UKRAINIAN DEFENSE REVIEW

№3 [JULY-SEPTEMBER 2014]

UDR

Defense express

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UkrOboronProm

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it's important to know

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CENTER FOR ARMY CONVERSION & DISARMAMENT STUDIES

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PROTOTYPE OF AN-70 MILITARY TRANSPORT MAY BE DELIVERED TO UKRAINE'S MINISTRY OF DEFENSE

The possibility is being considered of making available the first prototype An-70 military transport aircraft to Ukraine's Ministry of Defense as an interim measure pending the delivery of the first two aircraft that were ordered previously but not delivered on due time, Antonov reported on 5 June, 2014.

At this point, Antonov continues work on the wide-body medium-payload short takeoff & landing military transport aircraft An-70. Following the successful completion of trials, the An-70 It has performed a cross-country flight on the route Kiev – Odessa – Kharkiv – Lviv – Ivano-Frankivsk – Kiev, which lasted 8 hours 8 minutes. The aircraft repeatedly crossed storm fronts during this flight. The operation of the radar system was checked in actual weather conditions to identify and recognize hazardous meteorological formations, which was positively assessed. Moreover, the An-70 successfully underwent tests under natural icing conditions. All its systems functioned normally. The temperature field, vibrations, and noise levels in the workspace of crewmembers and the cargo hold were also monitored throughout the flight.

UPGRADE PACKAGE FOR L-39M TRAINER AIRCRAFT INTRODUCED TO KAZAKHSTAN

At the KADEX 2014 international arms exhibition in Astana, Kazakhstan, State Company "Odessa Aircraft Plant" which is incorporated with Ukrainian Defense Industries (otherwise known as Ukroboronprom) State Corporation demonstrated an upgrade package aimed to modify the L-39 trainer aircraft to new, more capable L-39M configuration, Defense Express reported.

The package includes new higher thrust engines, an advanced control system for the power plant, as well as improvements to the aircraft's acceleration capabilities enabling a 10-percent reduction in the length of run and in the required takeoff distance. The package additionally includes onboard training equipment that will allow the aircraft to be used for in-flight training of MiG-29 and Su-27 fighter pilots in navigation and weapons-aiming skills. Upgrading several L-39 aircraft to L-39M capability will be of lesser cost than the cost of a fifth-generation Full-Mission Simulator.
The L-39M upgrade will improve the quality of training new pilots for the Ukrainian Air Force.

MOTOR-SICH NEGOTIATING POTENTIAL PARTNERSHIP WITH POLAND'S PZL SWIDNIK

Motor-Such, Ukraine's top manufacturer of air engines, is in the process of negotiating a potential partnership with Poland's PZL Swidnik to build Mi-2 choppers and Polish-designed Sokol helicopters.

According to Polish newspaper Dziennik Gazeta Prawna, "Working groups have already been established to evaluate the feasibility of the potential partnership... If the two firms come to terms on it, we will see an agreement concerning not only business but, also, politics".

This partnership could, in the future, involve the Polish firms ITWL and WZL-1 to remanufacture the Mi-8, Mi-24 and SW-3-type helicopters with Ukrainian-built powerplants.

The newspaper said that the Polish-Ukrainian partnership makes particular sense in the context of worsening relations between Kiev and Moscow: "In this way Ukraine could set up a logistic base here in Poland on which to modernize its own army". Polish analysts argue that Poland could benefit much from cooperation with Ukraine who remains among the world's leading arms exporters.

UKRAINE TO EXPORT THREE OF ITS REDUNDANT MIG-29 FIGHTERS TO CHAD'S AIR FORCE

Chad in the process of modernizing its armed forces, and for this purpose a decision was made to acquire multirole fighters to equip the country's Air Force. As a result of long consultations, a decision was made in favor of acquiring three MiG-29 Fulcrum multirole fighters from Ukraine, IHS Jane's Defence Weekly reported on 27 May, 2014.

The former Ukrainian Air Force MiG-29 jets will be subjected to overhaul and limited upgrade at the State Aircraft Repair Plant in Lviv.

It is supposed that the Chadian Air Force, in 2009, concluded an acquisition contract for three MiG-29 fighter aircraft, including one combat capable trainer airplane. The acquisition package additionally includes the training of pilots and technicians in Ukraine as well as deliveries of replacement parts and ammunition.

The first MiG-29 in Chad colors was seen flying a test mission from Liviv Danyo Halytskyi International Airport. The aircraft featuring the number TT-OAP, which was posted on the airliners.net spotters website in late May, will be handed over to the Chadian Air Force representatives in the nearest time.

KAZAKH BORDER GUARD SERVICE TO TAKE DELIVERY OF AN-74T-200A TRANSPORT AIRCRAFT

Kharkiv's State Aircraft Manufacturing Company (KhGAPP) will deliver an An-74T-200A freighter aircraft to the Border Guard Service of the Kazakh National Security Committee, in a ceremony that will take place on the sidelines of the KADEX-2014 international exhibition of weapons systems and military equipment in Astana, KhGAPP announced in a press statement.

In April 2013, KhGAPP delivered another An-74T-200A aircraft to the Kazakh Internal Affairs Ministry's Internal Security Forces.

A 10-ton freighter, the An-74T-200A can provide transportation for up to 67 personnel or 40 patients on stretchers; or military equipment (both self-propelled and towed) and other military supplies of an equivalent weight — to 2700 kilometers at 720 km/h.

NEW MS-500V ENGINE FOR EU

Motor Sich has established a working group with a leading Polish helicopter manufacturer PZL Swidnik in anticipation of joint production of helicopters that would involve Ukrainian engines.

The 950hp Motor-Sich MS-500V engine will supposedly be co-manufactured with PZL Swidnik, a top official of the Ukrainian Company announced on 21 May 2014. To this end, work on certification of the MS-500V engine has been resumed with the aim of having it certified in August 2014. At this moment, however, there is no certainty as to how many, if any at all, engines the Polish partner will want to buy.

Motor Sich began design and development on the MS-500V engine back in 2010 after an agreement on its licensed production was signed. The engine was intended for use in new Russian Ansat light training helicopter and to eventually replace U.S. Pratt & Whitney PW-207 powerplants that equip Russian-built choppers. There was talk about the delivery of 370 units, on which the Ukrainian manufacturer could earn $400M.

However in 2011, a joint venture with Russian Helicopters collapsed after the Russian side decided to go with a Canadian Pratt & Whitney PW-207K engine for its Ansat light helicopter, despite the fact that Ukrainian engines were to have been put in 20 Russian helicopters in 2012. There were reports in the Russian press at the time saying that the Canadian engine was preferred because it is 40% cheaper than the Ukrainian counterpart. In an attempt to lure the Russian partner back, Motor-Sich then offered it 85-percent share in the venture instead of originally agreed 15 percent, but it didn't work.

Currently, Russia is the final destination of 30 percent of Motor Sich's output, though it used to purchase half of the Company's production in previous years, while the Ukrainian Company began to more focus on its fastest growing market – the Central and Southeast Asia.

MOTOR-SICH, RUSSIAN HELICOPTERS NEGOTIATING REENGINING OF MI-8 CHOPPERS

The Russian Helicopters holding group and Ukrainian air engine maker Motor-Sich have been negotiating a project to re-engine 20-30-year-old helicopters Mi-8T, CEO of Russian Helicopters, Alexander Mikheev told reporters on 22 May 2014.

"As regards the Mi-8, there is a re-engining project which is being negotiated with Motor-Sich," Mikheev said during the HeliRussia Exhibition which took place in Moscow on May 22-24.

As Mikheev put it, "It's a matter of economy, a matter of cost". "The Mi-8T helicopter platform has a certain lifespan, and it will be up to the operators to decide whether to invest in re-engining or acquire new helicopters," he said.

Some media outlets reported quoting President of Motor-Sich Vyacheslav Boguslaev as saying that the Russian Helicopters holding group approved the legacy Mi-8T helicopter re-engining project.

During meetings with Russian Helicopters officials held on the sidelines of the HeliRussia 2013 exhibition, the President of Motor-Sich talked over problems and solutions regarding the operation and service support of production-standard Motor-Sich engines used on some of the Mil-8/17 helicopters, according to Russian Helicopters' representatives.

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UKRAINE DEMONSTRATES NEW INDIGENOUS UAV DESIGNS

State-owned "Ukroboronprom" defense industrial corporation carried out a practical demonstration of new unmanned air vehicles developed by Ukrainian companies, the interim director general of Ukroboronprom said as quoted in a statement released by the State Corporation on 12 May 2014.

Spetstechnoexport, a firm incorporated with Ukroboronprom, as well as specialized firm UAVia, State Company "General-Purpose Experimental Aircraft Design Bureau", S.Korolev Zhytomyr Military Institute, Ukrainian Armed Forces' Institute of Weapons & Military Equipment and other organizations assisted in the demonstration at the Borodyanka airfield, Kiev Oblast, Yuri Tereshchenko said.

The demonstrations included a reconnaissance mission, with real-time imagery dissemination, performed by an UAVia's BpAK R-100 multi-role UAV system, as well as a flight demonstration of an indigenously assembled multirotor UAV. These UAVs could be a valuable contribution to intelligence, surveillance and reconnaissance (ISR) capabilities of the Ukrainian army and security forces, particularly in the context of the ongoing antiterrorist operation in eastern Ukraine, Yu. Tereshchenko said.

UKRAINE IS DEVELOPING COUNTER-UAV WEAPONS

The Institute of Electromagnetic Research in Kharkiv has been working intensively developing enabling technologies for counter-UAV operations, CEO of the Company, Yuri Tkach told Defense Express in an interview on 21 May 2014.

"We are now witnessing more intense and effective use of unmanned aerial vehicles for various purposes. That is why the development of technologies for anti-UAV operations becomes of increasing relevance, and their importance will be only growing with time," Tkach said.

One of counter-UAV system concepts being developed by the Company employs so-called "volume" radiation. The system generates a massive wave of powerful jamming pulses within a very wide frequency range from hundreds of megahertz to tens of gigahertz.

Furthermore, Yu. Tkach went to note that there are proposals regarding the use of UAVs as platforms for microwave weapons.

«A number of organizations in Ukraine are currently showing much interest in using microwave weapons for defeating hostile UAVs. On a parallel track, there is a proposal being considered to equip UAVs with various modifications of microwave weapons for attacks on targets using a mix of microwave ammunition and other weapons,» said Yu. Tkach.

BTR-4E GOT BAPTISM BY FIRE

Several military production companies in Kharkiv Oblast have been awarded orders for the manufacture of a total of 194 BTR-4 APC vehicles for the Ukrainian Armed Forces and Police, deputy Kharkiv Oblast Governor, Vasyl Khoma told a news conference.

He said that 40 BTR-4 vehicles are intended for delivery to the Ministry of Internal Affairs, and the other 154 to the Ministry of Defense, with payment for the order to be sourced through Ukraine's State Budget. The order will run for six months.

In May 2014, the initial quantity of four BTR-4E APC vehicles was transferred by the Ukrainian Prime Minister, Arseniy Yatsenyuk to the Ukraine National Guard's special operations squad "Omega" deployed in the theater of anti-terrorist operation outside Slovyansk.

Yuri Tereshchenko, director general of national defense industrial group Ukroboronprom, expressed the view on 4 June 2014 that, now that the BTR-4 has got "baptism by fire" in operations outside Slovyansk, it has good prospects in terms of advance on the international markets.

The vehicles came under intense hostile fire while fighting with terrorists near Slovyansk. "The armor on the BTR-4 withstood, without failure, direct impacts from enemy weapons, including heavy machineguns and autocannons, while counter-HEAT side screens protected crews against several hits made from man-portable anti-tank grenade launchers. Armored glass withstood direct impacts of sniper rifle rounds. It is the reliable equipment and the designer brain that helped save the lives of the crew and infantry squads, thus enabling the ATO forces to accomplish their assigned missions," Yu. Tereshchenko said.

BTR-3E1V MAKES ITS DEBUT AT KADEX 2014

The BTR-3E1V, an upgraded configuration of the BTR-3E1 armored personnel carrier, was demonstrated at KADEX 2014 international arms exhibition, Defense Express was told by Serhiy Tuzov, chief of the marketing division at Kiev Armor Plant, which is incorporated with Ukroboronprom State defense industries group.

The upgrade incorporates some departures from the original design by virtue of having a German Mercedes engine integrated with Allison automatic transmission, as well as a new remote overhead weapons station BM-3M "Shturm". The latter is designed to be operated from inside the vehicle by the gunner or vehicle commander using a TV sensor for fire control. This allows the gunner to remain in relative protection of the vehicle and, also, makes the fire more effective.

"About 250 vehicles with this equipment fit have been delivered to export customers so far. The BTR-3E1V has made its debut [at the exhibition] in Kazakhstan," S. Tuzov said.

BTR-3E APCS, DOZOR HMMWV VEHICLES TO BE PROCURED FOR UKRAINE'S ARMED FORCES, NATIONAL GUARD

The Ukrainian government will procure 22 BTR-3E armored personnel carriers worth UAH 100M to meet the requirements of the Ukrainian Armed Forces and National Guard. This was announced by Prime Minister Arseniy Yatsenyuk on May 22, 2014, during a visit to a military base in the vicinity of Kyiv where the 2-nd reserve battalion of the National Guard and a special operations squad were holding a combined scheduled battle drill practicing anti-terrorist missions prior to deployment to the theater of anti-terrorism operations in eastern Ukraine.

During the trainings, the combatants practiced in arresting armed criminals, release of hostages, repelling the attacks and detention of criminals, examination of motor vehicles at border checkpoints. They were also trained in shooting, unarmed combat techniques, basics of general and special courses of training of service dogs.

