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Modeling rifle section reconnaissance patrol formation

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Abstract

The successful execution of reconnaissance patrols by rifle section commanders hinges on their ability to adeptly organize their soldiers into effective formations. These formations must ensure both the safety and efficacy of the soldiers and the mission at hand. Inefficient utilization of human and material resources within rifle sections assuming the role of reconnaissance patrols can detrimentally impact the combat readiness of higher echelon units. This paper aims to explore the optimization of rifle section organizational structures by aligning them with regulations and effectively balancing capabilities with requirements. By comparing prescribed protocols in the Serbian Armed Forces with commanders' practical insights and utilizing scientific methodologies to evaluate various scenarios, this research endeavors to distill one or several generalized rifle section reconnaissance formations applicable across a spectrum of situations.

Keywords:

rifle section (rifle squad); formation; reconnaissance patrol;
command and control; scenario-based method.

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An informal survey conducted through a series of interviews with the Serbian Armed Forces members in 2018 showed that Serbian Armed Forces rifle section commanders have trouble forming a reconnaissance patrol formation from available rifle section soldiers. They stated that they were not able to conduct all reconnaissance patrol formations according to the Serbian Armed Forces "Rule of infantry soldier-section" (2016).

That finding raised attention and became a problem of research in the next two years. During that period, the subject of research was the capabilities of rifle sections associated with the type and number of weapons, equipment, and specialities of rifle section soldiers when they conduct reconnaissance patrols.

The hypothesis at the beginning of the research was that the rifle section could form an effective reconnaissance patrol formation but not in all prescribed variants. The aim of the research was to discover one or several prescribed variants of formations which could raise the capability of the Serbian Armed Forces rifle section to safely and effectively conduct reconnaissance patrol without changing a weapon and equipment. The main research method was content analysis of regulations, scenario-based analysis, interviews, and brainstorming. The aim was to form one or several general variants of formations applicable for most situations in full compliance with the regulation and with reality in performance taking into consideration the real capabilities of the weapons and equipment of the troops.

Basics of reconnaissance patrol and rifle section

To be able to determine the best routes for a force to approach its objective, or secure the flanks of main forces, a commander orders reconnaissance actions so that the route, area, or zone can be checked for enemy forces, and how the weather and other factors have affected terrain. Reconnaissance is traditionally a job for small units organised as patrols in team, group, section, or platoon size. A reconnaissance patrol is not only conducted by specialized units like special forces, it is also conducted by more ordinary, general-purpose units like rifle units (Colton 2008, 54). In the Serbian Armed Forces, reconnaissance patrols are formed from units of all branches and services depending on the situation. In the Infantry battalion, the biggest infantry unit in the Serbian Armed Forces, the most commonly used unit for reconnaissance patrol is the rifle section. When the rifle section gets the task to form and conduct a reconnaissance patrol, basic rifle organization changes into a reconnaissance organisation.

At that point the problem becomes visible. The reconnaissance units are specially equipped, trained and focused on reconnaissance missions, but rifle units are not. The rifle section soldiers are generally trained for combat and reconnaissance, but they are not primarily specialized for all reconnaissance activity, especially those behind enemy lines. For rifle section commanders organizing their soldiers to perform reconnaissance patrols is very important to be able to conduct the given task

with minimum risk for soldiers and the mission. This command organization will be able to cover the general structure and the structures of its individual elements: personal, technical and organizational, as well as the appropriate transformation of these structures ([Wrzosek 2022](#), 38).

The Serbian Armed Forces conduct a reconnaissance patrol to collect intelligence on the enemy, combat area, and meteorological conditions in a certain area. A reconnaissance patrol is a temporarily formed reconnaissance unit from a company or platoon. The strength and composition of the reconnaissance patrol can be a reconnaissance section which depends on the task, strength, activity and distance of the enemy, the type of combat actions, speed of movement of the majority of own forces, characteristics of the land, meteorological conditions and others ([II Uprava GŠ JNA 1977](#)).

In other larger armed forces reconnaissance patrols have identical tasks and roles. In the United States Army patrols are missions to gather information or conduct combat ([Headquarters 2013](#)). Reconnaissance patrols are conducted before executing operations to find the enemy and determine his strength and dispositions ([Headquarters 2001](#)). They avoid combat except for self-protection or to take advantage of an unusual opportunity ([Headquarters US. Marine Corps 2000](#), 12-1). In Russian Ground Forces reconnaissance patrols are typically platoon-sized elements, reinforced with engineers and other specialists ([Grau and Bartles 2016](#), 43,276). The mission of the patrol is to provide intelligence data on the enemy's strength, composition, and direction of movement. The patrol attempts to penetrate and report on the enemy's main body. The patrol also reports information on routes, the radiological and chemical situation, and the nature of the terrain ([Headquarters 1984](#)).

