

THE CONCEPT OF MODERN ARTILLERY RECONNAISSANCE IN FOREIGN ARMED FORCES AND ITS IMPLEMENTATION IN THE SERBIAN ARMED FORCES IN THE FUNCTION OF OWN UNITS SAFETY

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Abstract: *Serbian Army's modernization process thru the introduction of new digitalized and modernized weapons and equipment requires discovering the most optimal methods for handling and using it considering all key characteristics of modern armed conflict. During practical use of this weapons and equipment, in participating in field exercises and combined arms live fire exercises (CALFEX) we could see the dynamics of operations in modern warfare requires more mobility, better target acquisition in whole area of operation, faster flow of information and data processing, as well as speed of reaction toward better artillery fire effects and decreasing risks for own forces. Thru analysis of realized exercises where participated artillery units equipped with modern reconnaissance equipment we empirically concluded there exist strong need for arrangement and change of organizational framework of artillery units. Considering that actual formations are dimensioned according with requirements of equipment which is more or less exceed we identified need for adaptation to modern equipment requirements in terms of optimization human resources potentials both in quantitative and in qualitative sense. Thru this work we offer some models of doctrinal arrangement and change of organizational framework structure.*

Key words: *Artillery reconnaissance, modern equipment, doctrinal arrangement, formation.*

1. INTRODUCTION

During running operations in modern warfare, accurate and precise artillery fire support is recognized as very remarkable, so artillery reconnaissance, as part of it have great contribution in the operation's goal reaching. By following the development of techniques and methods of

units usage in modern wars, as answer to possible threats, the need arises for modernization of all combat systems in Serbian Armed Forces. Focus in modernization process is given to increasing fire power, range, speed of reaction and mobility of artillery units in zone of operation. In modern equipment and high mobility enemy's units usage environment combined with camouflage, it is very difficult to detect enemy's key elements which implicate strong need for modernization of artillery reconnaissance equipment and improvement of whole artillery reconnaissance system.

Actual regulations and field manuals defines that handling and control of artillery fire doing exclusively the artillery branche members, otherwise, practical usage of artillery units shows that current organization of artillery reconnaissance don't afford completely and comprehensively observing, target acquisition and handling and control of artillery fire in whole area of operation.

From forces protection aspect, usage of modern artillery reconnaissance equipment significantly decreasing risks of own loses, but that requires doctrinal arrangement changes and improvement of organizational framework structure artillery recon units.

In the light of previous, this work will consider changes of system and organization of artillery reconnaissance by comparison with artillery reconnaissance organization in United States Army (US Army) and The Armed Forces of the Russian Federation (AFRF).

Accordingly, work's goal is to inspect how changes of doctrinal arrangement and organizational-framework changes affect to increasing level of own units safety.

2. THE ORGANIZATION OF ARTILLERY RECONNAISSANCE AND EQUIPMENT USED BY UNITED STATES ARMY AND THE ARMED FORCES OF THE RUSSIAN FEDERATION

In order to reach the most acceptable solution for changing of doctrinal arrangement and suiting of organizational-formation structure to usage of modern equipment for reconnaissance it is necessary to analize organization of artillery reconnaissance in world's leading countries armed forces in production and usage of artillery reconnaissance modern equipment.

The United States Army and The Armed Forces of the Russian Federation are surely one of the leading forces in production and use of modern weapons and equipment, while the analysis can led to the conclusion that the organization and principles of the of units differ in many ways. The characteristic of artillery reconnaissance in artillery units of the US Army is certainly that artillery target's data is collected by all participants of the operation and all possible sources in the area of operation. According to current US Army regulations, target acquisition can be obtained in several ways (Army techniques publication, 2015):

- Direct observation by special operations forces, scouts and forward observers,
- Electronic intelligence sources such as radio frequency intercept systems,
- Human intelligence sources (HUMINT),
- Weapons locating radars,
- Unmanned aircraft systems,
- Higher headquarters and joint sources,
- Maneuver formations down through the squad level.

By analysis of the aforementioned methods of data collection led to the conclusion that the diversity and level of sophistication of reconnaissance devices directly affects the level of own units safety.

Looking at organizational framework structure of the artillery units of the US Army, we can see that the command-reconnaissance part is completely excluded from the organization of the artillery battery, and that the artillery reconnaissance system is established by the formation of several support teams and forward observers. Support teams and observers are in the ground order of battle of maneuver units, and as they are composed of artillery commissioned officers, non commissioned officers and soldiers, conditions are created for faster reaction and more precise handling of artillery fire. By increasing the speed of reaction, accuracy and precision of handling artillery fire, greater effects of neutralizing the enemy are achieved, which in turn leads to reduction of own units losses.

Battalion and brigade level units have a platoon or battery for target acquisition. The basic component of these reconnaissance units are radars designed to detect the fire positions of enemy fire support and provide data that enables counter batting. The characteristics of individual radars are shown in table 1.

