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"PARTNER 2009" Weaponry and Military Equipment Fair

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THE third PARTNER 2009, Weaponry and Military Equipment Fair, held from 2 to 5 June 2009, was organized by the Jugoimport-SDPR and the Belgrade Fair under the patronage of the Ministry of Defence of the Republic of Serbia. The goal of the manifestation was to present defence technology and industry capacities of the Republic of Serbia as well as scientific achievements and offers of foreign defence industries to national and international audience.

Over 70 exhibitors from the country and abroad presented their products among which prevailed development projects of the Military Technical Institute (VTI) and the Jugoimport SDPR. A number of leading Serbian defence companies participated in the Fair, the most prominent among them being: ZASTAVA ORUŽJE – Kragujevac, KRUŠIK – Valjevo, PRVI PARTIZAN – Užice, SLOBODA – Čačak, MILAN BLAGOJEVIĆ – Lučani, UTVA – Pančevo, PRVA ISKRA – Barić, TRAYAL – Kruševac, PRVA PETOLETKA –Trstenik, IRITEL – Beograd, MILE DRAGIĆ – Zrenjanin, EDEPRO – Beograd, etc. Foreign exhibitors were from Austria, Belgium, Greece, Israel, Macedonia, Germany, Poland, Republika Srpska, Romania, USA, Slovenia, France and Sweden. Apart from weapon and military equipment manufacturers, several overhaul companies, e.g.: TRZ – Čačak, TRZ – Kragujevac, MOMA STANOJLOVIĆ – Batajnica and ORAO – Bjeljina, presented their capabilities at the Fair.

Fig.1. Open exhibiting area of the PARTNER 2009 Fair

At the Belgrade Fair visitors could see modern small arms, fire support artillery and missile systems, self-propelled and towed artillery systems, anti-armor combat systems, combat and non-combat vehicles, tanks and armoured vehicles, ammunition of various calibers and purposes, artillery and mortar fuze systems, mines, electronic reconnaissance and surveillance systems, telecommunication equipment, radars, C4 systems, UAVs, trainer aircraft, logistics equipment, antiterrorist and special operations equipment, personal protective equipment, etc.

When small arms are concerned, the visitors` attention focused on the CZ-999 pistol, the M-97 submachine gun, the M-21 assault rifle and the large caliber sniper rifle CRNA STRELA (Black Arrow), all the products of the ZASTAVA WEAPONS, developed in cooperation with the VTI. This company, founded in 1953, also exhibited a wide choice of hunting weapons as well as a 30 mm automatic grenade launcher.

The submachine gun is of 9mm caliber PARA with an effective range of 150m. Depending on whether it is equipped with a 20 or 30-round clip, without or with a stock, it weighs 2.85kg or 3.3kg, respectively. It can be optionally fitted with a folding stock, a laser target marker and a silencer. The operating principle is free bolt recoil. It is suitable for close combat in populated areas and counter-terrorist actions in hostage situations. It is primarily intended for equipping special force and reconnaissance units and for personal protection of combat vehicle crews.

Fig.2. 5.56 mm assault rifle M-21

The M-21 assault rifle, of 5,56x45mm caliber, reached a limit of 20,000 rounds fired during reliability testing, owing to its polygonally rifled barrel. The gas-operated rifle is designated on the basis of the Kalashnikov automatic system, which makes it highly efficient and resilient under all extreme climate and combat conditions. The folding stock, grip, frame and magazine are made of contemporary composite materials. The main subsystems fitted into this rifle are: M-21 optoelectronic sight with 3 x magnification and the field of vision of 14°, laser target designator, and 40mm underbarrel grenade launcher with the rate of fire of 12 rpm. Five different types of rounds are developed for this underbarrel grenade launcher.

Apart from its basic 12.7x107mm caliber, the CRNA STRELA (Black Arrow) rifle can be manufactured in .50

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Browning caliber on demand. With the effective range of 1800m and with the use of penetrating, incendiary and armor-piercing rounds, it is efficiently used for neutralizing light-armored and non-armored vehicles, grounded aircraft and helicopters, radar and communication systems, ammunition and fuel depots, individual targets, etc. The double-chambered reactive muzzle brake and two spring buffers inside the stock reduce recoil. The basic design of the *Mauser* bolt is preserved.