One brigade can have 2 infantry battalions, with 3 infantry companies each ([Engelbrecht 1998](#), 31), with 3 rifle platoons each, with 3 rifle sections each ([Headquarters 2006](#), 1-3). If each infantry company organizes one reconnaissance patrol with the strength of one rifle section, this would mean that at the brigade level, 54 rifle sections should be ready to carry out 6 reconnaissance patrols. Since all rifle sections periodically change in the role of a reconnaissance patrol, this means that all sections must be familiar with the possibility of using their resources to perform this task. Suppose each of the 6 rifle sections in the role of a reconnaissance patrol does not use its human and material resources effectively. In that case, it can in part affect the combat capabilities of the entire brigade.

Organization of rifle section and reconnaissance patrol

The Serbian Armed Forces "Rule of infantry soldier-section" from 2016, regulates that organizational structure of rifle section consists of nine members: the rifle section commander („komandir odeljenja”, abbreviated as “KO”), machine gunner-1 („prvi nišandžija”, abbreviated as “N-1”), assistant machine gunner-1 („pomoćnik nišandžije-1”,

“Po-1”), machine gunner-2 („drugi nišandžija”, “N-2”), assistant machine gunner-2 („pomoćnik nišandžije-2”, “Po-2”), rifleman-1 („prvi strelac”, “S-1”), rifleman-2 („drugi strelac”, “S-2”), rifleman-3 („treći strelac”, “S-3”) and sniper („snajperista”, “Sn”). The rifle section personnel are armed with four 7,62 mm M70 automatic rifles (or 5,56 mm M21 automatic rifles), two 7,62 mm M84 machine guns, and one 7,9 mm M76 semi-automatic sniper rifle (Žnidaršič, Stojadinović and Slađan 2021, 162) (Figure 1).

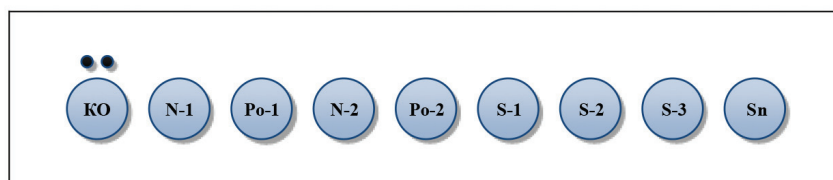


Figure 1 Organizational structure of the rifle section (KzO GŠ VS MORS 2016)

Determination of the basic organizational structure of the rifle section was the first step. The next step was to identify the variants of rifle section reconnaissance patrol formations in Serbian Armed Forces regulations.

The variants of rifle section reconnaissance patrol formations in Serbian Armed Forces regulations

To be able to determine the best routes for The Serbian Armed Forces, “Rule of infantry soldier–section” regulates that the rifle section is sent as the reconnaissance patrol by a company commander or battalion commander and that they can give the task of moving in the grip of the lead, in their area or in the area of the enemy, in the attack, defence, rest, march, fighting in the fight surrounded by enemy, pursuit, retreat and other activities and operations, reconnoiter the enemy, terrain, and important objects, at a distance determined for each specific situation (KzO GŠ VS MORS 2016, point 193, 194, 197).

The regulation specifies that all reconnaissance patrol activities take place around the core. The core leads the rifle section commander as reconnaissance patrol commander („komandir izviđačke patrolne”, “KIP”) or his deputy (when rifle section commander moves with the lead scouts) (KzO GŠ VS MORS 2016, point 200). The reconnaissance patrol is moving generally in a column formation. In the lead of the core, two to three soldiers were designated to be the lead scouts („čelni izviđači”, “ČI”) (Figure 2) (KzO GŠ VS MORS 2016, point 198).

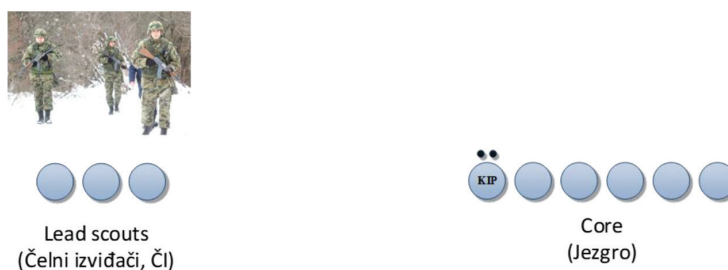


Figure 2 Lead scouts of rifle section reconnaissance patrol (Stamenković 2019, 132)

If necessary, to prevent surprises from the side of a reconnaissance patrol, the rifle section commander as reconnaissance patrol commander, designates side scouts („bočni izviđači”, “BI”) (KzO GŠ VS MORS 2016) (Figure 3).

