event.

Also at Le Bourget, Antonov unveiled its new light transport aircraft An-132 project developed for Saudi Arabia. Taqnia Aeronautics Company, a subsidiary of Saudi Company for Tech-


An-148-300MP maritime patrol aircraft


An-148-100EM medical evacuation

nological Development and Investment (TAQNIA), signed an memorandum of understanding with Antonov in May 2015 to develop and manufacture the An-132 light cargo planes in Saudi Arabia. Under the agreement, King Abdulaziz City for Science and Technology (KACST), Taqnia Aeronautics Company and Antonov will redevelop the existing An-32 aircraft to produce a new variant with improved payload, range and take-off characteristics. The program will also encompass the development of a new cockpit with state-of-the-art US-made navigation systems, which will allow the crew to efficiently operate the aircraft in adverse conditions. Additionally, new equipment and systems will be integrated into the aircraft to significantly enhance its capabilities. The new An-132 will be able to deliver payloads of up to 9.2 tons to a range of 3,175 km, at a cruising speed of 550 km/h, and it can be configured for transportation of 71 troops or 41 paratroopers. The new Saudi-Ukrainian aircraft will be powered by two turboprop engines supplied by Pratt & Whitney Canada.

Prototype production started in September of 2015, and as early as in 2017 the new An-132 is expected on display at Le Bourget. On February 21, 2016 the Antonov and Arabian company Taqnia Aeronautics inked an agreement on cooperation in producing AN-132 in Saudi Arabia. The document was signed during the international aviation exhibition AFED-2016 in Riyadh, Saudi Arabia

The An-32 platform was selected after studying the requirements of Saudi Arabia and the global market for light transport aircraft in the military and civil sectors. The light transport aircraft is primarily intended to transport cargoes, while its secondary roles will include aerial delivery of cargoes on parachute platforms, airdropping of paratroopers, medical evacuation, reconnaissance, maritime surveillance, and other military and civilian missions.

AN-132 is a new light, multi-purpose transport aircraft to be jointly developed by Antonov and Taqnia Aeronautics Company. The aircraft will be based on Antonov An-32 (NATO reporting name: Cline) twin-engine turboprop.

For its part, the Ukrainian Navy Command announced it is developing a program to modernize its aviation arm by equipping it with a new maritime patrol aircraft system based on the Antonov aircraft technology. The program particularly includes the replacement of the aging Be-12 ASW/SAR aircraft with multirole patrol airplanes An-148-300MP.

The future maritime patrol aircraft system An-148-300MP will be developed as a derivative of the An-148-300 regional jet technology for use in roles that include maritime patrol, the conduct of surface warfare, electronic reconnaissance, electronic surveillance, electronic warfare, radio intelligence, search and rescue operations.

To perform these roles, the An-148-300MP will be fitted with radar and optronic sensors for surface search, as well as windows on each side of the fuselage for visual search tasks.

The composition of the weapons package will be configured to specific customer requirements. Particularly the modification designed for the Ukrainian Navy will carry anti-ship missiles in underwing pylons.

According to Antonov, the An-148-300MP is designed to have the maximum flight duration of 10 hours, patrolling altitude of 1,525 m and patrolling speed of 370 km/h, and will be able to fly to 2,650 km during a six-hour mission.

The An-148-300MP project -which was presented by deputy chief designer at Antonov, Oleh Bohdanov at the Ukrainian-Polish forum on "Antonov Aircraft Westernization" in Bydgoszcz, Poland -- will be performed by a consortium consisting of Ukrainian and Polish companies, under the import substitution program.

The above described new Antonov products provide striking evidence that Ukraine's aircraft industry -- despite the break-up of cooperation with Russia and warnings by Russian officials about the potentially disastrous consequences of this decision for the Ukrainian aviation sector – is strong enough not only to operate sustainably, but also to produce modern, high-quality technologies. UDR

TECHIMPEX: IMPROVING

TECHIMPEX

TECHIMPEX: IMPROVING YOUR CAPABILITIES

THE SCIENTIFIC-PRODUCTION COMPANY "TECHIMPEX LTD" is a Ukrainian private-sector company that performs contracts under Ukraine's Government Defense Acquisition programs and enjoys an extensive experience in repairing and upgrading of military equipment and selling it in the domestic and foreign markets.

Founded in 2003, Techimpex has evolved from a contractor for renovation and repair of automotive, armored and engineering vehicles to a system integrator in the field of comprehensive military equipment modernization supported by the Company's in-house R&D capabilities.