Fig. 3. 12.7 mm x 107 mm sniper rifle CRNA STRELA

The PRVI PARTIZAN exhibited a wide range of appropriate ammunition for all small arms models at display. After nearly 90 years of existence, this company offers over 300 ammunition types for pistols, rifles and small arms as well as for special, hunting and sports purposes. The wide assortments of the SLOBODA and the KRUŠIK, two companies with high-quality track records of a number of decades, included artillery and mortar ammunition from 20 mm to 155 mm calibers.

The modern multi-task ALAS (Advanced Light Attack System) missile system is based on a 25km-range guided missile, with turbojet propulsion which enables the maximum mid-course speed of 180m/s. The advantage of this missile system is that its cruising altitude is between 150m and 500m, thus making it considerably protected from enemy radars, while its relatively low IR signature, due to the turbojet engine, makes it hard to detect by TV or thermal imaging systems. The mid-placed engine is powered by air intake through air inlets mounted symmetrically to the longitudinal missile axis. The engine is of a conventional type with an axial compressor, a combustion chamber and a single-stage axial flow turbine.

Fig.4. ALAS missile system

The multipurpose ALAS missile system is intended for a wide spectrum of actions against enemy targets such as tanks, armored fighting vehicles, fortifications, command posts, low-flying helicopters, coastal ships, industrial facilities, bridges, etc. Its tandem shaped charge warhead penetrates 800mm of RHA with pre-positioned ERA plates.

The missile can be programmed to fly along a pre-set trajectory with defined coordinates of check points, with the possibility of activating the homing head for potential target detection. The ALAS system is thus transformed into a reconnaissance system ready for rapid target destruction. A TV or IR homing head provides remarkable precision and efficiency.

Fig.5. Range of warheads of the MALJUTKA anti-armour missile system

Fig. 6. BUMBAR ant-armour missile system

As far as anti-armor combat was concerned, visitors` attention was drawn to the BUMBAR (Bumble Bee) anti-armour guided missile system and the MALJUTKA system with a range of 3000m, a new shaped charge warhead capable of penetrating 800mm of RHA and an average flight velocity of 110m/s. On the basis of VTI's projects, the SLOBODA conquered the production of a family of warheads for the MALJUTKA system.

Light and portable, the BUMBAR system is equipped with a 136mm round that weighs 19.8kg together with the tripod. The missile is thrust vector controlled and armed with a tandem shaped charge warhead capable of penetrating over 1000mm of RHA at a speed of 250 m/s. Its hit probability is 90%. The effective range of this anti-armored missile system, capable of being fired in closed spaces and from the shoulder, is from 75m to 600m. Further development of the BUMBAR aims for an effective range of up to1000m.

Fig.7. RL-4M missile system

Visitors were also attracted to the modified RL-4M missile system, based on the modification of the R-73 air-to-air IR homing missile and its adaptation to land firing. A booster was fitted in order to compensate for the lacking initial aircraft speed and to achieve a required range. The experts from the VTI and MOMA STANOJLOVIĆ mounted it on the PRAGA vehicle, after removing the turret. This AA technical solution drew the attention of smaller countries in particular due to its affordability.

Fig.8. GROM-B air-to-surface missile

A family of 60mm light mortars, with barrels 1200mm and 1500mm long, a range of 5.2km or 5.5km and a weight of 25.5kg or 27kg, respectively, was also presented at the Fair as well as a family of revolver grenade launchers and their 38mm ammunition, based on non-lethal ammunition, and 40mm ammunition, based on NATO standard ammunition for underbarrel grenade launchers of low muzzle velocity.

One of the best export projects of the Serbian military industry, the modernized self-propelled artillery system NORA-B52 K, dominated the open exhibit space of the Belgrade Fair. This 155mm self-propelled turretless gun-howitzer is intended for general direct and indirect fire support. It has high fire power and respectable range, high rate of fire, good maneuverability, on- and off- road mobility and capability of high and low angle fire without a change in firing position.

The NORA-B52 K possesses a high degree of automation of all weapon functions – from deploying in the firing position, through calculating firing elements to automatic loading of projectiles and propelling charges. The range of 42km is achieved with an original solution of base bleed projectiles. A base bleed projectile V-LAP (Velocity Enhanced Long Range Artillery Projectile), which should enable this artillery system to attain an effective range of 65km, is in the final stage of development.

Fig.9. 155 mm self-propelled artilery system NORA-B52

A high-efficiency muzzle brake and the breechblock with a horizontal sliding wedge bolt are installed on the 155mm/52 caliber barrel. The chamber automatic sealing system is installed as a part of the barrel and the bolt, so the weapon uses caseless ammunition. The muzzle velocity is 925m/s, and the firing rate is 6rpm. The base ammunition package includes 36 rounds and 42 propelling charges. Optional equipment includes a 7.62mm or 12.7mm machine gun for close combat.

