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ORGANIZING MODERN INFANTRY: AN ANALYSIS OF SECTION FIGHTING POWER

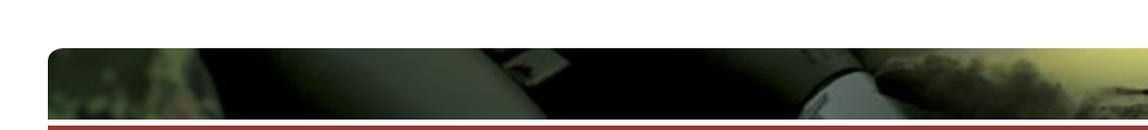
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As the 21st century unfolds, Canada continues to face an international arena marked by uncertainty, volatility and risk. While many threats have receded, others have grown in importance, and still others have arisen in their place. The threats we now face are complex and often asymmetrical in nature. It is within this uncertain context that the Land Force must continue to operate to meet Canada's national security needs and expectations. However, this entails an inherent requirement to do so not only in the short-term but also in the long-term. As such, the Army must constantly work towards a fuller understanding of the character of the future security environment and its implications for armed conflict. Moreover, it must foster operational concepts and doctrine that are clear, relevant and always forward-looking. Finally, it must seek capability building blocks, such as an infantry section, that ensures the Army's effectiveness in the future battlespace at home and abroad.

This article presents an in-depth review and comparative analysis of several factors affecting modern infantry section organization and capabilities in order to offer conceptual and design considerations for the army infantry section to operate successfully in future full-spectrum operations.

FUTURE SECURITY ENVIRONMENT

Ongoing trends (e.g., globalization, rapid scientific and technological innovation, demographic change, shifting regional power balances and the growing prominence of non-state actors) are leading to considerable change in the nature of conflict and its conduct. The result is that the likelihood of large force-on-force exchanges will be eclipsed by irregular warfare conducted by highly adaptive, technologically enabled adversaries: media-savvy foes intent less on



defeating armed forces than eroding an adversary's will to fight; rogue states bent on challenging the status quo; and trans-national criminal organizations ready, willing and able to buy, sell and trade everything from drugs to armaments for their own gain. Furthermore, turmoil will often occur in urban areas, with adversaries taking full advantage of the complex physical, moral and informational environments that large, densely populated cities provide.

Throughout history, foot soldiers have always formed the core military capability and the basic building block of any land combat organization. To be sure, many of the broad contours of future conflict will resemble those present today. Yet a key difference will be that potential adversaries are likely to be even more adaptive and the threats they pose even more varied. Both globalization and exponential technological change will offer a wide array of actors the capacity to achieve a degree of influence and reach unlike anything seen in the past. This, combined with human ingenuity, will provide adversaries with an increased capacity to organize, network and mount significant challenges on a range of fronts—moral, political and military. With greater access to a range of enablers—including cell phones, the Internet and a wide array of weapons and weapon-related technologies—adversary mobility, reach and lethality will increase.

Grounded on the lessons that we have captured from today's operations and to mitigate against the unpredictability of future conflict and prepare the Army for the challenges it might face in the future, this document will act as impetus for discussion for infantry section development. In essence, it is a conceptual guide, from which force generation must evolve, acknowledging where we are, what we have achieved and what we must do to ensure continued success in the future.

"The infantry section is the heart of the Canadian Army."

—Lieutenant-General Andrew Leslie¹

WHAT IS AN INFANTRY RIFLE SECTION FOR?

As part of an infantry platoon, the infantry section's extant role is to close with and destroy the enemy. It does this across full-spectrum operations by manoeuvre to seize an objective with a view to holding ground.² In the last century, technology has brought enhanced mobility, firepower and protection primarily with the addition of organic supporting vehicles. The manoeuvre that these vehicles bring is an integral addition to the dismounted soldiers of the section. The weapon is the infantry section. The vehicle's capabilities are part of a fighting system. Nevertheless, infantry is not defined by the platform that delivers it to battle. Regardless of how infantry may arrive at an objective, all infantry ultimately operates dismounted. That is what defines the infantry.

While there have been numerous discussions as to mission, role and task of the infantry section as an introduction to the organization and equipment, the most common arguments put forth to support infantry section size and structure over the past few decades have been limited to defining the infantry section as a fixed number of personnel with a specific weapon set. "To argue against this organization of the rifle section is to face repealing many battle-proven and entrenched philosophies inherent in western military systems."³ These philosophies have been reinforced repeatedly until they have been considered by some as unchallengeable canons. Numerous studies and experiments have espoused core principles against which we have historically measured the effectiveness of manning and equipping, as well as the efficiency of, the infantry section. The Canadian Army's *The Section and Platoon in Battle* covers section organization and the basics of both mounted and dismounted tactics without any detailed examination of how a single section would be organized to do everything. His entrenchment of the section size and narrow scope of training tactics remains a critical element in examining the organizational structure of the infantry section. While the role of the infantry section will not change—otherwise that infantry

section would not be infantry—doctrinally, there are endless options for the tactical employment of an infantry rifle section. There are numerous supporting elements that lend to flexibility and agility and ultimately the utility of the infantry to deal with complex environments. Regardless of what outcome the strategic debate for force structures takes, there will always be a requirement for boots on the ground.

HISTORY: THE ADVENT OF MODERN INFANTRY

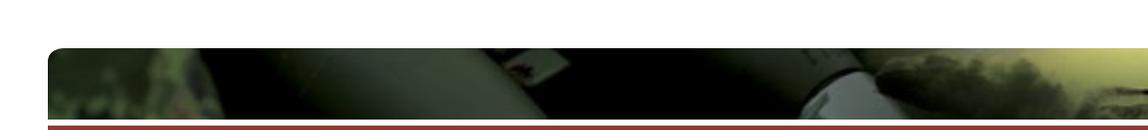
The formation of the modern infantry platoon and section finds its origins back to small groups of Roman legionnaires commanded by a *decanus*.⁴ There are also examples of the same in the “Corporal’s Guard” of the 19th century. Through the World Wars, as the variety of weapons and tactical options for the employment of infantry within the battalion became more complex, the organizational structure of the infantry company became increasingly subdivided for task execution.⁵ This evolution offered greater flexibility on the battlefield and devolved greater responsibilities to platoon- and section-level commanders, who shared in those responsibilities in order to achieve tactical mission success. In short, as the complexity of the environment increased, responsibility was divided.⁶

This evolution to the platoon, and sometimes section, as the lowest level unit with discrete tasks as part of a commander’s plan demanded greater flexibility within the infantry section but also led to a consistency of organization and weapon assignments that in themselves increased tactical options. A commander could employ a section in a variety of tasks knowing that, if equally equipped and trained, any section could handle the assigned tasks. Though much is made of the adoption of the Lewis Gun by infantry sections to provide fire support, the real breakthrough that saw the first major alteration of the infantry section was the advent of the grenade. The “cult of the bomb,” as it became known, also led to the advent of the infantry mantra, “fire suppresses, grenades kill,” something the US Marine Corps, for example, still advocates today.

During the First World War and between the two World Wars, the Canadian infantry platoon had four sections:⁷ two rifle sections of seven soldiers commanded by a sergeant providing movement⁸ elements, and two Lewis Gun sections providing firepower elements to support the forward movement of the rifle sections.⁹ Relying on the experience of the First World War, the Lewis Gun sections, each with one machine-gun, required a section of seven soldiers (all ranks) to ensure an adequate supply of ammunition in field operations.¹⁰

With regard to firepower in the Canadian Army’s experience, the replacement of the Lewis Gun (13 kg) with the Bren Gun (10 kg) and finally the FNC2 (7 kg) meant that the soldier with the weapon could carry more ammunition, thus resulting in a loss of assigned ammunition carriers (although these still do exist in the machine-gun platoon construct). Of course, firepower and movement are inextricably linked. As for movement, the result was three identical sections, each with two automatic rifles, forming a fire support group under the section 2IC, and a movement (assault) group of the remaining riflemen under the section commander. Hence, with improved firepower to suppress the enemy came safer movement.

The infantry’s ten-soldier section, organized as support and assault elements, permitted the section commander to deploy a fire support element to cover the movement of his assault group. Such an arrangement allowed the section to conduct its own manoeuvre—movement supported by fire to gain a position of advantage. Alternatively, it was recognized that when employed as part of a larger assaulting organization (platoon, company and battalion), the section could remain as a single element, with both the fire support group and the assault group moving together within the higher commander’s plan. The flexibility allowed by the two-element section organization was not taken as a requirement that they always would be employed in the support and assault configuration.



Further fundamental change to the infantry section structure would occur when it became mechanized. The Canadian infantry M113 had a driver and crew commander/gunner who would remain mounted, leaving eight soldiers as the standard dismounted section. Doctrinally, these two mounted soldiers were always considered as “bayonets first” and expected to dismount when required rather than be inextricable from the vehicles. The reality was there was no one else assigned to drive the vehicles if the entire section dismounted.

With regard to manoeuvre, the section would always be part of larger organization, it would “never” operate in isolation, and it would be required to form a single extended line only in the final approach and assault. Hence, flanking manoeuvre at the section level was unnecessary. This concept of manoeuvre assumed mass forces taking part in large-scale conflict during the period of the Cold War. This concept was further developed in the section to the point where the elimination of the requirement for a separately defined fire support element resulted in two identical fire groups of four: each fire group would be armed with one C9 light machine-gun and three C7 assault rifles. Later, one C7 would also mount the M203 grenade launcher, leaving only three riflemen¹¹ per fire group (one being the section commander or the second-in-command) and two soldiers carrying heavier weapons which were better suited to fire support tasks. This later concept also allows the section to operate as two groups of four, with each group having fire support, communications and movement. This section organization, which has prevailed since the 1990s, is perceived as well-armed and flexible in that it carries a balanced, full suite of weapons, of which one or more would be suited to any particular task. This balanced capability offers more tactical options to the section and platoon through the apportioned communications, firepower and manoeuvre demanded in a complex environment.

The doctrinal organization of the infantry section, combined with a single-option section assault tactic,¹² leads to a very specific conceptualization of what a section can do. In fact, soldiers and NCOs learn to follow the checklist-mandated expectations in training and then return to units where employment of sections might seldom reflect the repetitive activities seen in training. To some extent this has resulted in a growing divergence between theoretical warfighting requirements which dictate training methods on one hand, and what is being executed in infantry battalions that focus on a much broader concept of employment of infantry sections on the other. The reality is that this divergence is almost universally true of all school environments that require doctrinal foundations and have difficulty keeping up with current operations. While any perceived training delta is currently being addressed in pre-deployment training, there may be a gap remaining between the training baseline and doctrine, and the real-world requirements once the current pre-deployment training ends.

As the 21st century unfolds, it is expected that future land operations will be “characterized by the deliberate use of dispersion and aggregation undertaken by adaptive forces in order to create and sustain tactical advantage over an, adaptive adversaries.”¹³ To that end, the infantry section as the focal building block of all operations must be well grounded in the lessons we have captured from past operations.

ABCA¹⁴ INFANTRY SECTION ORGANIZATIONS

Note on Terminology: The ABCA nations do not consistently use the labels “assault group,” “fire team” and “fire group” for the same section elements. For the purposes of this article, “assault group” will refer to a four- or three-personnel dismounted manoeuvre element, and “fire team” will be used to describe a two-personnel team within the section. The term “section” will also be used to refer to the US Army and USMC squad. For simplicity, section weapons will be generally referred to as the assault rifle, the (under slung) M203 grenade launcher and the light machine-gun (LMG) without reference to specific national variants of the general weapon types.