The Prime Minister emphasized that the Ukrainian Armed Forces and National Guard are provided with everything necessary as urgent as possible since"nothing has

been purchased for 23 years"."What was seen two months ago and what we have today are extremely different pictures".

Moreover, it was revealed on 4 June 2014 that the government will acquire 200 high mobility multipurpose wheeled vehicles (HMMWV)"Dozor" to equip the army and National Guard units. The Dozor vehicle is twice cheaper than a standard APC vehicle. It has light weight and boasts having good mobility performance and the ability to operate in day/night conditions.

UKRAINE DEMONSTRATES TWO NAVAL SHIP DESIGNS INTENDED FOR KAZAKH NAVY

At KADEX 2014 international arms exhibition which took place in Astana, Kazakhstan, from May 22 to 25, Ukraine demonstrated two naval ship designs. The 440-ton and 1,200-ton ship designs, developed by State Company "Ship R&D Center" in Mykolayiv, which is incorporated with State-owned Ukroboronprom defense industrial corporation, are offered to the Kazakhstan Navy, a Defense Express correspondent at the Exhibition premises reported.

The demonstration was assisted by representatives of Oto Melara, Thales, MBDA and MTU, the suppliers of weapons and equipment for the two ship designs.

[it's important to know]

MISTRAL AND COURTESANS IN CRISIS

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L9015

By selling Mistral-class amphibious assault ships to Russia, France would violate the EU Code of Conduct on Arms Exports, devalue the European export control system and damage its own international reputation – just for the sake of a meager 1.2 billion euros. Will France sell itself so cheap?

Putin, while on a recent visit to Austria, admitted that Russia really is an aggressor country. "Yes, indeed, it's true (as I've already talked about this once before), we used our armed forces in order to ensure freedom of expression for the Crimeans, and we resorted to blockading of some elements of the Ukrainian army." Andrei Illarionov, the noted independent Russian expert, gives a legal interpretation of this Russian presidential statement as follows: "These actions of the armed forces of the Russian Federation, including "the blocking of individual elements of the Ukrainian army," as well as the subsequent annexation of Ukraine's AR of Crimea and the city of Sevastopol, fall under the criteria of "aggression" as defined by the UN General Assembly Resolution 3314 (Definition of Aggressions) that was adopted on December 14, 1974".

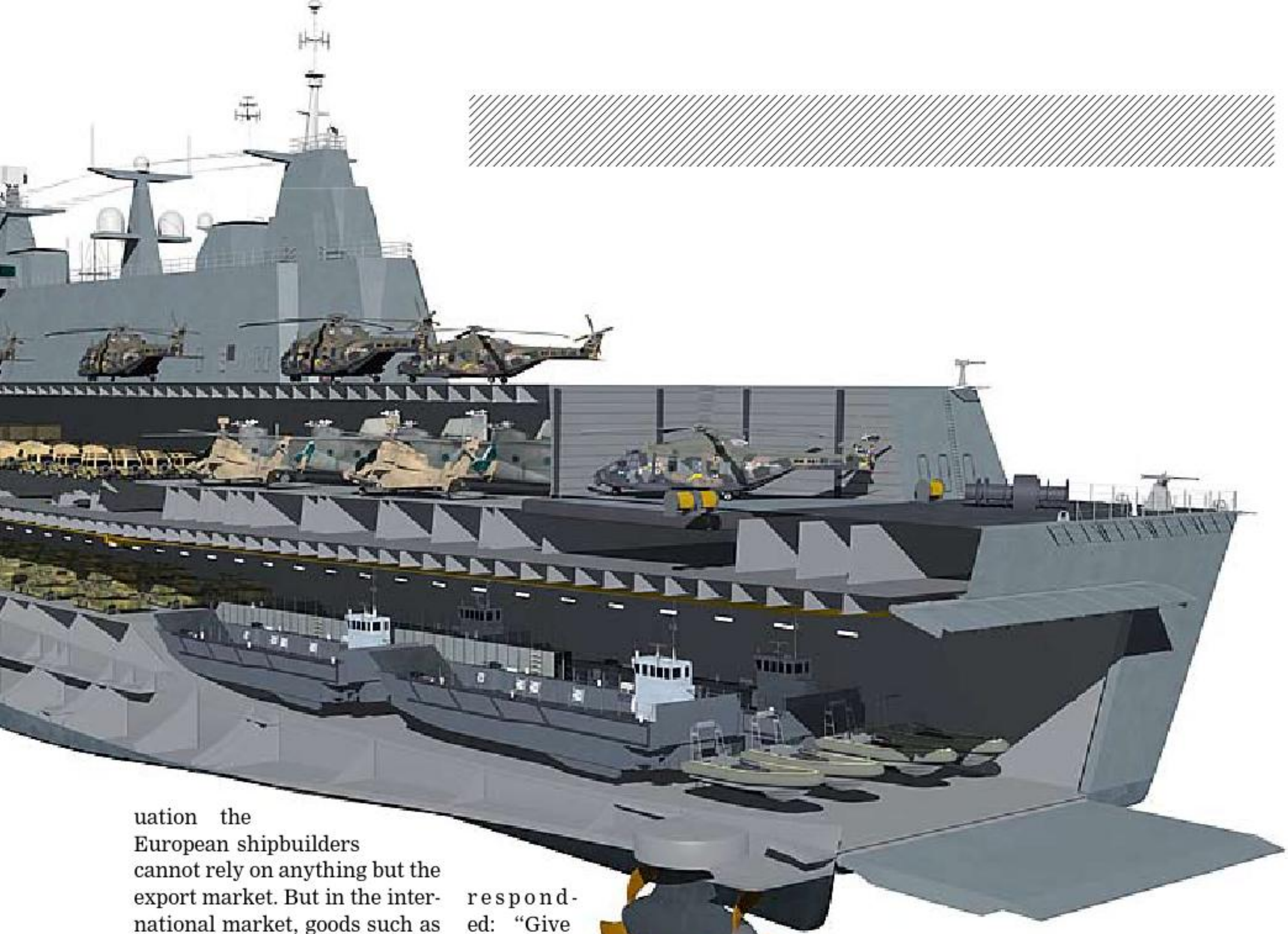
In principle, there is no need to explain once again to the international community what means the Russian occupation of Crimea, what means the Russian war in Ukraine's Donbas or what are the evidences of the direct support being given to the terrorists who are helding hostage millions of residents of the Donetsk and Luhansk regions. The truth is quite clear, defined and validated. In Europe, though, some pretend they don't know this truth, speaking of the situation in Ukraine in terms of "internal conflict", "civil war", or "Ukrainian crisis." The Europeans do not do it out of a great love for Putin, but, as usual, because of money or potentially foregone "profit".

The most glaring example is the planned sale by France of Mistral-class warships with amphibious assault capabilities to the Russian Navy. This contract, which includes the delivery of two amphibious ships of the Mistral class for purely offensive purposes to Russia ("Mistral" is otherwise referred to "invasion ship"), will bring the French shipbuilding industry 1.2 billion euros in profits, with an option for two more ships to be constructed in Russia. It is to be admitted that this deal came as a windfall for the French as the naval shipbuilding crisis in Europe is deepening, the European navies are "drying out" without budgetary support and the outlook for growth of naval fleets is negative. So in this sit-

LINKED NUANCES

Vladivostok — the first of the two Mistral-class amphibious assault ships being constructed in France for Russia – will feature a Russian-built satellite communications suite named Centaurus. Previous reports had it that the ship would be fitted with the Syracuse satellite communications system based on French satellites. As well as high frequency and ultra high frequency communication receivers and transmitters commonly used in the Russian Navy vessels, the Vladivostok will be additionally equipped with the Item R-794-1 integrated into the upgraded Centaurus satellite communications suite. Shipborne communications terminals of the Centaurus suite would provide 512 kbit/s data transfer between the ships and with the land terminal. However, the interfacing of the Russian communications suite with the French data links might be a problem, experts warn: "Combat and information capabilities are normally laid down as a single sequence at the initial phase of constriction; the interface between them should be provided for as early as during the design and development process. If the data links from the command post are tailored to suite the French technology, it would be extremely difficult to make them match our equipment. In that case all the equipment will have to be given up and replaced with ours". Moreover, at some phase of the trials, compatibility problems may arise with other French equipment, particularly with respect to electromagnetic fields.

The work to fine-tune and diagnose the communications equipment suite at the Vladivostok is scheduled to continue till 25 November 2014. The work, which will cost the Russian budget 145 million rubles, would be carried out in Saint-Nazaire, France, and Saint Petersburg, Russia.



uation the European shipbuilders cannot rely on anything but the export market. But in the international market, goods such as the "Mistral" are not too much in demand, being too expensive and too peculiar in terms of functionality. Ships in this category are needful to countries intending to conduct major amphibious assault operations. But warships of this kind are produced domestically in most of these countries (e.g., the U.S. or China), who are not willing to relay on other countries for such sensitive capabilities.

At the international naval show Euronaval 2008 in Paris, a Russian Navy team led by Commander-in-Chief Admiral Vysotsky visited the exhibition stand of the French company DCNS. Just after a couple of minutes, the DCNS stand was in a panic as Admiral Vysotsky simply pointed to a mock-up model of the Mistral amphibious assault ship and asked "How much?". The reply was something like "it's expensive, three hundred fifty million ..." Vysotsky, almost as in a joke, responded: "Give me two." The French were unable to believe their unexpected luck ... Dreams come true!

Here we should note one important detail. This event took place at the end of October 2008, just 2 months after the end of the Russian-Georgian war. The smoke from Russian tank convoys had not yet cleared over Georgian towns and villages when the French, without hesitation, were willing to sell the Aggressor country the ship that would be best fit to perform missions in local conflicts such as the one in Georgia. Admiral Vysotsky explained the main motive behind the Mistral purchase thus: "Had Russia had a ship of Mistral class during the conflict in Georgia, it would have taken the Black Sea Fleet just 40 minutes instead of 26 hours to accomplish its mission." Even such a broad hint dropped by the Admiral about Russia's willingness to use the "Mistral" in future war conflicts in neighboring countries (for example, Ukraine or the Baltic states) did not calm down commercial zeal of the French. The deal was signed and construction of the ships got underway. One of them was given a very symbolic name. It was called the "Sevastopol".

French government officials are trying to portray themselves as «ordinary businessmen» whose only concern is about business, not about international policy. Explaining the reasons for the arms trade with the Aggressor, French government officials are citing arguments such as the need to bolster domestic production or to meet payroll expenses for shipyard employees.

The occupation of the Crimea and the "hybrid" war waged by Russia in the Donbas did not stop France. French government officials are trying to portray themselves as "ordinary businessmen" whose only concern is about business, not about international policy. Explaining the reasons for the arms trade with the Aggressor, French government officials are citing arguments such as the need to bolster domestic production or to meet payroll expenses for shipyard employ-

ees. These are no doubt good intentions. But, most importantly, France is seeking to inspire the international community to believe that, formally, the Mistral sale to Russia would not violate anything. Indeed, the Russian Federation is not under arms embargo of the United Nations or the EU. So it turns out that all the pressure being put on France over the Mistral deal is situated in the nature of moral principles. And this is, as it were, a purely voluntary matter: you may choose to honor it or not, as you wish.

However, there is a little nuance to which French officials prefer to pay lip-service. In 1998, the European Union accepted the Code of Conduct on Arms Exports, which, in 2008, was further bolstered by the Common Position defining common rules governing the control of exports of military technology and equipment. These short documents laid down eight criteria for the export of conventional arms by EU Member States. So, the Mistral sale to Russia at the time of the occupation of Crimea and the war in Ukraine violates six of the eight Code of Conduct criteria! Judge for yourself.

Criterion # 2: Respect for human rights in the country of final destination. It does not seem necessary to say that the human rights situation in Russia is not all right. Although, of course, ships of the "Mistral" class can hardly be used for internal repressions, but the delivery as such of offensive arms to an undemocratic government can serve as encouragement for further tightening of the authoritarian regime.

Criterion №3. Internal situation in the country of final destination, as a function of the existence of tensions or armed conflicts. War conflict and tensions in the Russian Caucasus have continued for two decades now and are unlikely to end in the near-term future.

Criterion №4. Preservation of regional peace, security and stability. This criterion provides that the EU will not export weapons, if there is a clear risk that the intended recipient would use the military technology or equipment to be exported aggressively against another country or to assert by force a territorial claim. When considering these risks, EU Member States will take into account inter alia: a) the existence or likelihood of armed conflict between the recipient and another country; b) a claim against the territory of a neighbouring country which the recipient has in the past tried or threatened to pur-

> The Mistral sale to Russia at the time of the occupation of Crimea and the war in Ukraine violates six of the eight Code of Conduct criteria

GERMAN VIEW

Although French consent to sell the warships to Russia has not been criticized in public by Berlin, the deal has been criticized behind the scenes by some influential independent analysts. Unlike Washington, Warsaw or capitals of the Baltic States, German government officials have refrained from publicly criticizing the upcoming Mistral sale to Russia. However, this does not mean that they in Germany are welcoming this deal or would be willing to do a similar order from Russia. Based on displacement tonnage, Mistral is the largest ship in the French Navy after the nuclear-powered aircraft carrier Charles de Gaulle. A Mistral-class ship is capable of transporting and deploying six helicopters, up to 100 vehicles including 13 tanks, and several hundred soldiers. Russia ordered two such ships – the Vladivostok and Sevastopol. The first has already been launched, with its delivery scheduled for this October or November. Four hundred Russian naval sailors have already arrived in Saint-Nazaire to undergo training on Mistral ship. The second ship is due for delivery in 2015.

