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9th PARTNER – Defence Exhibition

Vasilija Joksimović [1)]
Radiana Brusin [1)]

FOR about two decades, each two years, the biggest International Armament and Military Equipment Fair on the Balkans is held at the Belgrade Fair. This year, at the end of June (25th – 28th) the 9th International Armament and Military Equipment fFair PARTNER 2019 was held under the patronage of the Ministry of Defense of the Republic of Serbia. The main organizers were the Military Technical Institute and "Yugoimport - SDPR", leader in the area of production, integration and promotion of armament and military equipment in the region and respectable participant in the world market. The holder of the technical realization was the Belgrade Fair, owner of the most representative fair facilities and provider of the fair services, supporting the most prominent and most requiring events.

Figure 1. International Armament and Military Equipment Fair PARTNER 2019

The goal of such manifestation is to present each advancement of defence technology and industry capacities of the Republic of Serbia, as well as scientific achievements, last researches and, of course, a great opportunity for exhibiting and establishing new contacts and cooperation with foreign companies and participants.

As it was expected, this significant meeting exceeded the results of the previous manifestations. Numerous representatives of manufacturers and business partners from more than 30 countries, 7 500 visitors, 11 official delegations of the Ministries of Defense, armed forces and state institutions of partner countries and organizations were registered, 128 exhibitors: 96 from Serbia and 32 from: Austria, Korea, Columbia, Pakistan Turkey, Poland, Belarus, Bulgaria, Bosnia and Hercegovina, Great Britain, Denmark, India, Italy, Ireland, China, Croatia, Czech Republic, Germany, Finland, France, Montenegro, Netherlands, Slovenia, Switzerland, Sweden, USA on 25 000 m2 of total exhibition space.

The International Fair is visited by many high ranking delegations from the whole world, as well as the representatives of NATO, European Defense Agency and other international military and security organizations. Among all of them prevailed the development projects of the Military Technical Institute (VTI), "Yugoimport SDPR" and Aeronautical plant “MOMA STANOJLOVIC” - Batajnica - today the most important military institutions in the Western Balkans.

The remarkable role for development technology within the Serbian Armed Forces have: Military Medical Academy (VMA), Military Geographic Institute (VGI), Technical Test Center (TOC) and Military Academy (VA).

Also, a number of leading Serbian defense companies and weaponry and military equipment producers who have the enviable international reputation had the significant role at the Fair and the most prominent among them being: "ZASTAVA ORUŽJE" – Kragujevac, "PRVI PARTIZAN" – Užice, "KRUŠIK" – Valjevo, "SLOBODA" – Čačak, "MILAN BLAGOJEVIĆ" – Lučani, "IMK 14 OCTOBER" – Kraljevo, "FAP" - Priboj, "UTVA" – Pančevo, "PRVA ISKRA" – Barič, "TRAYAL" – Kruševac, "PRVA PETOLETKA" – Trstenik,

[1)] Military Technical Institute (VTI), Ratka Resanovića 1, 11132 Belgrade, SERBIA
Correspondence to: Vasilija Joksimović; e-mail: vasilija.joksimovic@vti.vs.rs

"IRITEL" – Beograd, "EDEPRO" – Beograd, "EI OPEK" – Niš, "TELEOPTIK - GYROS" – Zemun, "Sova Night Vision" – Niš, "JUMKO" – Vranje, "MILE DRAGIĆ" – Zrenjanin, "KODŽIĆ & Co" – Beograd, "GEPARD" – Novi Sad, etc.

Apart from the armament and military equipment manufacturers, several overhaul companies presented their capabilities: "TRZ" – Čačak, "TRZ" – Kragujevac, "MOMA STANOJLOVIĆ" – Batajnica, "ORAO" – Bijeljina, etc.

The Military Academy (VA) also participated and presented the results of the scientific work of their students and professors through the presentation of various simulators and modern didactic tools involved in teaching at the Military Academy at all levels of study. At the stand of the Military Academy, interested visitors could see the demonstration model of a remote operated machine gun combat station, didactic radar model, flight simulator for "Lasta" aircraft, weapons used in simulation pistol shooting hall as well as numerous books used for Basic Academic Studies at the Military Academy and the Military Medical Academy.

This time visitors had the opportunity to see the modern small arms, contemporary shooting arms and ammunition of various calibers and purposes, fire support artillery and missile systems, self-propelled and towed artillery systems, anti-armor combat systems, combat and non-combat vehicles, tanks and armored vehicles, artillery and mortar fuze systems, mines, electronic reconnaissance and surveillance systems, telecommunication equipment, radar-computing devices, crypto protection devices, various simulators, unmanned aerial vehicles, combat armored vehicles, trainer aircraft for the initial pilot training, lightweight airplanes, river patrol boats, logistics and electronic equipment, antiterrorist and special operations equipment, personal protection ballistic equipment, fire-fighting equipment, etc.

Visitors were interested in new and modern equipment they had not seen at the previous Fair. So, further on, we mention some of the newest, modernized and interesting equipment.