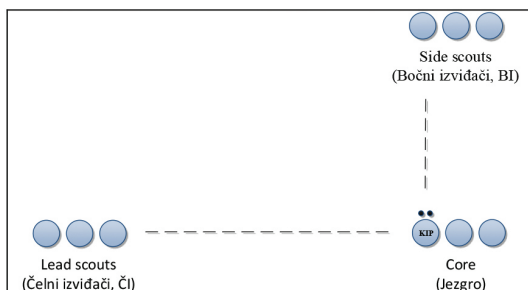


Figure 3 Lead and side scouts and core of rifle section reconnaissance patrol

For monitoring the movement and the actions of the scouts, the rifle section commander as reconnaissance patrol commander designates observers at the core („osmatrač čelnih i bočnih izviđača”, “OČI” and “OBI”). Observers move inside the core or outside of the core (Figure 4). The lead and side scouts are occasionally replaced, as they move, especially when reconnaissance is carried out in difficult weather conditions (KzO GŠ VS MORS 2016, 198-200).

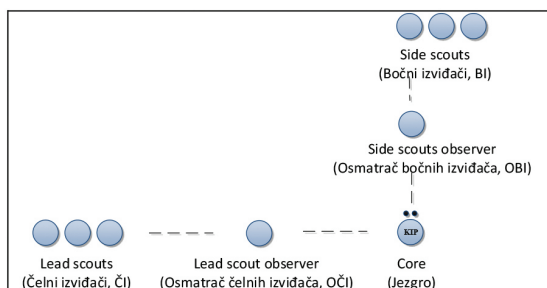


Figure 4 Observers of lead and side scouts of rifle section reconnaissance patrol

When in the reconnaissance area they are isolated and important objects are outside the direction of movement of the lead or side scouts, rifle section commander as reconnaissance patrol commander designates additional scouts („dopunski izviđači”, “DI”) (KzO GŠ VS MORS 2016, point 199) (Figure 5).

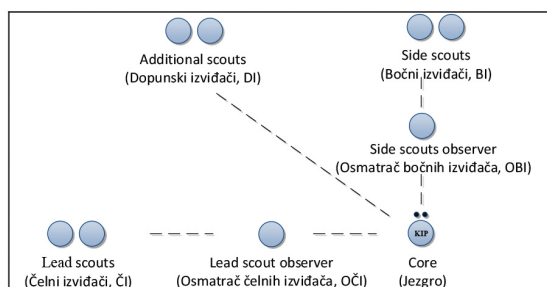


Figure 5 Additional scouts as an element of the rifle section in reconnaissance patrol formation

All scouts move at a distance that secures the core of the reconnaissance patrol from surprise and enables visual connection and signalling, with the task of detecting the enemy in a timely manner, performing reconnaissance on a particular object and reporting to the commander and directly securing the core of patrol (KzO GŠ VS MORS 2016, point 201).

In this variant, it becomes clear that all soldiers scout outside the core and that core is only one man. This is in coordination with the Rule, but it becomes clear that the reconnaissance patrol is maximally engaged outside and that the commander is that one man. This is acceptable for standing position but not for movement. Commanders have just too many scouts to control and coordinate.

In Figure 5 it is clear that the problem is the lack of soldiers in the rifle section to conduct all variants of reconnaissance patrol formation. Maximizing the engagement of all rifle section soldiers could be a short-term option with a lack of control and safety. Here it is also visible that it is crucial that general military training should prepare all platoon commanders regardless of service in order to define the necessary behaviour to perform their fighter roles, one of which is reconnaissance patrol (Petcu 2016, 47). To perform a detailed analysis, it was necessary to know all possible regulated variants of formation. The third step was to determine all possible variants of the rifle section formation in the reconnaissance patrol and determine criteria to select those that are effective.

Variants of the rifle section formation in the reconnaissance patrol

The basis for creating scenarios of all variants of formations were two primary criteria: 1) the number of soldiers in the reconnaissance patrol and 2) the elements of the reconnaissance patrol.

For the first criterion found in the Serbian Armed Forces, "Rule of infantry section – soldier" indicated that the rifle section is a unit of nine soldiers. For the second criterion, it is established that rifle section reconnaissance patrol formation could have six elements: lead scouts (ČI), lead scouts observer (OČI), side scouts (BI), side scouts observer (OBI), additional scouts (DI) and core (jezgro) (Table 1). Back scouts („začelni izviđači"), although determined in reconnaissance units, in rifle section regulations are not a mandatory element of the rifle section reconnaissance patrol formation (Figure 5). For that, no explanation was given but was accepted as a regulated fact in the research. All elements of the rifle section reconnaissance patrol formation are shown in the columns. It is listed in the lines the number of soldiers who can make up each element (Table 1).

