

# UDR

## THE SERVICE OF «KRAZ»



# DOZOR

## UKRAINIAN LIGHT VEHICLE



### ASSAULT POWER

Mi-24G – South African and Ukrainian modernization for Azerbaijan

### MICROWAVE RAIDERS FROM UKRAINE

New advantages for self-protection means



### SARMAT

Multi-target remote weapon station





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& DISARMAMENT STUDIES**

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# UKRAINE TO STEP UP DOMESTIC ARMS PRODUCTION FOR THE COUNTRY'S OWN MILITARY NEEDS

**Ukraine will increase domestic production of arms to meet the requirements of its own military forces, the President of Ukraine, Petro Poroshenko has said as quoted by his press office.**

The State Defense Procurement Order will be fully based on the lessons learnt by the Ukrainian Armed Forces [and] National Guard in combat operations in the east [of the country],» the statement said. «There will be no more wasting of billions of people's mon-

ey, taxpayers' money on research programs that nobody needs and that have only served to the elements of theft. Today, Ukrainian production [companies] will be loaded with [orders] for precision weapons systems, Ukrainian drones, and ev-

erything that the Ukrainian army needs - from bullet-proof vests to thermal imagers,» Poroshenko said. «The Ukrainian army will be able to fight in a way that will be effective, mobile, and professional,» the head of state said.

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# SPECIAL OPERATIONS FORCE TO BE SET UP IN UKRAINE

**Special Operations Force (SOF) will be set up in Ukraine to complement the capabilities of the Ukraine Armed Forces' air, land and naval forces, the Interim Minister of Defense has said.** The move comes amid un-



rest in eastern Ukraine, where fierce fighting has continued between government troops and pro-Russian separatist groups. "The Special Operations Force will be trained in rapid response to similar attacks at the country", Mykhailo Koval said

while speaking to a celebration meeting at Ivan Cherniakhovsky National Defense University of Ukraine. The new force will be formed from personnel of some military units, Koval said, without specifying the identities of the units.

## UKRAINIAN GOVERNMENT ALLOCATES \$790MN TO ARMED FORCES

**Ukraine's Cabinet of Ministers has made Hr 9.494 billion (\$790 million) available to the military and internal security forces.**

The text of the Cabinet of Ministers decree ordering the disbursement of the funds was posted on the Government's website on 31 July 2014.

The money will pay for programs such as the purchase of housing for and one-time payments to families of military and internal security personnel killed in action; the provision of winter supplies for the military; the overhaul and acquisition of arms and military equipment.

Of the Hr 9.494 billion disbursed, Hr 8.987 billion is intended for the Defense Ministry and the rest for the Main Department of Intelligence. The latest disbursement of funds will bring Ukraine MoD's 2014 budget to Hr 30 billion (\$2.5 billion).

## EMBARGO ON DELIVERIES OF PRECISION WEAPONS TO UKRAINE LIFTED

**Advisor to the President of Ukraine Yuriy Lutsenko informed on the air in TSN news that the embargo on the delivery of precision weapons to Ukraine had been lifted.** Lutsenko did not answer the questions on whether weapons could be supplied to Ukraine in the shortest time. He just said that it was a secret information and this question must have been addressed to the Ministry of Defence rather than a civilian citizen like himself.



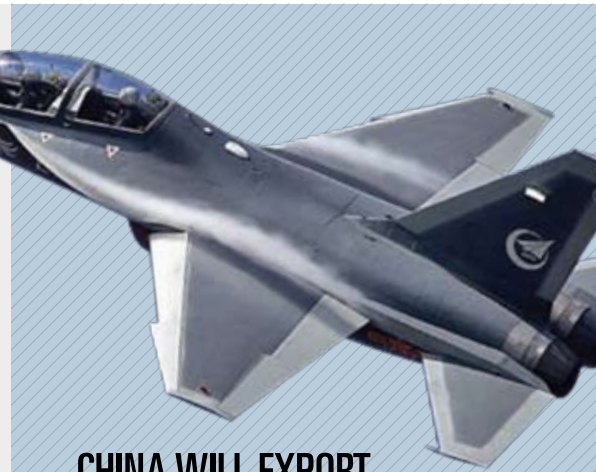
# UKRAINE CAN OBTAIN U.S. ALLY STATUS WITHOUT NATO MEMBERSHIP

**The U.S. Congress passed in two readings the draft law on the prevention of Russian aggression, according to which the Republic of Moldova, Ukraine and Georgia are granted the status of the U.S. allies without the membership in NATO.**

The draft law is passed over to the specialized commission for preparing it to be adopted in the final reading. The draft law provides for granting the status of an ally without NATO membership for the whole period while each of these countries will meet certain criteria with the view of transfer or potential transfer of defence systems and defence services. The draft law recommends the U.S. President Barack Obama to increase U.S. military cooperation with the Armed Forces of Ukraine, Georgia, Moldova, Azerbaijan, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro and Serbia, and strengthen the assistance of the United States and NATO in providing the security of these countries. In addition, the draft provides for amendments

to the law on natural gas in order to implement emergency procedures for the approval of natural gas exports to members of the World Trade Organization, and encourages the United States Agency for International Development (USAID), the Agency for Trade and Development, Overseas Private Investment Corporation (OPIC) and the World Bank Group to support assistance to Ukraine, Georgia and Moldova in the exploitation of natural gas, oil, and the development of alternative energy sources.

The document prohibits all federal departments and agencies to take any actions aimed at recognizing the sovereignty of the Russian Federation over the Crimea, or any other provision of support to the illegal annexation of the Crimea by the Russian Federation. In addition, recommends the Secretary of State to strengthen democratic institutions, independent media, political and non-governmental organizations of the former Soviet Union and enhance educational and cultural exchange with the states of the former Soviet Union.



### CHINA WILL EXPORT 24 OF ITS HONGDU L-15 FALCON JET TRAINERS FITTED WITH UKRAINIAN ENGINES TO VENEZUELA

China's Hongdu Aviation Industry Corporation (HAIG) has signed a contract to export 24 of its L-15 Falcon jet trainers to Venezuela Air Force, HAIG said on its micro blog at Weibo.com., one of China's most popular social media websites.

Each of the aircraft will be fitted with two Ukrainian Motor-Sich AI-222-25F turbofan engines with afterburner. First reports that the Venezuelan Ministry of Defense selected China's L-15 Falcon trainers came in April 2014. During a speech to air force academy cadets in Aragua, Admiral Carmen Melendez, the country's defense minister, said that the nation has chosen to purchase L-15s from China. Melendez confirmed the plans on Apr. 4 after a meeting with President Nicolas Maduro, and said that the Venezuelan Air Force has already begun the process of importing the Chinese trainer aircraft. However, no details on the deal or specific delivery times were revealed. It is expected that the already purchased K-8W trainers will be relocated to pilot training and aircraft maintenance center at Base Aérea Rafael Urdaneta, Maracaibo (the municipality of San Francisco, Zulia State), while the L-15 Falcons would be to equip Grupo Aereo de Caza No.12 (GAC-12 - Fighter Group No.12) at the Vicente Landaeta Gil airbase in Barquisimeto, which is the location of the Venezuelan Air Force's fighter pilot school.

# UNITED STATES TO EXPAND MILITARY AID TO UKRAINE

At the request of the Ukrainian government the United States is planning to provide military and technical aid to Ukraine including weapons and military equipment in accordance with the bill on the prevention of Russian aggression which has passed two Congress readings. The document was passed to the Committee on Foreign Affairs for its adoption in the final reading as stated on the official website of Congress on Thursday, July 17. As stated in the document, the U.S. President has the right to grant to the Government of Ukraine at the request of the government, as appropriate and in accordance with the capabilities

and needs of the Armed Forces of Ukraine the following defensive equipment, services and training:

- 1) anti-tank weapons and ammunition.
- 2) anti-aircraft weapons and ammunition.
- 3) vehicle installed arms and ammunition.
- 4) Small arms and ammunition, including pistols, submachine guns, assault rifles, grenade launchers and sniper rifles.
- 5) armoured vehicles.
- 6) high mobility multipurpose wheeled vehicles.
- 7) inflatable boats.
- 8) vests and so on.

# ANTONOV COMPLETES FUSELAGE ASSEMBLY OF FIRST AN-178 MILITARY TRANSPORT AIRCRAFT

On 29 July 2014, fuselage assembly of the first An-178 medium transport aircraft was completed by Antonov State Enterprise, the company's press-service reports.

"Now final assembly of the aircraft will start: mating of major airframe components (wings, empennage, pylons, nacelles, etc.), installation of aircraft systems, testing of aircraft equipment and preparation of the aircraft for its maiden flight and certification testing. A special aspect of this project is that it was carried out using paper-free technique during design and production of the aircraft. The technique employs state-of-the-art PLM software NX/TeamCenter comprising electronic annotated 3D models, which helped shorten development time and labor intensity of design, production and assembly of the first prototype", - the company said.

The An-178 is a new member of An-148/158 family (passenger air-



craft of the family are able to carry from 68 to 99 passengers). The jets demonstrated good performance during operation under various climatic and weather conditions, on unpaved and high-altitude airfields.

"The An-178 will perform with success all the tasks a military trans-

port aircraft is supposed to perform, including the provision of military logistic support, cargo and personnel airdrop, medevac operations, air transportation of light vehicles, and the delivery of equipment and engines. Moreover, the An-178 is unique in that it can carry palletized or con-

tainerized loads of all categories existing in the world, including large 1C shipping containers, Antonov said.

Antonov expects the An-178 to replace older types including the popular An-12 as well as the C-160, of which 1,400 and 200 units were built respectively.

## 'MOTOR-SICH' TO DELIVER MI-2MSB HELICOPTERS IN 2015

**'Motor-Sich' is to supply first Mi-2MSB helicopters under Ukrainian state orders in 2015.** «The volume of the order will depend on the available budget resources. According to our estimates Ukrainian state customers need the minimum of 50 upgraded Mi-2MSB helicopters,»

said representative of the company. According to him 'Motor Sich' plans to supply upgraded Mi-2MSB helicopters initially to Ukrainian customers only. «First of all these will include the military authorities and state emergency service, possibly the Ministry of Health. We have not considered commercial orders,» said

manager of the company. The Mi-2MSB helicopter is powered with upgraded fuel-efficient engines AI-450M with take-off power up to 465 hp created jointly by Motor Sich JSC and SE Progress Ivchenko, new avionics and advanced control system. During the meeting with journalists dedicated to the first

flight of Mi-2MSB, CEO of 'Motor Sich' Vyacheslav Boguslayev noted that work on the development of Mi-2MSB modification had been completed in a record-breaking time. «What we have got today is virtually a new helicopter with new performance characteristics: lower noise level, which is very im-

portant for operation in European countries, higher lifting capacity and fuel efficiency.» The price of an upgraded helicopter accounts for USD 4.5 million while the brand new helicopter costs USD 15 million. Mi-2MSB can operate as a patrol, rescue, ambulance and military helicopter.



## BLIK-2 WEAPONS STATION MAKES DEBUT AT ADEX-2014

Kiev's Armor Factory, a state company incorporated with Ukroboronprom state defense industries holding group, introduced its "Blik-2" weapon station at ADEX-2014 International Defense Industry Exhibition in Baku, Azerbaijan, Defense Express was told by Serhiy Tuzov, Marketing Director at the Factory.

The Blik-2 is an integrated machine-gun/grenade launcher turret designed to engage enemy personnel, vehicles and ground-based targets of other kinds. It is comprised of 7.62mm and 12.7mm machine-

guns, a 30mm grenade launcher and a smoke grenade dispenser system – all integrated into a single turret. The turret can also be used against aerial targets flying at altitudes of up to 1,000 meters.

The turret is controlled remotely from distances up to 50 meters. It is suitable for installation both on vehicles (wheeled or tracked) and stationary facilities. It features an optical TV sight with 47 degrees FOV. The Blik-2 weapon station has been selected to equip the 'Dozor-B' Light Armored Vehicle and other combat vehicle types produced in Ukraine.

## LVIV'S LORTA INTRODUCES NEW RADAR SYSTEM

State Factory LORTA of Lviv (a state-owned company incorporated with Ukroboronprom defense industries holding group), has designed and built a new millimeter wave radar system and introduced it at "Arms and Security 2014" Exhibition in Kiev.

Originally designed for helicopter installation for use in collision/obstacle warning roles, the radar is suitable for operation in reduced visibility environments and is capable of detecting an electricity transmission line from 300-600 meters, Dmytro Kuzminsky, director of the R&D unit at the Company, said in an interview with Defense Express.

Functionality of the new radar can be expanded to include surveillance and target acquisition. This could be achieved by way of upgrading the radar's data handling capabilities, on which LORTA is currently working in a collaborative effort with Lviv's Radio Engineering Institute. This upgraded radar could be installed onto military armored vehicles for use in target detection role, Kuzminsky said.

## ANOTHER FIVE OPLOTT MBTS BEING PREPARED FOR DELIVERY TO THAILAND

Kharkiv Malyshev Plant (KMP) will ship the second batch of five Oplot main battle tanks to Thailand by the end of September, Mykola Belov, director general of KMP, told reporters.

Production of the five Oplot MBTs is now almost completed, and deliveries under the Oplot MBT contract with Thailand, which includes 49 vehicles, will be finished by the end of 2015, Belov said, and added: "A number of the vehicles have already undergone welding work, while hulls for others are in the process of welding and mechanical treatment; so production process of the tanks is going on".





# ORIZON-NAVIGATION SHOWED OFF ITS NEWLY DESIGNED PRODUCTS

Orizon-Navigation, a state-owned company incorporated with Ukroboronprom defense industries holding group, introduced a number of its most recent designs at "Arms and Security 2014" exhibition in Kiev.

These included the CH-4004 "Karat", a rugged soldier computer designed to provide navigation and situational awareness to dismounted soldiers supporting combat operations in tough environments.

Designed as component part of a future soldier's information and navigation system optimized for dismounted C4I, the Karat would provide connectivity to the Army/Special Operations tactical C4I networks. It would improve intra-unit data communication and coordination between the dismounted soldier and his leader.

Moreover, Orizon-Navigation is currently developing an integrated personal C4ISR system comprised of a CH-3003M personal navigation device, a laser rangefinder, an electronic compass and a range of other devices. The system is now undergoing the State Trials process that is potentially leading to Approval for Service Use.