DISMOUNTED INFANTRY SECTIONS

The following graphic depicts the doctrinal dismounted section for ABCA infantry:

ABCA DISMOUNTED INFANTRY SECTIONS															
		Assault Group 1					Assault Group 2					Assault Group 3			
 US ARMY	 Sect Comd	 Rifleman	 Rifleman	 M203 Grenadier	 LMG Gunner		 Rifleman	 Rifleman	 M203 Grenadier	 LMG Gunner					
 US MARINES	 Sect Comd	 Gp Ldr	 Rifleman	 M203 Grenadier	 LMG Gunner		 Gp Ldr	 Rifleman	 M203 Grenadier	 LMG Gunner		 Gp Ldr	 Rifleman	 M203 Grenadier	 LMG Gunner
 UK ARMY		 Sect Comd	 LMG(-) Gunner	 M203 Grenadier	 LMG Gunner		 Sect 2IC	 LMG(-) Gunner	 M203 Grenadier	 LMG Gunner					
 CDN ARMY		 Sect Comd	 Rifleman	 M203 Grenadier	 LMG Gunner	 Rifleman	 Sect 2IC	 Rifleman	 M203 Grenadier	 LMG Gunner	 Rifleman				
 AUS ARMY		 Sect Comd	 Scout	 M203 Grenadier	 LMG Gunner		 Gp Ldr	 Scout	 M203 Grenadier	 LMG Gunner					

Figure 1: ABCA Dismounted Infantry Section Organization

US Army. The US Army rifle section (squad) consists of a section leader and two four-personnel assault groups. Each assault group consists of two assault rifles, one M203 grenadier and one automatic rifleman (M249).¹⁵

US Marine Corps. The US Marine section (squad) consists of a commander and twelve troops in three assault groups (totalling 13 personnel). Each assault group consists of four Marines: the group leader/rifleman (M4/M16), one rifleman (M4/M16), one grenadier (M4/M16 with M203) and one light machine-gunner (M249).¹⁶

British Army. The British Army infantry section consists of eight soldiers: a section commander, a second-in-command and six soldiers. In conventional warfare, the section is split into two four-personnel assault groups. These assault groups each consist of the section commander (or 2IC) armed with a L85A2 5.56 mm rifle and three riflemen armed with a L85A2 5.56 mm rifle with 40 mm under slung grenade launcher, a L110A1 5.56 mm light machine-gun, and a L86A2 5.56 mm light support weapon.¹⁷

Of particular note is that, as a result of combat operations in Afghanistan (Op HERRICK), the British Army's actual arming of the section is markedly different. The section commander and 2IC are armed with SA 80A2 5.56 mm rifle. There are two light machine-guns (similar to Canada's C9), two under slung grenade launchers (M203 equivalents), one general purpose machine-gun (same weapon as Canada's C6), and one sharp shooter with a L129A1 7.62 mm assault rifle (procured as an immediate operational requirement for the operation). The SA80 A2 light support weapon, which has a heavier and longer barrel allowing greater muzzle velocity and accuracy than the standard SA80, is still in inventory but is not used in theatre or domestically.

Canadian Army. The Canadian infantry section consists of ten soldiers: a commander, a second-in-command and eight soldiers, including a driver and a gunner.¹⁸

Australian Army. The Australian Army infantry section is made up of eight personnel divided into two four-personnel assault groups. Each assault group consists of a team leader, a scout with enhanced optics, a grenadier with a M203 and a LSW gunner with F89 Minimi light support weapon.¹⁹

MECHANIZED INFANTRY SECTIONS

The following graphic depicts the ABCA mechanized infantry sections:

		Dismounts											
	Vehicle	Crew	Sect Comd	Assault Group 1				Assault Group 2					
	 M2 Bradley	Dvr Comd Gunner	Sect Comd	Gp Leader	M203 Grenadier	LMG	Rifleman	Gp Leader	M203 Grenadier	LMG			
	 M1126 Stryker	Dvr Comd	Sect Comd	Gp Leader	M203 Grenadier	LMG	Rifleman	Gp Leader	M203 Grenadier	LMG	Rifleman		
	 EFV	Dvr Comd Gunner	Sect Comd	Gp Leader	M203 Grenadier	LMG	Rifleman	Gp Leader	M203 Grenadier	LMG	Rifleman		
				Assault Group 3				Specialist Reinforcements					
				Gp Leader	M203 Grenadier	LMG	Rifleman						
	 FV510 Warrior	Dvr Comd Gunner		Sect Comd	M203 Grenadier	LMG	Rifleman	Sect 2/C	M203 Grenadier	LMG			
	 FV432	Dvr Comd		Sect Comd	M203 Grenadier	LMG	Rifleman	LMG (-)	Sect 2/C	M203 Grenadier	LMG	Rifleman	LMG (-)
	 LAV III	Dvr Comd Gunner		Sect Comd	M203 Grenadier	LMG	Rifleman	Sect 2/C	M203 Grenadier	LMG			
	 ASLAV	Dvr Comd Gunner		Sect Comd	M203 Grenadier	LMG		Sect 2/C	M203 Grenadier	LMG			
	 M113	Dvr Comd		Sect Comd	M203 Grenadier	LMG	Rifleman	Sect 2/C	M203 Grenadier	LMG	Rifleman		

Figure 2: ABCA Mechanized Infantry Section Organization

US Army. The principal US Army infantry fighting vehicle is the M2 Bradley. The Bradley has a crew of three and, depending on the variant, carries six or seven dismounts. The US Army also employs the Stryker armoured personnel carrier, which has a crew of two and carries nine dismounts.

US Marine Corps. The US Marines employ the Expeditionary Fighting Vehicle (EFV), representing the signature mission of the USMC. Formerly called the Advanced Amphibious Assault Vehicle, it is capable of transporting 18 Marines (a reinforced squad) and a crew of three over water at speeds of 29 mph (46.7 kph) with agility and mobility equal or greater than that of the M1 main battle tank.²⁰

British Army. The British Army employs the FV510 Warrior infantry fighting vehicle. It has a crew of three with seven dismounts. Like the LAV III, the Warrior does not carry the eight-personnel section organization as its dismountable element. The requirement for a third vehicle crewman was again offset by the reduction of one assault group to three soldiers in the Warrior mounted section. Note that the vehicle is considered integral to the section. The British Army is also continuing to upgrade its remaining FV432 Bulldog armoured personnel carriers (APC), which have a crew of two and ten dismounts. (This vehicle was used in Iraq but is not used in Afghanistan.)

Canadian Army. For the Canadian Army, “the rifle section is normally organized as two assault groups, one of four soldiers and one of three soldiers, as well as a vehicle group of three (gunner and driver, crew commander/sect 3 IC). Each assault group is further divided into two fire teams of two soldiers each. The section commander commands Assault Group 1 and the section 2IC commands Assault Group 2. This is the grouping that will take out one enemy position, with either group assaulting the position while the other group supports. This basic grouping is the easiest to command and control.”²¹

Note that in this latest draft of *Section and Platoon in Battle*, the section vehicle is the LAV III, and a crew of three now remains with the vehicle. This results in a dismounted section of two assault groups, one of four and one of three personnel, when the section is at full strength. For sustained tasks, operations have often found a fourth soldier necessary to provide rear security on halts and to assist with ammunition loading. Also note that the vehicle is considered part of the section and it provides intimate support to permit manoeuvre.

Australian Army. With the Australian Light Armoured Vehicle (ASLAV) employed as an armoured personnel carrier, the vehicle capacity is described as three crew plus six dismounts. This results in two three-personnel assault groups being dismounted from each section carrier. The Australian Army also employs upgraded M113 (eight dismounts with a crew of two) and the Bushmaster Infantry Mobility Vehicle (IMV) (11 dismounts and a crew of one).

THE AUSTRALIAN VIRTUAL INFANTRY SECTION EXPERIMENT (VISE)

The Australian Army has executed a series of simulation exercises to compare the relative effectiveness of various-sized dismounted sections. In an experiment to assess the relative effectiveness of various section sizes and organizations, the Australian Army Virtual Infantry Section Experiment (VISE) employed an adapted first-person shooter video game system to compare the tactical effectiveness of eight-, nine- and 12-personnel sections. Reported at the SimTecT 2004 Conference,²² a paper presenting some of the experiment’s results offers some food for thought, but its results should be accepted with caution. While the authors note that the nine-personnel section marginally performed better against the assessment criteria than did the eight- or 12-personnel organizations, they did not attempt to explore all of the reasons why this may have occurred.

The three dismounted section organizations in the experiment were fundamentally different in nature:

- The eight-personnel section consisted of two four-personnel assault groups, with the notable difference that one assault group had a light machine-gun and a medium machine-gun, while the second had only a light machine-gun. Each group also had an M203 grenade launcher. (This is the current Australian Army section organization, less the medium machine-gun, i.e., two balanced assault groups.)
- The nine-personnel section was in three elements (command, assault and support) of three personnel each. The assault and support groups were identically equipped, each having a light machine-gun and an M203 grenade launcher. The command group consists of the section commander and two scouts. (This was the Australian Army section organization in use at the time of the experiment, and the one that soldiers were most comfortable operating within.)²³

- The 12-personnel section was divided in to three four-personnel assault groups, one group with a light machine-gun and a medium machine-gun, the other two with a light machine-gun each. Each group also had an M203 grenade launcher.

(Note that these were all designed as dismounted sections, without addition of the potential available firepower of section vehicles.)

The nine-personnel section was determined to produce better overall results in the study's analysis. While this is probably based primarily on the fact that it was the familiar section organization for the participating soldiers, there is another factor to be considered. The nine-personnel section allows the commander the flexibility to remain outside the assault groups' fighting process while directing them. The commander also has the two section scouts as his own reserve, to be used to deal with new threats or to reinforce the assault groups as dictated by the tactical situation.²⁴ This allows the commander to balance his attention between the immediate fight and command responsibilities, thus improving the commander's situational awareness and flexibility to react to the evolving situation. This section structure gives the commander a significant advantage over the eight-personnel section structure, which places the commander in the immediate fight as an assault group commander, while having to also command the entire section and to monitor the actions and demands of the parent platoon.

In the VISE report, the authors do note that the participating soldiers had no learned doctrine for a 12-personnel infantry section organization and thus found it unwieldy. The available report also describes higher ammunition usage (and a resulting lower measured efficiency based on "mean effective rounds per enemy death") by the larger section, but without connecting it to the simple and obvious factor of more weapons in action compared to the smaller sections.

While the VISE did not examine the capability of sections smaller than eight soldiers, it can be noted that the core capability component of the nine-personnel section was its two three-personnel assault groups. Directed by a commander who remained outside these core elements²⁵ and supported by the various possible roles of the scouts, these three-personnel assault groups were the basis of the most effective section organization tested in the experiment.

OBSERVATIONS ON SECTION ORGANIZATIONS ACROSS THE ABCA NATIONS

Over a span of decades, the slow evolution from a platoon of four seven-personnel sections in a foot-borne platoon to a mounted platoon deploying three sections of seven-personnel dismounted, no commander (or staff) oversaw more than one element of change. Each change was likely perceived as minor and balanced by concurrent offsets (fewer sections balanced by more firepower) or required by other organizational changes (reduction from ten, to eight, to seven dismounted soldiers per section as vehicle crew responsibilities arose and limited by the vehicle's space for carrying additional soldiers). Inevitably, none of those who managed each of these evolutionary changes were in a position to oversee or predict the overall change to three-quarters of the original number of soldiers on the ground in an infantry platoon.²⁶ The development of the section structure seems to have been done more in the context of the new equipment that required manning than in the larger, coherent review of the infantry battalion as a fighting system in an operational context.

While there has been considerable debate over infantry section size and organization since World War II, across ABCA armies the section size of eight dismounted soldiers in two assault groups largely had its origins in a ten-personnel section with two re-assigned as vehicle crew. Currently, with the exception of the US Marine squad having three assault groups, each of these section organizations are virtually identical down to the allocation of weapon types (assault rifle, M203 grenade launcher and light machine-gun) within each four-personnel assault group. The current generation of infantry fighting vehicles—most notably based on the LAV-25/LAV III family—are large enough to accept the existing

section organization with the loss of one more soldier to a third vehicle crew position. Hence a further evolution to a seven-personnel dismounted section without any significant re-examination of the section organization. It is worth restating that in Canadian Army doctrinal design, the infantry section is ten personnel, and the vehicle enhances its manoeuvre and is part of the section.