At regular government press conferences, an official representative of Chancellor Angela Merkel has been frequently asked questions about the Mistral deal. He always answers reluctantly and briefly, as it was, for example, at a press conference on June 30. «The Federal Chancellor has already spoken about this, particularly in Stralsund (where talks between Merkel and French President

sue by means of force; c) whether the equipment would be likely to be used other than for the legitimate national security and defence of the recipient; d) the need not to affect adversely regional stability in any significant way. So it is clear that this criterion fits perfectly to modern Russia in all aspects.

Criterion №5. The national security of the member states and of territories whose external relations are the responsibility of a Member State, as well as that of friendly and allied countries. Member States undertake not to export arms to countries that might threaten the national security of not only other members of the EU, but also the security of friendly states. After the signing of the Association Agreement with the EU, Ukraine may rightly consider itself friendly and allied country of the European Union. Wonder what France thinks about it all.

Criterion №6. The behaviour of the buyer country with regard to the international community, as regards in particular to its attitude to terrorism, the nature of its alliances and respect for international law. As they say, it hits home, as every word is true for modern Russia – both as concerns the direct Russian support for the terrorists in the Donbas region or what kind of allies Russia has (Syria and North Korea), and, especially, the respect for international law in the context of the occupation of Crimea.

I mean, yes, it's black and white about the EU Code of Conduct. By selling the Mistrals to Russia, France would directly violate the basic provisions of this most important document of the European Union. It's interesting to know what else it would take to make Brussels and Paris give thought to this fact, as if Georgia and Ukraine weren't not enough! Can it be that France will continue to disgrace itself, selling its international reputation for the meager 1.2 billion euros? Be certain lest you make a bad bargain! UDR

Hollande took place in early May – Ed.), Steffen Seibert said. – The situation has not changed since then. Russia is not under arms embargo of the EU. Therefore, from a legal point of view, this deal violates nothing. Indeed, a European arms embargo on Russia is as yet nonexistent. As a matter of fact, however, Germany has unilaterally put on hold military-industrial cooperation with the Russian Federation. Particularly during the crisis over Crimea back in March, the Federal Minister for Economic Affairs and Energy Sigmar Gabriel vetoed the deal between Germany's Rheinmetall and Russia's Ministry of Defense, which called for the construction of a combat training center of the Russian Army outside Nizhny Novgorod. Afterwards the German government decided on a complete embargo of arms and other military items to Russia. Chairman of the board of the Eastern Committee of German Economy Eckhard Cordes said that permits for the export of some types of German products to Russia have become more difficult to get. As he put it, «The Federal Office for Export Control is now acting more and more restrictively as it concerns the export of industrial products to Russia, and it investigates export contracts for so-called 'potentially dual-use' items even more meticulously than before.» The approach used by this German government agency does not go to any comparison with the conduct of relevant authorities in France, said Cordes.

[aviation potential]

Ukraine retains substantial capabilities to repair and upgrade the Mi family of military and transport helicopters – both for post-Soviet and former Warsaw Pact customers. The country has established the national legislative basis as well as the R&D structures for life extension upgrade and updating of military helicopters using the MoD's R&D capabilities and overhaul repair and upgrade capabilities of the State Concern «Ukroboronprom».

Anton Mikhnenko, UDR

UKRAINIAN MI-SERIES HELICOPTERS UPGRADES

In Ukraine, one of the top companies in the area of helicopter overhaul repair and upgrade is the Konotop Aircraft Repair Plant 'Aviakon' from the Ukronoronprom Concern, which is doing repair works and participates in a range of Mi-24/Mi-8 helicopter upgrade programs for the benefit of both the Ukrainian Armed Forces and export customers.

The Company has some achievements related to Mi-24 helicopter upgrades for the Ukrainian Armed Forces. In 2011, the Mi-24 upgrade program was split into two phases. The first phase, dubbed as "minor" upgrade, involved domestic companies only, while the second (or "major") phase of the upgrade included the installation of equipment and systems provided by French Sagem.

As a result of the "minor" upgrade, the combat helicopter Mi-24PU1 was introduced into the Ukrainian Armed Forces' service. Upgrade improvements included modified Motor-Sich TV3-1I7V-MA-SBM1V-02 turboshaft engines; electronic-optical jamming system ADROS KT-01AV for protection against infrared-homing MANPAD threats; video & flight data recorder/data transfer system BUR-4-1-07; upgraded aircraft gun sight ASP-17VPM-V; laser crosshair line generator FPM-01kv; satellite navigation system GPS MAP-695; VHF radio unit KY-196B; EBC-406AFHM emergency locator transmitter; GTX-327 radar transponder with AK-350 altimeter as well as the THL-5NV hard helmet with PNL-3 night vision goggles.

In terms of its mission capabilities, the Mi-24PU1 is almost three times as effective as the original configuration, this despite the fact that the "minor" upgrade did not include the installation of the new domestically designed "Baryer-V" ATGW missile system in place of the Soviet-vintage counterpart, "Shturm-V".

The "Baryer-V" ATGW missile system is part of the "major" upgrade package that also includes the Sagem day/night observation/targeting system integrating IR imaging and television sensors. The system will also integrate a laser sensor for RK-2V missile control (provided by the indigenously manufactured device LKK-2V), and provide automatic interface between belly-mounted gyrostabilized surveillance camera and guided/unguided missile control equipment. The "major" package additionally includes the Sigma 95L light embedded GPS inertial system, the CN2H pilot night vision goggles, the CHDD-68 Digital LCD Display and the Mercator digital map generator – all provided by Sagem. This equipment set was approved by Ukraine MOD as a suitable solution for upgrading the country's combat helicopter fleet.

In place of the Mi-2's original GTD-350 powerplants, the MSB-2 will have more powerful Motor Sich AI-450M turboshaft engines for improved flight performance.

Upgrade project for the workhorse helicopter – the Mi-8 and its various modifications – (as is the case with the Mi-24) involves Sagem as supplier of night fighting capabilities and current-generation avionics. The upgraded helicopter will have improved performance due to the integration of more potent Motor-Sich TV3-117VMA-SBM-1V powerplant. Intended for use on the Mi-24, Mi-8MT and Ka-27/29 helicopters, the powerplant was formally approved for service use in the Ukraine Armed Forces in 2010. During flight testing with the TV3-117VMA-SBM-1V powerplant, a Mi-8MTV gained record height of 8100 meters in just 13.5 minutes, which is twice the normal climb-out speed for same-class helicopters. Prior to the upgrade, the Mi-8 could hardly climb out to higher than 5,000 meters, and it had to stay hovering at 1,200 meters during ten minutes to let the turbines get colder.

Given the national R&D and production capabilities, the Ukrainian MoD estimates that overhaul and upgrade of the Mi-24 and Mi-8 helicopter fleet will extend its service life to 40 years, meaning it will remain in operation till up to 2030.

A good example of the Company's cooperation with foreign partners was a contract from Azerbaijan. In 2010, «Aviakon», jointly with the South African company Advanced Technologies and Engineering and the Ukrainian State Enterprise "State Kyiv Design Bureau 'Luch'" remanufactured a number of Azerbaijan Armed Forces' Mi-24 attack helicopters to the Mi-24G standard using the Mi-24 Super Hind Mk.4

upgrade package developed by the South African partner. This included Denel-supplied chin-mounted gyrostabilized optronic surveillance and sighting suite to enable all-weather and night operation. The Mi-24G uses the Luch Baryer-V ATGW missile system as its main attack weapon, of which Azerbaijan was the launch export customer.

JSC "Motor Sich" furthermore offers upgrades or, rather, new modifications of the Mi-2 and Mi-8 helicopters, denoted as MSB-2 and Mi-8MSB, respectively.

In place of the Mi-2's original GTD-350 powerplants, the MSB-2 will have more powerful Motor Sich AI-450M turboshaft engines for improved flight performance.

It will also feature new external fuel tanks, allowing for bigger internal payloads, a more ergonomic passenger cabin, and a longer range of 750 km, and will have an advanced avionics suite.

The MSB-2 will have a flight instrumentation system with multirole displays used as flying instruments and for control of the powerplant and the helicopter.

Several modifications of the MSB-2 are planned for roles as follows: passenger/freight transportation; search and rescue (with relevant equipment set); medical evacuation; firefighting (with 900-liter water tank); crop-dusting and military.

At 4-ton MTOW, the helicopter will seat eight passengers. Qualification trials are scheduled to complete by the end of 2014.

In addition to Motor-Sich, remanufacturing works will be dealt with by an aircraft repair factory at Vinnytsya. As became known in October 2013, production line for the MSB-2 will also be launched at Orsha aircraft repair plant in Belarus, a controlling stake in which is owned by Motor-Sich. The operation is set to start up in 2015.

In April 2014, Motor-Sich held negotiations on partnership with Poland's PZL Swidnik to assemble and remanufacture MSB-2 helicopters in Poland. The next round of negotiations is forthcoming soon. Any details of future partnership are premature at this point, but potential areas of cooperation could include both the production of new aircraft and updating of existing fleets.

Motor-Sich upgraded the Mi-8 helicopter to the Mi-8MSB-V standard. On a decree by the Interim Minister of Defense Col. Gen. Mykhailo Koval issued in April 2014, the Mi-8MSB-V was officially approved for service use in the Ukrainian Armed Forces. According to Ukrainian Ministry of Defense, the helicopter is intended for transportation of personnel and cargo, pilot training, search-and-rescue operations, aerial surveillance and other missions aimed at increasing the mobility of the Ukrainian armed forces' units.

The chopper is an indigenous upgraded version of the Mi-8T Hip already in Ukrainian service. The most significant upgrades are new, more modern engines V3-117-VMA-SBM1V to improve the Hip's performance. Moreover, a flight information recording system, emergency beacon and climate control unit have been installed.

During flight testing with the Tv3-117vMA-SBM-1v powerplant, a Mi-8MTv gained record height of 8100 meters in just 13.5 minutes, which is twice the normal climb-out speed for same-class helicopters.

Expressions of interest in the Mi-8MSB-V are already coming from potential customers. Specifically Mexico announced it requires 14 helicopters in this category.

Ukrainian-built upgrades of the Mi-2, Mi-8 and Mi-24 helicopters have considerable market potential, considering that the choppers were delivered for export worldwide during Soviet era. If equipped with new capabilities in line with modern standards, a great deal of them could preserve their military usefulness for many years to come. For example, of the 8,200 Mi-8-series helicopters produced in 1996, about 2,800 were delivered to export customers in over 40 countries worldwide, including Algeria, Angola, Afghanistan, Bangladesh, Bulgaria, Vietnam, Egypt, India, Iraq, Canada, the PR of China, Pakistan, the USA, Poland, Romania, Cuba and Japan etc. Given the capabilities present in Ukraine, it would be much more cost effective for operators to have these fleets overhauled and updated than to acquire new helicopters. UDR

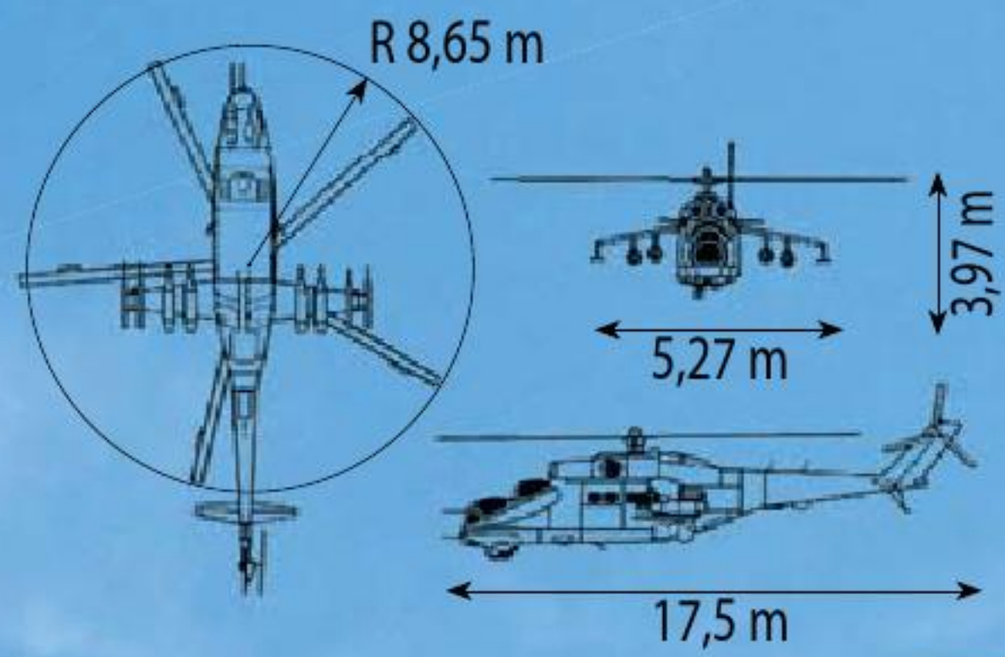
Mi-24PU1
multi-role transport attack helicopter

Works to remanufacture the Mi-24 helicopter to the Mi-24PU1 standard will be performed by the State Enterprise "Konotop Aviakon Aircraft Repair Plant" in partnership with JSC Motor-Sich, State Design Bureau Luch, Central Design and Development Bureau Arsenal and Research and Production firm NFP Adron.

Max takeoff weight **11,500 t**

Bomb-load **>3,0 t**

The Army combat helicopter Mi-24PU1 is intended for attacks on small ground targets (armored as well as unarmored) and enemy personnel, as well as for provision of fire support to ground forces at any time of the day or night. A highly effective combat chopper in high-altitude environments, the Mi-24PU1 boasts enhanced firepower and reliable protection against infrared-homing threats, and it has had its mission capability improved three times as compared to the original configuration.



SELF-PROTECTION

The electronic-optical jamming system ADROS KT-01AVE, designed and developed by the research and production firm NPF Adron in Kiev, is designed to defeat infrared-homing threats by confusing or 'blinding' missile seekers and thereby diverting the missiles from their courses.