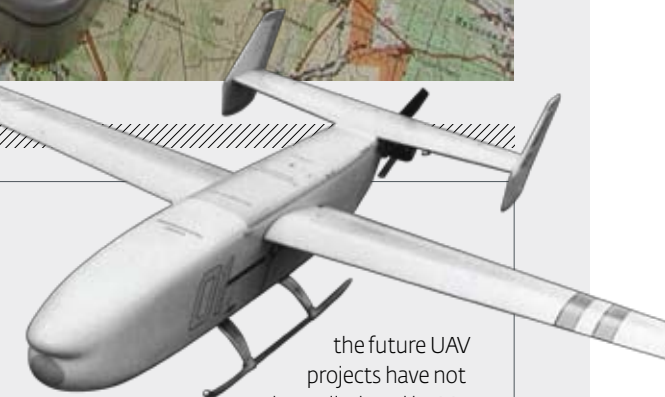
## ANTONOV PLANNING TO BUILD UAVS FOR UKRAINE'S ARMED FORCES

**State Company Antonov has addressed a letter to Ukraine's President, Petro Poroshenko, proposing that the Company launch production of unmanned aerial vehicles to**

**meet the requirements of the country's Armed Forces and the whole security sector.**

This came in an interview given by Dmytro Kiva, CEO of Antonov,

and published in "Delo" weekly business newspaper. "There is currently a broad range of unmanned aerial vehicles raging in mass from 50 kg to up to several tons. We are now working



out this initiative with the Ministry of Defense," Kiva said. Accurate details on physical characteristics or specifications of

the future UAV projects have not been disclosed by Mr. Kiva, neither did he reveal whether Antonov would engage with foreign partners in this effort, as is usual practice worldwide.



# UKRSPETSTECHNIKA SHOWED OFF ITS NEW INTEGRATED SYSTEM

At the "Arms and Security 2014" exhibition in Kiev, Joint-Stock Holding Company "Ukrspetstechnika" revealed a prototype of its integrated reconnaissance and electronic countermeasure system called "Jab", Defense Express was told by V. Kosheva, CEO of the Company.

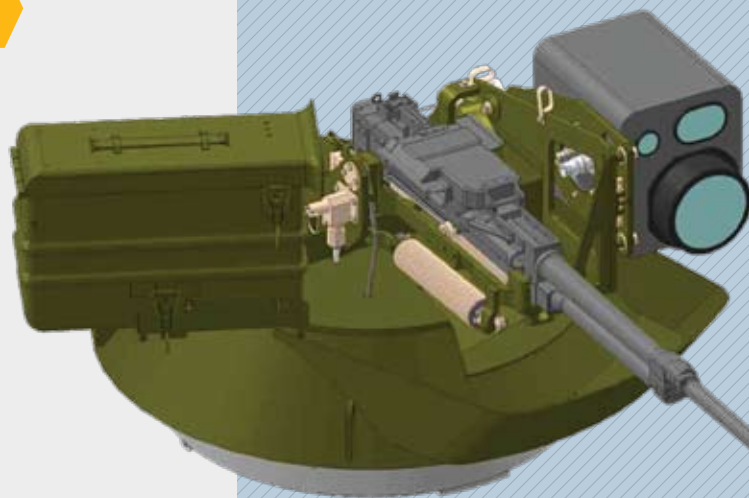
The Jab system is designed with capabilities for the detection, classification and identification of ground moving targets and slow, low flying targets, as well as for radio monitoring/interception, jamming warfare and target acquisition.

The system provides the capabilities as follows:

- Automatic detection (by a radar sensor) and the provision of geographically referenced data and detailed description (via optical sensor) of ground moving targets of all kinds;
- Detection of hostile communication/telecommunication links and radio-radar emplacements;
- Jamming of hostile communication links, radio-radar assets, GPS receivers and IED radio links

within a frequency range from 20 to 2,500 MHz.

The radar sensor is capable of maximum detection ranges of 3,000 meters for a human being and 6,000 meters for a vehicle; while the thermal imager can detect human beings out to 2,400 meters and vehicles out to 6,600 meters. The full set of the system's equipment is compact enough to fit on a single light armored car.



## MOROZOV MACHINERY DESIGN BUREAU COMPLETES DEVELOPMENT ON A NEW MACHINE GUN TURRET FOR LIGHT ARMORED VEHICLES

Kharkiv's Morozov Machinery Design Bureau has completed development on a new machine gun turret for light armored vehicles, "Ukraine Industrial" online publication reported on September 29, 2014.

The new turret was designed based on lessons learnt from recent local military conflicts as well as BTR-4/BTR-3E1 APC operations in the ongoing anti-terrorist campaign in eastern Ukraine.

The machine gun turret, which has received the nomenclature BPU-12.7, is designed to mount on light armored vehicles. 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.

The BPU-12.7 turret is suitable for installation on platforms such as Dozor-B and BRDM-2 armored military vehicles and armored vehicles based on KrAZ truck chassis. The BPU-12.7 installed on a Dozor-B armored vehicle underwent a number of tests. It has been selected for equipping the Dozor-B and KrAZ-Cougar vehicles slated for delivery to Ukraine's National Guard.

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
- Laser rangefinder

# UKRAINIAN ARMED FORCES TO GET ARMORED AMBULANCES DERIVED FROM BTR-4E APC

The health and lives of the Ukrainian soldiers supporting combat operations in the east of the country will be better protected with the delivery of the BMM-4C armored ambulance vehicles.

The BMM-4C armored ambulance, which is a variant of the BTR-4E armored personnel carrier, is slated for Approval for Service Use in Ukraine's Armed Forces after completion of the State Trials process, which is expected soon. A production line for the the BMM-4C armored ambulance vehicle, which was designed and developed by Kharkiv's Morozov Machinery Design Bureau, has been set up at Kharkiv's Special Machinery Factory (both of the companies are incorporated with Ukroboronprom defense industries holding group). The first two production-standard BMM-4C ambulance vehicles are scheduled for delivery to the Ukrainian Armed Forces by the beginning of October. Previously, BMM-4C ambulanc-



es were delivered for export by Ukroboronprom. The interior of the vehicle has room reserved for defensive weapons, stretchers, a storage container for medicines and medical items, a thermo container, and storage containers for mechanical ventilation equipment, defibrilla-

tion equipment and blood transfusion equipment. The vehicle provides reliable armor protection for the crew and patients. It is designed to support initial medical treatment and evacuation of critically wounded soldiers from the battlefield, and it can also be used for evacuation

of injured persons from disaster affected areas. The BMM-4C armored ambulance will be used as battalion level initial medical treatment vehicle. Experts estimate that armored ambulances should be available at a rate of one vehicle per battalion-size unit.

## BTR-3M2 MORTAR CARRIER READY FOR STATE TRIALS

The Ukrainian Army will have a new mortar carrier, the BTR-3M2, added to its fleet of armored vehicles.

Two BTR-3M2 vehicles will be delivered to the Ukrainian Army for State Trials in the nearest time, Roman Romanov, CEO of Ukroboronprom defense industries holding group, has said.

The BTR-3M2 was designed as a 120mm mortar carrying configuration of the proven BTR-3E1 armored personnel carrier. Like the BTR-3E1, the BTR-3M2 is an amphibious vehicle capable of water speeds of up to 10 km/h. The height of the vehicle's troop compartment was increased to make enough space for optional air conditioning



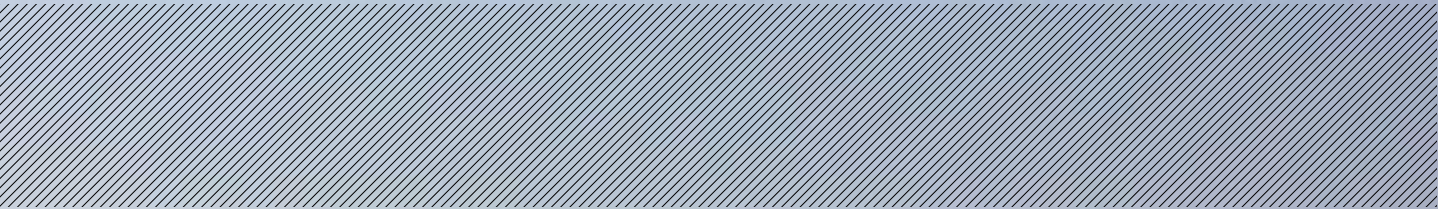
equipment for users operating in hot climactic conditions. Production-standard BTR-3M2 vehicles will equip units of the Ukrainian Army and National Guard. Previously, Kiev's Armor Plant developed the BTR-3M APC equipped with a 81mm mortar as required by an export customer.

[ hot topic ]



UKRAINIAN ARMY BEGAN TO TAKE DELIVERY OF ALL-TERRAIN WHEELED VEHICLES PRODUCED BY KRAZ PJSC

# KRAZ TRUCKS ON



# MILITARY SERVICE



Multipurpose wheeled vehicles comprise the core of tactical wheeled vehicle fleets of any armed forces in the world. As well as personnel and cargo transportation and truck trailer towing, these vehicles provide platforms for a plethora of special-purpose vehicle types such as artillery towing trucks, fuel trucks, mobile radar systems or mobile command and control centers. Chassis of multipurpose wheeled vehicles are used as platforms for different weapons systems, equipment and specialist technologies specific to individual armed services.

In Ukraine, specialist manufacturer of multipurpose wheeled vehicles is Kremenchuk Automobile Plant (otherwise known as AvtoKrAZ). KrAZ trucks for special purposes are well known in more than 40 countries worldwide; they were employed intensively in almost all military conflicts and wars of the 20th Century and the beginning of the 21st Century.

AvtoKrAZ has developed a comprehensive range of wheeled vehicles with different drive configurations, roles and protection levels. As almost 95% of the Ukrainian Armed Forces'

wheeled vehicle fleet requires overhaul or replacement with more modern equivalents, the Company created a family of trucks with 4x4, 6x6 and 8x8 wheel configurations, and payload capacities ranging from 5 to 22 tonnes. These trucks will form the core of specialist and special-purpose wheeled vehicle fleet – a move that is aimed to provide a higher level of system commonality across the country's tactical wheeled vehicle fleet and enhance combat readiness status of the Ukrainian Armed Forces.

In 2008, the Ukrainian military accepted for service use the 12t KrAZ-6322 "Soldier" 6x6 tactical truck, and, in 2011, the Ukrainian army began to take delivery of 6t KrAZ-5233VE "Spetsnaz" (or special-purpose") 4x4 tactical trucks. During pre-service entry testing held in different climatic conditions and on different roads and off-road, the all-terrain vehicle proved its ability to operate at temperatures ranging from minus 500 C to plus 600 C and at altitudes of up to 5,000 meters above sea level, as well as to cross wa-

AvtoKrAZ and Streit Group jointly developed armored personnel carriers named Cougar and Spartan, which saw their first public demonstration on 22 July 2014.

ter obstacles to a water depth of 1.5 meters, and to travel through 0.6-meter (2ft) deep snow. The Spetsnaz trucks being delivered to the Ukrainian Armed Forces come with warranty of five years or 30,000 kilometers.

The wheeled utility vehicle type most frequently delivered to the Ukrainian army is the KrAZ-6322 "Soldier" truck. This mil-

itary truck evolved from the previous KrAZ-260 model, from which it is differentiated in having a more capable engine, larger and heavier load capacity tires, as well as two 250L fuel tanks extending the vehicle's operating range to 1,400 kilometers. The KrAZ-6322 is powered by Russian YaMZ-238D eight-cylinder V-type four-stroke turbocharged diesel engine developing 330hp. The vehicle's load carrying ability was increased to 10t+ (two tons more than that of the 260 model), while maximum speed was improved to 85 km/h.

The KrAZ-6322 has a three-piece all-metal cab that is located behind the engine. The cargo platform is of metal construction fitted with rear drop side and a



removable tarpaulin with bows. Fold-back wooden bench seats are fitted for troop transportation. For improved riding ability, the vehicle has all wheel drive, while the transmission system comprises a two-speed transfer gear with a lockable central differential, and rear drive axles with interwheel differential locks.

As well as Ukraine, the KrAZ-6322 tactical truck is in military service with Iraq, Egypt, the Congo, Nigeria, Vietnam, the PR of China, Angola, Georgia, Indonesia and Azerbaijan.

The KrAZ-6322 family of all-terrain trucks includes derivatives fit-

ted with local armor protection, making these vehicles suitable for operation in high security risk environments. Available in both integral and add-on configurations, the armor protection system is certified to STANAG 4569 Level III. The KrAZ “Raptor” truck is built to survive small arms fire from any direction, as well as mine and IED detonations. There is local armor protection provided for the driver and passengers in the cab. The armor protection in the form of 10mm-thick ballistic steel plates is integral to the structure of the cab and engine compartment. Armor protection of the cab is augmented by the availability of an armored security module that has room for 20 fully equipped personnel. The module features side and rear windows for improved situational awareness. The KrAZ-6322 “Raptor” was the only three-axle truck to be able to negotiate a vertical step of

The KrAZ-5233VE ‘Spetsnaz’ truck is designed to provide transport for military personnel, special forces squads and peacekeeping troops; as well as for transportation of provisions and supplies on various on and off-road terrains. It can also be used as tow truck for artillery pieces of up to 152 caliber, freight trailers and special trailers

0.7 m during a demonstration at IDEX’ 2007 defense exhibition in Abu Dhabi, UAE.

The KrAZ-5233VE truck is designed to provide transport for military personnel, special forces squads and peacekeeping troops; as well as for transportation of provisions and supplies on various on and off-road terrains. It can also be used as tow truck for artillery pieces of up to 152 caliber, freight trailers and special trailers. The vehicle is fitted with central tire pressure inflation system for improved off-road performance while travelling over soft terrain. The vehicle can be built in right hand and left hand drive configurations to suit customer specifications. Local armor protection package is provided as an optional extra. KrAZ-5233VE trucks have already been made available to the Ukrainian MoD and Emergency Management Ministry where they are employed as platforms for various equipment and special-purpose systems.

At a defense technology exhibition in India in 2012,



AvtoKraZ unveiled an armored personnel carrier vehicle equipped with Mine Resistant Ambush Protected (MRAP) capabilities. MRAP vehicles are characterized by having large road clearance and usually have a V-shaped hull to deflect explosive forces from land mines and IEDs below the vehicle. Such vehicles can accommodate infantry units of up to squad size, providing all-round protection against small-arms threats, including large-diameter bullets. Vehicles in this category are well suited for use in counter-insurgent operations, patrol missions, convoy security missions, and reconnaissance missions. Being air-deployable by military transport aircraft, these vehicles could be used by light brigade teams for rapid troop transport.

AvtoKraZ, in partnership with Indian company SHRI LAKSHMI DEFENCE SOLUTIONS LTD (SLDSL) (Kanpur), has built a new armored KraZ-01-1-11/SLDSL truck. The designer defines the new truck as Mine Protected Vehicle (MPV) armored personnel carrier. The KraZ-01-1-11/SLDSL multi-purpose armored personnel carrier is designed to carry personnel and provide fire support, and can be used as carrier platform for various weapons and equipment. Based on the KraZ-5233-VE right-hand drive chassis cab 4x4, it is motorized by the YaMZ-238DE2 rated at 330 hp.