As a result of lessons learned from recent operations in Afghanistan, there has been keen interest across ABCA nations to provide the section with a heavier rifle for one soldier to act as a marksman when required (the “sharp shooter”). This proposal returns to mechanized infantry units a consideration that marksmanship and the effective use of the aimed shot have not been fully replaced by volume of automatic fire.²⁷

While any accepted tactical doctrine will evolve to best employ in-service vehicles, weapons and equipment, there is an underlying need to maintain a broader understanding of the relationship between those elements and doctrine. Doctrine is guidance as to how those capabilities will be applied. ABCA armies are rationalizing section size and capabilities to meet the potentially smaller capacities of some proposed and existing next generation infantry fighting vehicles (IFV). The evolution from a ten-personnel dismounted section, to eight (or seven) dismounted soldiers (plus vehicle crew) has been rationalized by the explanation that new weapons meant little reduction in firepower. A further explanation commonly heard in our oral narratives surrounding the evolution of the section, and often posited as a counter to criticism of the shrinking section and platoon, is that today’s soldiers are generally better trained and equipped, bringing a further combat multiplier into the equation. However, in complex terrain, mountains, jungles and the arctic, the vehicle’s support of fire power, protection, mobility and logistics is removed, leaving dismounted infantry equipped with what they can carry tailored for that task.

The presence of the infantry fighting vehicle, in most theorized tactical scenarios and born out of recent operational experience, was also presumed to ensure the firepower and capability balance were maintained for the smaller dismounted platoon and section organizations. But these rationalizations have never been attended by the development of a fundamental understanding of how far that concept can be taken. The finite limit is, of course, that a rifle section must have the capacity to hold ground.²⁸

The key factor in developing a model for a minimum section size will be the determination of the essential tasks and roles expected of an infantry section in each proposed organization.

How small can the infantry section be and remain effective in its key, primary tactical tasks? Neither was the claimed contribution of the vehicle (armoured personnel carrier or infantry fighting vehicle) taken as an absolute requirement. The dismounted infantry platoon was continually assumed to have all of its core capabilities once dismounted and operating removed from its vehicles. For small armies like Canada’s, this core generalist capability is the key to our flexibility to respond to very different threats. These rationalizations were accepted as each generation made minor changes in organization and equipment. The primary task of an infantry section in combat operations is to manoeuvre to secure an objective and to hold ground.²⁹ In stabilization operations, the task may evolve to providing a presence by extension. The key factor in developing a model for a minimum section size will be the determination of the essential tasks expected of that infantry section in each proposed organization, whether mechanized, dismounted, light, etc. To further this point, it will be necessary to define the essential differences between:

- *Panzergrenadier* infantry, for whom vehicles remain an essential combat power element;
- APC/IFV borne infantry, who dismount and fight with or without vehicle support;³⁰ and
- APC infantry, for whom the vehicle is merely a taxi leaving the infantry to fight solely dismounted.

As these core expectations evolve, so may the acceptable limit for section size change.

SECTION SIZE AND ATTRITION

Throughout this discussion of infantry section size and organization, it is necessary to keep in mind that the numbers given are for the dismounted sections at full strength. These numbers do not account for the inevitable decreases caused by injuries, illness, leave or other causes.

The Canadian Army's 2009 draft of "Section and Platoon in Battle" does address attrition in a limited sense: "Platoon strength and organization may change for specific missions and resource availability. Due to casualties, the platoon is seldom at strength during operations. When the strength falls below 20, the platoon commander should consider reorganizing into two rifle sections, and adjust his tactical drills accordingly."³¹ The current Canadian LAV III dismounted mechanized section size of one four-personnel assault group and one three-personnel assault group leaves very little flexibility to accept losses by attrition. The quoted passage above, recommending a platoon commander regroup to two sections when his platoon strength falls below 20³² dismounted members, indicates some consideration that sections of less than six members begins to lose tactical effectiveness (three six-personnel sections, plus platoon commander and platoon warrant officer, or smaller sections if a weapons detachment is maintained). This expectation allows each LAV III dismounted rifle section to lose one member, decreasing from seven to six members, before the tactical effectiveness of the platoon is considered to be affected and regrouping is the recommended action. Regrouping removes one of the platoon commander's three primary tactical sub-units and reduces tactical options for the platoon. It should be restated that the vehicle's two or three crew are part of and support the section. Additionally, the Canadian Infantry doctrinal dismounted section is eight soldiers plus two crew.³³

The narrow margin between the dismounted platoon strength and the point at which the platoon commander will be required to restructure makes attrition a critical point of failure in maintaining effective platoon combat power. To mitigate this factor, there is a need to rationalize the doctrinal establishments for the infantry platoon. Any doctrinal structure must maintain a balance between firepower capabilities and essential flexibility for the available number of soldiers when the potential of casualties is considered. Examination of the US Marine Corps' infantry section strength, vis-à-vis the US Army's, reveals a larger structure in the Marine Corps designed to absorb attrition caused by the inherent risks of intense assault operations or the loss of a landing craft. The reality is most nations do not have the abundance of resources nor can they afford to man for attrition. Considering only force employment scenarios, there are other factors than the enemy that attrit the section size: illness, leave, training courses, etc.

Vehicle capacities do limit the platoon strength as deployed outside the wire, but they do not limit the actual strength of the platoon. If the platoon is over-strength on deployment, it will have a standing reserve of personnel to immediately replace losses in the sections from known and anticipated causes of attrition. This over-strength manpower, which would return the infantry to the "left out of battle (LOB)" concept³⁴ used in the First and Second World Wars, can be based on average documented rates for illness, leave, etc., without the delays for an operational reinforcement system to fill permanent establishment shortfalls.

The current Canadian infantry section, as dismounted from the LAV III with seven soldiers, can be considered to have a very small margin for attrition before effectiveness is affected. In the evolution from the M113³⁵ to LAV III, the capacity of the section vehicle became a widely accepted, if seldom critically examined, limitation on section size. Simply, it was a constraint of the vehicle system. Comparatively, any proposal for the employment of a smaller infantry section would have a proportionally greater need to ensure that mitigating measures are in place to minimize the effects of attrition.

TRENDS AFFECTING CLOSE COMBAT

The current size and organization of the dismounted infantry section has been the result of a number of converging trends.

Firepower Capabilities of the Section. Firepower increases have also affected the infantry section. Increases in firepower capabilities have readily been offered as an offset to the shrinking section. From the combination of Bren Gun and Lee-Enfield, or even the C1 and C2, to the C7, C9 and M203, excluding the support weapon of an armoured personnel carrier or infantry fighting vehicle, the modern eight-personnel infantry section dismounting from its section vehicle can produce a significantly greater amount of firepower than its predecessors. This does come with an attendant cost in the individual soldier's load to bring the ammunition to the fight that supports this firepower argument.

Personnel Requirements for Mechanization. The established principle for the infantry (and the Army) is "equip the man, not man the equipment." Mechanization has been a significant factor in recent years by requiring vehicle crew positions to be manned by each section. It was, perhaps, coincidental that M113, and later the LAV, fit the doctrinal section of ten personnel as long as the crew was inclusive to that number. Any alternatives to maintain the pre-mechanization dismount strength would have required a significant increase in vehicles for a battalion or in vehicle size plus additional crew personnel. One more vehicle per platoon would equate to roughly a 25% increase in vehicle requirements or a 20% decrease in the number of mounted platoons (25 platoons would require 125 vehicles vice 100, or 100 vehicles could only provide for 20 platoons). Undoubtedly, the convergence of vehicle program costs and the mathematics of a ten-personnel section becoming an eight- or seven-personnel section plus crew were too convenient for planners to ignore. It is undeniable that the LAV III is a combat multiplier and brings greater combat power to the fight including:

- greater mobility to get the section to its objective;
- greater protection, reducing potential casualties;
- more fire power in terms of volume, type, range, lethality and precision;
- increased technological advantages from its onboard command, control, communication and information systems; and
- its ability to carry additional ammunition, supplies and specialist equipment.

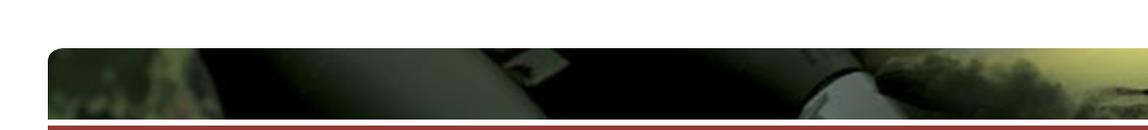
However, once reaching the objective, the infantry section dismounts. Infantry is defined by its boots on the ground. Once dismounted, the advantages imparted from its APC/IFV are reduced or lost. The section is not enabled by the vehicle. To accomplish its role, it is dependant on sufficient dismounted section strength. Diminishing that cuts the capabilities of the roles, missions and tasks of the infantry.

Competing Demands for Limited Personnel. There have been competing requirements for manning across the Canadian Army, and infantry battalions have lost organic supporting capability (anti armour platoon, pioneer platoon and mortar platoon) in recent years. However, the overall strength of the infantry platoon has remained relatively constant since World War II. This is not a factor in designing an organization. The issue is retaining sufficient maning.

Technology. Technology is being leveraged to gain the full strategic and tactical advantages of a mobile, agile and flexible force. Advances in technology have enabled the improvement of many basic items of equipment used by the infantry. While some of these advances (e.g., clothing textiles) would not be unusual to an infantry soldier of the 1930s, and others (e.g., automatic rifles) might be perceived as expected advances from known items, others and their operating requirements would be completely foreign to an observer from the past. Night vision equipment, complex radio systems and global positioning devices are such items that can be complex modern enablers for the infantry section.

These technological advances also include the requirements to maintain, employ and fight a section vehicle. However, the cost of many of these advances is demanding training requirements (for effective employment beyond simple functional skills), both to learn and to maintain skills. In fact, much of a mechanized infantry battalion's efforts are centered on the supporting requirements for its vehicles, much like an armoured unit.

These technological advances also include the requirements to maintain, employ and fight a section vehicle. ...many of these advances have demanding training requirements...



Cognitive Demands. New technology also demands cognitive skills above and beyond what were expected of infantry soldiers of past generations. Additionally, such technology further complicates an already complex operating environment by requiring personnel, especially the section commander, to maintain a broader and more detailed situational awareness in addition to the exercising the direct responsibilities of command. These effects, taken one by one, are each quite manageable. In total, they encompass a considerable demand on the infantry section and its commander. The reality is that as things become more complex, our cultural ability to grasp them improves equally quickly. “Capability development was/is not driven solely by imitation or resuscitation, but also by unique adaptation and indigenous innovation.”³⁶ This has always been the case in history. These new demands do need to be defined by operational research and analysis so that we can better understand them.

Simplistically, the evolution of the platoon through the 1980s, 1990s and into the 2000s maintained the organization and basic weapon mix of the infantry platoon with upgrades to weapons and equipment. In battalions equipped with the M113, the result was not a visibly evolved mechanized infantry organization or doctrine, as it was the original dismounted platoon **plus** its assigned vehicles. With the fielding of the LAV III, tactics, training and procedures were written for its deliberate employment in the combat team. Of course, when separated from its vehicles for any reason, the platoon and its core capabilities remained unchanged. It remains extant that the role for the section is to manoeuvre dismounted and hold ground. This has resulted in reinforcing the reality that the infantry platoon, and its constituent sections, is a relatively inviolable doctrinal unit.

Innovations in technology and doctrine are the harbingers of change in warfare. Potential developments of new technologies will continue to extend down to the section level, not only in the context of shared situational awareness (SA) but also in the provision of real-time capabilities to contribute collected information including in the human dimension. To ensure the projected “integrated soldier”³⁷ is viable in addition to the existing scope of duties, new information-sharing devices will add to the soldier’s load, whether every soldier or select soldiers are equipped for this task. To be sustainable, this addition will require enormous attendant power and transmission capabilities. Power is the Achilles heel. All this technology only works if there is power. These support requirements will be more readily sustainable if the section is expected to operate in close proximity to its vehicle, using the vehicle as the primary power supply, data storage and communications capability to share data beyond the section. Regardless of technology, the nature of war does not change, and the infantry will dismount from its vehicles and have to close with and destroy the enemy, old style.