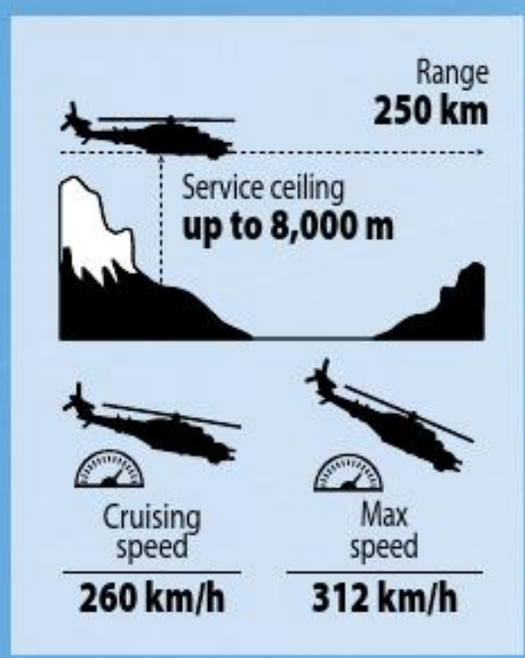
Laser target designation system integrated with night vision goggles enables speedy and accurate target sighting at nighttime and in adverse weather conditions.

ARMAMENT

External hardpoints can hold up to four unguided rocket pods carrying 20 rockets each.

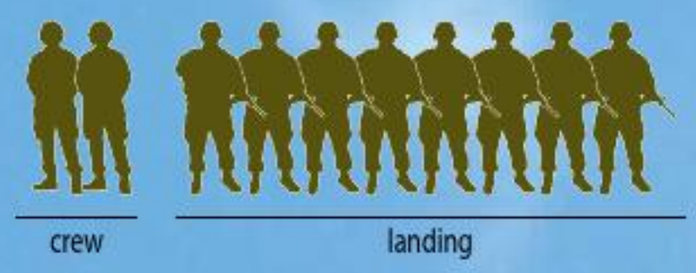
PROPULSION SYSTEM

The Mi-24PU1 is a twin-engine design based on the Motor-Sich TV3-117 VMA-SBM1V 2000-2500 hp turboshaft providing a one-and-a-half-ton increase in payload capability over the original design. Maximum horsepower is rated at 2,800. As well as providing an enhanced payload capacity, this will enable the aircraft to operate at altitudes of up to 5,750 m, a 1,500 m increase from the current level. The upgrade provides advantages over the original design in terms of reliability performance, simplicity of maintenance, reduced fuel consumption and extended lifespan.



15 m – min night flying height

1 m – accuracy of target approach



Major upgrade

The Mil-24PU2 upgrade includes an avionics suite from Sagem Defense Sécurité

Clockwise rotating mechanically controlled tail rotor

Optronic jamming system "Adros"

Windows can open inside, enabling the use of personal firearms by paratroopers onboard

External hardpoints can hold either guided missile pylons or unguided rocket pods carrying 20 rockets each. Other unguided weapons include free falling bombs and incendiary tanks

EQUIPMENT

The Mi-24 helicopter will be retrofitted with multifunction display suite, video & data recorder/ data transfer; on-board mission computer, light embedded GPS inertial system, MERCATOR digital map generator and day/ night observation/targeting system OLOSP410.

In addition to its fixed 30-mm twin gun with 250 rounds of ready-use ammunition, the Mi-24 can carry up to 3,000 kg of other weapons mounted on wingtip hardpoints. These can hold guided missile pods with up to eight rounds of rocket munition or up to four B-8V20A rocket pods housing 20 Soviet-designed S-8-type unguided rockets each

TARGET DETECTION & IDENTIFICATION RANGES

BARYER-V ANTI-TANK GUIDED MISSILE

Armor penetration capability

800 mm

Range

7,5 km

system guidance

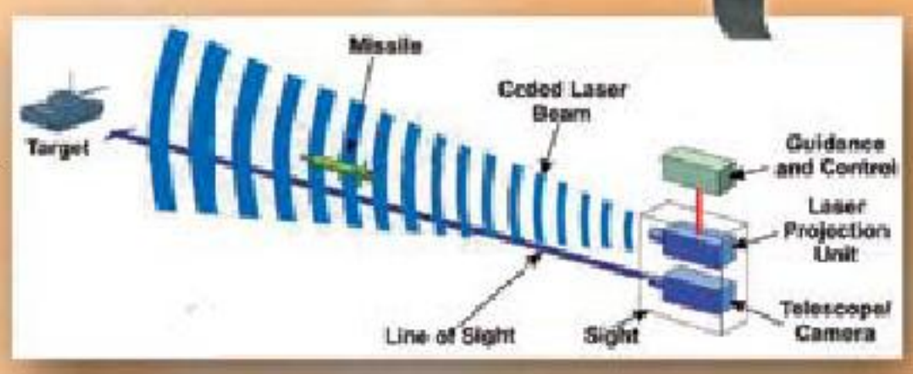
SAL

Mass of the missile

25 кг

Warhead type

tandem shaped-charge



EO/IR surveillance/ sighting system on a gyrostabilized platform enables day/night operation of weapons

[quoted speech]

V. KOSHEVA: «'MALACHITE' RADAR HAS ALREADY BEEN PUT THROUGH 'TEST BY FIRE' IN THE UKRAINIAN-RUSSIAN MILITARY STANDOFF»

In January 2012, radar system "Malachite" produced by private Holding Company «Ukrspetstekhnika" was approved for service use by Ukraine's Ministry of Defense. A current-generation follow-up to the Soviet-vintage meter wavelength radar system P-18, the new Ukrainian design encompasses most state-of-the art solutions generated by the national school of thought on radar technology. The system has already been put through "test by fire" in the Ukrainian-Russian military standoff and proved itself efficient on the battlefield. The following is an interview conducted with Vira Kosheva, chairperson of the Board of JSC «Holding company 'Ukrspetstekhnika'" by Defense Express on the "Malachite" and the Company's plans for the future.

Defense Express: The Malachite radar station was approved for service use in early 2012. What makes it dissimilar from the P-18 radar? How many such systems have been delivered to the armed forces so far?

Vira Kosheva: The Malachite is dissimilar from the P-18 radar system in many aspects. Unlike the P-18, it provides the capabilities for digital processing of echo signals; interface with modern C3I networks (command & control posts); enhanced countermeasures resistance; measuring radial velocity of the target; minimum detection threshold reduced to 2.5 kilometers; antenna tilt within +15 ÷ -15 degrees to the horizontal; employment as Air Defense alert radar by Army's and Air Force's SAM units. Other advantages include economy of operation, the fewer number of vehicular platforms required for transportation and many more others. Finally and most importantly, our system has detection range of 400 kilometers, meaning it detects and tracks targets more effectively and at longer ranges than any of the radar systems currently used by Ukraine.

The new capabilities of the Malachite radar system were duly appreciated by senior MoD leadership. As a result, the system was not only approved for service use but has achieved initial operational capability already.

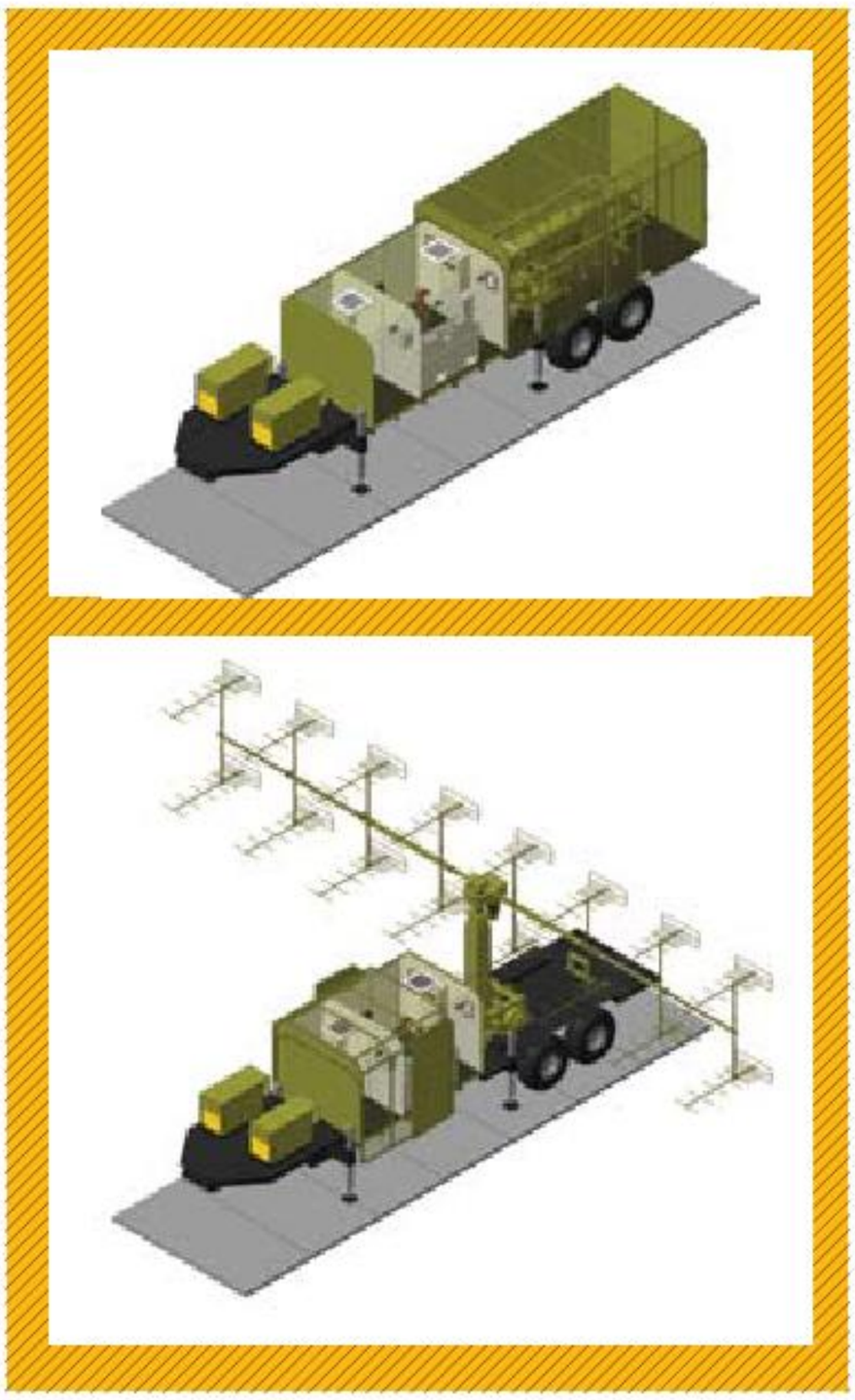
As regards deliveries to the Ukrainian Armed Forces, I can say that at this point we delivered two production-standard units of the Malachite system under the State Defense Procurement Order 2012, and one more unit was made available at no cost in order to boost the country's capability to defend itself in conditions of military standoff with Russia. One radar system is deployed on the western border and two others on the eastern border of Ukraine. Our systems are operating without any negative feedback from users. Radar output data is transmitted in real time to the Ukrainian Air Force's command and control center in Vinnytsya.

At this moment we are completing work under the State Defense Procurement (SDP) Order 2013, which was transferred by the MoD to 2014 for financial reasons. The SDP Order in question includes the delivery of two more Malachite stations. Within a month's time we are awaiting KrAZ vehicles from PJSC "AvtoKrAZ" so the two radar stations will be able to be delivered to the armed forces by the end of this summer.

At this moment we are completing work under the State Defense Procurement (SDP) Order 2013, which was transferred by the MoD to 2014 for financial reasons. The SDP Order in question includes the delivery of two more Malachite stations. Within a month's time we are awaiting KrAZ vehicles from PJSC "AvtoKrAZ" so the two radar stations will be able to be delivered to the armed forces by the end of this summer.

DE: – How much has the attitude of the country's leadership to own defense industry changed following the events in the Crimea and the aggravation of the situation in the East of Ukraine?

VK: Let's just say that we see an understanding of the urgency of army modernization. Our armed forces have at last begun to take interest in us. A proof of this is the fact that the formulation of SDP Order 2014 has got started, albeit belatedly. A draft of SDP Order includes the Defense Ministry's acquisition of three "Malachite" stations for the Air Force's radio-radar units, along with BTR-3 and BTR-4 [armored personnel carriers], bullet-proof vests, helmets and other supplies for the Armed Forces of Ukraine. Moreover, the Ukrainian Navy just recently began to show interest in our radar stations. Due to the well-known events in the Crimea, the Navy plans to order at least six such stations for the protection of maritime borders. However, as the SDP Order calls for the delivery of the radar stations in the current year, we physically will not be able to build the stations by that deadline. Most probably, if we take responsibility for creating a na-



val version of the «Malachite», we would be able to build the stations by the end of this year and in the beginning of next year.

DE: Are the "Malachite" stations performing well in the current operations where they are tasked with protection of airspace over eastern borders of Ukraine in almost war-like confrontations?

VK: The radar system «Malachite», which has successfully passed state trials (at Cape Meganom in the Crimea among other locations) is performing its assigned tasks on the eastern borders of Ukraine effectively and efficiently. When Russian Air Force's tactical airplanes were flying intensively in close proximity to the border with Ukraine on April 24-25, the Malachite unmistakably detected infringements of the state border and instantly transmitted airpicture data to the Ukrainian Air Force's command and control center. Our army was getting irrefutable, real-time evidence to the border intrusions.

DE: Ukrspetstekhnika, at one time, was actively developing a version of the «Malachite» radar system accommodated on one single truck chassis (without the use of a towed platform) and featuring an automatically deployable antenna. How is this project proceeding?