The KRAZ-01-1-11/SLDSL armored truck has seats for 12 personnel (2+10), the troop compartment being equipped with mine blast resistant seats. Crew members and passengers enter and exit the vehicle via two-piece rear door. The vehicle is equipped with the Rigel MK1 360° rotating turret accommodating light weapons that can include NSVT



AvtoKraZ, in partnership with Indian company SHRI LAKSHMI DEFENCE SOLUTIONS LTD (SLDSL) (Kanpur), has built a new armored KraZ-01-1-11/SLDSL truck. The designer defines the new truck as Mine Protected Vehicle (MPV) armored personnel carrier.

12.7 machine gun, PKMS 7.62 machine gun, and AGS-17 or AGU-40 automatic grenade launchers. Other weapon options are available, including a Ukrainian produced ATGM system and a remote weapon station. Eight firing ports are provided to allow rifles and other small arms to be used from within the vehicle. The KraZ-01-1-11/SLDSL standard mission equipment includes communication equipment and EO/IR camera systems for all-round day/night situational awareness.

Monocoque design, armored-plated body, double doors and side walls with hollow cavity between the walls filled with blast resistant material up to 25 mm in thickness, V-shaped three-wall hull to deflect the blast effect are provided to ensure protection from small arms and mine threats.

Indian engineers have placed armor plating around the most important truck units: cab, power plant, fuel tanks, storage batteries, transmission components and transport module. The

blast absorbing material “Thika Mineplate” filling floor and sidewalls hollow cavity walls has thickness of 12-25 mm and weight of 19 kg/m<sup>2</sup> (for 12mm-thick material), which provides a significant weight reduction comparing with same-size 6-8mm ballistic steel plates. The designer claims that armor protection of vertical walls, bullet-proof windows and engine compartment meets STANAG 4569 Level 3A (7.62 x 51 AP at 30 meters with 930/ms). Blast absorbing material “Thika Mineplate” exceeds requirements of STANAG 4569 Level 2 (6 kg blast AT mine explosion pressure activated under any wheel or mine explosion under center hull).

The KRAZ-01-1-11/SLDSL armored truck, jointly developed as private venture by the Ukrainian and Indian companies, is obviously targeted at markets in India and other countries in South-east Asia, Africa and Latin America, especially those which have large fleets of Ukrainian-built 4x4 and 6x6 wheeled off-road ve-





hicles in various configurations used for military purposes or commercial freight transportation. As well as export markets, the development of the vehicle was aimed at possible Ukrainian Army requirement.

AvtoKrAZ announced in 2012 that it had teamed up with other companies to produce new MRAP vehicles. Particularly the KrAZ ASV/APC/2013 was jointly developed with Ares Security Vehicles of United Arab Emirates and unveiled at IDEX-2013 exhibition. This multi-purpose vehicle is designed to provide personnel transport and fire support. Based on the KrAZ-5233VE 4x4 chassis, the armored personnel carrier has all wheel drive and is motorized by Russian YaMZ-238DE2 engine coupled to 9JS150TA-B transmission gearbox. The vehicle has armor protection certified to STANAG 4569 Level 2 and Level 3.

AvtoKrAZ is closely engaged with Streit Group in developing new armored personnel carrier vehicles. These include the Shrek family of mine resistant ambush

protected vehicles. The Shrek APC is offered in three configurations – the KrAZ – Personnel Carrier, KrAZ – Ambulance and KrAZ – RCV (route clearance vehicle equipped with a rake-type articulated robotic arm used for route proving). The design of the Shrek MRAP vehicle is based on a KrAZ-5233 4x4 all-terrain military truck. The vehicle features a V-shaped hull and provides B6 + / STANAG 4569 level 2 ballistic protection. It is fitted with a central tire pressure regulation system, and run-flat inserts are installed in the tires.

The KrAZ MPV TC (Shrek One) is another MRAP design, jointly developed with Streit Group of Canada. The Shrek One is equipped with advanced weapons and self-defense equipment (both active and passive).

Armor system of this MRAP vehicle provides all-round protection against Soviet 7.62x39 mm armor-piercing ammunition as well as shell splinters and grenade shrapnel. The vehicle has a V-shaped hull. It withstands blasts equivalent to 14 kg of TNT under any wheel, or 7 kg of TNT anywhere under the hull.

The KrAZ MPV is powered by a YaMZ-238D turbocharged diesel engine developing 330 hp, mated to manual 9JS150TA-B transmission. Alternatively Deutz or Cummins diesel engines can be installed. Windows are made with multilayer bullet-proof glass with a polycarbonate inner layer.

The KrAZ – RCV is used for route-proving and to dispose discovered mines, IEDs and other explosive hazards. The vehicle is fitted with a high-tech Grasping rake-type articulated robotic arm used to handle suspicious items from a distance. Crew can safely investigate anything the arm can reach out to 20 meters away. The robotic arm can manipulate payloads of up to 200 kg. Optional equipment


includes remotely controlled Air Digger and Water Disruptor.

The first 30 Shrek vehicles in various configurations have been delivered to the United Nations Organization. The vehicles are currently used in civil protection and road clearance missions in Mali and other crisis areas in Africa.

Apart from the Shrek vehicle, AvtoKrAZ and Streit Group jointly developed armored personnel carriers named Cougar and Spartan, which saw their first public demonstration on 22 July 2014.

The Cougar 4x4 APC is light armored vehicle personnel carrier that is ideally suited for combat operations in urban environments. It can be equipped with various types of weapon stations and turrets armed with 7.62mm or 12.7mm machine guns or a 40mm automatic grenade launcher. The vehicle is based on Toyota Land Cruiser 79 chassis. It is motorized with a Toyota 4.5L six-cylinder gasoline engine rated at 240 hp or a Toyota 4.5L turbo diesel engine rated at 218 hp. It has length of 5,352 mm and wheelbase of 3,180 mm, with road clearance of 300 mm. With a 180L fuel tank, the vehicle is capable of speeds up to 105 km/h (65 mph).

A well armed armored vehicle weighing almost 8t, the Spartan 4x4 APC is based on Ford F550 chassis. It is motorized by FORD V8-6.7L turbo diesel engine coupled to a five-speed automatic transmission. It has length of 6,020 mm, wheelbase of 3,576 mm, and road clearance of 510 mm. With a 257L fuel tank, the vehicle is capable of speeds up to 110 km/h (68.4 mph).

After the first public demonstration, the vehicles were sent out to rebel-held east Ukraine. Deliveries of production standard Cougar and Spartan vehicles to the Ukrainian Armed Forces will begin as soon as in August 2014. 

# KrAZ-6322 «Soldier» 6x6 tactical truck

Design  
Authority and  
Manufacturer –  
AvtoKRAZ PJSC,  
Ukraine

Year of Production entry – 1997. The all-terrain truck is designed to provide transport for military personnel, as well as for transportation of artillery systems and provisions and supplies on various on and off-road terrains. The vehicle is used as standard issue in the Ukrainian Armed Forces.

## LOAD CARRYING CAPACITY



**12,9 t**

Gross weight



**12 t**

Payload capacity



**30 t**

Permissible  
weight of the  
towed trailer

## ENGINE

The KrAZ-6322 6x6 truck is powered by Russian YaMZ-238D eight-cylinder V-type four-stroke turbocharged diesel engine developing 330hp, coupled to a 8-9-speed manual transmission.

## DERIVATIVES

- 1 – KrAZ-6322 PARM recovery vehicle
- 2 – KrAZ-6446 tractor truck
- 3 – KrAZ-63221 long-wheelbase chassis



## Cab

Of all-metal construction, equipped with heating, ventilation and air conditioning (HVAC) systems

## Seats

Fully adjustable in height, tilt and distance to the steering wheel

## Hoist winch system

Manually operated with 55 m 12 t winch cable

**\$95,000**

**Max price tag**

Unit price will range from \$60,000 to \$90,000, depending on equipment fit and the number of vehicles ordered

**6x6**  
**tactical truck**



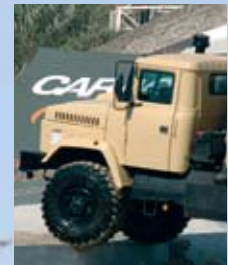


**MANEUVERABILITY**

Fording depth	Speed	Road clearance	Side slope	Gradient	Vertical step	Trench	Ascending/descending angles	Range
1,2 m	85 km/h	0,37 m	25°	30°	0,7 m	1,8 m	30/38°	1400 km

**KRAZ-6322 "RAPTOR" ARMORED TRUCK**

The KrAZ-6322 family includes variants fitted with local armor protection. Available in both integral and add-on configurations, the armor protection is certified to STANAG 4569 Level III. A KrAZ-6322 "Raptor" MTTV is shown here performing a demonstration test during IDEX exhibition



The KrAZ-6322 has two 250 L fuel tanks. Fuel consumption – 35 l / 100 km



A man in a dark suit and glasses stands in front of a large white armored vehicle. The vehicle has 'UN' markings on its side and is displayed on a metal grating floor. The background shows an exhibition hall with other vehicles and equipment.

[ direct speech ]

**G. GOUTOROV:**  
**«WE OFFER OUR CUSTOMERS  
AN EXTENSIVE RANGE  
OF ARMORED VEHICLES AND  
A FLEXIBLE SERVICE PACKAGE»**

**Products by Streit Group, the world's leading privately owned manufacturer of armored vehicles, were a special thrill of Eurosatory 2014 International Defense Exhibition where the Company unveiled a number of its latest designs developed jointly with Ukrainian partners among others. The following is an interview conducted with Guerman Goutorov, CEO of Streit Group, by Defense Express on the Company's achievements and plans for the future.**

**Mr. Goutorov, could you tell us just a few words about your company. How long have you been on the market?**

– Streit Group is, without exaggeration, one of the world's leading privately owned companies providing wheels-up construction of its own vehicles as well as up-armoring of existing civilian vehicles for law enforcement and civilian customers.

During its almost twenty years of existence, the company has significantly expanded its product portfolio to include cash-in-transit vehicles, law-enforcement and public security vehicles, personal protection vehicles and vehicles for tactical units. Across all global production facilities, Streit has the ability to manufacture over 520 vehicles per month and to deliver its products to customers in more than 100 countries worldwide.

**What did you bring to «Eurosatory 2014» defense exhibition?**

The company launched a family of armored vehicles for the transport of troops, which are primarily intended for border security, police and special operations forces. These are the

Shrek bomb disposal vehicle, the Spartan police vehicle, the Varan armored personnel carrier with a Ukrainian-built remote weapon station, the Warrior special operations vehicle and several types of armored fighting vehicles (AFV).

**How are relations with Ukraine going? What products do you make jointly [with Ukraine]?**

We have a sufficiently long history of relations with Ukraine. We have been actively engaged with PAT «AvtoKrAZ». At Eurosatory-2014 we demonstrated the Shrek vehicle which we designed jointly with AvtoKrAZ.

Shrek is a new mine resistant ambush protected vehicle. It is based on a KrAZ-5233 4x4 all-terrain military truck. The vehicle features a V-shaped hull and provides B6 + / STANAG 4569 level 2 ballistic protection. A central tyre pressure regulation system is installed in the vehicle, and run-flat inserts are installed in the tyres.

The Shrek route clearance vehicle (RCV) is fitted with a high-tech Grasping rake-type articu-

lated robotic arm used to handle suspicious items weighting up to 200 kg – from distances up to 20 meters away. Optional equipment includes remotely controlled Air Digger and Water Disruptor.

The Shrek vehicle will be available in three configurations: KrAZ – Personnel Carrier, KrAZ – Ambulance and KrAZ – RCV.

The initial quantity of 30 vehicles in various configurations have been delivered to the United Nations Organization. The vehicles are currently used in civil protection and road clearance missions in Mali and other crisis areas in Africa. I hope that orders for the Shrek will grow, as the vehicle has come out very well.

Also at Eurosatory exhibition, we showcased for the first time the Varan 6x6 armored personnel carrier. This was a new experience to us since we worked primarily with the 4x4 axle configuration previously. The vehicle, nonetheless, has come out quite well enough. Transmission and ballistic testing has been done this year. The vehicle weighs 18 tonnes and can transport pay-



loads of up to two tonnes. It can accommodate eight passengers in addition to its crew of two. The Varan has a steel monocoque V-hull that provides ballistic and blast protection up to STANAG 4569 Level 4. Installed on a KAMAZ wheeled truck chassis, the Varan is powered by a Cummins 8.9-litre ISL 400 diesel driving all six wheels through an Allison 3200SP transmission.

Streit Group will offer the vehicle in several configurations, and particularly the one with a SARMAT remote weapon station (RWS) produced by Ukraine's Luch design bureau. Partnership with that company was a new experience to us, and we hope it will be a success.

### How would you assess potential for further cooperation with Ukrainian manufacturers?

At this point, we and PAT «AvtoKrAZ» have another joint project aimed at the creation of a heavier 8x8 vehicle. In general, we are planning to set up JV production lines for both heavy and lighter armored vehicles intended for law enforcement and border protection customers and other institutions of the security sector. The JV production could be set up on the basis that we will provide the technology and the Ukrainian partner will provide manufacturing facilities. For smaller vehicles, Streit Group plans to provide repair kits. We are intending that assembly of vehicles of various configurations will be carried out precisely at PAT «AvtoKrAZ» facilities in Kremenchug. We are looking forward to future fruitful cooperation with Ukraine.

### In addition to the Varan vehicle equipped with a Ukrainian-built RWS, the ex-



One of the key objectives is to create a family of armored vehicles. For now we have armored fighting vehicles in 4x4 and 6x6 wheel variants. At IDEX-2015, we are planning to launch an 8x8 vehicle. That is to say, we are going to have a comprehensive range of wheeled military vehicles in weight classes ranging from 5 tonnes to 26 tonnes.

### hibition saw the launch of the Warrior armoured vehicle armed with Belarusian-designed remote-controlled anti-tank missile launcher system Shershen-D. What could you say about this development, and what is your outlook for this?

Our Warrior is armed with a specialist missile suite comprising a Belarus-made launcher station that fires Ukrainian-built missiles. This is a completely new solution. I hope it will sell, because it is rather unique. In road position, the missile launcher station is stored inside the vehicle. In firing position, two hatches are opened electrically on the vehicle roof and at the same time the missile launcher station goes up automatically from inside the vehicle to be placed in firing position. It takes 45 seconds to bring the launcher into firing position. The missile can engage targets at a maximum range of 5,500 meters.

The Warrior weighs 8.9 tonnes and has a payload capacity of 1.1 tonnes. It has seats for 12 personnel and a crew of two, and provides STANAG 4569 protection. The Warrior is motorized with a Ford V8 6.7l Turbo-charged Diesel engine coupled

to an electronically controlled 6-speed automatic gearbox.