The armed version of the Miloš UGV (unmanned ground vehicle) was unveiled for the first time during the PARTNER 2017 exhibition but in the process of modernization it was equipped with different weaponry and surveillance system and visitors could see this enhanced system with many functionalities.

Figure 2. Remotely controlled unmanned ground vehicle Miloš

The main purpose of the Miloš remotely controlled unmanned ground vehicle is destruction and disabling targets on range up to 800 meters. Full remote control of vehicle and weapon system is carried out from a distance safe place. It is equipped with 7.62 mm automatic machine gun and RBG 40/6 mm grenade launcher. It is also equipped with day CCD WFOV and NFOV camera, night/thermal camera and laser range finder LRF. It has a total weight of 620 kg and built-in batteries provide sufficient power from 2 to 8 hours depending on the mission for which it is used.

One of the items that was integrated in different systems is Multisensory reconnaissance platform. It was developed at the Military Technical Institute in collaboration with local institutes and companies. Various types and possibilities contribute to the systems into which it is integrated.

Figure 3. Multisensory reconnaissance platform MIP-3

MIP-3 Multisensory reconnaissance platform is a prototype of Intelligence, Surveillance and Reconnaissance system designed for passive observing, surveying and geo-location of moving and stationary targets in daily, night and low visibility conditions, in moving or in stationary position. This platform provides target detection, identification and geo-location, automatic data exchange with Army Geographic Information System, enabled data distribution to other networked systems. It could be used as a stand-alone system/sensor or as a node of an ISR Network. Effective range of this platform is 8 kilometers.

One of the exhibits that attracts most attention is certainly the "Pegasus" reconnaissance drone that was developed at the Military Technical Institute and premiered at the PARTNER 2011.

Figure 4. Medium range UAV Pegasus

Military applications of the medium range UAV include day and night reconnaissance and surveillance missions, target acquisition and designation, artillery fire adjustment, etc. Medium range UCAV is designed for strikes on light armored/unarmored vehicles and enemies using laser guided and IR/TV guided missiles. It has the altitude, velocity, course controlled by autopilot, as well as the emergency and return

home mode. It is guided in fully autonomous way (points tracking, holding and camera guidance).

As far as air combat was concerned, visitors' attention was drawn to PASARS, the anti-aircraft system.

Figure 5. Self-propelled hybrid anti-aircraft system "PASARS"

PASARS is intended for protection of the armor-mechanized ground units against the attack from air space, as well as for action against ground targets, during marching and executing combat missions. It is characterized by high mobility, cross-country possibility and a short reaction time. Armament of the system is made of a modified 40 mm/L70 BOFORS automatic gun and a twin launcher of inertial and IR self-guided missiles, at a common rotatable platform mounted on a modernized, highly mobile and well protected FAP 2026 wheeled vehicle, having the new armored low-profile cabin.

A project of the Military Technical Institute, LRSVM (Modular self-propelled rocket launcher), capable of launching rockets of different caliber and range was also presented at the fair.

Figure 6. Self-propelled multi-tube modular rocket launching system "OGANJ"

Self-propelled multi-tube modular rocket launching system "OGANJ" is intended for basic fire support of brigade-level units. Modernization of the existing system consists of:

- Installation of a new, armored 4 seats cabin and armored turret armed with 12.7 mm machine gun;
- Installation of a universal launch platform for container modules of Oganj 50 km rockets, Kosava 1,
- Kosava 2 and ALAS missiles, as well as for the container modules for system Morava (128 mm Plamen, Oganj, and 122 mm Grad);
- Installation of the INS, GPS and weapon control system to achieve the automatic aiming line;
- Installation of the new command unit for digital control of the existing analog servos;
- Installation of the radio communication system for speech and data link with the UPARS (coordinates of the launcher, vehicle azimuth and firing elements).

The modernization yields a universal launch platform for the existing artillery rockets and new rockets and surface-surface guided missiles, with the reduced preparation and firing time.

Another system of electronic attack that was developed at the Military Technical Institute, in collaboration with a local company is shown in Fig.7.

Figure 7. Drone-carried jammer for jamming tactical communications

Drone-carried jammer represents a drone as a platform for electronic attack that operates in 30-88 MHz frequency range (up to 512 MHz is a possible option) with effective RF power up to 50 W. Drone-carried jammer for jamming tactical communications is intended for blocking tactical communications by any type of radio devices. The range of a jammer could be significantly increased, i.e. the jamming range could be several times increased in distance from the initial ground jamming position where it was launched. Another means of drone-carried jammers usage could be the false target for anti-radiation guided missile, or as a mean of enemy.

As a leader in the area of production, integration and promotion of armament and military equipment in the region, SDPR presented various projects and systems among which most attention was drawn to new combat vehicles and artillery weapons.