TABLE 1 Elements of rifle section reconnaissance patrol formation

	Lead scout	Lead scouts observer	Side scouts	Side scouts observer	Additional scout	Core
	(ČI)	(OČI)	(BI)	(OBI)	(DI)	(Jezgro)
1	3 soldiers	1 soldier	3 soldiers	1 soldier	3 soldiers	1 soldier: Section commander
2	2 soldiers		2 soldiers		2 soldiers	2 soldiers: Section commander + 1 soldier
3	1 soldier		1 soldier		1 soldier	3 soldiers: Section commander + 2 soldiers
4						4 soldiers: Section commander + 3 soldiers
5						5 soldiers: Section commander + 4 soldiers
6						6 soldiers: Section commander + 5 soldiers
7						7 soldiers: Section commander + 6 soldiers
8						8 soldiers: Section commander + 7 soldiers
9						9 soldiers: Section commander + 8 soldiers

By combining all columns (elements) and rows (numbers of soldiers) from Table 1, all possible variants of rifle section reconnaissance patrol formation were created. The variants had to have nine soldiers in total and all soldiers were seen as equal as if they were the same speciality (Table 2).

TABLE 2 List of scenarios that represent variants of the rifle section reconnaissance patrol considered as all soldiers were of the same speciality (Žnidaršič 2022)

Variant number	Lead scouts	Lead scouts observer	Side scouts	Side scouts observer	Additional scouts	The core
	(ČI)	(OČI)	(BI)	(OBI)	(DI)	(Jezgro)
1						9: KO + 8
2	3					6: KO + 5
3	2					7: KO + 6
4	1					8: KO + 7
5			3			6: KO + 5
6			2			7: KO + 6
7			1			8: KO + 7
8	3	1				5: KO + 4
9	2	1				6: KO + 5
10	1	1				7: KO + 6
11			3	1		5: KO + 4
12			2	1		6: KO + 5
13			1	1		7: KO + 6
14	3		3			3: KO + 2
15	3		2			4: KO + 3
						• • •
150	1	1	3	1	2	1: KO
151	1	1	3	1	1	2: KO + 1
152	1	1	2	1	3	1: KO
153	1	1	2	1	2	2: KO + 1
154	1	1	2	1	1	3: KO + 2
155	1	1	1	1	3	2: KO + 1
156	1	1	1	1	2	3: KO + 2
157	1	1	1	1	1	4: KO + 3

For a better understanding of Table 2, invariant number 1 (marked row 1), the scenario is: that all nine soldiers are in the core. In variant 2 (marked row 2), the scenario is: 3 soldiers are lead scouts and 6 soldiers are in the core. In variant number

8 (marked row 8), the scenario is: 3 soldiers are lead scouts, 1 soldier is lead scouts observer and 5 soldiers are in the core.

The result of combining data from Table 1 is Table 2 in which 157 scenario-based variants of rifle section reconnaissance patrol column formation where all soldiers are presumed to have identical roles and specialities. But all soldiers in the rifle section are not of the same specialty and that is something that in the next step has to be taken into consideration.

Variants of the rifle section reconnaissance patrol formation balanced by soldier specialities

Soldiers of the rifle section are armed with six automatic rifles, one sniper rifle, and two machine guns and carry two complete kits of equipment to service machine guns. A machine gun 7,62 mm M84 crew consists of a machine gunner and an assistant of a machine gunner. The machine gunner is armed with a weapon that weighs 10 kg without the weight of ammunition. With two small ammunition boxes and 200 bullets in the ranks under the weight of his weapons and equipment could not be audible and concentrated on covert, careful and quiet movement in order to avoid being spotted by the enemy (Figure 6). The assistant of a machine gunner is armed with an automatic rifle, but he is limited in moves because he carries two large ammunition boxes with a total of 500 bullets. Carrying these large ammunition boxes, whether in his hands or on a combat vest, makes it difficult for him to move, even if he is relieved of unnecessary equipment in preparation for the task. It is also difficult to ensure that he remains silent and careful after a long movement.

In case it is necessary to open fast and persistent fire, members of the machinegun crew should be very close to each other. In a reconnaissance patrol, they are more likely to need to engage for the purpose of fire support for the withdrawal of lead, side or additional scouts.



Figure 6 Machine gunner and rifleman in scouting (Subotić 2014)

The sniper is armed with a 7,9 mm M79 semi-automatic sniper rifle, a long-barreled rifle that masks well but is less suitable for covert movement than an automatic rifle. The optics on the rifle are not suitable for observation in the role of scouts at short distances. Ten bullets in a rifle magazine is a small firepower that could protect or

neutralize the enemy in case of encountering him. In almost half of the interviews, commanders thought that the sniper could be used as a lead, side or scout observer, but the prevailing view in this stage of research is that it would be more useful in the core than outside it in the event of sudden combat contact with the enemy.

In the organization prescribed by the “Rule of infantry soldier–section” relative restrictions are given in point 202, that snipers and machine gunners are not assigned to lead and side scouts in principle. Although the restriction is not stated for the machine gun assistant, he should stay with the machine gunner in order for both of them to service the machine gun as successfully as possible. So, in such a determination, only riflemen can be determined as scouts.