Table 1: Tactical and technical data of the radar in use in the US Armed Forces (*Fire Support for the Brigade Combat Team, 2016*)

Radar	Observation sector	Observation distance	Target detection
AN/TPQ-36	16-00	0.75-24km	Shorter range, higher group of angles, lower projectile velocity. Weapons such as mortars and short-range artillery pieces.
AN/TPQ-37	16-00	3-50 km	Longer range, lower group of angles, higher initial projectile speed. Long-range artillery and missile systems.
AN/TPQ-50	64-00	0.5-10 km	Shorter range, higher group of angles, lower projectile velocity. Weapons such as mortars.

Each artillery battalion has these radars, which, in addition to the stated purpose, can also correct the fire of its own artillery, providing data on the place of fall of the projectile so that the technical fire direction sections can calculate corrections. All radars used in the area of operation thus enter into a single system of reconnaissance and target acquisition.

In the organizational framework structure of artillery units of the US Army, there are no embedded units equipped with unmanned aerial vehicles, but in order to protect their own forces, when engaging in joint operations, other units that have unmanned aerial vehicles in their composition collect information on artillery targets.

In relation to US Army, the organization of artillery reconnaissance in AFRF is an integral part of the execution of artillery combat operations. In the AFRF artillery reconnaissance is organized at all levels, from artillery batteries corps and groups of armies.

Reconnaissance of the enemy on the field itself is organized by the commander of the artillery unit in accordance with the order of the superior headquarter. The organization of artillery reconnaissance is itself is based on the possession of observation posts by reconnaissance units using specialized vehicles equipped with devices for detection of targets and target acquisition.

For the purposes of target acquisition the AFRF use advanced reconnaissance devices and systems both from the ground and from the air.

In addition to the basic optoelectronic devices in the artillery units of the AFRF, reconnaissance radars are also used to detect targets in the enemy's ground order of battle, the appearance and characteristics of which are shown in Table 2. From the aspect of forces protection, AFRF use lightly armored vehicles equipped with modern reconnaissance devices,

which largely provides protection for personnel during the march and occupation of observation posts, but also makes them easier to see compared to smaller reconnaissance teams equipped with portable devices.

Table 2. Radars in AFRF equipment (Source: www.topwar.ru for Kredo-M1 and www.roe.ru for Aistenok)

	Purpose: detection of moving targets on land or water, artillery fire support at any time of the day, regardless of the season, and also in low visibility conditions. Features: Target detection distance: • Manpower: 15km • Non-combat m/v: 32 km • Combat m/v: 30 km • Explosive projectile 155 mm: 10 km Data accuracy: 20 m per distance and 0-05 per direction. Weight of the set: 51 kg Manufacturer:Рособоронэкспорт, Russia
	Purpose: The Aistenok radar is intended for detecting the position of mortars 80-120 mm, detecting moving targets (combat vehicles) and for correcting own artillery fire 122-152 mm. Features: Target detection distance: • Mortars: 5 km • Moving targets: 20 km • Correction: 10 km • Operating range: J-band Data accuracy: 30–40 m Manufacturer: Алмаз-Антей, Russia

3. MODEL OF ORGANIZATION OF ARTILLERY RECONNAISSANCE IN MODERN COMBAT OPERATIONS

Modern combat operations have as their primary goal the avoidance of conventional warfare, and the application of quick and short actions using precise and deadly weapons in order to impose their own will on the opposing side as soon as possible. In order to achieve these goals, the tendencies of the development of the armed forces in the world go in the direction of increasing mobility, the possibility of accurate and precise detection of targets in the entire area of operation, rapid transmission and processing of information, as well as increasing the speed of response in order to achieve the greatest possible effect of artillery fire and reducing the risk of losses of own forces.

Comparing the methods of conducting artillery reconnaissance in the Serbian Armed Forces (SAF), the US Army and Armed Forces of the Russian Federation, it can be concluded that the artillery reconnaissance in the SAF and AFRF is almost identical. In the AFRF, reconnaissance personnel rely more on the use of command-reconnaissance vehicles as primary artillery observation posts, which allows them to leave their positions more quickly and have more consecutive follow-up observation posts. With the introduction of the BOV KIV armored

vehicle in the SAF artillery units, the conditions are created for our artillery reconnaissance units to be engaged in a similar or the same way.

On the other hand, the artillery reconnaissance units in the US Army are smaller, mobile, trained for independent work, which allows them to carry out their assigned tasks with significantly smaller numbers. Also, their presence at the front end of their own forces allows them to have a better overview of the situation on the battlefield, timely sighting of targets and handling fire of them.

Following the trends in the development in the world, the SAF began the process of improvement and modernization by introducing digitalized weapons and modern equipment into operational use. Namely, self-propelled howitzers 155mm NORA B52 M15, modernized self-propelled howitzers 122mm 2S1 GVOZDIK and self-propelled multiple launching rocket system digitalized 128mm M17 OGANJ and modern devices for observation, handling and fire control were put into operational use in the units of the SAF. The mentioned process made it possible to shoot at longer distances, and by automating the observation system and calculating the elements for shooting, the time for the preparation and fire delivery was shortened.