VK: The project is running its course. We are now boning right down to it. Our plan is to demonstrate to potential customers, in a month or a month and a half, a mobile version of the «Malachite» wherein the antenna will deploy within 20 minutes simply by pressing a few buttons. In addition, a telescopic rotary lifting arm will be employed enabling vertical extension of the antenna mast to the height of up to 10 meters.

It should be mentioned that we have revised some of our approaches to the one-single-chassis solution. Indeed, having an antenna system and related control post accommodated on one single vehicular platform would improve the systems' mobility performance. However, this may have implications for the safety of the operator team, this is because the radiating antenna often makes an easy target for enemy fire. If operating crew survivability is to be ensured, it appears more feasible that the antenna will be located at a certain distance from the hardware vehicle.

We removed none of the vehicular platforms from the composition of the radar system, but, instead, provided for a capability enabling the antenna on the towed platform to be deployed independently of the platform with the hardware component. By so doing not only we improve crew survivability, but, also, enable the antenna system installed on a towed platform together with the rotary lift-

ing arm to be accommodated on a KrAZ-type truck chassis or on an otherwise suitable platform. As a matter of fact, this means a possibility of creating a new mobile antenna system that could be offered as a standalone product.

DE: How have your relations with partners in Russia and Belarus changed following the events in the Crimea and eastern Ukraine?

VK: In fact, relations with our partners in those countries have been terminated. At one time, our radar system «Malachite» was adopted for integration with the upgraded S-125 SAM system which Russia was planning to deliver for export. However, this has not occurred, due to the current events. As far as I know, a version of the P-18 system currently being created by Lianozovo Electromechanical Plant will be employed here in place of the Malachite.

A similar situation is present with another our partner from Belarus, who undertook to provide a rotary lifting arm for the «Malachite». This did not become critical for us, as we have found a partner in Ukraine, who will make the equipment that we need.

Generally speaking, cooperation with Russia is not critical for us, because we make almost everything on our own.

DE: Your Company's product range includes millimeter wavelength radars «Lis» and «Barsuk», which, in the current situation, would be very helpful with their ability to detect border intrusions. Is interest in these capabilities being observed on the part of Ukraine's military and security sector organizations?

VK: The first batch of 39 "Barsuk" system units was delivered seven years ago. The equipment was then shelved in warehouses until it began to be required – not only by the MoD or the State Border Guard Service but, also, by the ordinary people just concerned about helping our soldiers in the east. Our radar gives the soldier a limited situational awareness at night time.

Now we offer a comprehensive solution based on these designs. The millimeter wavelength radar systems that we have produced, tested and evaluated in operational settings could be installed onto domestically built armored personnel carriers equipped with thermal imagers and daylight cameras. The radar would provide a day/night capability for the detection of moving targets in a predetermined sector of interest, with the thermal imager and daylight camera employed as a complementary means of detection. Indeed, such a complex solution is costly, still it will be much cheaper to buy than equivalents offered by Western suppliers. But most importantly, this would save lives of our soldiers. Providing a Company-size unit with one or several vehicle equipped with such capabilities would be a force multiplier for the unit as a whole.

COMMENT BY COL. OLEKSIY BELAVIN, CHIEF OF ENGINEERS, UKRAINE'S AIR FORCE

For now, we will give positive feedback on performance of the "Malachite" radar station. Although operated for a short time so far, these recently-delivered stations are now actively employed by radio-radar units and proved themselves sufficiently effective and useful. There were some imperfections detected, which were promptly removed by Ukrspetstekhnika as part of in-service support, and we are grateful to HC «Ukrspetstekhnika» for the modern radars that provide us a capability for monitoring the airspace over Ukraine. We are interested in these stations and will continue to buy them again. Now we are looking forward to further improvements to the Malachite's performance with regards to mobility and reduced time into and out of action.

DE: What other products from your Company's portfolio could be helpful to our army?

VK: We can see the enemy using unmanned aerial vehicles in the area of the conflict. Our Company offers the Ukrainian army a product named "Enclave», which is specifically designed to deal with threats of this kind. It has long been tested and evaluated, and can be safely used for handling the challenges faced by the army.

Moreover in eastern regions of Ukraine, cell phone technologies are used intensively for the delivery of communications of various kinds, and there is a risk of remotely controlled explosive devices being used against our forces or vehicles. Therefore there may be a requirement for the counter-radio-controlled explosive device jammer that we produce, which can jam all mobile signals within a 200m+ radius.

In general, we have products to offer that will be helpful most notably in the current situation. Just one small thing is all that is needed – the funding of the security sector so that they could buy our products. UDR

Interviewed by Anton Mikhnenko

TABLE 1

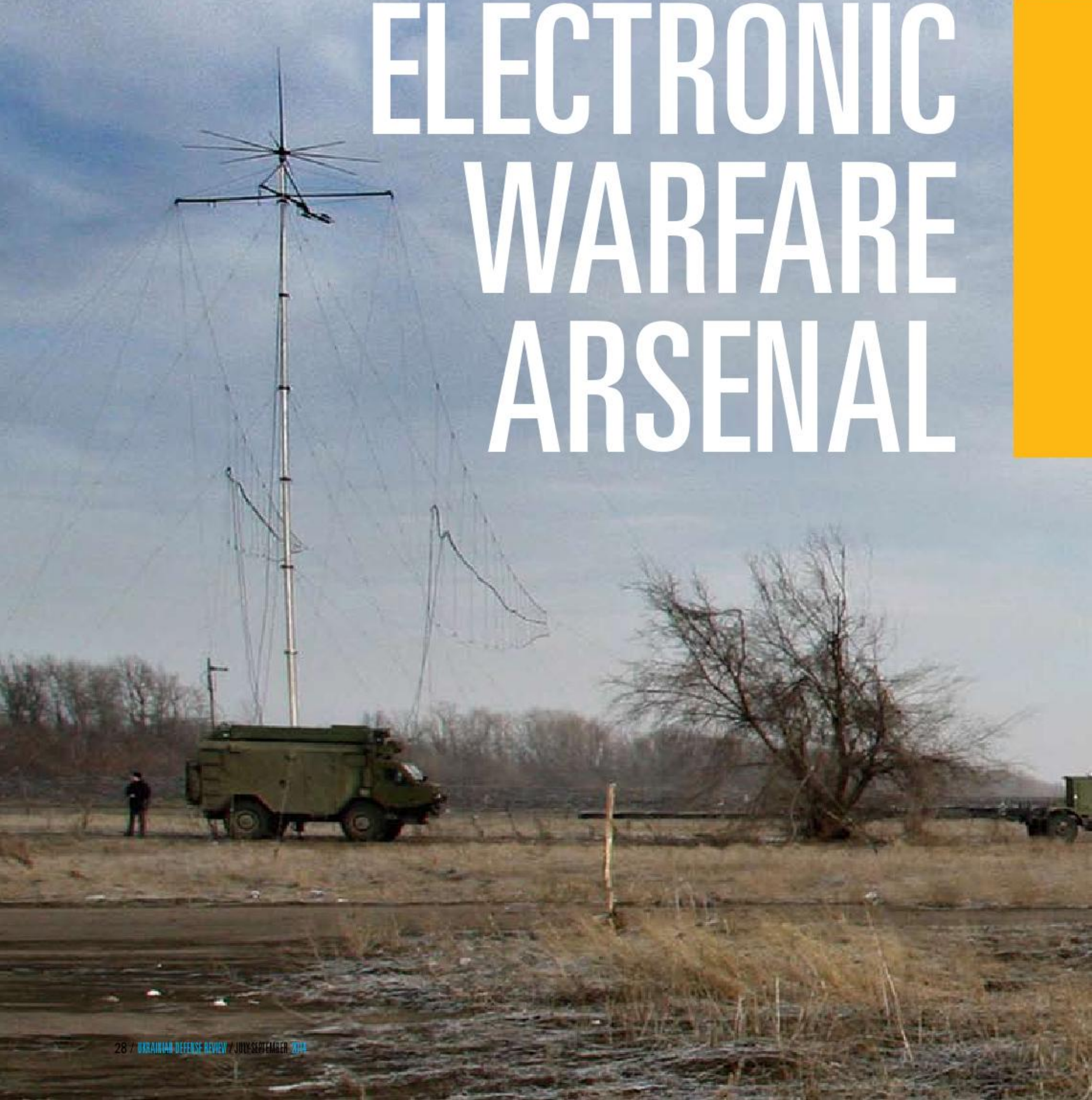
	Baseline P-18, prior to the upgrade	P-18MA/ P-18U, NPO Aerotechnika»	P-18M, NPO LEMZ	P-18MU, HC Ukrspets-technika	RLS Malachite, HC Ukrspets-technika	P-18M, OJSC Tetraedr	P-18M, SDB "SKTB Granit"
Operating frequency range, *MHz*	150-170	140-180	150-180	150-170	150-170	150-180	—
Target coordinates being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

TABLE 2

		Malachite-M, HC Ukrspetstechnika	Vostok-E, DB Radar
1	Target coordinates determined	Azimuth, range, radial velocity	Azimuth, range, radial velocity
2	Frequency tuning method	electronic	electronic
3	Fighter-type target detection range, H>10 km, km	400	350
4	Small-size low-flying target detection range at H=100/1000 m, km		
5	Range, m	Up to 100	150
6	azimuth, degrees	0.4	5.5
7	radial velocity, m/s	10	10
8	Maximum number of targets being engaged simultaneously	256	>120
9	Ground clutter suppression ratio	> 40 dB	> 40 dB
10	Sea-target handling capability	available	unavailable
11	Number of vehicular platforms required for transportation	1 vehicle	2 vehicles
12	Into-action time, min	25	8

[hi-tech]

ELECTRONIC WARFARE ARSENAL



The electronic warfare (EW) component is a key factor of success in a modern military operation. Lessons learnt from recent conflicts show the exceptional importance of the EW component, which becomes a true force multiplier allowing battlefield capabilities to be employed with greater effectiveness and efficiency. Ukrainian engineers traditionally have had a broad range of designs to offer in this high-technology area.

In Ukraine, key players in the area of EW R&D and production of EW equipment are the Complex Automation Research Institute (CARI) of Donetsk and "Topaz" Holding Company, which both are part of the State Concern "Ukroboronprom". These two companies are credited for creating EW countermeasure systems such as "Mandat-B1E", "Liman" and "Garant" — each designed with its own functionality and mission set.

The MANDAT-B1E jamming complex was designed by Topaz state joint-stock holding company for the detection, direction finding and analysis of signals used in modern radio communications, for identifying the co-

Alex Serduk,
Exclusively for UDR

ordinates of threat radio beaming sources and jamming communication channels within the 1.5-1,000 MHz working frequencies range. At the same time, the system is capable of generating frequency/phase-synchronized spot/barrage jamming beams to disrupt and disable land-based communications.

The MANDAT-B1E jams radio communication lines, both fixed and programmable frequency-hopping, regardless of the type of modulation used. The system ensures effective jamming of up to 105 fixed-frequency radio communication lines or up to 18 hopping-frequency radio communication lines within the entire range of its working frequencies.

The system allows for information on hostile electronic emissions to be obtained and displayed in real time. It also supports work with electronic maps of the terrains of interest, and provides identification of priority jamming sectors; control over and jamming of hostile communication channels; detection of new hostile emitters while jamming the earlier detected ones; accumulation, documentation and storage of the information obtained; transmission of output reports to authorized users via communication links.

The MANDAT complex is installed on KrAZ-type cross-country truck chassis, enabling the system to be rapidly redeployed even on difficult terrains. The system's stations are equipped with autonomous power supply units, air conditioners as well as ventilation and heating systems. The equipment in the stations can operate at ambient temperatures ranging from -50 C to +50 C, which means that the system is suitable for employment in almost all regions of the world.

The system's designers recommend the following optimum composition of the system:

- R-330PM control station (mounted on the KrAZ-type cross-country truck chassis);
- three R-330UK PC-based HF/VHF ECW surveillance
- radar stations (mounted on the KrAZ-type cross-country truck chassis);
- three R-330KM2 PC-based HF jamming stations (mounted on the KrAZ-type cross-country truck chassis);
- three R-330UM2-1 PC-based VHF-1 jamming stations (mounted on the VEPR-type armored vehicle chassis);
- three R-330UM2-2 PC-based VHF-2 jamming stations (mounted on the VEPR-type armored vehicle chassis);

At the same time, two PC-based ECW reconnaissance stations and two jamming stations for each frequency range is the minimum possible composition of a complex.

As you know the importance of highly effective air defenses has recently increased dramatically in proportion to the value of combat aircraft in the modern-day warfare. The State Enterprise "Complex Automation Research Institute" (CARI) of Donetsk has designed and built a ground mobile air defense electronic countermeasure (ADEC) system which received designator LIMAN.

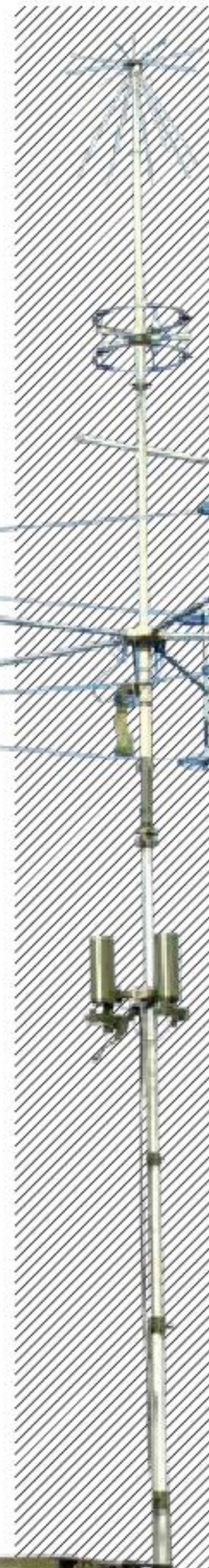
The ADEC system LIMAN is designed to protect ground targets against aircraft attacks by means of jamming hostile aircraft navigation and radio communications links with airborne or ground support platforms.