For all the above reasons, two machine gun crew consists of two marksmen and two assistants, as one sniper and the rifle section commander are marked as not eligible for scouting. The core is the only organisational structure where they fit. Based on those criteria, all variants with less than six soldiers in the core are rejected as inadequate. That resulted in the rejection of 138 variants and the remaining 19 variants (Table 3). In all 19 variants, it is very obvious that 3 riflemen could not perform all scout duties all the time. In some moments they need rest and replacement with other riflemen but there is no additional rifleman in the rifle section to replace only 3 riflemen.

TABLE 3 Variants of rifle section reconnaissance patrol formation

	Variant number	Lead scouts	Lead scouts observer	Side scouts	Side scouts observer	Additional scouts	The core
		(ČI)	(OČI)	(BI)	(OBI)	(DI)	(Jezgro)
1.	2	3					6: KO + 5
2.	5			3			6: KO + 5
3.	12	2	1				6: KO + 5
4.	15			2	1		6: KO + 5
5.	22	2		1			6: KO + 5
6.	24	1		2			6: KO + 5
7.	52	1		1		1	6: KO + 5
8.	61	1	1	1			6: KO + 5
9.	67	2		1			6: KO + 5
10.	69	1		2			6: KO + 5
11.	3	2					7: KO + 6
12.	6			2			7: KO + 6
13.	13	1	1				7: KO + 6
14.	16			1	1		7: KO + 6
15.	25	1		1			7: KO + 6
16.	70	1		1			7: KO + 6
17.	4	1					8: KO + 7
18.	7			1			8: KO + 7
19.	1						9: KO + 8

This conclusion from Table 3 pushed the following analysis in research.

Variants of the rifle section formation in the reconnaissance patrol for most situations

Findings from Table 3 that 3 riflemen are suitable to perform all scout duties and that the rest of the rifle section could be in the core of reconnaissance patrol are simplified for research purposes. Lead, side and additional scouts are gathered as leading scouts. (Table 4, Figure 7)

TABLE 4 Reconnaissance patrol when soldiers are assigned to non-specialized positions

	Variant number	Lead scout	Lead scout observer	Side scout	Side scout observer	Additional scout	The core
		(ČI)	(OČI)	(BI)	(OBI)	(DI)	(Jezgro)
1.	2	3					6: KO + 5

In the picture, it would be seen like in Figure 7.

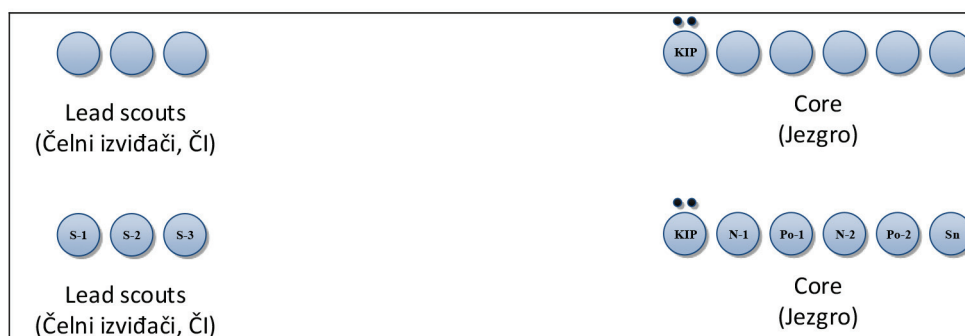


Figure 7 Assignment of soldiers in rifle section reconnaissance patrol formation

In this analysis, as interviewers, there were included infantry section and platoon commanders, instructors and specialists of the infantry and reconnaissance speciality at the Serbian Armed Forces, as well as teachers who conduct training with cadets of the infantry at the Military Academy of the University of Defence in Belgrade.

Interviewers in the research were tasked with examining each variant presented in Table 3, Table 4, and Figure 7. They were instructed to provide observations on both positive and negative characteristics they identified, as well as to propose changes aimed at enhancing performance or suggesting solutions that could facilitate the rifle section's successful execution of a reconnaissance patrol.

Comments and suggestions made by the interviewers during the research agree that the continuous engagement of all three riflemen on the duties of lead, side and additional scouts, as well as on the duties of observers of the lead and side scouts, meant a lot of stress for the three men during the execution of these activities. The duty of a scout is difficult and involves periodical changes in order to maintain the degree of their attention in perceiving a possible enemy and space.

All observations were gathered, leading to the conclusion that, while there may be occasions where all three riflemen could be assigned roles such as lead, side, additional, or scout observers due to reconnaissance needs, such arrangements should be avoided. This is because they would likely result in significant fatigue among the riflemen, increasing the risk of lapses in attention that could endanger the entire rifle section (reconnaissance patrol). This approach has been deemed unsustainable over the long term, as it compromises the safety of the rifle section during reconnaissance patrols.

By comparing the proposed advantages and disadvantages of the variants given by the interviewers, it was concluded that it is safe and efficient to engage one rifleman as a lead scout (Figure 8).