Early experiments in “wearable computers”³⁸ for soldiers were hindered by the existing technologies which prevented developing systems with acceptably low weights and user friendly interfaces. The rapidly evolving technological revolution in personal electronics (e.g., iPhone 3GS) also meant that while a future utility of computerized aids for soldiers could be envisioned, specific requirements and applications may not have been developed to the point of building a solid case for further development at the time that would convince the military establishment to promote change. More recent and widespread advancements have seen the development of not only improved computer and communications technologies but a much more technologically aware and prepared population from which future soldiers will be selected.

The cellular telephone market has demonstrated the potential for miniaturization of personal electronic devices, with rugged examples now being available that have better chances to perform well in a military environment. With the acceptance that technological advancements will continue to be an enabler of combat operations, further work is being done in many relevant fields.³⁹ Marked advances in wireless communications and networked systems have also opened a realm of possibilities for a networked operating environment to support the infantry section.

Following network management approaches used for internet wireless networks, many low power networks can exist within the same bandwidth. Individual soldier systems could be programmed to connect by default to their section vehicle. In the event that a connection to the section vehicle cannot

be established, the soldier's device can be designed to default to another vehicle in the platoon, then the company and finally to any nearby friendly vehicle to maintain contact with the network. Such a system of default connections, with access to more sensitive information dependent upon network protocols being input by the user (similar to radio network keys), will ensure a flexible network that will not drop soldiers completely from contact if their vehicle is removed from the network by any cause. (To facilitate training and skill development with such a system, this integrated soldier would need to be a part of garrison network nodes which could be established to promote use of the devices as an automatic and practiced skill set and not only used when deployed with section vehicles.)

Employing the section vehicle as the primary data storage and communications node for the section can allow most data to be held in the vehicle's data storage and only displayed to the soldier on request. This minimizes the essential data to be stored on individual units for no-fail access as required. (However, with technology like the 32 GB iPhone 3GS, the individual can access tremendous data, applications and communication capabilities.) Embedded communications requirements, such as GPS locations of vehicles and personnel, can be collated and sent by the vehicle system without any specific demand on the members of the section. For security of information and information sharing, section vehicles within a platoon can be networks of virtual and self-managing RAID arrays,⁴⁰ automatically maintaining redundant data storage. This technology should be viewed as an enabler. The danger, of course, is inextricably slaving the soldier to the vehicle node, creating a critical vulnerability and impacting the flexibility of the infantry section to perform its function.

A significant advantage to operating in close proximity to the section vehicle is the potential for it to provide the power necessary to maintain individual network devices and other electronics. This may be as simple as providing the means to carry extra batteries, to power battery recharging units or even, in future, to provide an automatic recharging capability for any devices within the vehicle.⁴¹

The key factor in developing and extending network support to the infantry soldier is to balance the additional skill requirements and cognitive demands such that they do not become primary responsibilities in and of themselves. Automation of data exchange, minimizing input requirements at critical times and maintaining the network as a system in support of primary roles will all have to be managed as critical aspects of future development in order to ensure that they do not impose greater cognitive penalties than they offset.



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THE HUMAN DIMENSION

The demands on tomorrow's soldiers are discussed in *Land Operations 2021: The Force Employment Concept for Canada's Army of Tomorrow*. This publication describes the requirement that the soldier must be prepared that in future "the centre of gravity for tomorrow's soldier is the command environment."⁴² Military operations are predicted to increase in complexity, and the future challenge for the profession of arms will be to maintain soldiers' leadership capabilities at all levels to achieve success. The impact on the infantry section (and the Land Force as a whole) is to "produce a soldier with a broader body of knowledge and skills."⁴³ In fact it has always been the case that new demands require new effort. These new demands do not require an increased need for academics, but rather they are to be addressed through training and self-development from enriched fundamental training and experience of operations. Significantly, the document notes the following: "Tactical competencies and individual and collective war fighting skills that have traditionally defined the soldier as a warrior will be broadened to include the 'soldier as a diplomat' and 'the soldier as a scholar.'⁴⁴

In fact, Canadian soldiers have always had to be warriors, diplomats and scholars. It was only during the Cold War period that certain capabilities of the soldier were allowed to atrophy to the point that the image of the soldier became one of merely a warrior.

The infantry soldier has been the target of many new demands on his or her cognitive capabilities over the past two decades. Increasingly complicated weapons, radios, GPS, vehicle systems (including weapons and ancillary equipment in addition to the vehicle itself) have all placed demands on the section and its soldiers. Well-designed technology (laser range finders, newer GPS, etc.) greatly increase capability with simple training requirements. Well-designed technology is intuitive to the user. Poorly designed technology (e.g., complicated radio systems) burdens the soldier with substantial training requirements. These increases in trade-specific learning requirements, and knowledge and skill demands, are compounded by a parallel increase in general knowledge and skill requirements (e.g., detailed and formalized rules of engagement, cultural sensitivity, vehicle check points and improvised explosive devices) that the infantry has not previously taught its soldiers.⁴⁵

Throughout this era, we have maintained the same educational standards for acceptance into the infantry. For soldiers joining combat arms occupations, that standard is completion of Grade 10 (Secondary III in Quebec).⁴⁶ In addition, candidates must pass the Canadian Forces Aptitude Test (CFAT). Historically, infantry candidates have required one of the lowest passing scores on the CFAT to be accepted for enrolment. The reality is most NCO applicants are secondary school graduates. In fact, the CF recognizes the current level of cognitive demands being placed on our soldiers and the expectation that the future operating environment will increase those demands. While current personnel policies encourage and support life-long learning and academic self-improvement, these policies will have their greatest effect when applied to the best possible candidates through careful initial selection.

In a perfect world, historically, the ten-personnel dismounted section had a section commander, a 2IC, two automatic riflemen and six riflemen. Of the ten soldiers in the section, only the section commander and the 2IC are required to have training beyond Basic Infantry Qualification to do their jobs (in the ideal scenario, the 2IC would have the appropriate section commander's qualification). With each generational change of leaders, those six riflemen were the manpower base to replace the 2IC (who became the section commander in a simplified environment) and maintain skilled soldiers on the automatic rifles. (Note that the FNC2 automatic rifle was functionally the same weapon as the FNC1 service rifle, thus limiting additional skill and knowledge requirements for this task.) At each rotation of the section's personnel, the best remaining rifleman became the #1 rifleman, to be groomed as the most likely next 2IC. For each rotation, the manpower base of five riflemen needed to provide only one of their numbers to move into the #1 rifleman's position, making one in five an expected norm for advancement within the section. Even with any normal level of attrition among the soldiers (release for voluntary or unsuitability reasons, inter-company posting to combat support or service support positions, trade reassignment, etc.), the section's capability to produce its own replacement leaders and automatic riflemen is not seriously affected: it can afford to lose two to three riflemen

per cycle, who were not going to be in the line of succession, as long as the training system replaces them with new soldiers ready to gain experience through the next cycle.

Advancing a few decades to the LAV III section, the functional capabilities of the infantry section has greatly expanded. That same ten-personnel section in a mechanized unit now has a section commander, a 2IC, two machine-gunners, a driver, a vehicle gunner, a vehicle crew commander (for whenever the section commander is not in the turret) and three riflemen (two of which carry M203 grenade launchers). Of these ten soldiers, at least five require additional courses (leadership, weapon or vehicle) to carry out their primary tasks. Four dismounted soldiers carry weapons more complex than the service rifle. The section now has only one "rifleman" carrying just the service rifle, and even newly trained soldiers joining the section are liable to be assigned a grenade launcher or machine-gun as soon as they arrive.

The training requirements have become overwhelming. This same section must also provide candidates for new machine-gunners, drivers and crew commanders for succession internally and higher. It is undeniable that current and future cognitive demands placed by technology have a large continual training requirement. Add the need and expectation of the soldier to comprehend the complexities of the environment, and the burden of training/education becomes exceptionally heavy. The bottom line is the demands we place on the infantry section can only be successfully achieved if we have soldiers who are capable of meeting those demands. The infantry recruit applicant is primarily being enrolled to fill a rifleman's position. His or her aptitude and potential are also considered. Once basic training is complete, and for the rest of that soldier's career, further advancement is dependent upon demonstrated aptitude and proficiencies.

FUTURE VEHICLES

Adaptive dispersed operations (ADO) envisions a highly adaptive Land Force in terms of time, space and purpose, throughout the width and depth of the battlespace, in order to create and exploit opportunities, control the tempo of operations and overwhelm the adversary's understanding of the battlespace. The essence of ADO is the ability to conduct coordinated, interdependent, full-spectrum actions by widely dispersed teams across the moral, physical and informational planes of the battlespace. For the foreseeable future, the infantry section will continue to be the smallest building block to address such operations. While what defines the infantry is its ability to hold ground, dismounted, the synergistic integration of the future vehicles with the soldier is a combat enabler and will provide the additional physical capabilities necessary for the infantry to have:

- greater strategic deployability and operational and tactical mobility;
- better survivability (protection); and
- more precise or lethal firepower.

To that end, these vehicles must be balanced, agile and possess a full-spectrum capability. They must leverage technology to deliver high levels of lethality and protection. As part of the larger future family of vehicles, they will need to be interoperable, modular and have component commonality.

While all infantry fighting vehicles / armoured personnel carriers are a balance of mobility, protection and firepower, there will be limits to which any or all of these characteristics can be increased while maintaining an acceptable per vehicle cost (which will dictate numbers available for a given project cost) and weight (to maintain desired deployability). Based on foreseeable technology, it is unlikely that any future vehicle would provide significant increases in all three categories. Available information on possible next generation infantry fighting vehicle designs shows that one likely future evolution in section vehicles will be maintenance of mobility and firepower characteristics while increasing protection.⁴⁷ The offset may well be in available space for dismount soldiers.

The greatest change to the infantry section organization over the past 40 years has been the addition of a section vehicle. As transportation, this capability was maintained and subsequently improved through the ¾ ton truck, the M113 and, currently, the LAV III. With each new generation of section vehicle, protection has improved, and the capability to provide intimate fire support has been introduced and upgraded. As discussed above, the ten-personnel section fit each of these vehicles with the reassignment of riflemen to vehicle crew positions. The perspective is that a fighting vehicle brings greater protection, mobility and firepower and, ultimately, greater manoeuvrability as a fighting system integral to its dismounting soldiers. While, doctrinally, the dismounted Canadian infantry section is ten personnel—and that is based on the number required to accomplish its role—the reality has been that the addition of a vehicle has entailed less and less dismounting infantry soldiers. Current and future operations still depend on infantry sections to operate dismounted, especially in complex environments. It is interesting that the Infantry Corps has not openly opposed the dwindling number of dismounts.

It is very likely that some of the next generation infantry section vehicles will not have the capacity to fit the existing section organization into one vehicle. The loss of dismounting soldiers to vehicle crew positions has resulted in the mandate that any changes to organizations must remain person year neutral.

Tactical Armoured Patrol Vehicle (TAPV). Canada is embarking on a program to purchase a TAPV. While different variants will be procured under the project, the armoured personnel carrier variant is pertinent to this discussion. The Canadian Forces backgrounder⁴⁸ on the TAPV project states that the APC variant will have a crew of three and be able to carry four dismount soldiers. Designed to replace the RG-31, the Coyote and to complement the G-Wagon, the TAPV is not intended to be an infantry combat vehicle and may only see use in the infantry units for specialist groups. It is possible that the TAPV could be used to carry an infantry assault group, but extrapolation of this possibility would require doubling the number of vehicles carrying an infantry platoon.⁴⁹ Employing TAPV as a section vehicle will also increase vehicle crew requirements, even if the crew per vehicle decreases to two positions. The TAPV may have two or three crew and carry four to six dismounted soldiers.