The weapon is mounted on the 8x8 cross-country wheeled chassis. The drive is on all 4 crankshafts, with two front steering shafts. A Diesel engine provides a high level of cross-country mobility and good maneuverability. The total weight of this self-propelled artillery system is around 30.000kg.

This year's novelty was the SORA (self-propelled artillery system), designed by the VTI's experts, a modernized 122 mm howitzer D-30 mounted on the modified platform of the FAP 2026 6x6 terrain vehicle. This artillery system, with a 5-member crew, has the overall weight of 16,500kg and the operational range of over 500km. The maximum range is over 15,000m and the fire rate is 6 rounds/m. It is intended for the fire support of units up to the brigade level.

Fig.10. 122 mm self-propelled artillery system SORA

Besides the M-2001 tank, realized by the modification of the well-known M-84 tank, another two exhibits aroused the attention in the category of fighting wheeled vehicles – the LAZAR robust armoured fighting vehicle and the KURJAK special reconnaissance vehicle designed in the design studios of the Jugoimport SDPR.

Fig.11. M-2001 tank

The concept and the technical solutions of the LAZAR, multi-purpose, ambush-protected, armoured fighting vehicle, are adapted to modern infantry and special-purpose units engaged primarily in counter-terrorist operations, in urban as well as in sparsely populated areas of different configurations. The concept is based on the combination of Mine Resistant Ambush Protected (MRAP) vehicles and Multi Purpose Armoured vehicles (MPAV).

Fig.12. LAZAR multipurpose armoured vehicle

The emphasis in this vehicle is on maneuverability and mobility, armour protection, armament and accommodation for 10 infantrymen fully equipped. The 8x8 configuration with rigid drive axes and springs, together with the structural solution of the floor, enables a high level of protection against mines. A wide range of armament and special equipment is optional.

The KURJAK (Black Wolf) reconnaissance fighting vehicle is a modified BRDM-2 Soviet reconnaissance 4x4 armoured vehicle. Depending on its purpose and equipment, there are two variants: BWLS (Black Wolf Long Sight) reconnaissance vehicle and BWA (Black Wolf Artis) artillery reconnaissance vehicle.

Fig.13. MUNJA multi-purpose engineering vehicle

A multipurpose engineering vehicle MUNJA (Lightening) is based on the T-55 tank. According to available data, no one in the world has ever realized such an AFV configuration. Comfortable space for the 8-member crew (commander, driver, gunner and 5 pioneers) is provided in the interior. The crew is provided with everything necessary for survival at the battle ground. All ergonomic requirements are fulfilled.

The MUNJA is equipped with a dozer blade as well as with all the necessary engineering kits stowed inside and on the vehicle necessary for performing various engineering tasks such as crossing artificial and natural obstacles, blocking, road repairing, demining, etc. Equipment includes a computer system with integrated general positioning system software, digital compass, laser rangefinder and digital camera. Smoke grenade launchers (6+6), which cover the 120-degree area in front of the vehicle, serve for vehicle and crew protection.

Besides being primarily an engineering vehicle, this armor tracked vehicle is extremely suitable for equipping peacekeeping force units during special operations. The armament including a 30mm automatic grenade launcher and a 7.62mm machine gun, has proved to be an ideal combination in counter-terrorist actions for neutralizing point targets while engineers perform tusks such as mining, demining, demolition, etc. It can be equipped, on demand, with a remote mining system PLJUSAK (Shower).

Fig.14. ZASTAVA light transport vehicle

In a group of non-combat vehicles, visitors` attention was drawn to the FAP 1118 4x4 transport vehicle, the military model of which is in the final stage of testing. The vehicle is powered by a turbo-diesel engine of 4250ccm volume capacity and it develops 130 kW at 2200 r.p.m. The weight of the vehicle itself is 6400kg, and its payload is 5000kg. This 4x4 off-road vehicle successfully crosses 60% gradients and side slopes of 35% owing to its low center of gravity with no risk of overturning. The fording depth is 80cm. With the operational range of 700km, FAP 1118 is designed to operate efficiently in the temperature range from -30^{o}C to +50^{o}C.

Figure 15. FAP 1118 truck

The ultimate hit of this Fair were three functional models of the robotised systems for close anti-armour combat: MILICA, APOS and DALOS, realised by the VTI.