The LIMAN automatically searches and intercepts radio communication and navigation-aid signals, whether fixed or frequency-hopping. It can jam a specific frequency or can be used to barrage jamming across a large portion of frequency band to deal with frequency-hopping (HAVE QUICK) systems. The maximum jamming range is 450 km.

A standard ADEC LIMAN battalion consists of:

- early warning communications monitoring radar system;
- from four to eight 225-400 MHz jammers SP-1;
- from four to eight 960-1215 MHz jammers SP-2

The number of jammers in a LIMAN battal-



Jammer "Liman-P1" (left) and Control Station "Liman-PU" (right)

ion, which can amount to 16 units maximum, varies with mission scenarios and the combat objectives to be achieved.

The system is truck-mounted on the chassis of KaMAZ, Ural, KrAZ, ZIL or similar platforms, and provisions are made for installing the system on the chassis of the BTR-70 armored personnel carrier. The jammers can operate either collectively or independently.

The LIMAN ADEC system provides the interception and jamming of hostile aircraft radio emissions, enabling an air raid to be disrupted just before it actually beings. Its range of capabilities includes the interception, classification, friend-or-foe identification and jamming of aircraft communications and radio control data links with airborne mission support platforms at ranges of up to 450 kilometers, and robust suppression of hostile aircraft radio communications systems at ranges of up to 200 kilometers. This is a rapid-response system, with the time interval between the detection of hostile emissions and the start of jamming transmission not exceeding 3 μseconds. The jamming envelope covers a 200x200-km area if hostile emissions are coming from 4,000 meters. For low-flying air threats at altitudes of 1,000 m and 500 m, the jamming range is set at 100 km and 70 km, respectively.

In Kiev, the CARI, a state-owned enterprise, has designed and built a highly effective EW [electronic warfare] countermeasure system designed to jam the signals of remote control (RC) switches being used to trigger roadside bombs or improvised explosive devices (IED) throughout the frequency range. The Ukrainian-designed RCIED jammer system designated GARANT (which means 'guardian') is designed for vehicle use (military convoys, lone automobiles, tanks and armored vehicles), or fixed-installation protection. Adequate protection is provided by jamming the signals of RC initiators and preventing them from functioning at a distance. This is accomplished by setting up high-power broadband barrage jamming creating around the jamming carrier vehicle a 'secure bubble' area impervious to hostile radio transmission from RC triggers, which covers the entire frequency range employed by RC initiators and is powerful enough to protect a vehicle convoy. The GARANT equipment kit includes three RC link jamming units (designated BPRL-1, BPRL-2 and BPRL-3), each comprising four active jamming dispensers complemented with one highly-productive ultra-broadband omnidirectional-beam flagpole antenna array. In all, the system uses 12 jamming units (each covering its assigned frequency band) and only three antenna arrays. GARANT is kind of a unique design which in its many aspects far surpasses western-designed alternatives. What makes the Ukrainian design truly unique is the broadband flagpole aerials employed in the GARANT RCIED jammer. Western equivalents, for example some of the French make, employ ded-

icated aerials specific to different parts of the frequency band (each radio transmitter, to be precise) – in all 12-14 antenna arrays as compared to GARANT's three. GARANT can be mounted on transport vehicles of all kinds (automobiles, armored personnel carriers, tanks and other AFV types), while foreign-designed equivalents (Russian, German or French) require a dedicated platform to be carried, with consequent inconveniences related to the need to assign such a dedicated platform to each vehicle convoy or even a standalone vehicle under protection. The GARANT with a baseline equipment fit includes attachment hardware optimized for the KamAZ-class truck platform. The attachment hardware can be custom-configured for any vehicle type, depending on specific assignments or the scenario's challenges. GARANT equipment kits are mounted on Ukrainian Army tanks used for RCIED countermeasure operator training. The baseline GARANT equipment kit includes one power supply unit for each of the three BPRL jamming units. The power supply unit is built into a standard housing with integral batteries. The BPRL unit can be configured for all types of power supply units from all suppliers. The jammer's output power is optimized in such a way so that to neutralize RC triggers to best effect but to give the operating crew as little as practical exposure to RF radiation.

Each of the BPRL units with an assigned antenna array weighs no more than 16.40 kg. In operating configuration, the antenna arrays for the BPRL-1, BPRL-2 and BPRL-3 units have heights of 2,880 mm, 2,500 mm and 800 mm, respectively. The jamming dispensers can be operating using 12 V power supply units or an external 11.5-14 V supply. Each BPRL unit (with four of its jammers operating all at a time) has an operating time of 60 minutes on two rechargeable batteries. In transport configuration, the GARANT equipment kit is transportable by railway, road, sea or air. Equipment options include a wideband directional-beam antenna designed to be mounted on fixed installations for jamming RC signals in a localized area.

The Ukrainian protection systems are understood to be a unique and all-capable means of neutralization and disablement of hostile radio communications, allowing terminal effectiveness of enemy combat devises to be reduced considerably. UDR

[technologies]

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

The Adros KT-01AV, developed and patented by Adron, is being manufactured by the Progress research-and-production complex in Nizhyn, near

ANTIDOTE FOR MISSILES

UKRAINIAN RECIPE

CAPABILITIES AND POTENTIALITIES OF THE ADROS OPTICAL-ELECTRONIC JAMMING SYSTEM

Alex Serduk
for UDR

Kyiv. The 20-kilo system is designed to equip MI-24 and MI-8/MI-17 helicopters. This has been tested on board MI-8 and MI-24 helicopters. Ukraine also offers potential buyers an export configuration of the system, designated Adros KT-01AVE.

HUNTING FOR AIR TARGETS

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

That day in August 1969 became the evil day for the Israeli Air Forces, when six fighter bombers never came back to their home base after an assault on Egypt's army positions. The Air Force Command was perplexed, because the jets were piloted by highly-professional pilots with a vast experience in combat operations. In addition, the bulk of the enemy's air defense weapons had been destroyed by that time, at least in the regions where the jets were missing. The Israelis would have been comforted to consider what had happened to be a tragic accident. But this was not the case, which they saw very soon, having lost 23 warplanes in just 17 days. Moreover, the fighters were downed while attacking seemingly defenseless truck convoys or Arab positions outside air defense umbrellas. As the Israelis seemed to believe, a fighter aircraft, guided by air-, ground– and radio intelligence, attacks a trench line, where the hazard can only come out from machine guns. But if a plane ignites and explodes in the air, there is no way how this can be caused by fire from small-caliber weapons. Soon the army intelligence found out that the planes had been downed using Soviet-made MANPAD (man-portable air defense) missile systems Strela (Arrow). That was one of the first times when that system was employed in a combat operation.

Americans, in turn, had developed a MANPAD missile system of their own, known as Stinger, which was first applied in combat in Afghanistan in 1986 to down Soviet military airlifters and helicopters. This prompted warplane designers to equip aircraft with JPS jamming systems and "thermal traps", and pilots had to hurriedly learn how to fly at very low altitudes. It had not taken long for MANPAD missile systems to become the number-one antiaircraft weapon for an array of rebel, revolutionary and national liberation movements – in a word those to whom more powerful weapons were unavailable because of the lack of cash and, more importantly, adequately-trained operators.

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

ANTIDOTE FOR MISSILES

Protection of both military and civil aircraft from IR-guided MANPAD weapons like Sidewinder, Red Eye, Chapparel, Piton,

Xiuning-5 or Stinger is normally provided using false thermal targets and electronic-optical active jamming systems. Operation of electronic-optical active jamming systems for the protection of military and civil aircraft depends on the principle of modular jamming of infra-red radiation. This type of protection does better than the elimination of false thermal targets, as the latter implies an expendable protection reserve which is limited. Conversely, electronic-optical active jamming systems provide reliable protection as long as the flight continues, while remaining virtually non-sensitive to the target discrimination devices employed by IR seekers. Field testing and the use of electronic-optical active jamming systems in combat operations demonstrated their high performance and operational reliability. The systems effectively defeat a few types of IR-guided missiles, providing an adequate protection against multiple threats flying from many directions all at once, and eliminating the need for the use of special missile attack warners. The systems are easy to operate and suitable to maintain even in field conditions. Light and compact, these are easy to integrate onto helicopters from various manufacturers.

UKRAINIAN SOLUTION

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

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

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

TABLE

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

The technology incorporates a newly-designed electronically-controlled modulator with programmable processors.

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

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

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

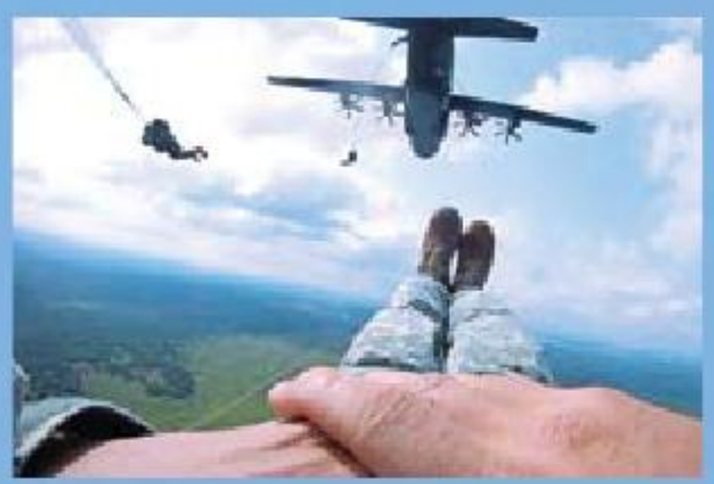
[see what we can do!]

FROM HEAVEN

IHOR SYLA
section leader, senior test parachutist, State R&D and Test Center of the Ukrainian Armed Force

VOLODYMYR KOPCHAK
Defense Express

FREE-FALL JUMP OF UKRAINE'S PARACHUTE INDUSTRY



TO EARTH

Armed forces in many countries worldwide, including the United States and the Russian Federation, are currently modernizing parachute equipment in their inventories, replacing obsolescent systems with more up-to-date designs. While relevant American programs have been oriented exclusively in favor of domestic suppliers from the very beginning, for the Russians it took some time to turn to indigenous designs in the parachute technology domain. Ukraine seems to be inclined to deal with this issue (which is equally if not more pressing in Ukraine than in the USA or Russia) on its own ...

Ukrainian Airborne Troops still have to use parachute systems that date back to the USSR. The current inventories of the Ukrainian armed forces' Airborne Troops and Special Operations Forces include personnel parachute systems D-5 Series 2, D-6 Series 4, PV-3, Z-5, Z-5 Series 2 and Z-6. Eighty percent of this inventory is slated for decommissioning due to shelf life expiration.

At the turn of the 2000s, most of the airborne, emergency rescue and parachute systems inherited by the Ukraine Armed Forces from the Soviet army had worked out their estimated service life. These systems were kept operational for a certain time past their estimated service life due to running repairs or life extensions. Anyway, by 2013, all the existing parachute systems in the Ukrainian Armed Forces inventory had become obsolete and worn-out.

New and expensive parachute systems (particularly emergency parachute systems for aircraft crew members) were purchased in limited numbers from Russia, who had long been regarded the leading military parachute manufacturer on the former Soviet expanse. Chronic underfunding of government defense programs, unavailability of bank loans, a lack of modern materials on the domestic market and a shortage of skilled professionals all contributed to slow progress in the development of parachute technology in Ukraine.

However, thanks to the efforts of dedicated like-minded enthusiasts, not only did Ukraine manage to preserve its R&D and production capabilities, but to improve and use them to their full capacity to fully meet the national Armed Forces requirement for parachute systems. Two defense companies in Feodosia – the Research Institute of Aeroelastic Systems and Advanced Parachute Technologies Ltd — realizing the urgent need for parachute systems, made several decisions that enabled them to launch R&D on parachutes of almost all types. As is often the case, relevant projects were funded mostly by the two companies' operating assets. Due to this difficult decision, deliveries of new parachute systems to the Ukraine Armed Forces began in 2004:

- In 2004, the Personnel Parachute System (PPS) and Reserve Parachute System (RPS) replacing the Soviet-designed D-6 series 4 and

Z-5, respectively, were introduced into service;

- In 2009, the Training Parachute System "Scout" was introduced into service, replacing Russian-made training parachute systems D-1-5 of various series (parachute systems of this type had not been produced in Ukraine before);
- 2012 saw the introduction into service of the "Bars-S" Sport Parachute System replacing obsolete Soviet-designed sport parachute systems PO-9 of all series, PO-16, PO-17 and "Talka" of all series, as well as the U.S.-supplied "Para-Foil" system. The Bars-S is offered in two sizes of the main parachute's cupola (parachutes of this type, again, had not been manufactured in Ukraine previously).
- 2013 saw the introduction into service of the STATUS-SN Special-Purpose Parachute System replacing obsolete Russian-designed sport and special-purpose systems PO-9, PO-16 and Lesnik-2 (Ukraine never produced parachute systems of this type previously);
- The same year 2013 saw the introduction into service of the Steerable Reserve Parachute System PZ-81F (PZ-81-FT) replacing the worn-out Reserve Parachute System PZ-81. The PZ-81F is designed as a reserve parachute for use with the Bars-S and Status-SN main parachutes. Parachute systems of this type had not been produced in Ukraine before.
- During 2012/13, work on blueprints was completed, and Approval for Service Use (ASU) documents are now being drawn up for the strapdown parachute (SDP) systems Shelf-1 and Shelf-2, as well as the cargo airdrop platform P-7 for use with the cargo parachute system MKS-760F replacing the MKS-360.