Close Combat Vehicle (CCV). Canada is also seeking to purchase a new CCV, with a primary purpose of enabling the infantry to operate in intimate support of armour equipped with the Leopard 2. Possible contenders for the CCV, which have been identified in various sources, include:

Manufacturer	Vehicle	Characteristics	Crew	Dismounts
Rheinmetall	Puma	Tracked IFV. Primary armament: 30 mm auto cannon. Secondary armament: 5.56 mm machine-gun; anti-tank missile; 76 mm grenade launcher; smoke-grenade launchers.	3	6
	Boxer	Wheeled IFV (8 x 8). Primary armament: 40 mm automatic grenade launcher or 12.7 mm heavy machine-gun.	3	8
BAE Systems Hagglands	CV90	Tracked IFV. Primary armament: 40 mm auto cannon or 30 mm Bushmaster cannon. Secondary armament: 7.62 mm machine-gun.	3	7
Nexter	VBCI	Wheeled IFV (8 x 8). Primary armament: 25 mm NATO cannon. Secondary armament: co-axial 7.62 mm machine-gun.	2	9

Note: Vehicle characteristics as published at Wikipedia. Actual capabilities and weapon systems may change before any CF decisions for acquisition are made.

Any upgrades identified as project requirements to these vehicle types (of these listed vehicles or any other contenders identified in the formal process) could also result in smaller capacities for the dismantled section.⁵⁰ Simply increasing the number of vehicles per platoon may not be a suitable solution because of cost limitations on vehicle replacement programs. Larger platoon groups of vehicles would also create a more demanding command and control requirement and tactical challenges associated with increases in the number of vehicles for any unit size (platoon, company and battalion).

If one section is to dismount from one vehicle, and the number of dismantled soldiers carried by the section vehicle is considered an essential requirement, then anything less should be a critical shortfall. Section size, however, has never been considered an absolute requirement. As mentioned, reducing the size of the dismantled section has repeatedly been accepted as an offset to the addition of increased mobility, firepower and protection. The justification for the number of dismantles is based on the role of the infantry: to operate dismantled with a minimum level of combat power.⁵¹

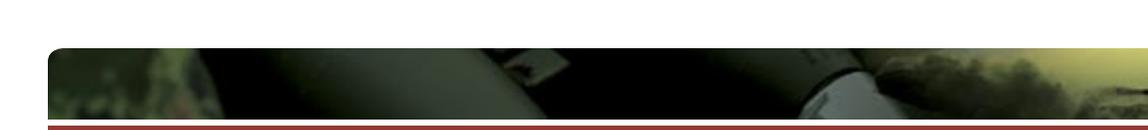
GENERALIST VERSUS SPECIALIST INFANTRY

There is an ongoing need to re-examine how effectively we are training the infantry section and platoon for the tasks we expect these organizations to perform in more and more complex environments. For many years, infantry training in the school houses was bound by a relatively inflexible mindset on what constitutes an infantry section, its organization and fundamentals of its tactical employment. In the past decade of counter-insurgency (COIN) operations, much of the core skills (generalist) training and mission-specific (specialist) training has become much more complex to teach soldiers, commanders and staffs what capabilities we should expect from the infantry section in contemporary scenarios. This training has become more demanding as a cognitive issue, while no less demanding physically. Fundamentally, regardless of the campaign type, the role of the infantry section has remained extant. Hence we train the fundamentals but in multiple scenarios to deal with contemporary operating environment realities.

The Canadian Army has always considered its line infantry to be generalists, expected to be able to meet any assigned tactical challenges in combat while remaining flexible enough to operate across the full spectrum of operations. To this end, there have been no major attempts at specialization in role or equipment and weapons.⁵² While a generalist infantry can result in being less prepared to execute particular complex roles, the modern solution is the institutionalization of complex pre-deployment training, sometimes lasting longer than the operational deployment.⁵³ This solution, however, is only possible when the political and financial support for operations permits its implementation.

When specialization was desirable, long entrenched attitudes prevented or slowed the change process. Specialization did not include any detailed re-examination of platoon or section organization and tactics. Doctrines that were developed for airborne, airmobile and mechanized infantry were at the tactics, training and procedures level, where they were most needed. The overarching doctrinal constructs remained extant because the basic tactical role of the military and the infantry remained extant. The infantry never departed from the core dismantled tactical doctrine it started with since close combat is conducted dismantled.

The Canadian Army serves to act as an instrument of national power in support of national defence. Since Canada does not plan to start any wars, it is difficult for its army to make such investments in specialization, especially when there is no military or strategic reason to do so. Hence, the Canadian infantry never developed a distinct specialist doctrine because it never departed from a generalist dismantled doctrine. In a small army, specialization requires an additional burden on person years (PYs), finances and resources that may simply not be available when committed for sustained operations. For Canada, the general infantry doctrine remained extant as the role of infantry remains extant. What was developed for mechanized infantry, B-GL-321-007 LAV Company Tactics (Interim) was written when the LAV was introduced into service. It addressed the divergence between the dismantled infantry section (i.e., vehicle support optional) and the newly defined mechanized infantry section (i.e., with the vehicle as an integral component of the section's combat power).



Undoubtedly, fundamental principles including fire and movement, basic skill sets, and general tactical employment will form a common baseline for training purposes. As for areas of specialization, they are evolving to enable the mechanized section to work closely and effectively with its vehicle in all operations. In parallel with this is the need to develop a more refined command awareness at all levels that some infantry companies will be better suited in certain environments for the same task. The Canadian Army solution to this is specialization through cross training.

FACTORS AFFECTING INFANTRY SECTION SIZE

Fundamentally, the infantry section should not be considered outside the infantry company framework and its ability to support platoon and section actions. From that perspective, the current Canadian infantry section is the result of a complex set of circumstances and compromises of what capabilities it should have, while seldom, if ever, letting go of any acquired capability or piece of equipment. The result is a heavily laden section of eight dismounted soldiers formed into two identical and well-armed assault groups (or seven soldiers in groups of four and three). Dismounted and without its vehicle, it has little depth to accept attrition without decreases in fundamental firepower capabilities and requires a high average degree of competency of all members to build and maintain the necessary experience base to efficiently support its own internal lines of succession.

A variety of factors should be examined continually and must be held in balance within a section of any size. These factors include but are not limited to the following:

Span of Control. The section commander must have a manageable span of control, even when rapidly changing circumstances increase demands on the section commanders' attention. The Canadian Army's generally accepted span of control of any commander is five active subordinates.⁵⁴ As the infantry section dismounts, the section commander initially commands the section as two groups and fighting vehicle. While these three elements remain under the section commander's orders at all times, as the fighting intensity increases closer to the objective, at some point the section command assigns portions of the objective to the other assault group. Typically, one assault group supports whilst the other seizes. When this close fight is so intense, assault and support may go down to the two-personnel fire team level. With mission command orders, each soldier knows the intent of the operation. So it is not necessary for the section commander to use directive control on each element at all times.

The US Army and Marine Corps dismounted or mounted section and the Australian nine-personnel section organizations separate the commander from subordinate fighting elements. In the US Marine Corps infantry section, the section commander has three four-personnel assault groups under command and only fights the section battle, not having to simultaneously fight an assault group and a fire team. Similarly, the Australian nine-personnel section places two 3-personnel assault groups under the section commander with two section scouts.⁵⁵ Removing the section commander from leading an assault group may increase his/her ability to make timely decisions and have a greater impact than having to simultaneously be decisively engaged in an assault group or fire team action. This separation of the section commander from the section's assault groups is an important distinction, worthy of further examination with operational research and analysis.

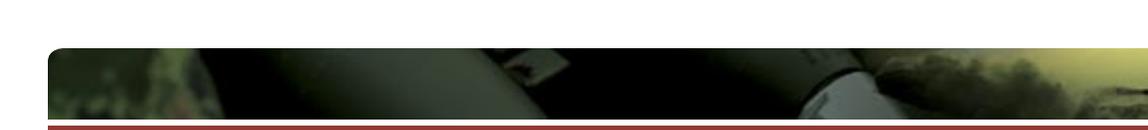
Size of Section Elements. The current doctrinal dismounted Canadian section is based on two four-personnel assault groups, with the expectation that it will seize one enemy trench. The acceptance of a seven-personnel dismounted section in current Canadian mechanized units demonstrates that a three-personnel fire group is also considered an effective section element so long as the troops are protected in a vehicle prior to dismount and are given intimate fire support from the section vehicle.⁵⁶ As previously discussed, this has also been effectively employed in the Australian nine-personnel section and is a likely element employed in the German *panzergrenadier* units with six dismount soldiers. While any reduction in size of section elements decreases the ability to suffer attrition (by any cause) and still operate effectively, this can be mitigated by having a ready reserve that ensures losses are quickly

replaced. For tactical tasks, it is possible that a three-personnel assault group may be a minimum size for that section element,⁵⁷ and reduction of the principal section sub-component to a pair is untenable. With a minimum of three, the soldiers share the core tasks of movement, readiness to provide covering fire for the moving soldier and maintaining surrounding situational awareness to the limit that that may affect the assault group's intended actions. A section commander external to the assault groups, the section vehicle and/or a section scout/marksman may assist assault groups in executing those core functions but also limits the primary roles of those appointments outside the assault groups' tasks. In a dismounted section organization limited to only two assault groups, reducing the assault group size to a pair may not be a feasible reduction because it can no longer accomplish its role as an infantry section. This may establish the point at which a section will require two vehicles to maintain an effective dismounted section size.

Individual Soldier Skills. While the physical requirements of infantry soldiers have not changed, certainly the increasing number of cognitive skills to operate effectively in a modern combat environment has increased. Without care in the selection of the best suited recruit applicants, there will be a follow-on limitation in the capabilities of the average infantry soldier to function in this demanding environment and still demonstrate the potential to assume more complex technical or leadership roles. The potential for a more cognitively challenging operating environment, further increases in skill demands being placed on the soldier and the loss of basic rifleman positions as a learning stage (or permanent billet) for soldiers makes the identification of recruit potential even more important to avoid undermining the section's potential effectiveness. By a similar argument that some have posited that the light infantry soldier must be fitter than average, it may be necessary to establish that the modern mechanized infantry soldier will have to be smarter than average to operate all the attendant technology.

The Soldier's Load. The traditional problem with technological innovations that allow the infantryman to become more lethal results in an increase to the soldier's load. The soldier's load will also directly affect the agility of the infantry section, potentially limiting both speed of movement and the ability of some soldiers to operate to best effect in close terrain and close combat depending on their weapons and weight load. Reducing the soldier's load of personal equipment, and ammunition and ancillary equipment for fire support weapons, can result in a much more agile section, one better prepared for operating on the objective terrain to which their vehicle will deliver them. There has been considerable critical examination and quantitative assessments with a view to establishing minimum effective loads. "Modern medical opinion has long ago decided that a soldier should not carry more than 33% of his own weight ... A rough estimate would fix the weight of the soldier's load at about 45 pounds ..." ⁵⁸ While a soldier's load remains a remit of the company or platoon commander to determine in his estimate process, the supposition that the infantry must always be prepared to operate for periods away from their vehicles causes an upward creep in the soldier's load.⁵⁹ In this final battle, heavier section support weapons may be ungainly and not employed to best effect. Advancing weapons technology is steadily giving us more destructive power for less size and weight. In such circumstances, lightly equipped soldiers with assault rifles, moving quickly and reacting to circumstances while supported by their vehicles' weapons systems may be a better solution. However there are limitations to access to vehicles in marginal or complex terrain.

While new technologies can add new items to the soldier's load, they seldom replace items with lighter versions and often add new capabilities on top of existing equipment at the cost of increased total weight. Relative comparisons of the soldier's load to past maximum and average weight loads, even as recently as used in dismounted operations in Afghanistan, do not give credible comparison data to determine the best balance of essential weight versus capability for a section that might be employed in a substantially different primary role. This is because past assessments are either from pre-mechanization eras or presume a dismounted role either by design or for the purpose of preparedness. Again, a soldier's load is determined by his/her commander's estimate. Returning to the assumption that infantry sections can be closely linked to their vehicles allows a critical re-examination of the load carried by each soldier.