Figure 8 Variant of formation chosen by interviewers

Such a variant of formation would place the least burden on riflemen who are suitable to engage in scout's duties, because of characteristics of their weapons and equipment. This formation will enable all riflemen to have equal engagement on demanding scout duty.

Subjects in research proposed that this variant be the basic formation of the rifle section as the reconnaissance patrol, but interviewed commanders from mostly reconnaissance specialty also concluded that it was necessary to appoint an observer of the lead scouts who would move between the man and the core. They insisted that there was a problem in maintaining a visual connection between the core and the lead scout on curved paths, in the woods and other "closed" poorly visible spaces with many obstacles. In those spaces and situations, the lead scout is more likely to be forced to move more slowly so that the core can follow him. When the core stops, it takes some time for the soldier in the core to start moving again. This slows movement and disrupts security due to frequent gathering.

This problem is in all cases being successfully resolved by appointing an observer to move between the core and the lead scout (Figure 9).

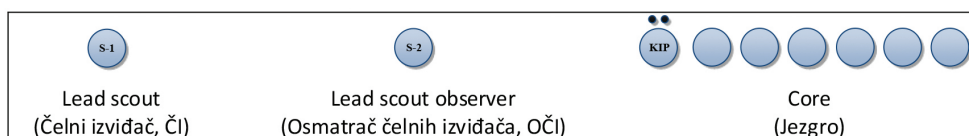


Figure 9 Less optimal, but more effective rifle section reconnaissance patrol formation

This led to a modification of the optimal formation variant from Figure 8 in which riflemen are evenly distributed on critical duties, on less optimal, but more effective rifle section reconnaissance patrol formation in Figure 9.

Formation variants in the core of the rifle section reconnaissance patrol

The determination of optimal and effective modules of rifle section reconnaissance patrol formation was a major success but formation within the core itself is the next step to complete research.

Since the Serbian Armed Forces “Rule of infantry soldier–section” stipulates that soldiers in the core generally move in a column (KzO GŠ VS MORS 2016, point 175), and it is not described elsewhere which other formations may be applied, only line formation was taken into consideration. Other formations for the movement of the rifle sections exist in literature like: line, file (column), staggered column, wedge, vee, echelon-left, echelon-right, box, diamond, Y and T (Žnidaršič and Bakos 2018) but in this study, it was initially limited to column formation as the only one listed in the legally accepted rule.

For easier data processing, machine gunner and assistant machine gunner were considered as a single entity (MGC-1 and MGC-2). They are crew and separating their members would reduce fire efficiency. The reconnaissance patrol (rifle section) commander is determined to be at the head of the patrol in all variants, i.e. at Position-1. Because it is the best position from where the reconnaissance patrol (rifle section) commander can affect the movement of the lead, side or additional scouts and core (Table 5).

TABLE 5 Variants of positions of solders in rifle section reconnaissance patrol (Žnidaršič 2022)

Variant number	Lead scouts (ČI)	Core					
		Position-1	Position-2	Position-3	Position-4	Position-5	Position-6
1	S-1	KO	MGC-1	MGC-2	S-2	S-3	Sn
2	S-1	KO	MGC-1	MGC-2	S-2	Sn	S-3
3	S-1	KO	MGC-1	MGC-2	S-3	S-2	Sn
4	S-1	KO	MGC-1	MGC-2	S-3	Sn	S-2
5	S-1	KO	MGC-1	MGC-2	Sn	S-2	S-3
6	S-1	KO	MGC-1	MGC-2	Sn	S-3	S-2
7	S-1	KO	MGC-1	S-2	MGC-2	S-3	Sn
8	S-1	KO	MGC-1	S-2	MGC-2	Sn	S-3
9	S-1	KO	MGC-1	S-2	S-3	MGC-2	Sn
10	S-1	KO	MGC-1	S-2	S-3	Sn	MGC-2
•				•			
•				•			
•				•			
109	S-1	KO	Sn	S-2	MGC-1	MGC-2	S-3
110	S-1	KO	Sn	S-2	MGC-1	S-3	MGC-2
111	S-1	KO	Sn	S-2	MGC-2	MGC-1	S-3
112	S-1	KO	Sn	S-2	MGC-2	S-3	MGC-1
113	S-1	KO	Sn	S-2	S-3	MGC-1	MGC-2
114	S-1	KO	Sn	S-2	S-3	MGC-2	MGC-1
115	S-1	KO	Sn	S-3	MGC-1	MGC-2	S-2
116	S-1	KO	Sn	S-3	MGC-1	S-2	MGC-2
117	S-1	KO	Sn	S-3	MGC-2	MGC-1	S-2
118	S-1	KO	Sn	S-3	MGC-2	S-2	MGC-1
119	S-1	KO	Sn	S-3	S-2	MGC-1	MGC-2
120	S-1	KO	Sn	S-3	S-2	MGC-2	MGC-1

By logically placing the soldiers with different weapons and equipment, several conclusions were made:

- Two machine gun crews would be good to be positioned so that they can use their heavy fire to protect the rifle section from any direction. This means that it would be good to place the first crew at the lead of the column and the second at its back.