### What are plans for the future of the company as a whole?

One of the key objectives is to create a family of armored vehicles. For now we have armored fighting vehicles in 4x4 and 6x6 wheel variants. At IDEX-2015, we are planning to launch an 8x8 vehicle. That is to say, we are going to have a comprehensive range of wheeled military vehicles in weight classes ranging from 5 tonnes to 26 tonnes. The next objective is expansion of markets in Asia and South America. We are planning to deal with polymers and active protection. We will further improve our vehicles, will enhance the levels of comfort and protection.

And, most importantly, I would like to conclude with a note that Streit Group has manufacturing that is sufficiently flexible. If a contract dealt with by a particular company cannot be completed on due time successfully, it would be transferred to any of the production plants we have around the world. And the fact as such that the company is privately owned allows for decisions to be made promptly, within a short space of time, and this is the approach we will continue to use in the future. **UDR**



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# SARMAT

MULTI-TARGET REMOTE WEAPON STATION (RWS)

The remote weapon station Sarmat is designed to equip light combat vehicles, small ships and coast guard boats. It is used for attacks against modern armored vehicles, both moving and stationary, as well as small targets, hovering helicopters, surface targets and enemy personnel, by day and night.

### Thermal Imager

Selex ES «SLX-HAWK» Thermal Imaging (TI) camera provides high-resolution night vision capabilities allowing day/night operation in all weathers.

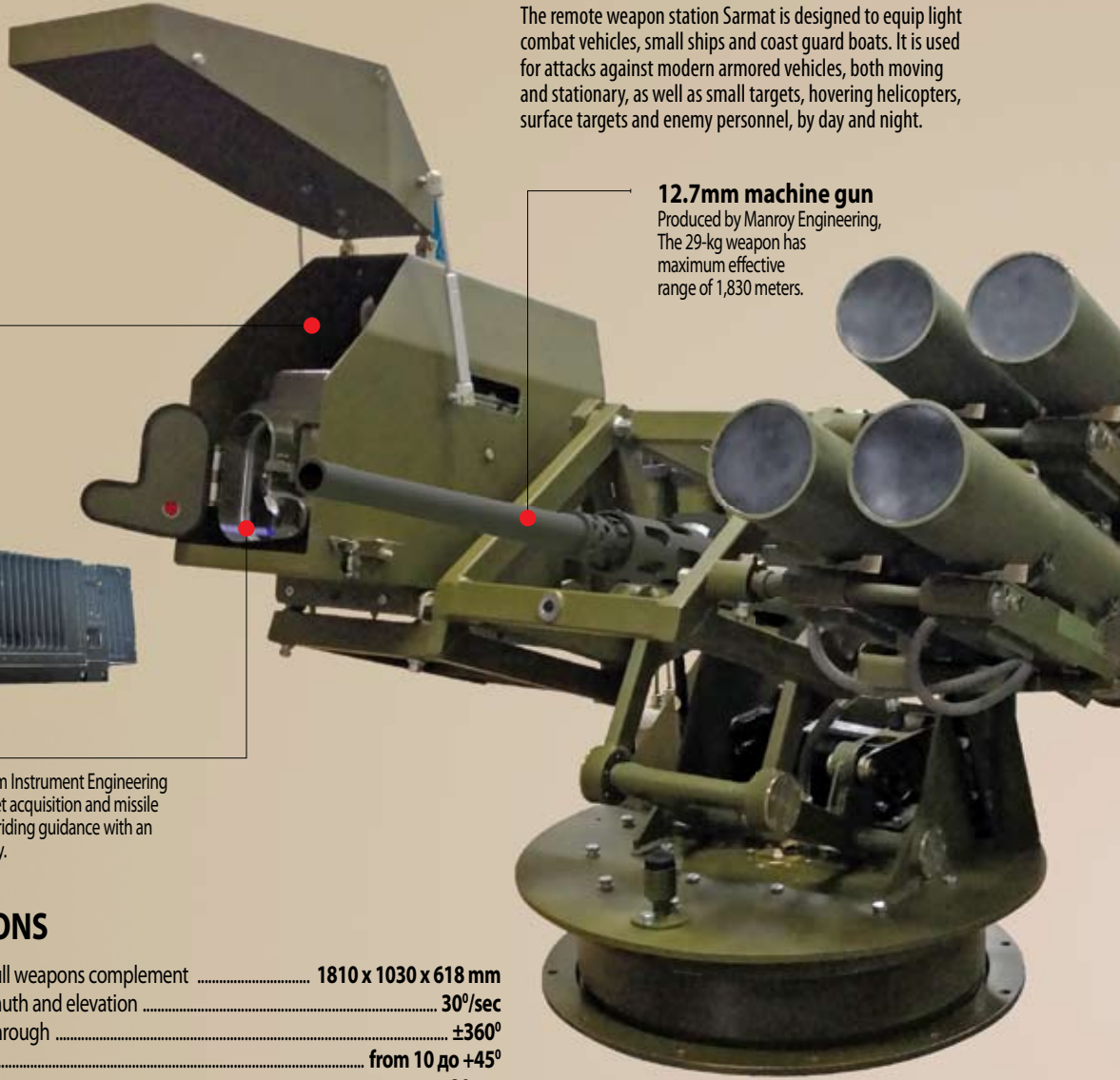


### Guidance Unit

Produced by State Company «Izyum Instrument Engineering Factory», it provides precision target acquisition and missile control in flight. It uses laser beam riding guidance with an automatic target tracking capability.

### 12.7mm machine gun

Produced by Manroy Engineering, The 29-kg weapon has maximum effective range of 1,830 meters.



## KEY SPECIFICATIONS

Dimensions of the RWS with full weapons complement ..... **1810 x 1030 x 618 mm**  
 Maximum rotation rate in azimuth and elevation ..... **30°/sec**  
 The system can be traversed through ..... **±360°**  
 and elevated from ..... **from 10 до +45°**  
 Ready to fire time ..... **20 sec**

The system comprises four RK-3 missiles and two RK-2S missiles in transport-launch containers produced by State Company Luch Design Bureau. The missiles can be fitted with warheads of various types: tandem-charge high explosive, blast/fragmentation, thermobaric or inert. With tandem-charge warhead, the RK-2S missile is able to penetrate through 800mm thick armor.

 **420** kg  
mass of module

 Design Authority  
**Luch State Design Bureau**  
(Kiev)

### RK-3



LENGTH OF MISSILE IN TLC  
**1120** mm



MASS OF MISSILE IN TLC  
**14,6** kg



ENGAGEMENT RANGE  
**2500** m



MISSILE CALIBER  
**107** mm

### RK-2S



LENGTH OF MISSILE IN TLC  
**1360** mm



MASS OF MISSILE IN TLC  
**29,5** kg



ENGAGEMENT RANGE  
**5000** m



MISSILE CALIBER  
**130** mm



ARMOR GAUGE  
**800** mm



### TLC

The missile is delivered and transported in a transport/launch canister (TLC)



### VARAN

The Sarmat RWS made debut at Eurosatory-2014 exhibition, mounted on Streit Group's Varan 6x6 armored personnel carrier. Headquartered in Canada, Streit Group has production facilities in all continents. The 18-t vehicle can carry a 2-t payload. It can accommodate eight passengers in addition to its crew of two. The Varan is mounted on a KAMAZ truck chassis. Streit Group will offer the vehicle in several different configurations, including one equipped with the Luch' Sarmat RWS.



### WARRIOR

The Streit Group's Warrior 4x4 vehicle is armed with Belarusian Shershen-D anti-tank missile launcher system that fires the Ukrainian RK-2S missile. In road position, the missile launcher station is stored inside the vehicle. In firing position, two hatches are opened electrically on the vehicle roof and at the same time the missile launcher station goes up automatically from inside the vehicle to be placed in firing position. It takes 45 seconds to bring the launcher into firing position. The Warrior weighs 8.9 tonnes and has a payload capacity of 1.1 tonnes. It has seats for 12 personnel and a crew of two.



### SKIF

The man-portable anti-tank missile system firing the RK-2S missile is available in domestic and export versions, designated Stugna-P and Skif respectively. The system is manufactured in Belarus as Shershen, firing the RK-2S missile.



### BTR-3RK

The youngest sibling in the BTR-3E1 family of Ukrainian APC's, the BTR-3RK carries a turret system with four ready-to-fire RK-2S anti-tank missiles.



### KOZAK

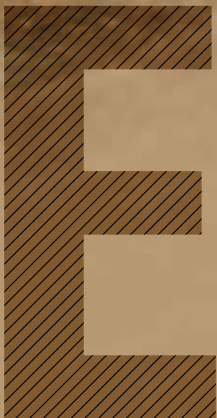
Produced by NPO Praktika of Kiev, the light combat vehicle Kozak is seen here equipped with the Skif/Stugna-P man-portable anti-tank system



[ light armor ]

# UNDER THE GUARD OF DOZOR





Engineers at Kharkiv Morozov Machine Design Bureau, which is part of the Ukroboronprom (Ukrainian Defense Industries) state-owned holding group, have developed the DOZOR family of high-mobility tactical vehicles that are intended both for civil and military applications. The civilian variant is designated DOZOR-A and military DOZOR-B.

Members of the DOZOR family are two-axis all-wheel drive vehicles based on a common 4x4 chassis. The vehicles are offered with a choice of armored and unarmored cabs incorporating many of the components and subassemblies borrowed from the BTR-80 armored personnel carrier (APC). The Dozor vehicle is motorized with a four-cylinder turbocharged IVECO diesel engine coupled to a mechanical transmission.

Options include more powerful IVECO engines developing 136 hp or 197 hp, the latter being mated to an automatic transmission. All the IVECO engines for the DOZOR-series vehicles are license-manufactured at an automobile plant in Kremenchuk.

Suspension is of independent type with A-type control arms, with torsion springs integrated with hydraulic buffers on each of the four wheels.

Wheel center members are of the same type as the ones found on the BTR-80 APC. Fuel supply system comprises two fuel tanks, with filler holes on either side of the hull. Headlights, rear taillight clusters and turn indicators are of a conventional design and, if required, can be outfitted with standard blackout devices. Optional extras include a GPS receiver, air conditioning system, night vision devices, means of communication and other equipment types.

The vehicle is available in armored and unarmored configurations, each coming with its own advantages. The armored variant, designated the DOZOR-B-1311, is intended for transportation of personnel and military provisions. It has reliable protection against small arms fire and effects of the weapons of mass destruction. Special operations forces and rapid reaction police squads can use it as a transport vehicle or a platform for a variety of weapons systems and military equipment, on the battlefield or in peacekeeping operations. The vehicle can operate over different terrain types, on highway or off-the-road.

The Dozor-B can form a basis for a family of specialist vehicles, including armored personnel carrier, armored car, NBC reconnaissance vehicle, command vehicle, medical evacuation vehicle, scout vehicle and utility automobile.

The vehicle is armed with a turret-mounted 12.7-mm KT-12.7 machinegun which is aimed and fired remotely from within the armored hull. There are some firing ports provided for the troops. The vehicle comes complete with a VHF R-173 radio with a range of 20 kilometers.

Here are key specifications of the DOZOR vehicle:



- weight in running order. **6.30 tons**
- engine power ..... **122 hp**
- max road speed ..... **90 km/h**
- fuel endurance  
(on main fuel tanks)..... **1,000 km**
- road clearance..... **400 mm**
- ascending angle ..... **30°**

dition to its crew of three (commander, gunner and driver).

The DOZOR vehicle was finalized in 2006. Since then it was demonstrated at many defense technology exhibitions in Ukraine and worldwide, but failed to generate much interest on the part of Ukraine's Minis-

The vehicle can carry a full squad of seven soldiers in ad-

try of Defense, and there were none of export contracts secured by the end of 2010 either. But now there are expectations that this situation will change.

It was reported that the Ukraine government would acquire 200 DOZOR vehicles in the nearest-term future to equip the Ukrainian Army and National Guard units. This was announced by the Ukrainian parliament speaker, Oleksandr Turchynov, during a DOZOR demonstration at Chuhuiv test and training facility in early June 2014.

The government is interested in providing the Army and National Guard with armored vehicles in this category, and induction of DOZOR-B vehicles would contribute to operational effectiveness of the Ukrainian Armed Forces while providing sustained business for the domestic defense industries, Mr. Turchynov said.

It was revealed in late July 2014 that production lines for first production-standard DOZOR-B vehicles will be launched at Lviv Armor Plant. Manufacturing development work for the new vehicle is now well un-

derway. Apart from the Ukrainian customers, expressions of interest in purchasing DOZOR-B vehicles were coming from Kazakhstan and a number of African countries.

Poland is another country that is showing practical interest in the new Ukrainian APC vehicle. In 2011, Poland's Mistra acquired production license for the DOZOR-B vehicle from a license rights owner in an unnamed EU country. It took two years for the Polish company to set up production line and obtain the requisite manufacturing facilities. The Polish version of Dozor-B, named Ocilla, is an upgrade to meet western manufacturing and quality standards as well as NATO ballistic protection requirements. Further upgrades are planned to include new driving axle, wheels and a remotely controlled weapon station in place of the one-man turret among other improvements.

A prototype up-

grade vehicle will be subjected to comprehensive testing at Military Institute of Armored and Automotive Technology in Sulejowek.

Ukrainian armored vehicle manufacturers are making great strides to keep pace with global trends. Particularly in July 2014, new armored vehicle personnel carriers SPARTAN and COUGAR, developed jointly by Streit Group (Canada-UAE) and AvtoKrAZ of Ukraine, were unveiled to the public. But this is another story which will be discussed in a later edition of Ukrainian Defense Review. 



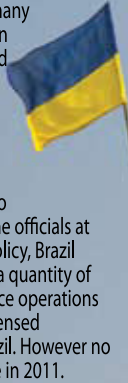
# DOZOR-B

## HIGH-MOBILITY MULTI-PURPOSE WHEELED VEHICLE



The DOZOR vehicle is designed to provide transportation for personnel and military provisions. It has reliable protection against small arms fire and NBC attacks. The vehicle is available in civil and military configurations, designated Dozor-A and Dozor-B respectively. Special operations units of the armed forces and internal security organizations can use the Dozor-B as a transport vehicle or a platform for different weapons systems and military equipment.

**P**roject on the creation of the Dozor family of multi-purpose wheeled vehicles was declared completed in 2006. Since then the vehicles were demonstrated at many defense technology exhibitions in Ukraine and worldwide, but failed to generate much interest from Ukraine's Ministry of Defense. There were none of export contracts secured by the end of 2010 either, this despite the fact that, according to statements made in 2010 by some officials at Ukraine's Ministry of Industrial Policy, Brazil expressed an interest to acquire a quantity of the Dozor vehicles for use in police operations and subsequent setting up of licensed production of the vehicles in Brazil. However no confirmation of the reports came in 2011.