Section Tactical Employment. Past and current iterations of the infantry section have been limited by the training approach to their tactics. While learning to command the fire support and assault group section organization required an understanding of various tactical options, these often devolved to simple flanking manoeuvres to complete training assessments. The eight-personnel dismounted section in two balanced assault groups resulted in an even simpler, and solitary, section tactic, a direct assault by the section, in the context of a platoon attack. To consider the possibility of an even smaller dismounted section, though intimately supported by its vehicle, a more flexible system of tactical employment must be envisioned. But a smaller section would give less flexibility and fewer options. It is necessary to move away from formulaic section-attack tactics and develop a more flexible concept of small-unit tactics that can be applied to any number of soldiers in an infantry section role.⁶⁰

Flexibility of Tactics. With tactical options and a more open approach to training, the section need not be limited to fixed element groups, either in size or personnel. Any combination of the section's soldiers should be able to execute variations of standard drills (cover and movement, entry drills, room or trench clearing drills, etc.) without having to shuffle orders of march or relative positioning to launch. Smooth transitions between drills and responsive application of fire and movement could ensure a more responsive section in operations, potentially resulting in a faster return to the protective armour and fire of the section vehicle. If section drills in training are based on a single, specific organization and a limited range of tactics, this becomes the entrenched method of employing the section.

Firepower. The current eight-personnel dismounted infantry section has considerable firepower compared to its predecessors. Increased firepower has increased tactical flexibility, permitting more freedom of movement and enhancing overall manoeuvrability. Increasing and maintaining the infantry section's firepower has been generally accepted as an essential characteristic to the point of dismissing the section vehicle's firepower as readily assignable to ancillary tasks in the higher commander's tactical plan (if this is a deduction out of the estimate process). The firepower of the infantry section can be maintained by establishing the section vehicle's weapons as integral to the section's capabilities rather than a separable part. Establishing the section vehicle as the principal firepower capability for each section permits reducing the dismounted support weapons and their associated weight load and associated effects. Employment of the fire of the section vehicle will also establish a limit on the effective range of the dismounted section (from its vehicle) and on the section commander's ability to exercise effective command and control to coordinate vehicle firepower with the movement of dismounted elements.

Weapons. Fundamentally linked to the section's firepower capability is the weaponry carried by section members. As discussed, the section's mix of individual weapons can affect dismounted mobility, agility in operations and the range of roles and tasks the dismounted section can be assigned. The inclusion of the section vehicle's weapon systems as an integral part of the section's firepower can balance the deployment of lighter weapons for more soldiers on an appropriate objective.

Attrition Mitigation. The ability of an infantry section to absorb attrition and maintain essential capabilities becomes more critical with a decreasing section size. As the section is reduced to a smaller doctrinal size, it is necessary to have replacement personnel positioned well forward, prepared to backfill even temporary absences without delay. Larger sections with heavy integral firepower may accept short- or long-term shortfalls of one or two soldiers without significant reduction in effective firepower by maintaining the section's heavier weapons in a drill based operating environment. Smaller, more lightly armed sections will rely more on the maintenance of the combination of agility, tactical flexibility and a more responsive cognitive environment to apply less dismounted firepower with greater precision under the protective covering fire of the section vehicle. Smaller sections will have less flexibility to accept attrition by any cause and will need a very responsive reinforcement system to ensure the number of soldiers deployed in a section is maintained.

Each of the aforementioned factors is interlinked and will need to be considered in determining the size, organization and roles of the infantry section. Whether it be selection of suitable infantry recruits,

weapons, section size based on vehicle types or the training of the section's tactical employment, it quickly becomes evident that one factor may enable or limit others, with no single ideal solution being discernible without first establishing which factors are determined by fixed criteria for a given scenario. Any analysis must begin with the philosophy of full-spectrum operations and the requirement to manoeuvre, seize an objective and hold ground (provide a presence) within a platoon construct. Even when fixed criteria are allowed, there is a need to document the reasoning for these limits so that when their underlying principles do change, those factors' roles in determining section size and organization can be reassessed. This must be captured in experimentation methodology.

Infantry Fighting Vehicles (IFVs) and Infantry Dismounts. The role of any infantry fighting vehicle is to enable manoeuvre of the section. The intent of the close combat vehicle is to offer a more capable vehicle that best supports or can be supported by armour (dependant on the terrain). A mechanized infantry platoon is fundamentally a fully capable dismounted platoon with a means of protected transportation and significant firepower capabilities. While earlier doctrine advocated separating mechanized infantry companies and their vehicles into two mutually supporting manoeuvre elements on the battlefield, today's doctrine emphasizes the default that the vehicle supports the section. Firepower and mobility of the section vehicle are considered integral components of the section. In a symbiotic relationship, the dismounted section does not have to be consistently equipped for any and all traditional dismounted infantry tasks.

To redefine this relationship and firmly establish a symbiosis between the section and its vehicle is to approach the German concept of the *Panzergrenadier*. This relationship and its importance to success in that role are described in German Army field manuals:

“According to the *HDv 231/100*, the fighting of a *Panzergrenadier-Battalion*⁶¹ is characterized by the following aspects:

“The fighting of the battalion is characterized by:

- the combination of fire and movement,
- attacking in conjunction with main battle tanks,
- swift changes between mounted and dismounted combat,
- close cooperation between mounted and dismounted forces,
- the particularly mobile combat . . . ”⁶²

Number of Dismounts. The close combat vehicle project may result in smaller section vehicles and fewer dismounted soldiers per vehicle. If this reduction in section size is offset by making the section vehicle the primary firepower element in the section, then the dismounted soldiers become the manoeuvre element in the close fight on the objective, providing close protection to their vehicle and providing additional observation and direction to ensure the best application of the vehicle's combat power. Of course, the justification to reduce the section size is lost once the section is out of direct support of the vehicle.

With emphasis on the protection provided by the vehicle by its fire support capability, the dismounted section should be employed in order to minimize its exposure to enemy fire and not in any long-range engagements with the aim of winning the firefight. This, combined with a primary employment in the final stages of actions on the objective, prompts examination of the usefulness of having dismounted soldiers permanently assigned to carrying heavier, longer-ranged individual weapons. The close battle will be characterized by a balance of agility, both individual and in the tactics of small-unit elements, speed of reaction and firepower. To this end, the benefits of having the current 50% of a section's dismounted soldiers carrying weapons heavier than the assault rifle, with their attendant ammunition loads, will need to be re-examined.

Soldiers armed with a compact assault rifle will have the greatest advantage in moving through close terrain (buildings, trench systems, etc.) once delivered there by their armoured vehicles. In very close quarters, the C9 and M203 can become hindrances due to their weight and size. These weapons certainly have advantages over the service rifle when their firepower characteristics can be employed to advantage, but it will need to be determined if maintaining flexible mechanized sections requires the constant assignment of soldiers to these weapons. Alternatively, the section could normally be armed fully with assault rifles with a section allocation of one light machine-gun and one unmounted M203 grenade launcher for when the commander determines their deployment to be necessary.

The Section Vehicle as Mobility and Agility Asset. When the section vehicle is used as a mobility asset for the infantry section rather than simply as transportation to the point of battle, it can also be used to decrease the individual soldier's load. Keep in mind that infantry operates dismounted on its objective. Based on the task, a commander will decide what equipment is essential for an operation. There is a danger in removing the prevalent assumption that soldiers must always be prepared to operate away from their vehicles. Leaving equipment behind in a vehicle may represent an unmanageable loss of capability for that section.

DIFFERENT SECTIONS FOR DIFFERENT ROLES⁶³

The close combat vehicle program may field an infantry section vehicle with less capacity for the dismounted section than the LAV III. It is very possible that the **tactical armoured patrol vehicle**, if employed as an APC/IFV, will result in an infantry section divided between two vehicles, with two crews for the vehicles and the requirement to coordinate the additional firepower options⁶⁴ made possible by deploying additional vehicles in support of the section. This establishes a potential point of divergence in what has long been considered a specific construct titled "the infantry section."

At any given time in our corps' history, the infantry section has been a singular organization with specific tactics. A tactical armoured patrol vehicle section (possibly deployed in two vehicles per section), a close combat vehicle infantry section (presumed to operate in close cooperation with its vehicle) and a LAV III section (possibly maintaining the capability for more extensive dismounted functions) can have different primary roles and therefore need not have the same organizations, weapons or tactical options. While these vehicles entail somewhat different organizational structures at the platoon and company level, the tactical role of the infantry section is extant across our forces. There is no intent to develop infantry sections for specific activities beyond their current role.



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All infantry sections must be able to meet the same set of basic tactical tasks. As previously mentioned, the dismounted infantry section is divided into two groups. To manoeuvre to assault a trench, one group assaults while the other supports. Can a smaller section operate effectively? Yes, as long as its structure and capabilities match the roles and tasks envisioned for it. However, if this section does not meet certain base tactical tasks, then it is not an infantry section. The potential offset of guaranteeing the section vehicle to replace diminished, dismounted firepower supports the assumption that smaller sections can be effective as long as that vehicle remains in intimate support. While the fire support of a vehicle system has always been greater than any dismounted system, it does have the limitations that it can only fire in one direction, has no redundancy and will not be able to go everywhere the section goes. Demanding a traditional generalist capability from a smaller section does have a line in the sand. Employing a smaller section within a specific organizational and operational framework has the potential to be effective within those boundaries as long as it is effectively supported.

To further this line of thought, to examine the makeup of the most effective dismounted section organization for each variation of the infantry company may result in platoon organizations of differing sizes and weapon mixes. These differences should not prevent any platoon organization from being tasked to perform more general infantry tasks in addition to the core role it has been designed to execute most efficiently.

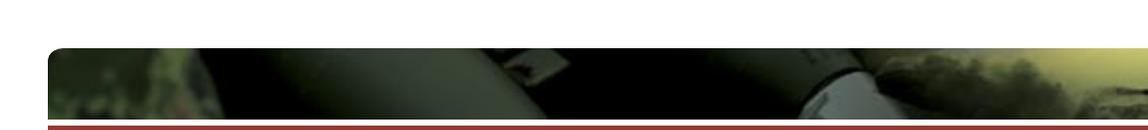
Creating different section organizations does lead to a training issue. The historic approach to training section tactics has often led to successful simplistic, repetitive training requirements and assessments. To employ a training approach that addresses a variety of possible section organizations will require a more open approach to teaching small unit tactics, to assessment criteria and the adoption of a stronger focus on the problem-solving and decision-making steps without undue emphasis on a checklist style evaluation of limited tactical solutions. There is a difference between teaching core skills and mission-specific training. Beyond ensuring an effective tactical solution, the most important criterion in evaluation should not be what tactic was executed, but how the commander's plan was developed to decide upon an effective solution with the assigned section organization.

OPTIONS ANALYSIS—DIFFERENT SECTIONS DIFFERENT ROLES

The infantry section structure has remained essentially unchanged despite over a decade of operations in the modern, non-contiguous threat environment. Those factors which directly affect the general section organization, such as number of soldiers, weapons and groupings, all lead to a large number of possible permutations for section organizations.⁶⁵ Our doctrine, through tactics, techniques and procedures (TTP), clearly bears out the reality on the ground of tactical flexibility of the section. The current twin-assault-group organization is familiar and is about as heavily armed as a section can be, even though its structure is considered relatively static. In fact, it is this generalist capability that makes the infantry section so flexible. Any newly proposed section organizations should be evaluated in both simulation and live exercises to assess their firepower, flexibility and effectiveness. Trials will need to be executed with care to minimize the effect of familiarity with certain organizations and tactics creating an undue preference for new options most closely related to the old.

Possible variations of the future infantry section may include those shown in the table on the following page. These section organizations show an evolution to smaller, lighter sections as the vehicle capacity for dismounting soldiers decreases. As the section loses personnel, the role of the vehicle and its firepower as an integral asset becomes more important. Similarly, although the lighter sections depend on agility and flexibility as core characteristics to execute tasks during minimal time exposed to an enemy, heavier section weapons should be available when needed to meet commanders' needs.

If dividing the infantry section between two vehicles is an acceptable option, vehicle requirements and person year (PY) limits may require a change in the platoon organization to two larger sections. In six vehicles, the platoon could deploy two dismounted sections of eight to ten personnel, plus a command team and a weapons detachment. This platoon configuration could be considered for either



heavily armed sections (as currently structured) or lighter sections employed in close cooperation with their vehicles. With two vehicles and their weapon systems, the section commander's command and control burden increases substantially, making the extraction of the commander from the fire group a critical consideration.