Experts have long debated on what kind of systems are more suitable for use for disembarkation or retrieval of special operations personnel in confined spaces. Based on a study of global trends in methods of delivery of forces, a decision was made in favor of developing a nonparachute insertion/extraction system (fast rope systems have been used for longer than 40 years by NATO forces). In 2013, the Ukraine Armed Forces fielded the detachable "Adapter-M1" fast rope insertion and extraction system tailored to the Mi-8 rotorcraft. With cargo bay doors dismounted, the Adapter-M1 allows for simultaneous descent on one or two ropes, each rope carrying up to two personnel sliding down simultaneously.

With the fast extraction rope hoisted in the helicopter's center of gravity, the Adapter-M1 allows for up to six personnel to be extracted simultaneously. Extraction is allowable when the helicopter is flying no faster than 70 km/h and no higher than 100 meters over the surface. Equipment of this kind is so far unavailable to any of the former Soviet armed forces excepting Ukraine's. Adapter-M1 systems began to be delivered to Ukraine's Security Service (SBU), Ministry of the Interior and Armed Forces units.

It may indeed be argued that due to the decisions made and the timely identification of priorities, Ukraine has managed to preserve the entire sector of its parachute industry, specifically the one dealing with the design, development and manufacture of parachute systems for air assault, special operations and Air Force applications. The parachute systems developed over recent years in Ukraine have laid the ground for growth and further innovatory activity in the industry.

There is an urgent requirement for such equipment, and rolling deliveries would provide the Armed Forces and the whole securi-

The Training Parachute System "Scout" ("Scout-L") has been in the Ukrainian Armed Forces' service for the fourth year now. The Scout-L system is intended for basic training of air pilots and paratroopers in jumping a round parachute, as well as teaching (with certain limitations) rescue parachutists and paratroopers about how to perform special airdrop missions, both in solo and in team.

ty sector with new indigenous production-standard parachute systems. Moreover, this effort has already yielded some practical results. At this moment, however, these results are far away from the expectations of both the Armed Forces and the designers. The year 2007 saw the "peak of exodus" of almost 80 percent of the current parachute equipment stock that is slated for decommissioning due to shelf-life expiration, resulting in a requirement gap which has since that year been filled with indigenously designed parachute systems (recall that the requirement gap is currently estimated at 10,000 parachute system units). The designers claim that with full, timely and smooth funding, the domestic parachute industry could deliver over 1,500 systems every year. However, as things stand now, the Ministry of Defense has procured no more than about 1,000 new parachute systems of different types over the past seven years. As regards the most state-of-the-art indigenous systems such as the "Status", only a meager two dozen or fewer such systems have been delivered to all the security sector organizations so far (this despite the fact that 300 parachute systems in this category were to have been procured in 2008 alone). As we can see, problems with funding for the MoD's requirements are nowhere near over. It appears that the exact same financial reasons have brought to a halt (temporarily, we hope) projects on the future radio controlled GPS-guided cargo delivery system (tentatively codenamed PGS-4000) and the PGS-100 cargo airdrop system.

So it appears that the Airborne Troops' requirement for parachute equipment will have to be met by performing life updates on existing inventories (both in terms of the number of uses and the duration of service life). For now, life updates have been performed on parachute systems in numbers enough to maintain the Airborne Troops combat effective and to meet the service's training requirements. However it must be appreciated that most of the systems that undergone life updates remain to be obsolete and worn-out, and so they still need to be replaced with new up-to-date equivalents.

Indeed, parachute systems could well be procured from foreign suppliers, albeit at a much higher price than the indigenous counterparts. But one should keep in mind that domestic development and production of major weapons and military equipment types means not only the provision of current requirements of the national armed forces but, more importantly, comprises

A flying-wing type system, the "Status" Parachute System was designed specifically for application in Special Operations Forces. The "Status" is planned for deployment with special operations regiments and the Airborne Troops' Marine Special Operations Center. "The "Status" Parachute System is by all criteria beneficial to us. Importantly, it has a stabilizing component that provides benefits both in terms of separation from the host aircraft and in terms of training of personnel. The new system provides better performances in terms of horizontal speed and accuracy of landing," experts claim.

part of the country's technical, technological and economic independence. This means employment generation, the preservation of R&D capabilities and a growth of production capacities of system integrators and component suppliers. As one expert put it, "These systems are no better or worse than foreign-designed counterparts, still they are ours, the indigenous systems". After all, development and production of this technology is beneficial in terms of the export market opportunities, especially considering that far from all countries can boast of having a domestic parachute industry, and that parachute equipment is selling very well on the global market.

WHAT IS OUR "STATUS" LIKE?

As mentioned above, parachute modernization programs are progressing in the USA and the Russian Federation along with Ukraine. We are talking about personnel airdrop systems in the first instance, and in this case the Ukrainian Armed Forces made choice in favor of the indigenous system "Status-SN".

New Russian-designed parachute system D-12 'Leaf". The system has both parachutes, the main and and reserve, placed in one pack on the back, while a cargo container and personal weapons are placed in front, giving the soldiers more flexibility during descent and landing. The D-12 'Leaf" has all-up weight of 165 kg.

Let's start with a brief description of the Training Parachute System named "Scout" ("Scout-L"), which has been in the Ukrainian Armed Forces' service for the fourth year now. Designed and developed by Feodosia-based "Advanced Parachute Technologies", the Scout-L system is intended for basic training of air pilots and paratroopers in round-cupola parachute jumping, as well as for teaching (with certain limitations) rescue parachutists and paratroopers about how to perform special airdrop missions, both in solo and in team.

The future special-purpose parachute system "Status-SN" is designed for basic training of paratroopers and other specialist personnel. It can also be used as means of insertion for combat-loaded personnel (with or without personal equipment) on special missions, in open terrains or confined spaces, in solo or in team.

In terms of its mode of functioning, applicability, and storage and transportation conditions, the Status-SN parachute system is similar to the Lesnik-2 counterpart. The main parachute is of ruggerdized construction for extended life span. So the new indigenous system is fully prepared to replace currently deployed previous-generation systems.

Ukraine's Airborne Troops have already tested the Status-SN in near-real-life operations, particularly during the Ukrainian-American international military exercise, Rapid Trident 2013, that took place place at the Yavoriv International Peacekeeping and Security Center of the the Ukrainian Army Military Academy. The

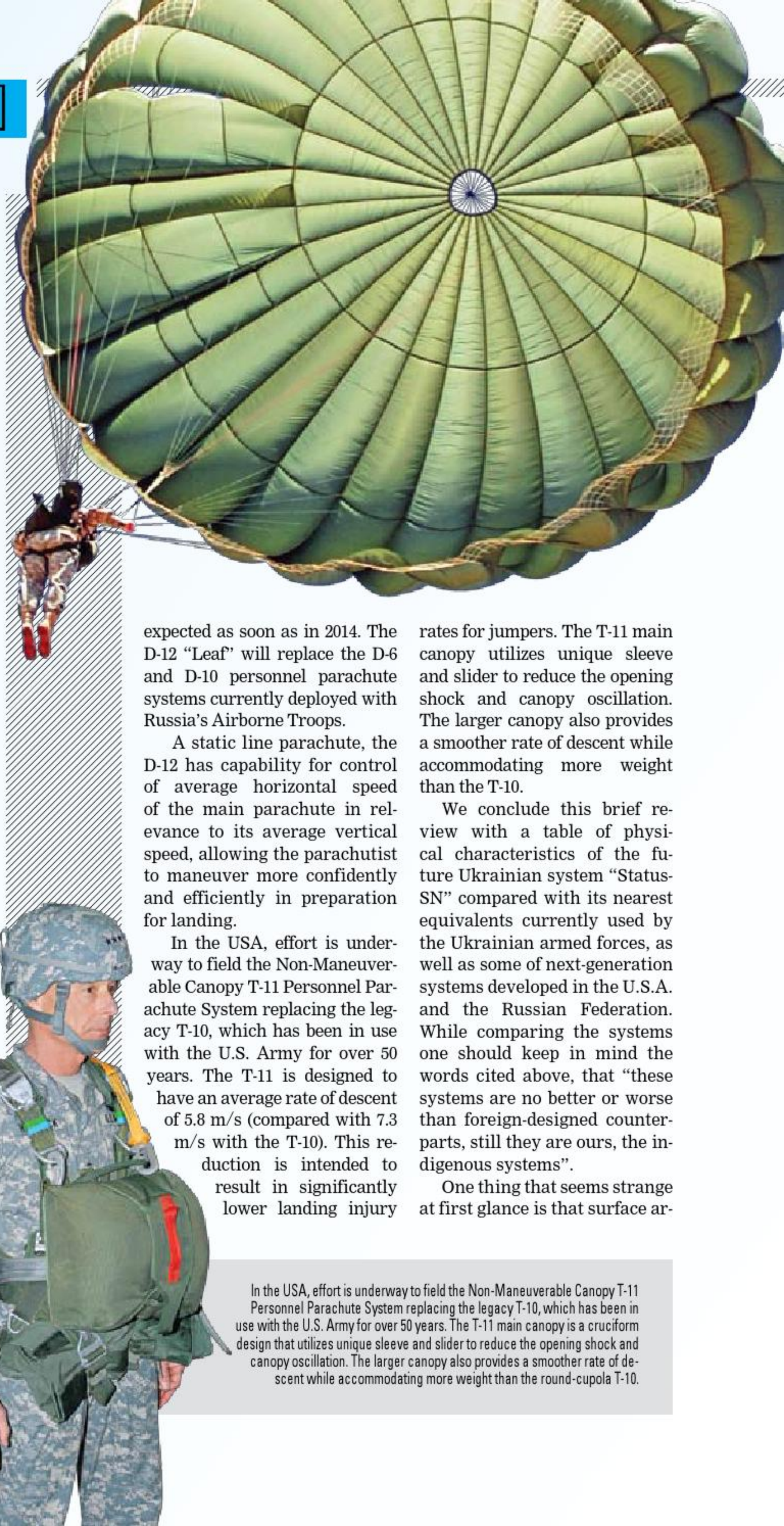
IHOR SYLA,

section leader, senior test parachutist, State R&D and Test Center of the Ukrainian Armed Forces:

«Two defense companies in Feodosia – the Research Institute of Aeroelastic Systems and Advanced Parachute Technologies Ltd — realizing the urgent need for parachute systems, made several decisions that enabled them to launch R&D on parachutes of almost all types».

Type – static-line parachute. "Scout/Scout-L" Parachute System. Key specifications and performance characteristics:

All-up weight	**70-125 kg**
Main canopy surface area	**83 m²**
Max. opening shock force	**10 G**
Aircraft speed range	**0...250 km /h**
Deployment altitude range	**150....3,000 m**
Average landing speed	**≤5 m/s**
Max. horizontal speed	**2.5 m/s**
360-degree turn time	**≤ 12 s**
Emergency reserve parachute	**Z-5 ZPS**
Assembly weight	**≤ 11 kg**
Life Limit (number of deployments)	**600**
Service life	**20 years**



exercise included parachute jumps performed by personnel of the 95th Independent Airmobile Brigade and 80th Independent Airborne Regiment of the Ukrainian Armed Forces, as well as participating paratroopers from Poland, Romania and Moldova. The new Ukrainian parachute systems performed flawlessly and accurately.

In Russia, the Scientific Research Institute of Parachute Design and Production developed the D-12 "Leaf" assault parachute system. The new system has both parachutes, the main and and reserve, placed in one pack on the back, while a cargo container and personal weapons are placed in front, giving the soldiers more flexibility during descent and landing. Being lighter than the D-10 model currently used by Russia's Airborne Troops, the new system has all-up mass of 165 kg as against 140 kg with the D-10.

The Russian designer had long encountered problems that are so familiar to Ukrainian counterparts, including the need to fund R&D at its own cost and risk, frequent interruptions in funding from the government etc, and furthermore, until recently, the Russian MoD intended to procure parachute systems from foreign suppliers. We also well remember that focus on Western-designed technology was a general trend at Russia's defense department until very recent time. Now, the situation is exactly the opposite. Airborne Troops' experts are conducting tests of the new parachute system jointly with the Designer. Initial deliveries are expected as soon as in 2014. The D-12 "Leaf" will replace the D-6 and D-10 personnel parachute systems currently deployed with Russia's Airborne Troops.

A static line parachute, the D-12 has capability for control of average horizontal speed of the main parachute in relevance to its average vertical speed, allowing the parachutist to maneuver more confidently and efficiently in preparation for landing.

In the USA, effort is underway to field the Non-Maneuverable Canopy T-11 Personnel Parachute System replacing the legacy T-10, which has been in use with the U.S. Army for over 50 years. The T-11 is designed to have an average rate of descent of 5.8 m/s (compared with 7.3 m/s with the T-10). This reduction is intended to result in significantly lower landing injury rates for jumpers. The T-11 main canopy utilizes unique sleeve and slider to reduce the opening shock and canopy oscillation. The larger canopy also provides a smoother rate of descent while accommodating more weight than the T-10.

We conclude this brief review with a table of physical characteristics of the future Ukrainian system "Status-SN" compared with its nearest equivalents currently used by the Ukrainian armed forces, as well as some of next-generation systems developed in the U.S.A. and the Russian Federation. While comparing the systems one should keep in mind the words cited above, that "these systems are no better or worse than foreign-designed counterparts, still they are ours, the indigenous systems".