### Armament

options include:

antitank guided missile system BARRIER



**16 ready-to-launch missiles**

NSVT 12.7-mm or KT 12.7-mm machine gun



**450 rounds**

AG-17 or AGU-40 grenade launcher



**87 rounds**

### Control

The Dozor APC can be outfitted with Orizon-Navigation's Bazalt-K navigation suite. The Bazalt-K is used to set tasks for slave vehicles and to control their movements



- 1 GPS/GLONASS
- 2 Vehicle-carried receivers – up to 32 vehicles
- 3 Command post equipment

### Antenna

VHF radio R-173 with a range of 20 kilometers

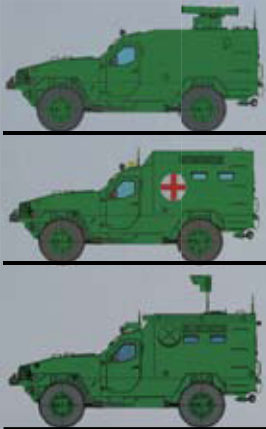
### Periscopic vision devices

for members of the infantry squad. Optional extras include night vision devices with range of 180 meters

### Firing ports

for small arms are covered with inward opening flaps

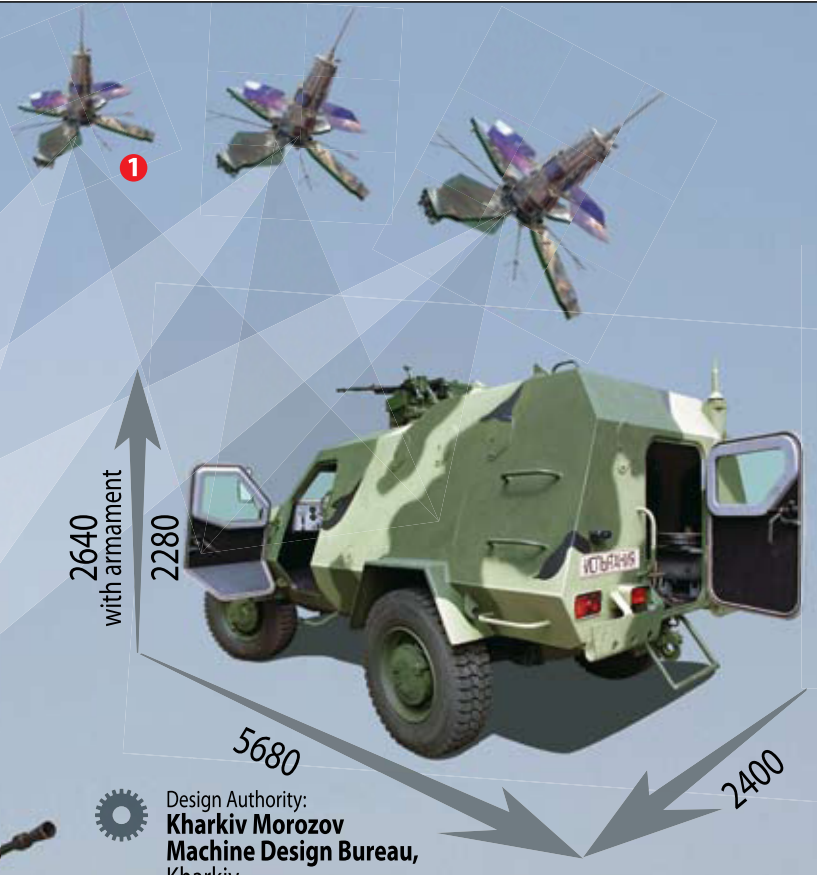
## CONFIGURATIONS



The baseline Dozor 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 mortars

### Suspension

is of independent type with A-type control arms, with torsion springs integrated with hydraulic buffers on each of the four wheels



Infantry squad



Crew



**6,3 tons**  
weight in running order – up to 8.6 tons

Design Authority:  
**Kharkiv Morozov Machine Design Bureau, Kharkiv**

### Mobility

The Dozor vehicle is air transportable in military transport aircraft such as the An-70. The choice of aircraft will depend on specific configuration and weight (which is a factor of the armor protection level) of the vehicle, as well as dimensions of the turret and other external equipment

### Interior of the Dozor-B vehicle

Fording	Max road speed	Road clearance	Side slope	Gradient	Vertical step	Trench	Ascending/descending angles	Range
1,5 m	120 KM/H	0,4 m	25°	30°	0,4 m	2 m	30/40°	750 KM

**Windows**  
of armored glass

**Powerplant**  
Engine options include 136 hp or 197 hp IVECO engines, the latter being coupled to an automatic transmission. The vehicle will come complete with a Ukrainian-built or foreign-built engine depending on customer requirements

**Lights**  
Rear light clusters and turn indicator lights can, if required, be outfitted with standard blackout devices.

### Interior of "Dozor-B"



**400** MM clearance



[ cooperation ]

# ASSAULT POWER



South Africa and Ukraine have implemented a collaborative program to upgrade the Azerbaijan Air Force Mi-24 attack helicopters to the Mi-24G Super 'Hind' standard (the G denotes the Azeri word for night – Geje). The first upgraded Mi-24 helos were demonstrated to Azeri senior officials in June 2010. The upgrades were performed by South African company Advanced Technologies and Engineering (ATE) and two Ukrainian companies – aircraft repair plant “Aviakon” in Konotop and Luch design bureau in Kiev. The Mi-24G upgrade is based largely on the ATE’s Mi-24 Super Hind Mk.4 design. It has core avionics equipment kit that is characteristic of all of Super ‘Hind’ helicopters. Borrowed from the South African Denel Rooivalk chopper, the equipment kit is comprised of an ATE-produced mission computer, a navigation system, a NVG-compatible

cockpit, as well as the Kentron Culumus Argos 550 gyrostabilized multisensor targeting and surveillance system integrating TV and IR sensors, and a laser rangefinder. The Mil-24G upgrade features a redesigned nose fuselage and cockpit re-equipped with the latest avionics. This provides advantages that include an improved field of view as compared to the original Mi-24 design; the helicopter’s center of gravity shifted rearward; improved maneuverability and easier flight control during flying around obstacles at extremely low altitudes. The new mission equipment is of lighter weight and has NVG compatibility. The cockpit equipment includes two monochrome multirole 6x8-inch flight control and data displays; a new GPS-fed Doppler navigation system; radio navigation equipment; an advanced man-machine interface; new helicopter piloting software; and helicopter in-flight monitoring equipment. The Super Hind Mk4 design

provides a significant weight reduction compared to the original design, this being achieved through the use of a modified Kevlar armor and replacing internal systems with more modern and lighter equivalents.

The Denel’s compact gyrostabilized multisensor surveillance and targeting system is installed in the nose fuselage to provide night/all-weather fighting capability. The system integrates a day TV sight, a FLIR thermal search system; a laser rangefinder and a laser beam generator to provide guidance for laser-beam-riding weapons.







The main weapon on the Mi-24 Super 'Hind' is the new Ukrainian Baryer-V ATGM system produced by Luch design bureau. It fires RV-2-type anti-tank missiles to ranges of up to 7,500 meters, and is capable of penetrating through 800mm+ core armor behind ERA protection. Azerbaijan was supposedly the launch export customer for the Ukrainian Baryer-V ATGM system. The weapon package additionally includes the GI-2 "Vector" chin-mounted dual-feed automatic cannon which can be aimed using the FLIR/TV sight, the hel-

met-mounted sight or the head-up display (HUD). The Mi-24G upgrade has provision for retaining the use of the aircraft's original 57 mm unguided S-5/S-8 rockets. For self-defense the helicopter is fitted with a programmable chaff/flare dispenser system.

The Ukrainian Ministry of Defense could potentially have interest in getting its Mi-24 fleet upgraded to the Mi-24G standard through collaboration with the SAR. But, in 2008, a contract to upgrade the Ukraine Air Force Mi-24s was awarded to Sagem of France. In De-

As claimed by Advanced Technologies and Engineering, the upgraded Mi-24G helicopter can fly at extremely low altitudes in terrain contour matching mode – a capability that was not available in the original Mi-24 design

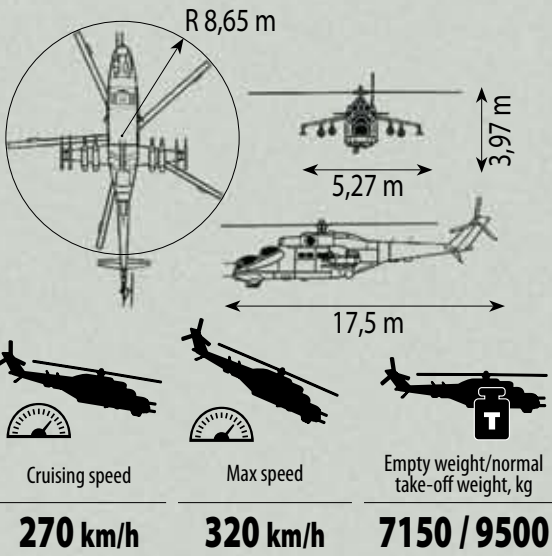
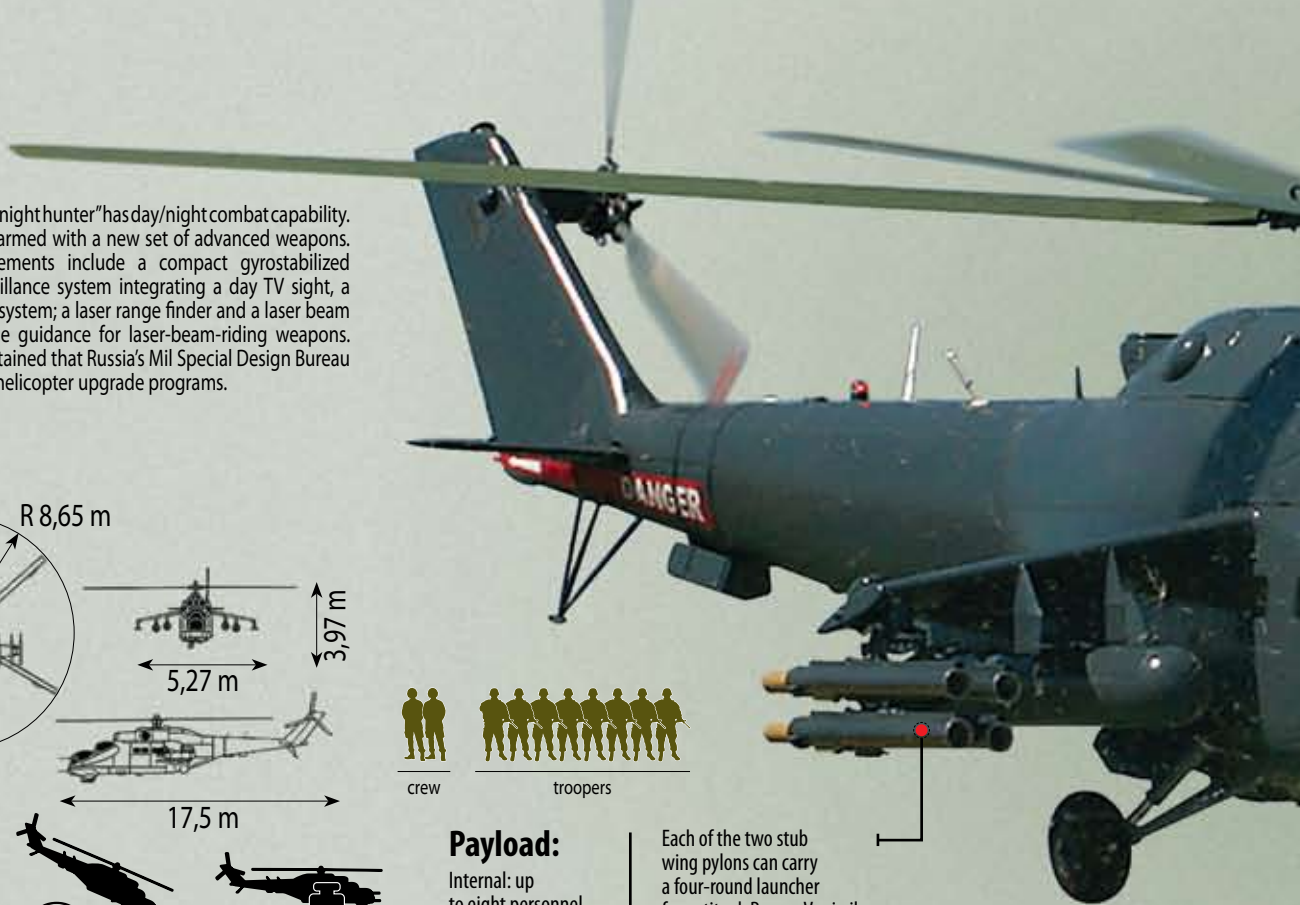
cember 2011 and in 2013 in Paris, Ukroboronprom and Sagem signed an additional agreement to that contract that would allow the project to be restarted. The Mi-24 upgrade packages offered by France and South Africa would give the aircraft generally similar performance capabilities. But what differentiates them is the fact that, by mid-2012, the upgraded Mi-24G purchased by Azerbaijan had undergone a comprehensive testing program that included firing helicopter borne weapons, and proved efficient in real-life operations. **UDR**

# Mi-24G

## UPGRADED ATTACK HELICOPTER

South Africa and Ukraine have implemented a collaborative program to upgrade Azerbaijan Air Force Mi-24 attack helicopters to the Mi-24G Super 'Hind' standard. The upgrades were performed by South African company Advanced Technologies and Engineering (ATE) and two Ukrainian companies – aircraft repair plant "Aviakon" in Konotop and Luch design bureau in Kiev.

The Azerbaijani "night hunter" has day/night combat capability. The Mi-24G is armed with a new set of advanced weapons. Other improvements include a compact gyro-stabilized targeting and surveillance system integrating a day TV sight, a FLIR thermal search system; a laser range finder and a laser beam generator to provide guidance for laser-beam-riding weapons. ATE previously maintained that Russia's Mil Special Design Bureau is assisting in Mi-24 helicopter upgrade programs.



### Payload:

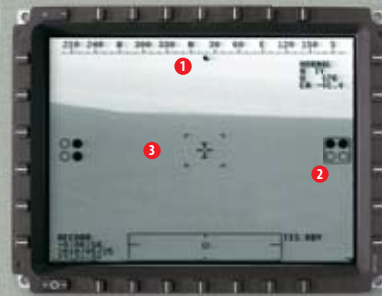
Internal: up to eight personnel or 1,500 kg of loads (max 2,400 kg);  
 External: up to 2,000 kg

Each of the two stub wing pylons can carry a four-round launcher for antitank Baryer-V missiles; Soviet-vintage unguided S-5/S-8 rockets can also be fired.