Figure 8. BOV M6 Miloš

The armored multi-purpose combat vehicle, with 4x4 drive – Miloš belongs to the category of modern armored vehicles intended for the performance of wide range of missions. The

main concept of the vehicle is based on a self-supporting hull, modern drive and transmission assemblies and an independent suspension system which ensures mobility in any terrain and weather conditions with the maximum combat weight exceeding 14 tons. The standard version of the combat vehicle accommodates 8 members of crew, out which 4 members are located in the rear part of the vehicle with the possibility of fast disembarking and embarking by means of the rear hydraulic ramp or the rear door.

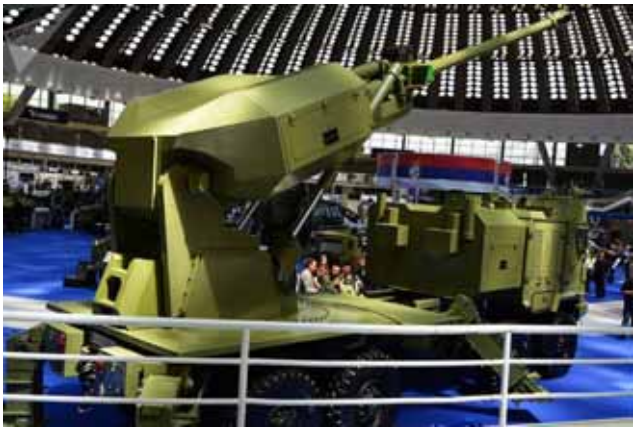

Figure 9. Aleksandar Self-propelled artillery weapon cal. 155 mm

This cutting-edge artillery weapon is the most powerful, fully automated fire support artillery weapon in 155 mm caliber with a high level of autonomy. The weapon was made through an integration of a 155 mm weapon module on a 8x8 chassis and it is completely controlled from the vehicle cabin. The most important component of the weapon module is a fully automatic loader with 12 projectiles and propellant changes, featuring the possibility of loading at all elevations and the rate of fire up to 6 rounds per minute. The combat set comprises a total of 24 rounds with any crew engagement necessary. For stabilization purposes, the weapon is fitted with 4 hydraulic trails enabling fire in both directions which makes this weapon unique in the world.

Figure 10. Soldier of future

Both the Military Technical Institute and SDPR in cooperation with various companies have been working to improve the equipment intended for the soldier in order to provide the best possible battlefield conditions. Many of these projects were presented at the fair and one of these is a project "VB-10" Soldier of future.

This project comprises 4 subsystems:

- Weapon subsystem,
- Fire control and command and control system,
- Subsystem for autonomous execution of combat missions,
- Subsystem for protection and survival in the battlefield.

The level of combat power of infantrymen has been determined in order to achieve the following objectives:

- High effectiveness in waging combat against all types of manpower, unprotected or protected with ballistic vests, within the zone of barrage fire,
- Higher fire accuracy and automation in preparing of firing data,
- Increased firing accuracy on targets at night,
- Ability to present targets and various information in real time,
- Efficient and rapid handling of all optoelectronic and communication equipment controls situated on rifle front hand grip and safe communication within the combat operation (digitalization of battlefield),
- Reliable detection of different irradiations in the battlefield and efficient protection from different types of contaminants, etc.

A project of the Military Technical Institute, new armed quadcopter with M80 anti-tank unguided rockets, was exhibited for the first time.

Figure 11. New armed quadcopter with M80 anti-tank unguided rockets

A quadcopter is an UAV that is lifted and propelled by four rotors. Quadcopters are classified as rotorcraft, as opposed to fixed-wing aircraft, because their lift is generated by a set of rotors (vertically oriented propellers). This quadcopter is a new project, it has already performed a flying test, but no test has been conducted with the weapon system. This UAV is electrically powered by four electrical DC motors and has a maximum flying time of 20 minutes. It has an empty weight of 35 kg and 107 kg with the batteries. It can fly at a maximum altitude of 2,000 m with a maximum range of 6 km. The armed quadcopter is equipped with different types of sighting and observation devices including daylight CCD camera with continuous optical zoom 30x, a thermal imaging camera with digital zoom 4x and laser rangefinder with a range up to 2 km.

The armament of the quadcopter includes four 64mm caliber anti-tank unguided rockets M80 which have a maximum firing range. The 64 mm RBR M80 unit consists of two components, the launcher tube and the rocket projectile with a shaped-charge warhead.

The HEAT warhead of the M80 is able to destroy of light/medium armored vehicles and fortified targets on the modern battlefield, excluding only the forward arc of modern

MBT and extremely highly reinforced field fortifications, bunkers and buildings. The recent development of new types of warheads provides enhanced efficiency against personnel in field fortifications and reinforced bunkers and buildings.

PARTNER 2019 was an excellent opportunity for the promotion of the Serbian military industry which resulted in fruitful contacts and cooperation on a number of projects with foreign partners. The next, tenth one, PARTNER Fair, that has grown into the biggest fair of this type in the region, will be held in 2021 when we can expect to see the realization of some projects which are now in the development phase or in the test range phase that could not have been seen on this Fair.

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9. sajam naoružanja i vojne opreme ”PARTNER 2019.”