- The rifleman or riflemen should be positioned closer to the section commander so that they are close enough to be able to replace the soldier on the duty of lead scout.

- A sniper has less firepower but a greater effect on the enemy if he is accurate. To be able to reduce stress for better accuracy, he should be assigned to Place-6. There, his ability to observe at the rear is greater in relation to the machine gun crew members, so he can successfully be an element of the back security.

Applying selection based on the given remarks 114 variants have been reduced and 6 variants remain (Table 6).

TABLE 6 Reduced variants of positions of soldier in rifle section reconnaissance patrol

Variant number	Lead scout (ČI)	Core					
		Position-1	Position-2	Position-3	Position-4	Position-5	Position-6
50	S-1	KO	S-2	S-3	MGC-2	MGC-1	Sn
54	S-1	KO	S-2	S-3	MGC-1	MGC-2	Sn
61	S-1	KO	S-2	MGC-1	S-3	MGC-2	Sn
65	S-1	KO	S-2	MGC-1	MGC-2	S-3	Sn
67	S-1	KO	S-2	MGC-2	S-3	MGC-1	Sn
71	S-1	KO	S-2	MGC-2	MGC-1	S-3	Sn

Analysis shows variants in which the scenarios are identical and where machine gun crew-1 and crew-2 can be switched (marked in Table 6). The acceptable variant is where crew-1 is at the place which is directed towards the lead of the core column and crew-2 towards the rear of the core column, and then the number of variants is reduced to 3 (Table 7).

TABLE 7 More reduced variants of positions of soldier in rifle section reconnaissance patrol

Variant number	Lead scout (ČI)	Core					
		Position-1	Position-2	Position-3	Position-4	Position-5	Position-6
54	S-1	KO	S-2	S-3	MGC-1	MGC-2	Sn
61	S-1	KO	S-2	MGC-1	S-3	MGC-2	Sn
65	S-1	KO	S-2	MGC-1	MGC-2	S-3	Sn

In variant number 65 (marked in Table 7), the rifleman at Position-5 is recognized as an inadequate solution because it is necessary to be closer to the section commander in order to be able to follow the events at the lead of the column and be more familiar with the situation when he should be engaged as a lead or side scout. After the rejection of variant number 65, only two variants remained (Table 8).

TABLE 8 More reduced variants of positions of solder after rejection of variant number 65

Variant number	Lead scouts (ČI)	Core					
		Position-1	Position-2	Position-3	Position-4	Position-5	Position-6
54	S-1	KO	S-2	S-3	MGC-1	MGC-2	Sn
61	S-1	KO	S-2	MGC-1	S-3	MGC-2	Sn

The last dilemma was whether both riflemen were in Position-2 and -3, respectively closer to the section commander (Variant number-54), or that rifleman-3 was placed in Position-4 (Variant number-61).

In Variant number 54, both riflemen would be better acquainted with the situation when they need to be engaged as scouts, but machinegun crews would be grouped. In case of need the crews would not be able to open fire on the wider lead for the defence and thus keep the enemy while the scouts are withdrawing. Machinegun crews would be vulnerable to the concentrated, sudden and strong fire of the enemy at one point where they are placed.

In Variant number 61, Rifleman-3 would be positioned farther from the section commander but would also be part of a subgroup capable of confronting an enemy attacking the flank or rear of the reconnaissance patrol. In such a scenario, he could assume command of this subgroup and engage the enemy while the primary group maintains suppression fire. Core variant number 61, was more acceptable to most subjects in research (Table 9 and Figure 10).

TABLE 9 Core variant number 61, more acceptable to most subjects in research

Variant number	Lead scout (ČI)	Core					
		Position-1	Position-2	Position-3	Position-4	Position-5	Position-6
61	S-1	KO	S-2	MGC-1	S-3	MGC-2	Sn

In the picture, it would be like in Figure 10.



Figure 10 Spatial representation of Core variant number 61

In the further course of the research, in relation to an optimal variant (Table 9), the subjects in the research were asked to determine one rifleman less in the core to be an observer leading scout (Table 10).

TABLE 10 Who would be more suitable to be an observer leading scout from the core?

Variant number	Lead scout (ČI)	Lead scout observer (OČI)	Core					
			Position-1	Position-2	Position-3	Position-4	Position-5	Position-6
61	S-1	?	KO	S-2	MGC-1	S-3	MGC-2	Sn

In this case, they had to decide whether to keep the Rifleman-3 (S-3) in Position-2 or-4. The interviewers in the research agreed that in such a scenario it is best to be in Position-2. Because of the need for the rifleman to be closer to the reconnaissance patrol commander, in order to be better acquainted with the events. In that scenario, machinegun crews, have positions very close to each other, but the Rifleman-3 is much more prepared and effective for lead scouting in this variant.