One thing that seems strange at first glance is that surface ar-

In the USA, effort is underway to field the Non-Maneuverable Canopy T-11 Personnel Parachute System replacing the legacy T-10, which has been in use with the U.S. Army for over 50 years. The T-11 main canopy is a cruciform design that utilizes unique sleeve and slider to reduce the opening shock and canopy oscillation. The larger canopy also provides a smoother rate of descent while accommodating more weight than the round-cupola T-10.

ea of «Status» cupola is only one third of that of the D-6, reducing significantly the range of deployment altitudes. The designer says the parachute systems D-6 and «Status-SN» are different types of systems that cannot be compared. The designer expects that with the attainment of full operational capability, concept of operational use of the "Status-SN" system might be adjusted to suit more specific needs of the Airborne Troops and Special Operations units.

At this moment, the situation with personnel parachute systems looks a stalemate. On the one hand, the need seems imminent to update specified parameters of the D-6 systems which have become obsolete and worn-out. However, this is not only unfeasible, but dangerous, because the condition of the existing inventory is such that it should have been replaced yesterday if not earlier. Given the slow rate of deliveries, Ukraine is still only at the initial phase of that effort. UDR

TABLE

Key physical characteristics of parachute systems

	«Lesnik-2» USSR	«D-6» USSR	«Status-SN» Ukraine	D-12 «Leaf», Russia	T-11 USA
Deployment altitudes, m	up to 2000	up to 3000	up to 3000		2286
All-up weight, kg	100	70-125	70-125	165	180
Aircraft speed range, km/h	140 – 400	140 – 400	140 – 400	–	up to 278
Max. opening shock force, g	16	10	10	≤ 7 (4.5 average)	–
Main cupola surface area, m²	22	83	22,4 – 27,8	90	115
Min. deployment altitude, m, (with 5 s stabilization)	600	300	600	–	150
Expected life limit, years	10	15	15	–	15
Assembly weight, kg	14	11,5	10	–	16,56
Average landing speed, m/s	5	5	5	4	–

UDR

VALERII RIABYKH
for UDR

"FED SAFE FLIGHT WITH

PARTS AND ASSEMBLIES THAT MAKE THE FLIGHT SAFER, MORE STABLE AND EFFICIENT

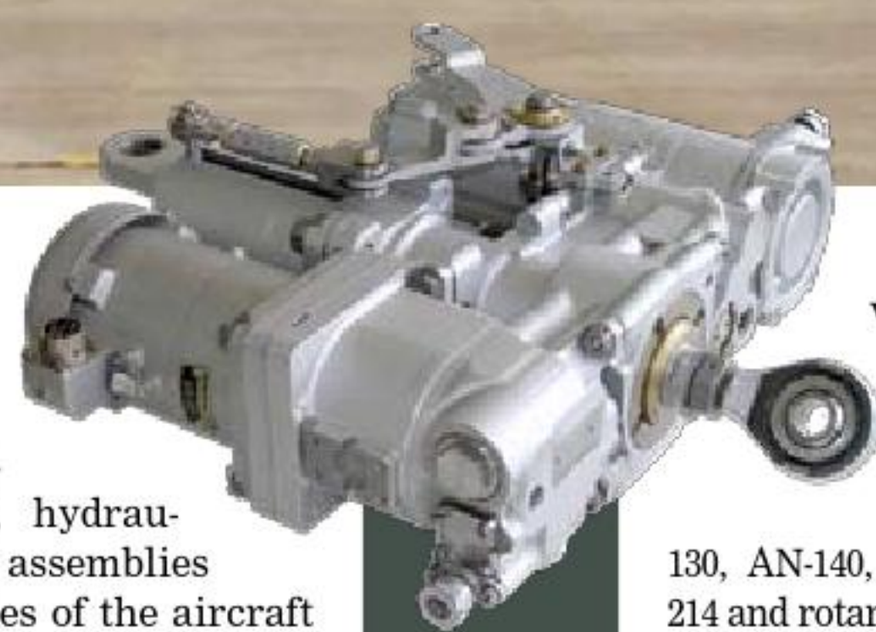
State-ownedEnterprise "Machinery Plant 'FED' of Kharkiv", which is part of State Concern "Ukroboronprom", produces precision fuel metering equipment, integrated hydraulic actuators, hydraulic motors, hydraulic pumps, pumping stations for the aircraft building and other sectors of the engineering industry. FED is currently the lead organization of R&D and Manufacturing Company FED, which incorporates Ukrainian businesses focusing on the design, development, manufacture, service support and overhaul of parts and assemblies for aircraft building and general engineering purposes. FED corporation also includes State-owned Enterprise "Assembly Design Bureau of Kharkiv" – Ukraine's top organization in the design, development, manufacture and testing of assemblies for the hydraulic, fuel metering and electrical systems of aircraft. Industrial partnership relations between the incorporated companies enable them to develop consistently and expand their customer base.

FED is the lead company of Ukraine's aircraft assembly industry, producing high-precision equipment for the aerospace industries, armored vehicles industries, railway industries and other sectors of the engineering business. Assemblies manufactured by FED are employed on all but every aircraft or helicopter being built in Ukraine and Russia, including the AN-72, AN-74, AN-124, AN-

140, AN-148, AN-158, Be-200, IL-76, IL-96, Ka-32, Ka-52, Mi-8, Mi-17, Mi-24, Mi-28, MiG-27, MiG-29, Su-27, Su-30, Su-34, Su-35, Tu-95/142, Tu-160, Tu-204, Tu-214, Yak-42 and Yak-130.

For equipping the new medium-range aircraft An-148, 22 products have been developed, certified and put in quantity production by the organizations affiliated with FED Corporation. These products include hybrid, integrated and electromechanical actuators of the primary flight control system, wing-flap systems, pumps and electrically driven pumping stations, hydraulic system assemblies and assemblies of the aircraft electrical power system. Companies affiliated with the FED Corporation provide 46 assemblies for each of the ready-for-integration aircraft AN-148.

Further to this, FED has launched new production processes for competitive product types designed for integration with engines TVZ-117 VM (VMA), AI– 222–25F, AI– 450, AI– 450MS, TV3-117-VMA– SBM1V, MS-400, MS-500, MS-350, which are installed on fixed-wing aircraft Yak-130, AN-140, AN-148, Tu-204, Tu-214 and rotary-wing aircraft of the Kamov and Mil series.



Automatic flight control unit ARP-20

The Company's Product Range currently includes:

- Integrated actuators (GP-21, GP-22, GP-23, GP-26, PGL-40);
- Assemblies of fuel systems, automatic control systems of aircraft engines NR3-VMT (VMA -T), NR3-VH, AUR-22, IM-3A, ND-450, ND-MS2, NR-2000, RT-2000;

- Different assemblies of flight control systems and actuators: ARM-19, ARP-20, ARP-21, AUVNA– MS2, RM-140, EPK-20, EPK-35, RM -140 and may more others;
- hydraulic system assemblies of installations: GA-213, GA-215; GA57/1U; NP70AM (-3), NS46,-2,-3,-6;
- Different assemblies of pneumatic braking systems for freight rail applications;
- Assemblies of armored military vehicles: hydraulic actuators, solenoid-operated pneumatic valves, driving control mechanisms.

FED also provides post-sales service support and maintenance for its assemblies.

FED owes its current successful performance to its consistent effort aimed at improving the competitive ability of its product range. This is facilitated by the availability of capacities for creating a closed-loop cycle of production and in-service support encompassing all of the processes — from the design and development, testing and evaluation, quantity production and quality control to in-service support, repair, maintenance and upgrade. FED Corporation has its own Design and Development Bureau and the capacities for rapid introduction of new processes and technologies.

FED has obtained certification verifying its compliance with ISO 9001:2008 and ISO 14001:2004 quality management standards; it holds valid Certificates from the Aviation Register of the Interstate Aviation Committee (IAC-AR).

The key to success for FED lies in innovative development and intensification of production (the path along which the Company has been going for a long time now); in launching and promoting new, more high-tech product lines by means of effective engagement between R&D and industrial communities, tapping into investment opportunities and commercializing R&D ideas. Effective R&D activities, the introduction and mastery of leading-edge processes and technologies based on fifth-generation mechanical processing equipment, metallurgical equipment and heat-treatment machinery, and mitigating production cost pressures should be the foundation upon which to further increase the proportion of high-tech, energy-efficient processes and to ensure that new-generation aeronautical technology meets the international standards in terms of flight operating safety. FED is planning to continue with the retooling and technical modernization of production processes, and with the insertion of state-of-the-art technical and technological solutions.

Flow control unit It is intended for fuel supply and automatic regulation of TV3-117engine. It is used on Mi-8T, Mi-24, Mi-28 and its modification, as well as Ka-27 Ka-28, Ka-29, Ka-30 Ka-32 Ka-50, Ka-52, Ka-60 helicopters.

FED is working closely with the premier Ukrainian and Russian aeronautical organizations such as JSC «Motor Sich», «Antonov», «Ivchenko-Progress», Kharkiv's Aircraft Factory, JSC «VASO», JSC «Irkut Corporation», JSC «KNAAPO «, JSC "Rostov Civil Aviation Plant # 412", OJSC "Samara Aircraft Factory 'Aviakor'», JV «Aviastar», OJSC «OMKB», OJSC «Rubin», OJSC «Crystal» and many more others. About 50 percent of FED's output is geared for the Russian market. At the same time, the Company is actively entering the Chinese market and forging strategic ties with Indian partners. FED is also working together with aeronautical companies in the Czech Republic, Southeast Asia, North Africa, Central and South America. This cooperation is focused on the export of components and assemblies of aircraft, as well as the provision of in-service support, maintenance, overhaul and rebuilding of aircraft. The Company is also looking for new market niches. To this end, it aims to comply with stringent requirements of these markets, especially as it concerns the development and industry adoption of innovative types of parts and assemblies. Nowadays, FED is successfully expanding its reach on the market for aircraft parts and assemblies, maintaining and improving its image as a modern aeronautical organization with a worldwide reputation. UDR

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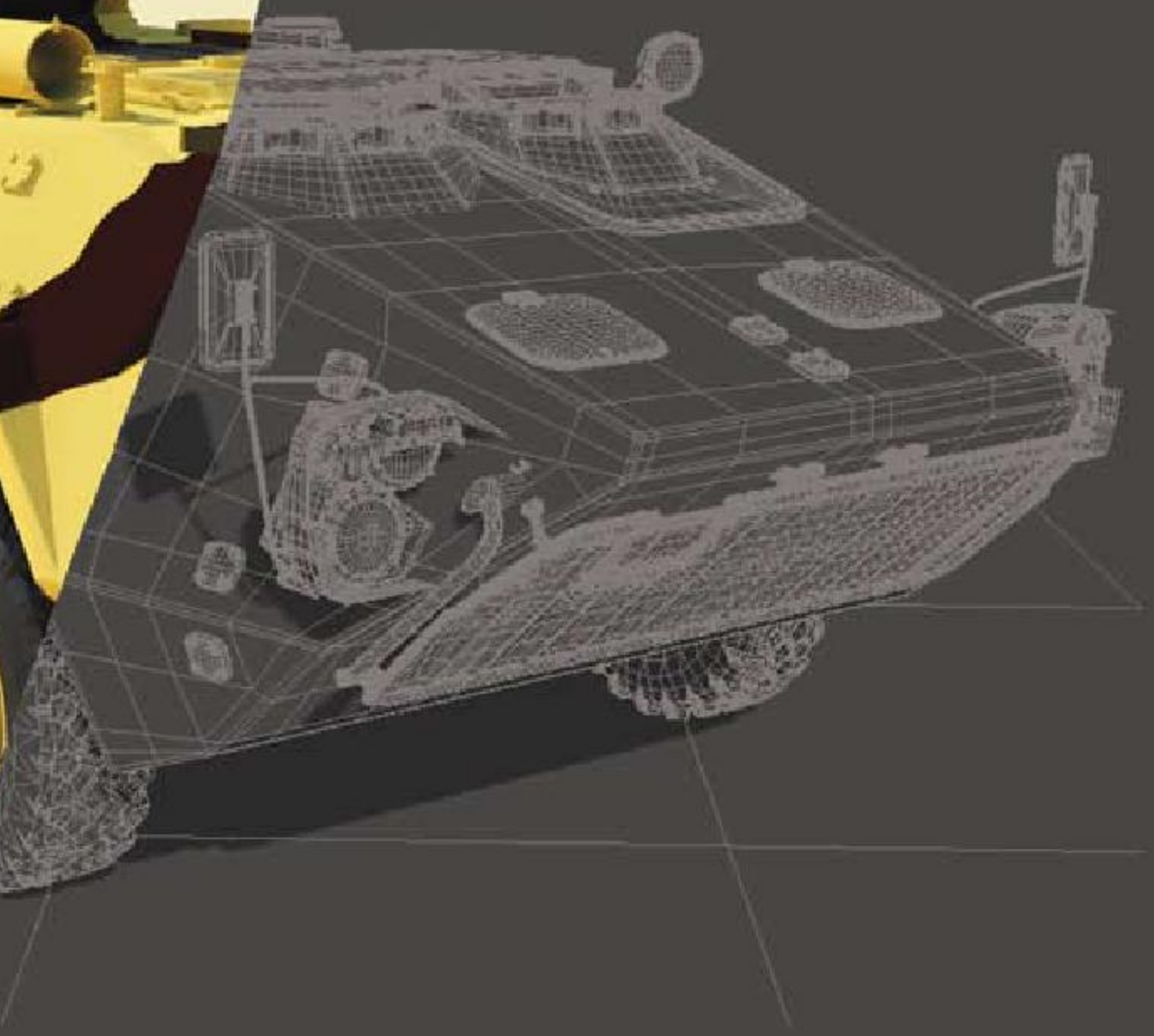
- Export of up-to-date technologies, design documentation and other research and development products of military.

- Marketing, engineering, consulting and mediating services in the sphere of foreign trade in armament and military equipment;

- Education and training of foreign specialists at military educational establishments of Ukraine and abroad.



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