Based on history and recent operations, the optimal infantry section size has been about ten dismounted personnel for combat operations. With core basic training and mission-specific training, this section is the most agile and balanced for any task. If the task is changed, there are a wide variety of factors which need to be assessed to determine if a small section, given other resources, is suitable to achieve that task. These factors will have to be assessed in view of any fixed limitations (vehicle capacities, available PYs, number of units to be equipped, etc.) that will create a baseline for the detailed assessment of other factors affecting the section's ability to conduct its essential roles and tasks. Ultimately, infantry does operate dismounted.

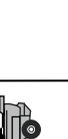
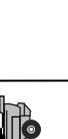
Larger sections will continue to have utility in employment where continuous support from armoured personnel carriers or infantry fighting vehicles are not available or cannot be guaranteed. In some circumstances, the seven-personnel dismounted section currently in use in mechanized units may not be large enough to absorb attrition and maintain critical capability levels. This is why it is employed within the platoon construct. Current operations, where soldiers are on leave or incapacitated due to injury, bear this out. With increased personnel, a section can cover more frontage, deploy more firepower and operate with more capability in the absence of its vehicles. Predicted growth in the cognitive and skill demands on individual soldiers, and especially on the section commander, will require critical analysis of the span of control to be exercised and methods of assisting information management.

Smaller sections will be most effective if they become more specialized and are equipped and employed within their selected roles. But if smaller sections become specialized to the point that they are no longer able to conduct the role, mission and tasks of the infantry, then they are, of course, not infantry. Smaller sections will be more dependent on the fire and protection provided by their infantry fighting vehicles and their individual loads of weapons and equipment. Lightly armed and equipped soldiers, operating under the protective umbrella of their vehicles, will have the potential to be delivered to an objective quickly and, once dismounted, be quite agile in complex terrain within the scope of their light capabilities. The loss of, or disconnection from, the section vehicle may put this smaller section at risk or even perhaps render it unable to complete its task.

The current doctrinal ten-personnel infantry section is a successfully proven compromise of troops to tasks, weaponry and equipment and the requirement to operate effectively with or without the intimate support of section vehicles. In fact, the tactics, techniques and procedures required of the infantry section have remained largely unchanged since the World War II. Distance, tempo and decentralization will likely continue to increase for section operations. This model has survived in recent counter-insurgency operations⁶⁶ due to the short duration of engagements and the high degree of supporting fire and logistics the dismounted section receives along with a robust replacement system to mitigate the effects of losses.

Despite that generalized infantry sections, which are expected to operate mounted or dismounted across the full spectrum of operations with a standard organization and weapons, have adapted to the contemporary operating environment, the future environment that infantry small-unit activities are expected to be conducted in should be considered to see if what currently works can be done better. In all likelihood, the isolation and dispersed environments and adaptive dispersed operations, in which infantry sections are currently finding themselves will only become more complex. The infantry section will need to be capable of small-unit manoeuvre integrated with air or indirect assets and other mission-enabling elements to operate independently. Care must be taken to not weaken the battle proven section as the basic building block of the infantry.⁶⁷ The rifle section is the sole manoeuvre unit through which all other levels of command are enabled.

POSSIBLE FUTURE INFANTRY SECTION ORGANIZATIONS

	Sect Str	Vehicle Crew	Vehicle	Comd ext to Asst Gps	Dismounted Section		Scouts/Marksman	Sect Wpns held in Vehicle	Remarks
					Assault Group 1	Assault Group 2			
1. Status Quo	10 (7 dsmt)								• No assumption that veh remains with dsmt sect.
2. Status Quo org in Heavy/Light Groups	10 (7 dsmt)								• Optional reorg of assault gps to concentrate firepower in one strong gp. • No assumption veh remains with dsmt sect.
3. Status Quo, comd external to assault groups	10 (7 dsmt)								• Sect Comd has better span of con. • No assumption veh remains with dsmt sect.
4. Two 3-man assault groups	9 (6 dsmt)								• Six, dsmts. • Two balanced fire gps. • Heavily armed and laden sect. • No assumption veh remains with dsmt sect.
5. Two lightly armed 3-man assault gps	9 (6 dsmt)								• Flexible, lightly armed for speed and agility. • Fire sp of veh integral to sect gps. • Sect Comd has complex span of con. • LMG and M203 retain in sect veh unless ordered deployed.
6. Current doctrinal 8-man dismount section, two vehicles (TAPV)	12 (6 dsmt)								• No assumption veh remains with dsmt sect.

THE WAY AHEAD

OPERATIONAL PRINCIPLES

If the Army can forecast the future security environment and understand what its force is expected to do to be effective in that environment, then the force structure can be created to properly function and have the ability to respond to future potential threats. This vision is based on the examination of threat, evolving doctrine and consideration of technology as a starting point for future force development. Force developers attempt to marry the synergy of new equipment and untested doctrine to help determine the right structure, weapons and tactics for our soldiers. In the foreseeable future of adaptive, dispersed operations, the role of the Canadian infantry will remain to close with the enemy by means of fire and manoeuvre in order to destroy or capture him or to repel his assault by fire, close combat and counter attack. To that end, as a generalist army to retain maximum flexibility for operations, the Canadian infantry must prepare for the combat in high-intensity conflict and create an organization that is flexible enough to respond to any crisis. This has resulted in reinforcing the reality that the infantry platoon, and its constituent sections, is a relatively inviolable doctrinal unit.

ORGANIZATIONAL PRINCIPLES

The infantry section is the core building block capability of all land operations and is the smallest unit to conduct tactical operations under command of its own leader. Its organization is built upon its role, mission and tasks, given a set of tools and considering basic functional command structure. To be combat effective, an infantry section requires optimizing its organization to consider the following inter-related criteria:

- **Sustainability and Survivability.** The size of the section should be the result of organizing it to meet certain essential criteria derived from its role, mission and tasks. It must have the ability to attack (fire and manoeuvre) an objective and handle combat or other losses and continue to function as it was designed. The ten-personnel section, with two fire teams, is the optimal composition for the organization. It can also easily sustain itself for a 24-hour period or longer.
- **Controllability.** To effectively command and control a section, a commander's span of control (leader-to-led ratio) should have no more than five parts, ideally no more than three of which are active at one time (e.g., assaulting group, supporting group and supporting vehicle). Embedded for controllability of the elements is the requirement to have effective communications.
- **Manoeuvre.** The section should have two balanced groups, each able to function as a fire base or as an assault element, but not necessarily identical in numbers or weapons.
- **Firepower and Equipment.** Projecting the section's equipment and weapons is critical to further define the possibilities of organizational structure. It is important to establish the equipment available because it impacts heavily on the section's flexibility in capabilities to deal with changing conditions on the battlefield. The equipment must match the organizational development and not dictate the section's structure.

CHARACTERISTICS AND LIMITATIONS

- **Tactical Agility.** Sections need be equipped with the right weapons for the right tasks.
- **Tactical Mobility.** The weight of equipment a soldier carries directly affects his/her mobility. The assault load should not exceed 1/3 of the soldier's weight. The best protection for the infantryman in close battle is his/her ability to move quickly and stealthily, utilizing cover and suppressive firepower while moving.
- **Operational Mobility.** The section, as part of the platoon, will acquire speed (the ability to rapidly mass through deployment) by the increased mobility offered by vehicles.

- **Technology.** The goal of technology is to offer useful and practical things to the individual soldier to improve his/her overall effectiveness. Developers of equipment systems must therefore employ a holistic approach to the integration of all equipment the infantryman carries so that it can fit onto the soldier by design. If technology is to be truly useful, it must not encumber our soldiers.
- **Information Dominance.** With information dominance, the section will be able to bring only what they need to the fight and will free them from worst-case logistics planning. Success on the modern battlefield will exploit the increase of velocity and speed afforded us by information-age technology.
- **Soldier's Skills.** Soldiers of the future, as in the past, will be called upon to be flexible and versatile. They will be counted upon to display mental agility and ingenuity as they seek alternative methods, often low technology, to cope with the circumstances that surround them. These skills will be taught through individual and collective training.
- **Attrition Mitigation.** The ten-personnel section, with two balanced fire teams, is the optimal composition for the organization. The section must retain the ability to handle combat or other losses and continue to function as it was designed. Once the section is no longer able to simultaneously conduct fire and manoeuvre among its two groups, it is ineffective.
- **Firepower.** The most important quality of firepower is its lethality. Firepower is the measure of suppression potential based on numbers and types of weapon systems carried by the section. The ability to achieve fire superiority facilitates manoeuvre and rapid destruction of the enemy. The importance of organic firepower in establishing dominance in the close fight is clear.
- **Protection.** The addition of protective equipment, including transportation, can greatly enhance survivability.
- **Logistics.** Dismounted, the section must be able to carry all organic individual and section equipment, weapons and ammunition using a weight limitation to sustain itself in combat. While the additional support of an organic vehicle may relieve this burden if the vehicle can remain in direct support, infantry inevitably operate dismounted.

CONCLUDING FUNDAMENTALS

The Canadian Army describes the future security environment to require a strategy of adaptive, dispersed operations to deal with the non-contiguous, non-linear character of the modern battlefield. These decentralized operations will find the infantry section, the foundation capability building block of all land operations, dispersed on the battlefield. This dispersion will necessitate and continue to define the infantry section's size and organization so that it is sufficiently capable to accomplish its role, missions and tasks. A well trained, properly equipped and fully manned section will continue to be an imperative to deliver the last 300 metres of Canadian foreign policy. Certainly, new technology will continue to improve mobility, firepower, protection, situational awareness, communications ability and logistics. The last 3000 years of combat have shown the nature of war to remain the same and the infantry section as a relatively inviolable doctrinal unit. The section has been repeatedly tried, tested and proven. For the foreseeable future, the infantry section will still have to close with and destroy the enemy. 

ABOUT THE AUTHORS ...

Captain O'Leary has served in the CF since joining the Princess Louise Fusiliers as a soldier in 1979. Transferring to the Regular Force in 1982, he was commissioned in The Royal Canadian Regiment the following year. Capt O'Leary has served in the 1st and 2nd Battalions of his regiment, at the Infantry School and as Reserve Support Staff (RSS)/Regular Force Cadre (RFC) with the 2 NSH (CB) and the PLF. Other appointments have included G3 Domestic Plans at LFAA HQ, Range Control Officer at LFCA TC Meaford and Training Officer at the Canadian Land Force Command and Staff College (CLFCSC), Kingston. A graduate of CLFCSC, Capt O'Leary was serving as Regimental Adjutant for The RCR at the time of his retirement from the Regular Force in 2008. He continues to serve with the 4th Battalion, The RCR.

Major Victor Sattler enrolled in the Canadian Forces in 1988, joining Princess Patricia's Canadian Light Infantry as a Direct Entry Officer. He has served in a number of staff positions, including Infantry Doctrine, Infantry Training, the Canadian Land Force Command and Staff College, the Canadian Forces College and J3 Arms Control Verification. Major Sattler's operational duties include: United Nations forces in Cyprus, deployment throughout Europe as part of the UK's infantry commitment to Allied Command Europe Mobile Force (Land), NATO Stabilization Force in Bosnia-Herzegovina, and International Security Assistance Force in Afghanistan. Major Sattler is a graduate of Queen's University (political science) in Kingston, the Canadian Land Force Command and Staff College, the Combined Arms Tactics Course at Warminster, UK, and he is a distinguished graduate of the United States Marine Corps' Command and Staff College. He is currently serving as a staff officer in the Designs Section at Director Land Concepts and Designs and working on a master's degree in National Security Studies.