The MILICA is a wireless remote-controlled system for close anti-armour combat and tactical level destruction of fortifications, mounted on a crewless tracked vehicle, up to 1,900mm long, up to 800mm high, weighing 250kg and with an operational autonomy of 2h. The system is of a modular type, with easily changeable purpose and armament. The wireless remote-controlled platform is armed with a 90 mm anti-armour missile system OSA with two launchers and a surveillance sighting camera or with a 120mm anti-armour missile system M-91. The MILICA can be deployed in all weather conditions and in all terrains, from a 500m remote commanding post which can serve several such systems.

Fig.16. MILICA modular robotised anti-armour system

The APOS (Automated Anti-Armour System) is a stationary wireless remote-controlled system for close anti-armour combat and destruction of fortifications at the tactical command level. Its main purpose is to replace a gunner at dangerous tasks of launching missiles from distances as close as up to 250m. The system is of a modular type, with easily changeable purpose and armament. Its operational autonomy is up to 6h and a commanding post, with a capability of simultaneously serving several systems, can be up to 1.000m away.

Fig.17. APOS remote-controlled automated anti-armour system

The DALOS (Remote-Controlled Light Armed Station) is a remote-controlled light surveillance-combat station intended for mounting on a combat vehicle or a stationary platform. The system is of a modular type, with a combat and a non-combat module operating separately. The combat module, consisting of a machine gun or a grenade launcher, is intended for neutralization of live force, fortifications and light armoured combat or non-combat targets as well as for generating smoke screens for camouflage or protection against laser and combat actions. The main purpose of the non-combat module is remote detection, target identification and acquisition, target prioritising and sighting at all day/night conditions.

Special attention of the visitors was drawn to a new model of LASTA after the finished phase of flight tests. This light piston-propeller training aircraft is primarily intended for initial and basic training of military pilots. With in-line tandem seating, the trainer was developed in accordance with the FAR (JAR) 23 regulations for acrobatic category of airplanes and it provides an easy transition to jet aircraft at higher training levels.

The LASTA is equipped with a six-cylinder 224kW (300 HP) engine of the opposed-cylinder type, and a double

metal propeller, which provide maximum flight velocity (at an altitude of 3000m and a takeoff weight of 1085kg) of 300km/h. The empty weight is 850kg, and the maximum takeoff weight is 1150kg. The total aircraft length is 7.97m. The trapezoidal wings have a wingspan of 9.7m and a surface of 12.9m^2. The altitude barrier of flight is 6000m. This low-wing aircraft has a tricycle retractable landing gear.

The armed version of the LASTA can be equipped with 7.62 mm or 12.7 mm machine guns, 57 mm rocket launchers or bombs weighing up to 100kg.

Figure 18. LASTA trainer

The Fair also saw a model of VRABAC (Sparrow), a mini-drone intended for day/night reconnaissance and surveillance at shorter distances, as well as for target finding and designating. It can be used to survey major infrastructural facilities such as pipelines, major roads, bridges, forest areas (fire prevention), etc. It has the operative height of 300-500m, the maximum flight speed of 85km/h, flight autonomy up to 1 hour and a maximum take-off weight of 5.3kg (1.5kg of payload included).

Figure 19. VRABAC UAV

Serbian military industry offered at the Fair a wide selection of personal protective equipment for soldiers, which enhances survivability in combat actions. The M-97 helmet provides a high level of ballistic protection (V_{50}=60m/s). When compared to the most significant world competitors, the testing showed that it provides 5% better protection, with 100g less weight (1460g). Several models of bulletproof vests, which became an integral part of every soldier's equipment in modern wars, were displayed.

Combat clothes and footware were presented. They are highly functional in providing necessary comfort, microclimate, protection from extreme temperatures, and, with their camouflage qualities, protection within the visible and IR part of the spectrum. The M-03 demining boots are a part of protective equipment used in mine fields, and efficient against infantry mines (up to 75g of TNT).

Figure 20. M2FV protective mask

Figure 21. Demining suit

The visitors’ attention at the Fair was also drawn to individual and collective equipment for NBC protection of body and respiratory organs, water and air purifiers, camouflage equipment, etc. Protective masks, protective suits, hoods, gloves, socks, goggles, filters, respirators, chemical detectors, and various detection and decontamination agents were displayed.

The PARTNER 2009 Fair was a good opportunity to demonstrate results and successes in conquering new technologies by the Serbian military industry. This manifestation has a commercial character as other major world fairs of this type. This manifestation is constantly upgraded, aiming at regional significance in the future with a considerable commercial effect. The next PARTNER Fair will be held in 2011.

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