### Guided weapons

The upgraded helicopter is fitted with Baryer-V ATGM system produced by Luch Design Bureau. Using the R-2V missile, the Baryer-V will be able to defeat armored vehicles and hardened targets from ranges of up to 7,500m, with a first-round hit probability of 70% to 85%. With its tandem shaped-charge or blast/fragmentation warhead, the missile will be able to penetrate 800mm+ of core armor behind ERA. Two stub wing pylons each can carry four-round launchers for R-2V missiles, for a total of eight.



### 1 TARGET SEARCH

- 1 Azimuth scale; location of the helicopter relative to North
- 2 The black square marks the position of an active launcher system, while the black dots are for missiles ready to fire
- 3 Crosshairs of multichannel FLIR sighting system



Rotor blades are of composite material construction

**Powerplant**  
2xTV3-117V engines  
each producing 2,225 hp

Armored windows

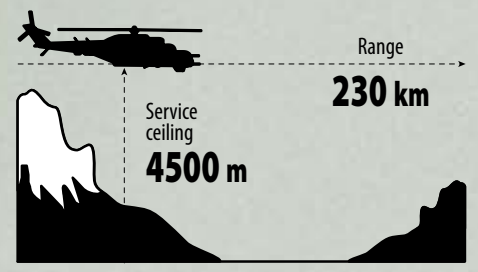
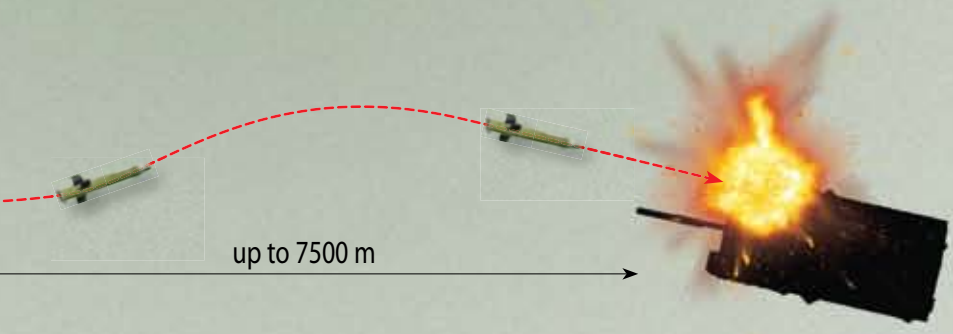


**Weapon control system**

Includes multichannel Forward Looking Infrared Radar (FLIR) with embedded laser rangefinding and automatic target tracking capabilities; a helmet sighting system (HSS) and a helmet mounted sight and display (HMSD) system.

**Cannon**

A compact nose turret accommodates a South African G1-2 "Vector" dual-feed 20 millimeter rapid-fire autocannon with 400 rounds of ammunition



**2 TARGET ACQUISITION**

- 1 View of a target locked in crosshairs
- 2 Helicopter's altitude
- 3 Range to a target



**3 MISSILE LAUNCH**

- 1 The black dot becomes transparent once the missile it marks is fired
- 2 Seconds countdown to expected missile-target impact



[ hi-tech ]

Some of the world's developed countries, realizing the promise of high-power microwave (HPM) technology devel-

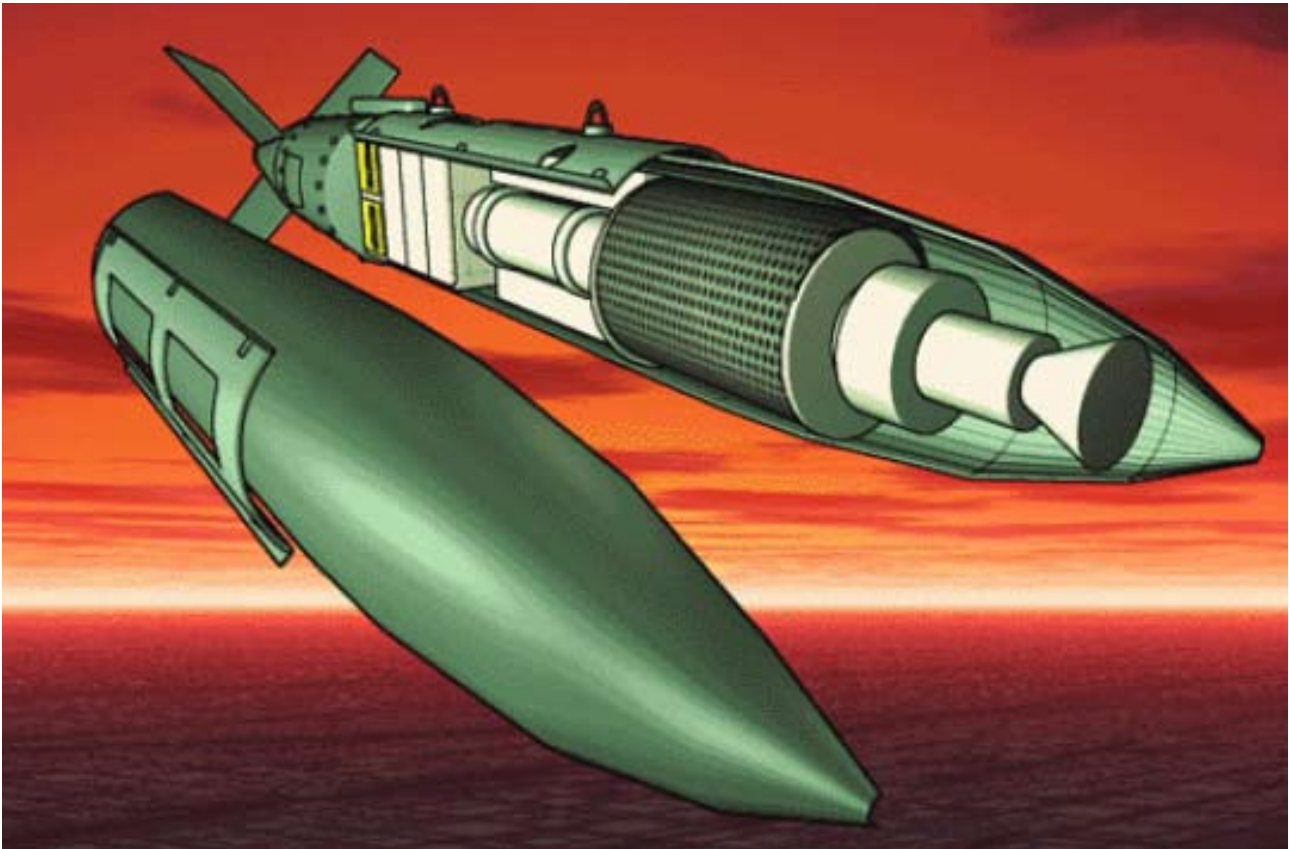
opment, have recently invested great effort and resources in developing and building such technologies and getting



# MICROWAVE RAIDERS FROM UKRAINE

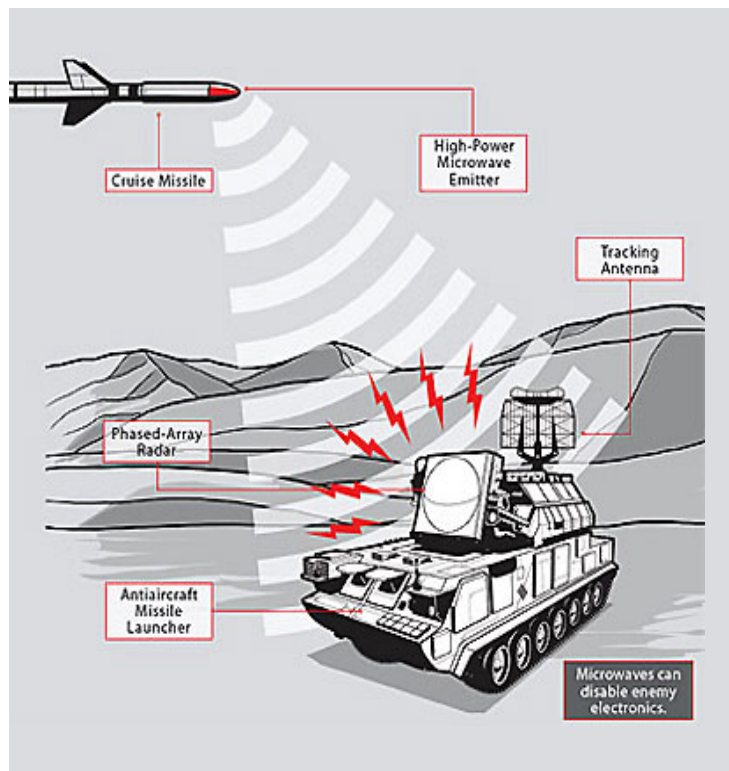
them deployed as operational weapons. However, few of the countries have been successful in bringing this promising but

technically complex type of weapons to production stage. Remarkably enough, one of such countries is Ukraine.



## MICROWAVE WEAPONS AS DISTINCT FROM ELECTRONIC WARFARE WEAPONS

The electromagnetic pulse effect underlying the functional concept of a microwave weapon (MW) is essentially an electromagnetic shock wave that affects electrical and electronic components of weapons and military equipment. HPM weapon is capable of damaging or irreversibly destroying electronic targets such as radar equipment, computers, power plants, etc. HPM weapons are commonly built as aircraft launched munitions or cruise missiles' warheads.



By changing the power, frequency and distance to the target, microwave weapons can produce effects that range from denying the use of electrical equipment to disrupting, damaging or destroying that equipment. Microwave weapon systems have the added advantage of self-protection means.

Primitive types of microwave weapons - so-called "soft" bombs - were used by the United States back during the First Gulf War and the war in Yugoslavia. Huge amounts of carbon fibers were dispersed from cruise missiles over Yugoslavian electrical distribution infrastructures, causing short circuits and knocking out that country's power grid.

A common assumption is that microwave weapons systems are similar to electronic warfare (EW) systems, but that's not so. Microwave weapons are different from electronic warfare systems on several counts. Electronic warfare systems are limited to jamming, and will affect enemy systems only when the electronic warfare system is operating. When the electronic warfare system is turned off, the enemy capability returns to normal operation.

There are several major distinctive characteristics that differentiate a microwave weapon system from an electronic warfare system. First, microwave weapons do not rely on exact knowledge of the enemy system. Second, they can leave persisting and lasting effects in the enemy targets through damage and destruction of electronic circuits, components and subsystems. Third, the

microwave weapon will affect enemy systems even when they are turned off. And finally, to counter the effects of a microwave weapon, the enemy must harden the entire system, not just individual components or circuits.

## MADE IN UKRAINE

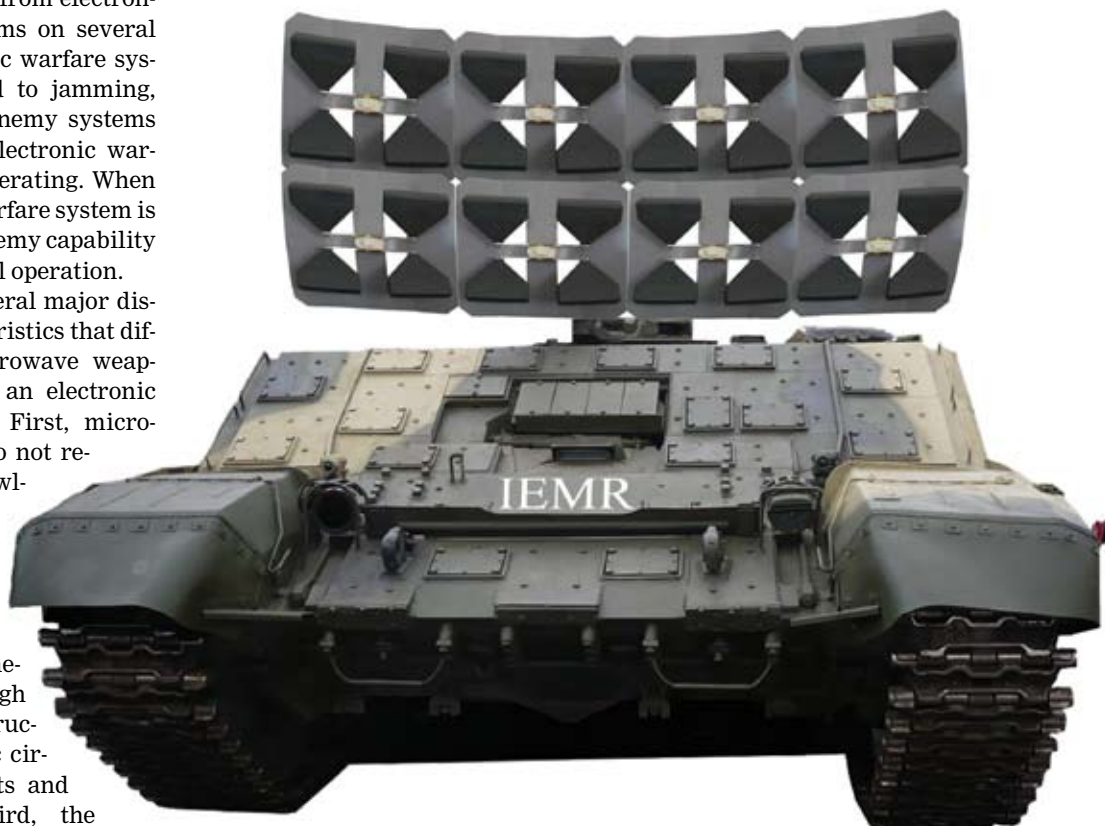
Since the early 1980's, the military research laboratories in the United States have been pursuing scientific and technological programs that seek to develop radio frequency and high power microwave technologies as a potential class of directed energy weapon systems. Particularly the U.S. Air Force Research Laboratory has con-

ducted research and studies on the effects of electromagnetic pulse weapons on electronics, with focus placed on both offensive and defensive requirements that can be satisfied by high power microwave weapons. Great strides have been made in developing new and innovative ways to reduce the size, weight and volume of microwave source and antennae, while simultaneously increasing power levels.

In other parts of the world, technological programs in the field of microwave weapon technology development have been actively pursued by Australia, UK and Sweden.

In Ukraine, development of microwave weapon technologies is being dealt with by the In-

An array of phased generators mounted on an AFV platform



stitute for Electromagnetic Research (IER) Ltd, Kharkiv. This Ukrainian firm can be amply regarded as one of the world leaders in the field of microwave weapon technology development, as some of the firm's products have been purchased and integrated into military arsenals of the United States and China.

The IER Ltd has developed, built and now offers for export a microwave weapon technology called the Autonomous Electromagnetic Attack Weapon (AEAW) system that is based on the Magnetically Insulated Transmission Line Oscillator (MILO) technology and uses Magneto Cumulative Generator (MCG) as its power source.