Another question of a who could take turns with the lead scout observer drew the attention of everyone (interviewers) to the sniper. His position is traditionally at the end of the column, but no explanation for that was found in papers during the research. It is assumed that such a position dates back to the time when this rifle and duty were introduced in the rifle section and when other soldiers were riflemen.

It was concluded that there are no reasons why such a position could not be changed. After careful study, it was concluded that the place of a sniper (Sn) in the formation should remain at Position-5, but flexible. In addition to this, it was also concluded that Position-2 and Position-5 can take either rifleman-3 (S-3) or sniper (Sn), according to the assessment and need (Table 11, Figure 11 and Figure 12).

TABLE 11 Positions of rifleman and sniper

Variant number	Lead scout (ČI)	Lead scout observer (OČI)	Core				
			Position-1	Position-2	Position-3	Position-4	Position-5
61	S-1	S-2	KO	S-3	MGC-1	MGC-2	Sn

In that way in core will always be one soldier at the end of the column on Position-5, who is not from the machinegun crew, and one on Position-2 who is ready to replace the lead scout or lead scout observer soldier (Table 11 and Figure 11).

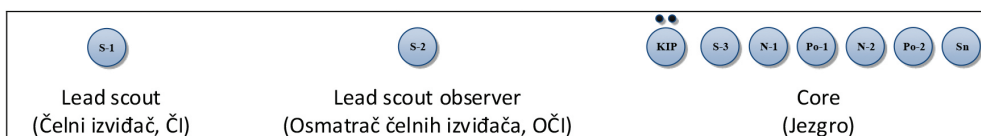


Figure 11 First variant of positions of soldier and sniper during movement of reconnaissance patrol

As they move, the lead scout, rifleman-1 (S-1) and observer lead scout, rifleman-2 (S-2) could be occasionally replaced with rifleman-3 (S-3) and sniper (Sn) (Figure 12).

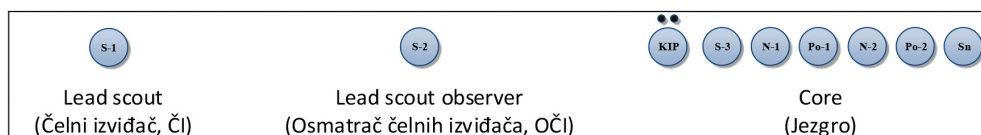


Figure 12 Second variant of positions of soldier and sniper during movement of reconnaissance patrol

All other variants on riflemen and sniper positions are also acceptable.

Conclusions

In conclusion, this research presents an optimal and effective rifle section reconnaissance patrol formation suitable for a variety of common circumstances. While the rifle section is not inherently a reconnaissance unit, it possesses the capability to perform reconnaissance tasks in less hostile environments compared to specialized reconnaissance units. It is crucial to avoid overburdening the rifle section with all reconnaissance tasks, as this could jeopardize both safety and mission success. Instead, tasks must be optimized and aligned with the soldier and equipment capabilities within the rifle section, prioritizing achievable objectives over unrealistic options.

This end results variant deviates from the optimum for soldiers engagement to optimal for soldiers safety. By implementing the method of a scenario-based analysis, firstly it was determined that rifle section could be in 120 variants of the rifle section reconnaissance patrol, if all soldiers were seen as equal, as if they are the same specialty. By logically placing the soldiers, with different weapons and equipment, several conclusions were made and when they are implemented, the large number of variants (120) is reduced on 6, then 3, and in the end to 2 (Variant number-54 and 61). The final dilemma between those two variants was resolved by subjects in research which determined that core variant number 61 was more acceptable than variant number 54 (Table 9 and Figure 10).

In the further course of the research, in relation to an optimal variant (Table 9), the subjects in the research were asked to determine one rifleman less in the core to be an observer leading scout. It was concluded that there are no reasons why such a position could not be changed. As shown in Table 11 (Figure 11 and Figure 12), it was concluded that the place of a sniper in the formation should remain at Position-5, but flexible. In addition to this, it was also concluded that Position-2 and Position-5 can take either rifleman-3 or sniper, according to the assessment and need. As they move, the lead scout, rifleman-1 and observer lead scout, rifleman-2 could be occasionally replaced with rifleman-3 and sniper, and all other variants on riflemen and sniper positions are also acceptable.

It is important to note that the proposed variants of the rifle section reconnaissance patrol formation are not rigid prescriptions but rather flexible frameworks in line with both regulations and the practical constraints of the rifle section's organizational structure. While the rule provides a broad framework for reconnaissance patrols, it may prove overly demanding for a rifle section of nine soldiers. Practice shows that it is very rare to have a rifle section in a standard organization engaged in a reconnaissance patrol. For such tasks, the superior determines the most capable manpower and equips him with the best resources from the unit. The purpose of this research was to upgrade and balance the capabilities of the rifle section as a whole to perform specific missions such as reconnaissance patrol in an effective way.

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