ENDNOTES

1. LGen Andrew Leslie, Army Commander, Canadian Association of Defence and Security Industries (CADSI) Conference, 15 May 2008.
2. Moving to less dangerous environments in the spectrum of conflict finds "providing presence to secure a population" in counter-insurgency operations.
3. Chris Shaw, "Adapting the British Light Infantry Section and Platoon Structure for the Contemporary and Future Operating Environment," *Small Wars Journal*, posted June 7, 2009, available at smallwarsjournal.com: <http://smallwarsjournal.com/blog/2009/06/adapting-the-british-light-inf/>.
4. Equivalent to a modern day sergeant, the leader of a *contubernium*, a squad of eight legionaries, the smallest unit of the Roman army.
5. See Bill Rawling, *Surviving Trench Warfare: Technology and the Canadian Corps, 1914–1918* (Toronto: University of Toronto Press, 1992) and Paddy Griffith, *Battle Tactics of the Western Front: The British Army's Art of Attack 1916–1918* (New Haven, CT: Yale University Press, 1994) for more accurate explanation of the section evolution. The popular myth that the Germans pioneered the section as an autonomous manoeuvre element in World War I and continued to develop this during the Reichsheer years is in fact false. The Imperial German Army was in fact quite slow to change its force structures due mostly to constraints imposed by their class-based army system.
6. If you look at the recent publication of General Sir William Heneker's *Bush Warfare* from circa 1908, this proved to be the case in jungle fighting—the complexity of the environment allowed responsibility for engagements to devolve.
7. The British infantry originally had four sections but went down to three when they became short on manpower. Canadian infantry battalions had 16 numbered sections split into four lettered companies. From *Section Leading*, published by the War Office, London, UK, 1928. Also see John English and Bruce Gudmundsson, *On Infantry* (Connecticut: Praeger Publishers, 1994).
8. See AAP-6 definition. Manoeuvre occurs when movement is combined with fire support. Without fire support, it is merely movement.
9. Machine-guns were developed from collective units and sub-units (i.e., MG companies) down to the platoon level to support the independent employment of platoons in a variety of tactical roles not needed in World War I, i.e. "policing duties," which today would be called tactical stability ops. See Lt Col Papineau, *Notes on Training*, Fifth Edition, [n.p.], 1934.
10. Additionally, spare gunners were trained should the primary become a casualty. This was the advent of all-arms training for all section members.
11. A grenadier is still considered a rifleman.
12. Fighting in built-up areas (FIBUA) training routinely demanded the flexibility of breaking out of the single-option frontal assault.
13. Canada, Department of National Defence, Directorate of Land Concepts and Design, B-GL-310-001/AG-001 *Land Operations 2021—Adaptive Dispersed Operations—The Force Employment Concept for Canada's Army of Tomorrow*, Maj Andrew B. Godefroy ed. (Kingston, Ontario: Army Publishing Office, 2007), p.2.
14. ABCA refers to the American, British, Canadian, Australian and New Zealand Armies' Standardization Program.
15. US Army Field Manual 7–8. For a historical recount of the US Army squad evolution, see Brian Mennes, *The United States Army Infantry Squad: Year 2015*, Master's Thesis, Army Command and Staff College, Fort Leavenworth, KS, 1999.
16. Wikipedia, http://en.wikipedia.org/wiki/Organization_of_the_United_States_Marine_Corps, accessed 7 May 2010, 12:47:54 GMT.
17. Wikipedia, [http://en.wikipedia.org/wiki/Section_\(military_unit\)](http://en.wikipedia.org/wiki/Section_(military_unit)), accessed 7 May 2010, 13:47:43 GMT.

18. Canada, Department of National Defence B-GL-309-003/FT-00 *Section and Platoon in Battle* (Draft 2009).
19. Wikipedia, [http://en.wikipedia.org/wiki/Section_\(military_unit\)](http://en.wikipedia.org/wiki/Section_(military_unit)), accessed 7 May 2010, 13:47:43 GMT.
20. The EFV would support ship-to-shore type operations and those immediately thereafter, but the USMC has identified that a smaller tactical vehicle might be desirable for other mission types. To this end, the Marines had divided a reinforced squad into packages. This would allow the usage of smaller vehicles, which would reduce the size of any vehicle required to provide mobility and would also increase survivability. A single vehicle carrying 17 marines means that those marines are rendered less effective or ineffective if their vehicle becomes damaged or destroyed. Splitting them up into more vehicles increases the survivability of the team itself.
See <http://www.globalsecurity.org/military/systems/ground/ctv.htm>, accessed 14 May 2010.
21. B-GL-309-003/FT-00 *Section and Platoon in Battle*.
22. Michale Barlow, Peter Morrison, Matthew Luck and Alistair Dickie, *Constructing the Virtual Section*, Land Warfare Development Centre, Australian Army, 2004.
23. Canadian doctrine also recognizes a two-personnel scout detachment at section level. Soldiers rotate through the task due to its danger and strains, both physical and mental. Thus to have a dedicated pair of scouts is questionable.
24. The logical next step for this experiment is to determine if the three-personnel assault group is more effective than the four-personnel assault group.
25. This may be true for tactics in an open environment, but once close terrain is encountered, command may have to devolve to the four-personnel group.
26. In part, the reduction of the platoon's two dedicated machine-gun sections was offset not only by the establishment of the third rifle section but also by the creation of the platoon's weapons detachment.
27. Or perhaps an unintended consequence of going from 7.62 mm to 5.56 mm. The range gap is identified for dismounted operations, away from the support weapon of the vehicle, in the 300- to 600-metre distance.
28. Without the ability to hold ground, an infantry section would be no different than the Armour Corps. Additionally, a logical extension of this "hold ground" concept is the need to provide a presence, be it to secure ground or secure a population, i.e., to stand on a street corner.
29. B-GL-309-003/FT-00 *Section and Platoon in Battle* defines an objective as an enemy trench.
30. Canadian Army tradition has generally been for infantry vehicles to remain with infantry sections. Otherwise, the vehicle is merely a taxi that another corps could potentially drive and own.
31. B-GL-309-003/FT-00 *Section and Platoon in Battle*.
32. Soldier Information Requirements (SIREQ) support this. SIREQ reports indicate that a six-personnel section is unsustainable with one casualty.
33. B-GL-309-003/FT-00 *Section and Platoon in Battle*.
34. LOB personnel (spanning all ranks) were on the unit establishment and intentionally left out of battle for the purpose of establishing an indoctrinated manpower pool to immediately rebuild the unit after casualties or other losses occurred.
35. M113 generally had eight or nine dismounts and a driver, all of whom belonged to that section.
36. See Editorial: "Strategically Relevant and Tactically Decisive," *Canadian Army Journal* 12.1 (Spring 2009).
37. Canada, Department of National Defence, Directorate of Land Concepts and Design, *Toward Land Operations 2021; Studies in Support of the Army of Tomorrow, Force Employment Concept*, Andrew Godefroy and Peter Gizewski eds. (Kingston, ON: Army Publishing Office, 2009).
38. "The Evolution of Army Wearable Computers," *Pervasive Computing*, Oct to Dec 2002, available at <http://computer.org/pervasive>.
39. "Warfighters demand greater processing power and reliability in rugged battlefield computers," available at <http://www.optoiq.com/index/display/article-display/349240/articles/military-aerospace-electronics/exclusive-content/warfighters-demand-greater-processing-power-and-reliability-in-rugged-battlefield-computers.html>.
40. RAID is now used as an umbrella term for computer data storage schemes that can divide and replicate data among multiple hard disk drives. The different schemes/architectures are named by the word "RAID" followed by a number, e.g., RAID 0, RAID 1, etc. RAID's various designs involve two key design goals: increase data reliability and/or increase input/output performance. When multiple physical disks are set up to use RAID technology, they are said to be in a RAID array. See <http://en.wikipedia.org/wiki/RAID>.
41. "Powermat is a complete solution for simultaneously delivering real time, wireless charging to multiple electronics, including mobile phones, music players, handheld games, electronic readers, GPS devices, Bluetooth headsets, netbooks and laptops. Powermat technology has been miniaturized to a level where it can be embedded into virtually any device, as well as walls and table top surfaces. Powermat technology is fast, efficient, and safe and revolutionizes the way consumers charge and power." See <http://www.powermat.com/us/about-powermat/>.

42. B-GL-310-001/AG-001 *Land Operations 2021—Adaptive Dispersed Operations—The Force Employment Concept for Canada's Army of Tomorrow*, pg. 24.
43. *Ibid.*
44. *Ibid.*
45. Today's force developers were, by and large, born prior to the Internet and thus sit on the wrong side of the digital divide. As a group, we seem more concerned about our soldier's abilities to grasp the complexities of new technologies. Hence this issue is often overstated.
46. Canadian Forces Recruiting Website.
47. These limitations are based on current technology.
48. See: <http://www.forces.gc.ca/site/news-nouvelles/view-news-afficher-nouvelles-eng.asp?id=3039>.
49. This was the CDR light forces design and the current plans by Director Land Force Development (DLFD).
50. Unless contract specifications set a minimum size.
51. As previously mentioned, a six-personnel section has proven to be the smallest size that can still do its role—to hold ground and have presence.
52. This is not completely true in that the Canadian Army has done specialist training with airborne and airmobile forces. Mechanized infantry may also be considered as a form of specialization. But for specialization beyond this, the Canadian Army is simply too small. Also of note is that we never had Light Infantry, rather equipment constrained battalions.
53. This has also been driven by other factors such as whole-fleet management and managed readiness. But a key question here is if pre-deployment training is so lengthy, are we now at a juncture where generalist training for all and specialist training before every task are becoming unwieldy and inefficient?
54. Generally, business management practices suggest that the span of control of more than four or five to one can't be fully effective, no matter how much formal training is provided. See <http://www.chally.com/benchnet.htm>, accessed 14:09 hrs, 5 Aug 10. The military formula also uses a 5:1 span of control, but the operational span of control is only 3:1 (that is, the number of active subordinate units that actually carry out the fundamental mission of the organization). The remaining two (roughly) staff positions under each commander are actually information processing assistants necessary to make even the 3:1 span of control effective. See B-GL-300-003/FP-001 *Command in Land Operations*, Chapter 3, para 2, Section 304, pg. 3–6.
55. They may be considered a reserve if not employed as scouts.
56. This is probably not stated clearly enough in 309–3.
57. Tactical armoured patrol vehicles (TAPVs) and close combat vehicles (CCVs) may see a reduction in the number of dismounting soldiers from each vehicle.
58. For a good historical examination of the soldier's load, see Major G. Tyliden, "The Accoutrements of the British Infantryman, 1640 to 1940," *Journal of the Society for Army Historical Research*, Vol XLVII, No. 189 (Spring 1969). Also, from Maj R.J. Vogel, Maj J.E. Wright and Lt Col G. Curtis, "Soldier Load: When Technology Fails," *Infantry*, Vol 77, No. 2 (March–April 1987): "On the basis of previous research and combat experience, the Infantry School has established the following goals for the weight to be carried by infantrymen: 45 percent of a soldier's body weight on approach marches (for the average soldier, about 72 pounds [32.7 kg]), and 30 percent (about 48 pounds [21.8 kg]) as a tactical load in a combat zone."
59. FIBUA doctrine discusses the flexibility that commanders have in adjusting soldiers' kit.
60. The new draft of 309–3 will address this, and it is certainly being reflected in the range of stability activities under full-spectrum operations.
61. Note that the late model Marder IFV (1A1, 1A3) employed by German *Panzergrenadier* units has a crew of three and five to six dismounting infantry. It is to be replaced by the Puma IFV, with a crew of three and six dismounts.
62. HDv 231/100 (zE), *Das Panzergrenadierbataillon*, state of 2001-03-01, Nr.1003. See <http://en.wikipedia.org/wiki/Panzergrenadier> assessed 10:53 hrs, 06/08/10.
63. The Canadian Army has come to the realization that it cannot afford the specialization of light forces. Doctrine is now geared toward symmetrical infantry battalions. Asymmetry at even lower levels of command is considered undesirable.
64. Early indicators are that TAPV would only have weapons for self-defence, not fire support.
65. This argument can be situated at the sub-unit level, but the section level is critical to focus on for capability determination.
66. In counter-insurgency operations, the tactics and skills of an infantry section may be diametrically opposed.
67. See S. Biddle and J. Freidman, *The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy* (Carlisle, PA: Strategic Studies Institute, September 2008).



Source: Combat Camera