The AEAW technology will be available in several configurations:

Parachute deliverable E-bomb designed to disrupt, damage or destroy enemy electronic targets, including radar sites, communication and data transfer links, navigational equipment etc.;

Air delivered E-bomb designed to be dropped from aerial platforms in close proximity to underground electrical grids and communication networks of cities, individual industrial facilities or military installations. Detonation, which occurs after the bomb penetrates into the ground, causes high-power pulsed currents to flow in the ground, causing the coupling of high voltage pulses. In turn, high-voltage pulses passing through communication networks and power grids make protection devices go off randomly, disrupting normal functioning of power supply systems of cities or individual installations (including military) and thus leading to paralysis of the said infrastructures;

A device installed on a missile or aircraft platform, which is



Combined coaxial-sector antenna and mode converter



General view of MILO with combined mode converter and coaxial-sector antenna with output dielectric window



Prototype ammunition (electromagnetic bomb) with logo periodic antenna

designed to knock out or destroy enemy electronic targets in the lower and upper airspace. The device is suitable for disabling or disrupting normal operation of hostile mission electronic equipment such as radars, navigational aids, data transfer links and control equipment.

The AEAW device attacks its targets by emitting high power pulses of microwave energy with power of  $\sim (1.5-2) \cdot 10^9$  W and duration of  $(1-2) \cdot 10^{-7}$  s. Upgrades are planned to the AEAW device to increase the power of emission to  $\sim 10$  GW. The increase in power level will be accomplished by way of combining several generators (MCGs in this particular case) to provide the desired level of power (with proportionate increase in the overall size and weight of the device).

Most of MCG types use the Vlasov antenna in the capacity of antenna-feeder device. Experts say that this type of antenna, with the antenna and feeder well matched, is excessively long and requires additional protections against potential disruptions due to high levels of output power being generated. Moreover, the Vlasov antenna has wide beam width, which precludes the generation of emissions with sufficient power density, hence, the density of electromagnetic field at long distances from the antenna. In the Vlasov antenna, the beam pattern is inclined at some angle relative to the generator axis, which causes some difficulties in practical use of the device.

In order to eliminate the mentioned problems, IER engineers developed a compact coaxial-sector antenna of a proprietary configuration where the combined radiator and mode converter (sector antenna) are integrated into a coaxial waveguide that is split in the



vertical cross section into two equal parts, one of which is additionally split by extended-length irregular-shaped radial diaphragms into three sections of 60 degrees each.

IER engineers have developed other types of antennas for use with the AEAW munition. Particularly the parachute deliverable version of the AEAW E-bomb can be fitted with a folding log-periodic antenna or a TEM-antenna made of sheet metal or mesh wire. Also, the parachute system can be equipped with a reflecting mirror to generate 45÷50 kW/m (power field out to 50 meters).

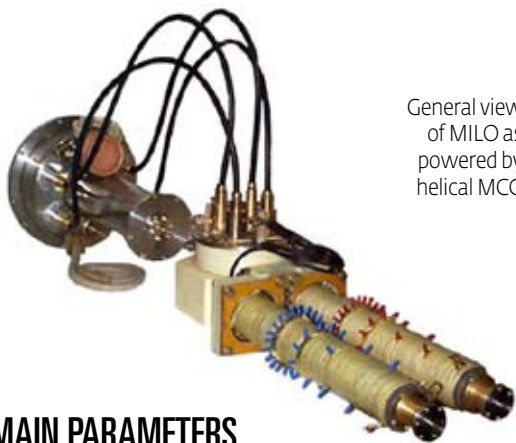
The IER has also developed a promising technology such as a beam independent pulse oscillator that uses a dipole phased-array antenna as radiating antenna. This wide band oscillator has relatively compact size and allows to obtain a peak output in the range of several gigawatts, both in multiple burst and repetitive pulse modes.

Another objective being pursued by IER engineers in this particular area of research is to accomplish an increase in generator output power. This required a solution that would combine output powers of the generators and efficient antennas radiating in a wide range. However, this brought about a side affect such as disruptions of the antenna performance occurring during bursts of intense power output. This was eliminated by introducing a beam independent pulse oscillator that uses a dipole phased-array antenna as radiating antenna.

The generator developed by IER is designed as part of a system integrating eight or twelve same-type phased generators. This solution allowed it to produce a high-power pulse source emitting repetitive pulse trains



Prototype missile ammunition with deployed horn TEM antenna ready to install



General view of MICO as powered by helical MCG

### MAIN PARAMETERS OF THE MAGNETO CUMULATIVE GENERATOR

Potential pulse amplitude .....	<b>Up to 450 kV</b>
Current pulse amplitude .....	<b>Up to 300 kA</b>
Pulse duration .....	<b>800 ns</b>
Mode of operation .....	<b>Single 90 gW pulse</b>




Reflecting mirror for AEMW ammunition in parachute deliverable configuration. An array of phased generators mounted on an AFV platform

at 120...600 MHz, with peak power levels of 10÷12 gW.

In one proposed configuration, the system can be mounted on an armored fighting vehicle platform (wheeled or tracked) and used for disabling or destroying most of modern hostile weapons during ground operations.

## CONCLUDING REMARKS

1. Due to their effectiveness and the fact that modern weapons and military platforms are densely packed with electronic equipment and highly sensitive components, high power microwave weapons hold much promise and value.
2. Capable of producing effects that range from denying the use of electrical equipment in hostile weapons and vehicles to disrupting, damaging or destroying that equipment, these “invisible killers of electronics” can serve as potent force multipliers.
3. Microwave weapons are now firmly integrated into military arsenals, and will remain so as long as electronics and computers remain within the modern world of weapons. This promises new opportunities for manufacturers of microwave weapons, especially in Ukraine where the Institute for Electromagnetic Research has all the requisite R&D and manufacturing capabilities, technology and domestic hardware components for producing new, more innovative types of microwave weapon technologies. 

[ electronic intelligence ]

# PASSIVE LOCATION





Electronic reconnaissance had always been of particular importance for the armed forces, providing about 80 percent of all the information of interest to the country's top political leadership that was necessary for military operation planning and the conduct of war. The fine art of electronic reconnaissance was most sophisticated, and demanded involvement of highly qualified specialists.

But all the buzzing about the Kolchuga only generated a lot of publicity for the technology, making it the best known Ukrainian defense industry product. How this technology was developed?

The passive electronic monitoring radar system Kolchuga was developed in the late 1980s as a replacement for obsolete older-generation operational-tactical and strategic designs. By the end of 1988, a factory in Russia's Kursk, better known as post office box No. V-8455, manufactured the first two prototype Kolchugas for government trials, which completed in February 1989.

After that, the radar was deployed as a standard issue with the Soviet armed forces, and design plan and specifications for the technology were handed over to the Topaz manufacturing corporation in Donetsk for organizing serial production. Since that time, the long-range electronic monitoring radar had begun to be operated, first by the Soviet army, then by military forces of newly independent states.

The Kolchuga long-range electronic monitoring radar was at the time a truly last word in military technology. Kolchuga had provided far better detection capabilities for both ground and airborne radio emitters as compared to the radio detection assets available at the time. Priority attention in developing the radar was committed to



The Ukrainian armed forces operated more than two dozen Kolchuga radar systems, which was enough to fully support the country's requirement for electronic monitoring out to 300-400 km.

reliability characteristics and maintainability. The item was intended in the first place for reconnaissance missions during military operations.

The Ukrainian armed forces operated more than two dozen Kolchuga radar systems, which was enough to fully support the country's requirement for electronic monitoring out to 300-400 km. But as the system came into operation it turned out that the technology "stuffed" with elec-

tronics was highly sensitive to voltage drops, resulting in backup power sources and sensitive subsystems getting out of order and adding to operators' headache. In a situation where underfunding of the Defense Ministry's needs took on chronic proportions, an effective asset such as Kolchuga was standing idle for months awaiting the arrival of maintenance teams from the manufacturer company. Ukrainian armed forces' intelligence de-

facto became hostage to economic situation and the monopolist company which overhead expenses grew to 1000 percent.

Rapid advancement of armaments and military technologies triggered by equally rapid political processes in neighboring countries resulted in the electronic environment beginning to change around Ukraine, while a number of regional conflicts in various regions of the world dictated the need to develop a radar design that would be adequate to modern warfighting standards and would enable reliable and effective monitoring of the electronic environment.

The country's top military leadership at the time was showing particularly keen interest in effective precision weapons. A number of upgrade works for Kolchuga were done by Donetsk's SKB RTU as private financing initiative projects. The company proposed several modernization projects for Kolchuga that would enable upgrading the technology to the required capability at the minimum cost possible. In the period from 1992 to 1996, a number of modernization works were performed for Kolchuga (with Defense Ministry's funds) by SKB RTU in close cooperation with Topaz.

Enhancements included new software and a long-range electronic monitoring radar suite designated Assorti. In addition, Kolchuga itself had undergone comprehensive modernization to the configuration currently known as Kolchuga-M. SKB RTU had also rid Kolchuga of a disadvantage such as power source failures. The enhancements (which in fact advanced the design to a fundamentally new capability) made it possible to downsize significantly the military's obsolete radar fleet and enabled electronic en-

vironment monitoring out to 600 km, while data collection and processing both for the Land Forces and Air Defense Forces had been automated to the maximum possible degree. By mid-1997, a Kolchuga-M had passed factory tests and was now ready for government trials.

It became clear after the trials that Kolchuga-M far surpassed the capabilities specified in the related operational requirements document, and it was as soon as at the start of 1998 that the new radar system was accepted as standard issue for the Ukrainian armed forces.

Kolchuga-M provides:

- the detection and analysis of impulse and continues wave signals; individual identification of practically all of the known electronic assets in

Enhancements included new software and a long-range electronic monitoring radar suite designated Assorti. In addition, Kolchuga itself had undergone comprehensive modernization to the configuration currently known as Kolchuga-M.

various categories as well as mission systems installed on board ground, maritime or airborne carriers; long range detection of multipurpose radars, identification systems, air traffic control systems and navigation systems;

- re-targeting using rotating antennas, which allows it to identify the composition and operational mode, and to track movements of hostile radio emitters up to 150 km away in width in both far-field (up to 600 km) and near field (up to 200 km) zones – without radar silence zones and with continuous high-precision position location of targets in whatever spot of the area being monitored.

Air defense capabilities include:

- take off detection of aircraft of various types and their identification by categories at ranges exceeding those of modern radar systems;
- tracking the movements of stand-alone and multiple targets;

A team of Ukrainian technology designers have been awarded government prizes for science and technology for the development and putting into full-rate serial production of the passive electronic monitoring long-range radar system Kolchuga. The Kolchuga had been in development from 1990 to 2003, its capabilities “surpassing all the existing foreign-designed equivalents”, reads a government decree awarding the State Prize. It is recalled in the decree that the Kolchuga has been integrated into the Ukrainian Armed Forces and put into full-rate serial production, and an export version of the technology has been developed. A few such systems have already been exported to Ethiopia, China and Turkmenistan. **UDR**



[ hydrodevices ]



# «SEA WOLF» HUNTERS

Ukrainian sonar technologies are, as before, in demand on the global market. History of the Kyiv based State Enterprise Kyiv Scientific Research Institute of Hydrodevices - KSRI of HYDRODEVICES, as is the case with other defense industry enterprises in Ukraine, has roots stretching back into Soviet era days. Established in 1956 to design and develop naval anti submarine warfare equipment, KSRI OF HYDRODEVICES has completed 320 R&D projects to date. Nowadays it has become Ukraine's lead research and development institution for hydroacoustic systems for surface ships, helicopters and fixed sonar stations, as well as special purpose radio sonobuoys. KSRI OF HYDRODEVICES designed technologies are in use not only in Ukraine and Russia, but have been exported to France, Poland, Bulgaria, China, India and Viet Nam.



ound is known to propagate far speedier and to greater distances in the water than in the atmosphere. This phenomenon gave birth to hydroacoustics a science studying the behavior and application of sound in water. Hydroacoustics, utilizing sonar technology, is most commonly used for detection, assessment, and monitoring of underwater physical and biological characteristics. SONAR (Sound Navigation And Ranging) is a technique that uses sound propagation under water (primarily) to navigate, communicate or to detect other vessels. That Ukrainian sonar technologies are highly effective is demonstrated by the fact that it was KSRI OF HYDRODEVICES designed sonar that helped detect and locate the Russian nuclear cruise missile submarine K-141 Kursk which was lost with all hands when it sank in the Barents Sea on August 12, 2000. Apart from sonars, the Ukrainian com-

pany is also dealing with radio sonobuoy systems, in particular those specially designed for applications such as the Tu-142M antisubmarine warfare aircraft. One such radio sonobuoy was used by Russians when they detected an American Sea Wolf type submarine off the

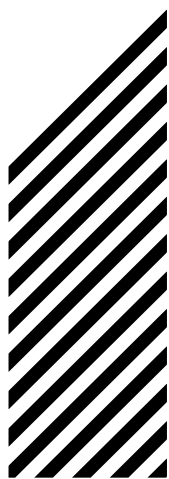
shore of the Kamchatka peninsula in 2003.

Radio sonobuoys for anti-submarine warfare applications make up the KSRI OF HYDRODEVICES's most promising designs. Basically, radio sonobuoy is expendable sonar system that is dropped/ejected from aircraft or ships conducting anti-submarine or underwater acoustic research. The buoy relays acoustic information from its hydrophone(s) via UFF/VHF radio to operators onboard the aircraft.

Sonobuoys are used for detecting submerged objects in primary (passive sonobuoys) and secondary (active sonobuoys) hydroacoustic fields. Also, there are radio sonobuoys for special applications which are capable of detecting electric fields and magnetic disturbances generated by submarines.

Sonobuoys are classified into three categories: active, passive and special purpose.

Active sonobuoys emit sound waves into the water and listen for the returning echo before transmitting



usually range and bearing information via UHF/VHF radio to a receiving ship or aircraft.

Passive sonobuoys emit nothing into the water but rather listen, waiting for mechanically generated sound waves (for instance, power plant, propeller or door closing and other noises) from ships or submarines to reach the hydrophone that are then transmitted via UHF/VHF radio back to a receiving ship or aircraft.

Special purpose sonobuoys relay various oceanographic data such as water and air temperatures and pressure, wave elevation or salinity readings, at various depths back to the ship or aircraft. The buoys are ejected from aircraft in canisters and use a parachute to deploy upon water impact. An inflatable surface float with a radio transmitter remains on the surface, for communication with the aircraft, while one or more hydrophone sensors and stabilizing equipment descend below the surface to a depth that is (preset) variable depending on environmental conditions and the search pattern. Data from the sonobuoy is downloaded into aircraft/helicopter computer for analysis and processing with respect to the detected submarine's course and speed, and also the overall tactical situation. Upon detecting an enemy's submarine, the host aircraft/helicopter attempts to effect magnetometric contact with the submarine to track its movement or destroy it. Radio sonobuoys are almost all equipped with water-filled batteries that become activated upon coming into contact with salt water to inflate a surface float with a radio transmitter. Sonobuoy is a self destructing system with a lifetime not exceeding eight hours after deployment.



