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Russian Soldier of the Future

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Ratnik is a Russian future infantry combat system. It is designed to improve the connectivity and combat effectiveness of combat personnel in the Russian Armed Forces. Today there are three versions of the development of this equipment. The third is the newest one, which includes an exoskeleton. The *Ratnik* outfit is comprised of more than 40 components, including firearms, modernised body armour, a helmet with a special eye monitor (thermal, night vision monocular, flashlight), communication systems, and special headphones, an optical array, communication and navigation devices, as well as life support and power supply systems. The *Ratnik* - 2 outfit adds significantly to the soldier's combat efficiency and survivability, not least because it's lighter: at 20 kilos, it weighs only half as much as its predecessor [1]. As for the third generation *Ratnik* infantry combat kit, it features an array of unique integrated biomechanical tools, including exoskeletal elements; it features built-in microclimate support and a health monitoring system. The total weight of the kit is up to 22 kg in the expanded configuration (without combat stock and weapons). In general, 90 percent of the body surface of the serviceman is protected. The flak jacket has several varieties, from light to heavy with insert plates. The design assumes continuous wearing for a minimum of 48 hours. Transmission of video information from the sight to the eye indicator is carried out in wireless mode. The communication system will allow the soldier to communicate with the command and his

colleagues at a tactical level. Saturation with electronics makes the soldier a single combat system, controlled by the latest technologies. At the same time, information about the location of the serviceman is transferred to the command post, which greatly reduces the probability of loss without a trace.

Modern lightweight 6B47 helmet

Modern lightweight 6B47 helmet of the Armed Forces of the Russian Federation with Night Vision with camera and side rail, made for *Ratnik* combat gear. Helmet weight is 1kg, protects from Makarov pistol shots over 5 meters distance. Even with all of its defensive attributes, the helmet weighs less than its American counterpart, which is smaller but weight of this American counterpart 1.5 kilograms. The basic variant of 6B45 has a weight of approximately 8 kg.

Control system *Sagittarius*

Control system *Sagittarius* includes communication facilities, target designation, processing and display of information, identification allowing the transfer to the command post information about the whereabouts of the soldier, communicator that determines the coordinates of the serviceman with the help of GLONASS and GPS for solving the problem of orientation on the terrain and target designation and other applied calculations.

The camouflage pattern of the *Ratnik*

The camouflage pattern of the *Ratnik* field uniform makes the soldiers less visible to infrared cameras. The uniforms of reinforced-fiber fabric of polymeric compounds protect the soldier against open fire and minor splinters/ballistic shrapnel, while the body armor vest, reinforced by ceramic and hybrid inserts, is effective against small arms, including armor-piercing bullets preventing bullet penetration and trauma. The *Ratnik* uniform is fitted with special sensors that are designed to transmit information to military medics about a soldier's physical state. Specially

designed sensors will continually record heart rate, respiratory rate, blood-oxygen saturation indicators and microvascular blood filling. The system will store and analyse this data and any deviation from the norm will trigger an alarm in the medical service. All information is automatically saved on a flash drive that stores medical history. Soldiers in medical units will have access to information about the condition of the wounded and their GPS coordinates. Based on the severity of the injuries, the state of a wounded soldier will be assessed on a scale of 0 to 5 [1]. This will help prioritize evacuation of the wounded and identify the best way of reaching them. Russian engineers have unveiled a unique thermal weapon sight for the *Ratnik* (Warrior) combat gear of the future. The tests of prototype Russian made thermal weapon sights visualizes for the user to see enemy soldiers in pitch darkness or in smoke on the battlefield. The system sensors can discriminate between objects even when the temperatures differ by one tenth of a degree. One cannot see camouflaged soldiers standing behind foliage with conventional night sights because they are blending with the terrain, but thermal imagers detect body heat. The new thermal sight becomes part of the *Ratnik* future soldier system and can detect enemy forces at ranges up to 1,200 meters. The gun sight is synchronized with a special helmet mounted eyepiece display. The soldier can put the rifle behind the corner by attaching the gun's sight to the rifle. The soldier will see everything around the corner in real time while remaining safe. Every thermal sight undergoes a number of tests including heat tests inside special compartments that simulate temperature fluctuation between minus 50 to plus 70 degrees Celsius as well as tests to see how they react to vibrations and impact [2].

The structure of the *Ratnik* includes several other elements of weapons, such as: protective glasses 6B50, protecting the eyes and part of the face of the serviceman from

the fragments of ammunition; water treatment filters, autonomous heat sources; additional sights for weapons equipped with night vision and a thermal imaging aiming system; video module for shooting from the shelter. It consists of a thermal imaging sight and a helmet monitor with a control system, which displays an image from the sight; active headphones that allow you to communicate during a fight; sensors of the identification system for military vehicles and soldiers on the principle of *their own-alien*. To distinguish *own* from *alien* a serviceman equipped with such a sensor can, looking at the screen of a special device that looks like a mobile phone. It displays on the electronic map the location of the soldier and the location of friendly forces at a given time.

Last version of *Ratnik*

Russian scientists and engineers have begun to create combat equipment of the third generation. This is *Ratnik-3*. We know that *Ratnik-3* includes a titanium exoskeleton that will increase physical strength and endurance, a flak body armor, a camouflage uniform that can be adjusted to weather conditions, an armored helmet with a flashlight, a display and a night vision device, as well as shoes with explosive sensors.

References:

1. Mode of access:

https://www.armyrecognition.com/russia_russian_military_field_equipment/ratnik_future_soldier_individual_soldier_combat_gear_system_technical_data_sheet_specifications_pictures_video_12205165.html. – Date of access: 20.03.2018.

2. Mode of access:

<http://www.sadefensejournal.com/wp/?p=3224>. – Date of access: 20.03.2018.