The use of artillery reconnaissance units, dimensioned according to the previous rules and instructions, in such conditions makes those units visible, vulnerable and sluggish with reduced possibilities of monitoring the activities and maneuvers of the enemy in the entire area of operation, and therefore to an increase in the risk of own losses. The need for a greater level of protection of our own forces and personnel as one of the most important elements of combat actions led us to think about changing the organizational frame structure and the way artillery-reconnaissance units are used. Through the practical use of the mentioned devices and equipment, and the analysis of the organization of artillery reconnaissance of foreign armed forces, we arrive at possible models of the organization of artillery reconnaissance in the units of the Serbian Armed Forces.

Starting from the lowest level of organization, the reconnaissance section, it was concluded that the organizational frame structure of the section should ensure the formation of 2-3 reconnaissance teams at the battery level, which would be equipped with modern portable devices and devices installed on appropriate vehicles and would be able for independently fire handling, which means that the section should have several teams of the following:

- 1st reconnaissance team
non-commissioned officer-scout, team commander
soldier-radio operator
driver.
- 2nd reconnaissance team
non-commissioned officer-scout, team commander
soldier-radio operator
driver.
- Observation team
non-commissioned officer-forward observer, team commander
soldier-radio operator
driver.

This organization would enable the formation of two artillery observation posts and one reconnaissance team at the battery level, which would increase the possibilities of observing a larger area in the area of operation, increase mobility, and given that the reconnaissance team

would be assigned to the composition of the maneuver unit, on the main direction of attack or the center of gravity of the defense, the same would provide a higher speed of reaction, faster and more accurate fire on enemy units in direct combat contact. All the mentioned changes would affect the increase in the degree of protection of own forces.

The next level of organization would be the command-reconnaissance platoon of the command-reconnaissance battery, whose composition should provide 3-4 battalion-level reconnaissance teams, trained, equipped and capable of independent management and handling of artillery fire. The composition of the command-reconnaissance platoon would be as follows:

- 1st section of the composition of 2 reconnaissance teams, which are of the same composition and purpose as the reconnaissance sections in fire batteries,

- 2nd section consists of 2 teams
non-commissioned officer-scout, team commander,
scout non-commissioned officer, sniper,
soldier-scout,
soldier-radio operator,
driver

- 3rd section of unmanned aerial vehicles
non-commissioned officer, department commander,
non-commissioned officer-operator,
soldier,
driver

The first section would carry out the same and similar tasks as the reconnaissance section in the batteries, with the fact that they would also have the obligation to organize reconnaissance from the observation posts of the battalion commanders and commanders of the command-reconnaissance battery.

The task of the 2nd section would be to scout targets in the depth of the enemy's deployment, and they would be sent to the enemy's territory as part of the reconnaissance elements of the supported unit or independently.

The third section, with the use of remotely controlled aerial platforms, would have the task of reconnaissance of the area of operation in the zone of the maximum range of the weapon.

Units dimensioned in this way with the specified methods of use would to a certain extent respond to the modern conditions of conducting combat operations.

4. CONCLUSION

Following the development of artillery-missile systems and associated accessories and instruments in the modern age and their importance, which is reflected in the creation of conditions for the achievement of operational tasks with the least possible losses of its own forces, the Serbian Armed Forces realized the necessity for a doctrinal regulation of the use of artillery units. Thus, in 2012, the procedure for the development of new rules and instructions was initiated, which resulted in the drafting of the Artillery Rules of Battle, the Artillery Brigade Rules, the Artillery Division Rules and the Artillery Battery Rules. However, the method of conducting artillery reconnaissance in the aforementioned rules has not been changed in relation to the rules issued in the eighties of the last century, although the dynamics of conducting modern combat operations and equipping units with reconnaissance devices of a newer generation also required it.

Comparing the way artillery reconnaissance is organized and carried out in the Serbian Army with the way it is done by the armed forces of the USA and the Russian Federation, it was concluded that artillery reconnaissance in the Armed Forces and the Armed Forces of the Russian Federation is carried out in an identical manner, while artillery reconnaissance is organized, prepared and carried out in the US Armed Forces. Smaller units that are more mobile, more independent and more present in the front end of their own forces, which allows them to detect as many targets as possible with significantly smaller formations and successfully handle artillery fire.

With the introduction into operational use of modern artillery devices and the modernization of existing systems, the artillery units of the Serbian Armed Forces have gained the ability to deliver artillery fire at distances greater than 50 km, and the need to improve the artillery reconnaissance system has been imposed in order to ensure the effect of artillery in all weather and spatial conditions while reducing risks to the safety of one's own forces.

This work offers a model for the formation of multiple artillery reconnaissance elements that are smaller, mobile, highly trained and equipped and capable of detecting targets and handling artillery fire, which would enable better knowledge of the situation in the area of operation, detection of well-masked and established targets and acting on them and significantly increased the security of its own forces.

By organizing several consecutive artillery reconnaissance stations (observation posts), with a smaller number of people and at a shorter distance, better knowledge of the situation in the operation zone would be achieved, lucrative targets for artillery action would be more successfully discovered, which would significantly reduce the risk of own losses, which would have a multiple impact to achieve the goals of their own operation.

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