Techimpex has over the past few years performed contracts for defense and security sector institutions of Ukraine involving major overhauls and upgrades on over five dozen BTR-70T, BTR-80, BMP-1, MT-LB-23-2, MT-LB-23-2, BRDM-2T, BRDM-2RH and PZM-

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YOUR CAPABILITIES

2 armored military vehicles as well as deliveries of repair and maintenance vehicles and a wide assortment of spare parts, assemblies and units.

The Company offers unique packages for upgrading Soviet/Warsaw-Pact military equipment to meet Modern Warfare standards. Particularly it offers solutions for upgrading the BRDM-2 and BTR-70 vehicles to the BRDM-2T and BTR-70T configurations respectively.

Techimpex offers upgrade packages for the MTLB and MTLBU vehicles that include the integration of ZU-23-2 air defense cannon. Enhancements include the Company's new fire control system (which is currently at the final stage of development) equipped with an automatic target tracking capability, enabling the weapon to be controlled and fired from within the armored hull of the vehicle.

Techimpex is developing an innovative sighting system for application on machineguns and air defense guns of various calibers. The system is fitted with optical and thermal imaging camera sensors to provide precision fire capability both in day and night operations.

Techimpex, leveraging its extensive expertise in the upgrade of combat equipment, has developed and built a concept prototype of an armored personnel carrier designated VARAN which it unveiled at Kyiv Arms and Security Expo – 2015. The VARAN APC is built to the same layout as modern wheeled armored personnel carriers such as Patria/Rosomak AFVs, Otocar ARMA 8x8 or FNSS PARS 8x8. The idea was to build a state-of-the-art APC with enhanced capabilities in terms of mobility, maneuverability, crew comfort and repairability to allow it to operate effectively on the modern battlefield.

Techimpex is set to develop a full lineup of vehicles based on the VARAN platform, including a C2 vehicle, a medical evacuation vehicle and an armored recovery vehicle. The VARAN APC, due to its layout design, offers a highly capable platform for conversion into a self-propelled mortar system, a fire support vehicle (armed with a domestically manufactured weapons turret accommodating 30-mm ZTM-2 autocannon, coaxial 23-mm cannon, 7.62-mm PKT machinegun, 12.7-mm NSVT machinegun and Barrier ATGM launcher in various combinations) and other configurations.

The Scientific-Production Company "Techimpex Ltd" welcomes potential customers for cooperation. Its engineering and technology capabilities coupled with broad experience and expertise will help You enhance and improve Your capabilities.