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The USA enjoys a preeminent position among other sonar technology manufacturing countries, and it effectively gained a monopoly position on that market after the Soviet Union broke apart. But Ukraine is well in a position to break up this monopoly, as interest in Ukrainian sonar technology designs from potential foreign customers is ever mounting. The manufacture of sonobuoy systems in Ukraine, which remained dormant during several years immediately after the Soviet collapse, has been resumed now, using available production capacities. Ukrainian sonar designs are of interest not only to potential buyers in Europe. China, a traditional partner of Ukrainian defense companies, is considering joint hydro acoustic technology R&D

projects with Ukraine, and Pakistan seems to be following suit. A few more countries, among them Libya, Malaysia, India and Turkey, are looking at Ukrainian sonobuoy systems as potential candidates for their military acquisition programs. China for example, needs sonar stations and sonobuoy systems for underwater situation monitoring in maritime locations where the forthcoming Olympic Yacht Race competitions are scheduled to take place.

Incidentally, as pointed out by naval experts, the design and manufacture of sonar technology, unlike other naval warfare equipment, still remains beyond the capabilities of China's defense industry. Furthermore, Ukrainian sonar technologies are by an order of magnitude cheaper than foreign designed





alternatives. The underwater situation monitoring sonar system Tronka, for example, costs a few hundred if not dozen thousand dollars, as against about \$50 million for a US equivalent. Tronka is designed for monitoring security situation in littoral areas, harbors, exclusive economic zones and selected facilities scanning a 360 arc at ranges up to 500 meters.

By the way, the corvette class battleship Ternopil, which was commissioned by the Ukrainian Navy in 2006, is equipped with powerful sonar assisted weapons. Tronka and other technologies of this kind have become particularly relevant after 9/11 terrorist attacks, as they permit speedy detection, identification and tracking of undersurface objects such as divers or small-size underwater vehicles.

Ukrainian designers themselves believe that the «KSRI OF HYDRODEVICES”’s sonar systems for helicopter applications hold much promise. One such, designated Ros’V, is tailored to anti-submarine warfare helicopters Ka-25PL and Ka-27PL, and operates most effectively in conjunction with sonobuoys.

«KSRI OF HYDRODEVICES” has developed a stationary version of the system, as well. For the Ukrainian Naval Forces, monitoring underwater situation in the Black Sea is one of the most acute and urgent problems to be resolved; the subsurface situation is monitored using air defense assets, while underwater situation remains virtually unattended. «KSRI OF HYDRODEVICES” has calculated how many stationary sonar installations are needed to fill this gap, and determined most critical locations where these need to be deployed. According to designers, this sonar system is sensitive enough to detect and locate an object as small as a dolphin, not to mention larger marine animals.

Helicopter based hydroacoustic systems have a multitude of applications in naval forces of many countries worldwide, providing anti-submarine defense capabilities. Helicopters, being much more maneuverable and speedier than surface ships, and capable of operating at great distances from the host craft, too, provide enhanced long-range detection capabilities for hostile underwater entities, be it a diver, a small size underwater vehicle or a submarine. Antisubmarine helicopters Ka-25PL, Ka-25Ts and Ka-27, all fitted with sonar systems designed by KSRI OF HYDRODEVICES, currently equip more than 130 naval

ships in service with naval forces of former Soviet states.

KSRI OF HYDRODEVICES has forced ahead; in 2005 it competed R&D for a new low-frequency measuring system designated Interferometer. This is designed for measuring acoustic characteristics of materials in aqueous media under the effects of hydrostatic pressure and temperature. KSRI OF HYDRODEVICES director, Yuri Shamarin, believes cooperation with the Russian Federation in the sonar technology development area holds much promise for Ukraine, notably in projects for the manufacture of ship-borne sonar installations for third countries. This is about expanding cooperation with the Russian concern Maritime Underwater Weapons Gidropribor among other companies. Other promising areas of cooperation include joint design and development of sonar systems for helicopter applications, as well as of free-standing sonar stations, Tronka type diver held sonars and mine and torpedo weapons systems.

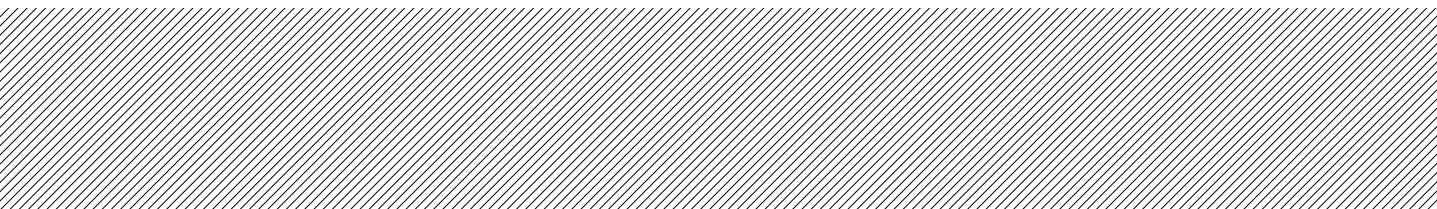
It remains to be added that a proposal to expand bilateral collaboration in the sonar technology development area was fully supported by participants in the second military technological cooperation sub commission meeting of the Ukraine-Russia interstate commission’s sub commission for cooperation on security issues. In particular, the sub-commission has given the green light to a proposed joint project between KSRI OF HYDRODEVICES and Taganrog based factory Priboy in Russia, for the design and manufacture of ship borne hydroacoustic systems, particularly but not exclusively for third countries. **UDR**



[ radars ]

# QUANTUM LEAP BY UKRAINE'S DEFENSE ELECTRONICS INDUSTRY





tate Enterprise Research Institute “Kvant” was established as a state-owned company in the far away year of 1949 with a mission to design and develop aircraft radar equipment. In subsequent years, the Company’s business grew to include the design and development of the equipment types as follows:

- Target designation equipment for ship-launched missile weapons;
- Electronic equipment kits for fixed-wing and rotary-wing ISTAR aircraft;
- Shipboard equipment for processing special data from naval reconnaissance satellite systems deployed on surface ships and submarines;
- Shipboard 360°-scan (including phased-array) radar systems;
- Optronic fire control systems, countermeasures systems and special-purpose weapons for naval warfare applications;
- Special mission computers for general-purpose shipboard and aircraft applications;
- Naval tactical data systems and other radio-radar and optical-electronic equipment for different shipboard applications.

SE RI “Kvant” was also dealing with the design and development of shore radar navigational aids and control systems for very large civilian ships.

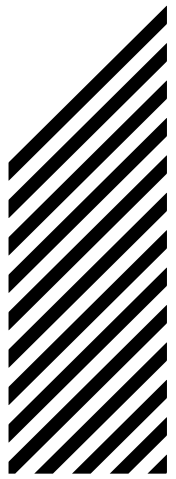
In the USSR, the equipment designed and developed by SE RI “Kvant” was seen deployed on

all but every surface naval ship, strategic submarine and different types of commercial ships.

After Ukraine regained independence, SE RI “Kvant”, exploiting its vast experience and expertise in sophisticated defense electronics, achieved much progress in designing, developing and manufacturing technologies for application on armored military vehicles and surface-to-air missile weapons systems. Over those years, the Company has developed and brought to production stage a range of new products that include components of the prime armament stabilization system on the main battle tanks T-80UD and T-84 and the indigenous current-generation MBT “Oplot”, television-optical sights for the upgraded infantry fighting vehicle BMP-1U and armored personnel carriers BTR-3E and BTR-4.

In years after Ukraine’s independence, NII Kvant designed and developed ship-

board optronic countermeasures system Kashtan-3, which is optimized for defeating precision laser-guided weapons. Inaugurated at IDEX-1999 arms exhibition, Kashtan-3 generated much interest among the global defense community. This was latterly followed up by what is now known as Kashtan-3M – a mobile PC-based optronic countermeasures system configured for ground use. The Kashtan (which means “chestnut tree” in Ukrainian) is intended to protect high-valued military and civilian installations against precision-guided munitions such as missiles, shells and air-launched bombs with semi-active laser homing systems. What distinguishes the Kash-

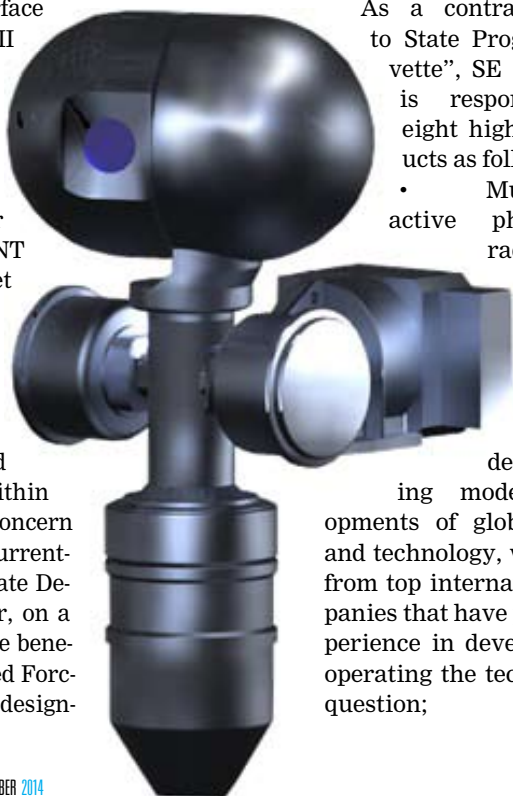


tan from international counterparts is that the latter are only capable of defeating precision-guided munitions that use semi-active laser homing techniques, while the Kashtan-3 provides protection against threats guided by electronic-optical homing systems of all kinds – semi-active laser (SAL), television and imaging infrared. The Kashan-3 can protect simultaneously from 20-30 precision-guided missiles launched from a hostile aircraft, leading its pilot to think that something is wrong with his target acquisition and sighting system.

In the early 2000, SE RI “Kvant” completed an upgrade project for the BAGNET-M sideways-looking airborne radar used on the Su-24 fighter, developed an upgrade package for the air defense artillery rocket system SHILKA (and produced a mock-up upgrade), and developed avant-projects aimed to upgrade the OSMINOG-2000 avionics equipment kit (used on the Ka-27 helicopter) and the USPEKH-2000 anti-surface ship missile system. NII Kvant is the designer of the BRIZ-M shipboard air and surface surveillance radar system; the OBRIY beyond-visual-range surface-wave radar system and the CONVENT integrated naval target detection/antiship missile cueing system for installation on aircraft and naval platforms.

At this point, SE RI “Kvant” is a R&D and production complex within the structure of State Concern Ukroboronprom. It is currently working, under the State Defense Procurement Order, on a number of projects for the benefit of the Ukrainian Armed Forces, being one of the lead design-

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ers of naval electronic equipment for the Ukrainian Corvette.

As a contractor party to State Program “Corvette”, SE RI “Kvant” is responsible for eight high-tech products as follows:

- Multipurpose active phased-array radar system

Phoenix-E; this system is being designed and developed using

modern developments of global science and technology, with inputs from top international companies that have positive experience in developing and operating the technology in question;

- Shipboard radar-optical fire control system Stilet for medium-caliber guns;
- Opto-electronic fire control system Sarmat-2 for small to medium caliber guns;
- Shipboard optronic countermeasures equipment kit Facet;
- Optronic naval helicopter landing system Saga;
- Infrared threat detection system Selena-X;
- Electromagnetic interference reducing system Sovmestimost;
- Shipboard combat management system CMS, which provides the capabilities as follows:
  - PC-based control of tactical employment of naval weapons, electronic warfare assets and naval battle groups;
  - Planning and coordination of missions for individual ships and groups of ships;



- Target data generation and control of sensors and weapons, with the after-action review and other capabilities.

SE RI “Kvant”, being a R&D and production complex within the structure of State Concern Ukroboronprom, has the sufficient human resource capacity, intellectual and industrial capacities that enable it to improve the competitive ability of its product range and lay the groundwork for future technology advances. The Company has a staff of 500 employees, of which 150 are directly engaged in prototype production projects. The Company’s R&D potential rests on a strong pool of scientists, researchers, engineers and dedi-



cated, qualified and highly-competent professionals.

Most reputable mathematicians in Ukraine, including from among the talented youth, are assisting in developing software applications for the equipment being designed by SE RI “Kvant”. So the Customer can be confident that SE RI “Kvant” has been at the leading edge of modern scientific study and technology.

As of this day, the Company has successfully completed state-commissioned trials of three high-tech products which had been recommended for service entry with the Ukrainian Armed Forces.

SE RI “Kvant”, who has an open-ended license qualifying it to deal with the design, development, overhaul and upgrade of military equipment, is consistently expanding the scope of its military-technical cooperation with international partners.

NII Kvant has successfully completed a number of contracts and is currently working on deals with countries in different regions of the world, including India, Italy, Kazakhstan, the PR of China, Myanmar, Pakistan, the Republic of Korea, Poland, the Russian Federation, Singapore, Switzerland and other countries.


Exports currently make a substantial portion of the Company’s sales output.

SE RI “Kvant” is currently engaged in a number of investment projects that promise a good market potential and might be of interest to potential investors. These particularly include:

- Shipboard 3D surveillance multi-beam active phased-array radar MAARS. The latter has a number of advantages over the

existing G-band counterparts, which include, but are not limited to, the following:

- Extended air target detection and tracking ranges;
- Substantially reduced weight and dimensions.
- Shipboard beyond-visual-range passive radar (Meganom) designed for deployment on light missile ships displacing up to 250 tonnes;
- Fire control system for light armored vehicle applications (Tornado) – an integrated sighting and fire control system for installation on light armored vehicles;
- Shore-based surface target detection radar (Bereg); this project aims to create a radar that will enable coastal border guards to detect and defeat small-sized surface and aerial targets;
- Shipboard beyond-visual-range surface-wave radar system Strazha;
- Upgrade of the Osminog-2 target detection and acquisition radar for anti-boat defense;
- Non-military investment project aimed to set up production of PC-based energy consumption metering control system (electricity, heating, heated water and natural gas). This project covers the design and development of a PC-based electricity consumption metering control system, including energy-saving aids, metering equipment and energy consumption management and control facilities.

SE RI “Kvant” has all the organizational and scientific capacities necessary for maintaining and broadening various forms of partnership – from the design and development to direct supplies of products – in compliance with relevant international standards. 



State Enterprise  
«Scientific and Production Complex  
«ISKRA»



# 80K6

## 3-D AIR SURVEILLANCE RADAR

80K6 3-D AIR  
SURVEILLANCE RADAR



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