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KEYS TO THE SEA

UKRAINE WILL RELY ON DOMESTIC R&D AND MANUFACTURING CAPABILITIES TO UPGRADE ITS NAVAL FLEET WITH NEW WARSHIPS

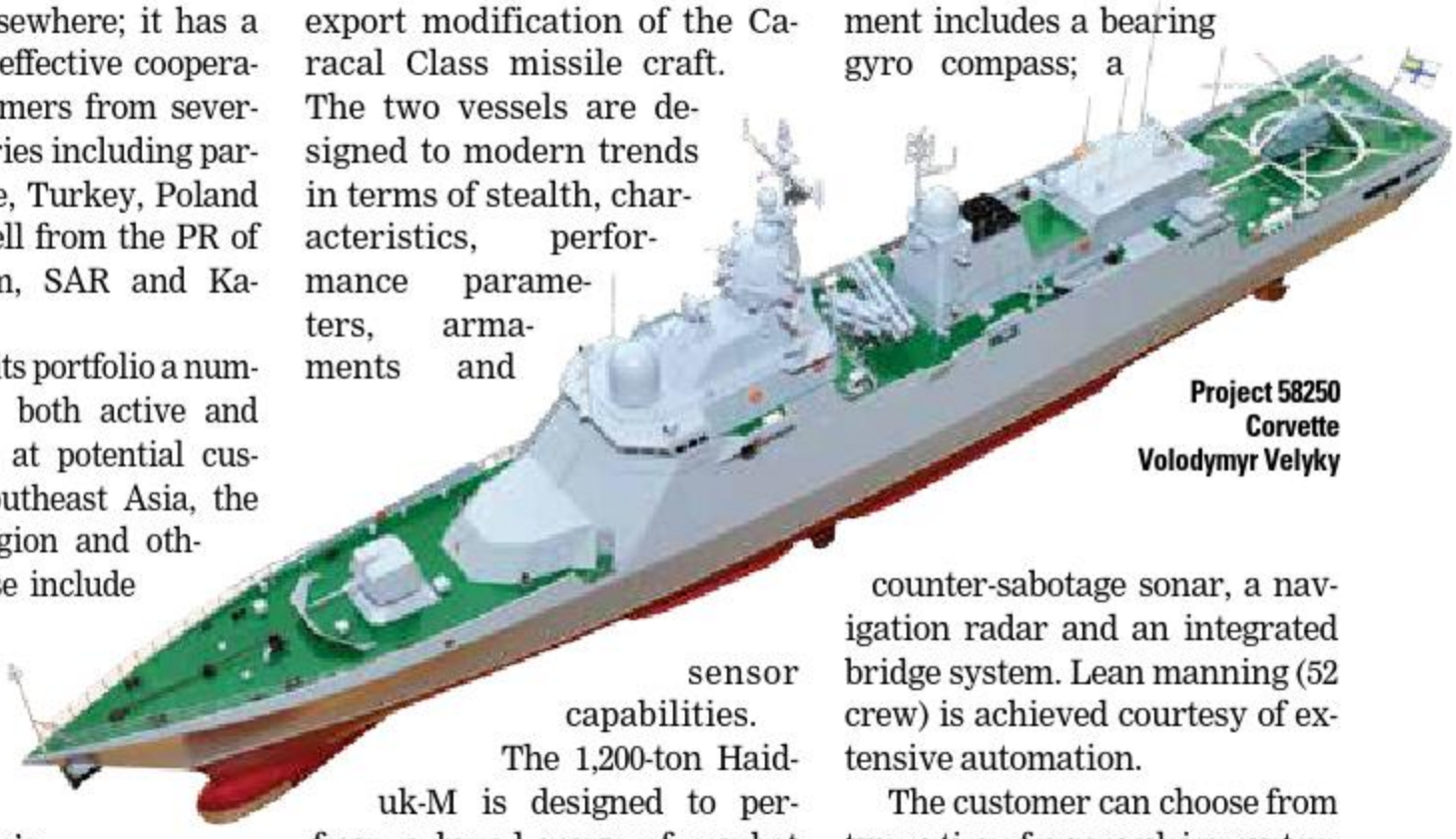
Volodymyr ZABLOCKY,
Defense Express

The 12 edition of Arms and Security trade fair that took place from 22 to 25 September 2015 in Kiev gave an insight in how Ukraine's defense industries are surviving at time of war, and what types of arms and military equipment (AME) they can offer to meet the needs of the Ukrainian military.

The core of the naval display at Arms and Security '2015 was made up of products by Mykolayiv-based Shipbuilding R&D Center (SRDC) – Ukraine's only specialist organization in the design of naval ships, boats and support vessels for Navy and Border Guard customers in Ukraine, as well as for export customers. The organization is renowned in Ukraine and elsewhere; it has a long history of effective cooperation with customers from several NATO countries including particularly France, Turkey, Poland and Italy, as well from the PR of China, Vietnam, SAR and Kazakhstan.

SRDC has in its portfolio a number of projects, both active and planned, aimed at potential customers from Southeast Asia, the Caspian Sea region and other regions. These include a 2,650-ton multi-purpose corvette (which is currently being built for Ukraine's Naval Forces); 1,200-ton Haiduk-M Class corvette; a 960-ton coast patrol ship; 680-ton Monsoon Class multi-purpose corvette; 640-ton RS655 Class multi-purpose corvette; 455-ton Caracal Class missile-armed craft; 340-ton Pearl-FAC Class missile-armed craft, 300-ton Coral Class patrol boat; 1,390-ton Triton Class medium landing ship; 700-ton Beaver-class transport and landing ship; 2,000-ton Argo-2000 Class SAR vessel; 38.4-ton Gyurza Class river-going armored gunboat; 54-ton Gyurza-M Class armored gunboat (currently under construction; two are due to be ready for commissioning with the Ukrainian Navy in 2015, and a total of nine are contracted for delivery till 2017); 54.5-ton Centaur Class assault boat (the first production boat is due for delivery in 2016), 17-ton Briz-40 Class fast patrol boat, and 900-ton towed coast guard support vessel.

At Arms and Security 2015, SRDC exhibited mockups of two of the ships listed above, which are the multi-purpose Haiduk-M Class corvette and export modification of the Caracal Class missile craft. The two vessels are designed to modern trends in terms of stealth, characteristics, performance parameters, armaments and sensor capabilities.



Project 58250 Corvette Volodymyr Velyky

The 1,200-ton Haiduk-M is designed to perform a broad range of combat missions. It is armed to engage surface, submarine, aerial and shore-base threats, with armaments that include 2x4 antiship MM40 Block 3 cruise missiles, 8x1 Mica VL vertical launch air defense missiles, a 76mm OTO Melara cannon, an Oerlikon 35mm Millenium cannon, 2 x 12.7 mm machine guns and 2 x twin 324-mm torpedo tubes, with room also provided for 2 x RBU-type antisubmarine rocket launchers. The ship has a hangar and flight deck for a single helicopter not heavier than 8,000 kg.

The threat detection and surveillance equipment includes a SMART-S Mk2 three dimensional, multi-beam naval search radar and an OTH search radar.

AAW weapons control is enabled through the use of STING EO weapon control system and the TACTICOS Combat Management System. Electronic warfare suite is comprised of a radar jammer and console, and a countermeasure system against laser-guided missiles. Other equipment includes a bearing gyro compass; a counter-sabotage sonar, a navigation radar and an integrated bridge system. Lean manning (52 crew) is achieved courtesy of extensive automation.

The customer can choose from two options for propulsion system -- a 28-knot CODAD or a 32-knot CODAG, both allowing for a cruising range of 3,500 nm at 14 knots.

Displacing fully loaded 455 metric tons, the Caracal-class fast missile boat is restricted to operations

New projects of SRDC - Multipurpose corvette "Gayduk-M"

New projects of SRDC - Fast attack craft "Caracal"

in enclosed waters such as the Caspian Sea or the Black Sea. Carrying a load of 2x4 anti-ship cruise missiles, short-range air defense missiles, a 57 mm or 76 mm cannon, and a 30 mm or 35 mm gun, it is well equipped for attacks on surface and shore-based targets and for self-defense against aerial threats.

The shipboard electronic warfare suite is comprised of a combined AAW and surface warfare radar, a long-range OTH radar, radar-optical and electro-optical gun control systems, a radar-electronic warfare system, navigation radars, an counter-sabotage sonar system and an integrated bridge system.

CODAG propulsion enables travel speeds of up to 28 knots, a cruising range of 200 nm at 14 knots and endurance of 25 days at sea. The crew is set at 35.

Also on display were products from subcontractor companies of naval equipment manufacturers – Zorya-Mashproekt (gas turbine engines), Kyiv Petrovsky Automation Equipment Factory (naval gun control equipment), Chernihiv Radio Factory (Delta-M naval radar, Katran naval weapon control system, KAU-30 naval gun system, Willow light turret weapons module) and more others.

Particularly noteworthy are products developed by Kiev-based NII Kvant as part of the Indigenous Corvette program to equip "Volodymyr the Great" ship First-of-Class (currently under construction at the Black Sea Shipyard in the Ukrainian port city of Mykolayiv). Those are Phoenix-E MPAR system, Stilet naval optical-radar tracking system, Sarmat-2 and Sens-2 small-to-media-caliber naval gun control systems, Faset naval electronic warfare system, the helicopter landing optronic support system "Saga", the IR threat detection system «Selena-X», an ECM system and a naval combat management system.

Antonov aircraft producer showcased the An-148-300MP, a version of its An-148 transport aircraft modified for offshore patrol missions. The An-148-300MP will be armed with missiles for self-defense and to enable attacks on small surface and aerial targets. Ukraine's Navy headquarters already showed an interest in the aircraft as a possible replacement for the aging fleet of amphibious Be-12 airplanes used by the Ukrainian Navy's air arm. Interest also came from Polish partners who proposed that the aircraft be co-produced or license produced in Poland.

The 3rd International Conference on "The Outlook for the Development of Weapons" took place on the sidelines of the trade fair. Naval panel discussion was concentrated around the upgrade of Ukraine's naval fleet with new warships, with time and cost risks minimized.

Speakers for both the Ukrainian Navy and industries were unanimous in holding that funds need to be found to complete the construction of first-of-class "Volodymyr the Great" corvette, which has been idle from the fall of 2014. What's more, alongside the construction of gunboats and assault craft at domestic shipyards, decisions should be made with respect to placing of orders for construction of new missile-armed boats capable of operating effectively in the Ukrainian Navy's areas of responsibility in the Black and Azov Seas.

The Navy chiefs are looking at the possibility of acquiring second hand two or three small torpedo submarines suitable for operations in an enclosed theater such as the Black Sea. They are also considering the purchase of several midget submarines and remotely operated underwater vehicles to enable a more effective conduct of military diving operations.

Navy commanders see regeneration of Ukraine's subsurface warfare capabilities as an important factor in marine warfare. But the psychological factor should not be overlooked. The presence within the Ukrainian Navy of at least a small submarine fleet capable to operate covertly throughout the Black Sea area will, to some extent, contain and constrain the enemy's superior fleet. UDR

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