THE LONG COURSE JOURNAL D'ENSEIGNEMENT ÉLANCE

The Royal Regiment of the Canadian Artillery School (RCAS)

L'École du Régiment Royal de L'Artillerie Canadienne (ÉARC)

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Col JW Errington

COMMANDER
COMBAT TRAINING CENTRE

As we continue to institutionalize initiatives as part our Strong, Secure, Engaged, members of The Royal Regiment of Canadian Artillery (RCA) have continued to successfully operate within environments that are characterized by emerging threats and the rapid evolution of technology. This past year has seen the deployment of RCA members to Latvia, Ukraine, and Iraq, displaying their abilities to maintain a high operational tempo, marked by highly agile, multi-purpose, combat capable forces that operate within a complex, and ever changing operating environments.

An adaptable and innovative individual training institution, the Combat Training Centre, including The Royal Regiment of Canadian Artillery School (RCAS) remains committed to leveraging field force operational lessons learned, adopting innovative teaching techniques, and applying emerging technology and equipment to enhance the delivery of individual training. The RCAS continues to be recognized as an organization that is relevant, efficient, and modern, enabling the development of highly qualified RCA leaders and soldiers ready to support land operations throughout the world.

As part of the RCAS, Instructor-in-Gunnery (IGs) and Assistant Instructor-in-Gunnery (AIGs) have consistently provided technical, and subject matter expertise to a number of organizations, supporting capability development, individual training and doctrine revitalization efforts. The Long Course Journal is a collection of articles and thoughts from our current IG and AIG students, which has allowed our students to focus on specific Artillery topics, while researching topics that will allow the RCA to continue to develop the employment of new technologies, doctrine, and individual training concepts.

During the year-long course, our IG and AIG students have had the opportunity to develop their technical and tactical acumen, under The Long Course Journal; IGs and AIGs share their thoughts on their understanding of emerging technology, capability enhancement initiatives, and the newest individual training delivery techniques.

Colonel J.W. Errington, MSM, CD
Commander Combat Training Centre

COMMANDER

CENTRE D'ENTRAÎNEMENT AU COMBAT

Alors que nous continuons à institutionnaliser des initiatives dans le cadre de la politique de défense du Canada: Protection, sécurité, engagement; nos membres du Régiment royal de l'Artillerie canadienne(ÉARC) ont continué à réussir leurs fonctions dans des environnements qui se caractérisent par menaces émergentes et l'évolution rapide de la technologie. L'année écoulée a vu le déploiement de membres de l'ARC en Lettonie, en Ukraine et en Irak, montrant leurs capacités à maintenir un rythme opérationnel élevé, marqué par une grande agilité, des forces polyvalentes et aptes au combat qui opèrent dans un environnements d'exploitation complexes et en constante évolution.

Une institution de formation individuelle adaptable et innovante, le centre d'entraînement au combat, y compris le Régiment royal de l'École d'Artillerie canadienne (ÉARC) demeure engagé à tirer profit des leçons opérationnelles de la force de terrain appris, en adoptant des techniques pédagogiques innovantes, et appliquer les technologies et les équipements émergents pour améliorer la prestation de formation individuelle. L'ÉARC continue à être reconnu comme une organisation pertinente, efficace, et moderne, permettant le développement d'emplois hautement qualifiés. Les dirigeants et les soldats de l'ÉARC sont prêts à soutenir les opérations terrestres à travers le monde.

Dans le cadre de l'ÉARC, l'instructeur en artillerie (IA) et les instructeurs adjoints en artillerie (IAA) ont toujours fourni des connaissances techniques et expertise de la matière à un nombre d'organisations. Ils soutiennent le développement des capacités, l'entraînement individuel et efforts de revitalisation de la doctrine. Le Journal d'enseignement élancé est une collection d'articles et de réflexions de nos étudiants actuels IG et AIG, qui a permis à nos étudiants de se concentrer sur des sujets spécifiques de l'artillerie, tout en recherchant des sujets qui permettront à l'ÉARC de continuer à développer l'emploi des nouvelles technologies, de la doctrine, et des concepts de formation individuels.

Tout au long de ce cours d'une année, nos étudiants IG et AIG ont ont eu l'occasion de développer leurs compétences techniques et sens aigu des tactiques, dans Le Journal d'enseignement élancé; les IG et AIG partagent leurs réflexions sur leur compréhension de la technologie, les initiatives d'amélioration des capacités et la techniques de formation individuelle les plus récentes.

Colonel J.W. Errington, MSM, CD
Commandant du centre d'entraînement au combat

L Col NS Roby

COMMANDANT

THE ROYAL REGIMENT OF CANADIAN ARTILLERY SCHOOL

THE ROYAL REGIMENT OF CANADIAN ARTILLERY SCHOOL

Welcome to the second edition of *The Long Course Journal*, which features highly relevant Artillery research from some of the brightest minds within The Royal Regiment. As detailed within Duty With Honour, the profession of arms has four key elements: responsibility, expertise, identity, and the military ethos. It is the second trait which forms the cornerstone of this journal, as it is incumbent for all Gunners to broaden our collective body of professional knowledge, in order to maintain dominance within operations which have become increasingly complex. As the Kings of Battle, it is imperative that we continue to develop our tactical and technical expertise, so we can continue to provide the Canadian Army with world-class, on-time, on-target Artillery support. I do hope that this journal will be a catalyst for discussion and debate, as we must all continue to ensure that our warfighting skills meet the challenges of the future battlespace. I wish to thank all of the staff and students on the Instructor-in-Gunnery and Assistant Instructor-in-Gunnery courses who contributed to this journal, and I do trust the reader will recognize the hard work and knowledge found within its pages.

Lieutenant-Colonel N.S. Roby
Commandant of The Royal Regiment of Canadian Artillery School

Bienvenue à la deuxième édition du Journal d'enseignement élancé, qui présente des recherches très pertinentes sur l'artillerie parmi les esprits les plus brillants du Régiment royal de l'Artillerie. Comme détaillé dans 'Duty With Honour, la profession d'armes' a quatre éléments clés: responsabilité, expertise, identité, et l'ethos militaire. C'est le deuxième trait qui constitue la pierre angulaire de ce journal, car il est titulaire pour tous les artilleurs d'élargir notre corps collectif de connaissances professionnels, afin de maintenir la domination au sein des opérations devenues de plus en plus complexes. Comme des Rois de la bataille, il est impératif de continuer à développer notre expertise tactique et technique, afin que nous puissions continuer de fournir à l'Armée canadienne des outils de classe mondiale, à temps, appui d'artillerie sur cible. J'espère que ce journal devient un catalyseur pour la discussion et le débat, comme nous devons tous continuer à veiller à ce que nos compétences de combat répondent aux défis du futur espace de combat. Je tiens à remercier tous le personnel et les étudiants des cours d''instructeur de tir et d'assistant-instructeur de tir ayant contribué à ce journal, et j'ai confiance que le lecteur reconnaîtra le dur travail et les connaissances trouvées dans ses pages.

Lieutenant-colonel N.S. Roby
Commandant du Royal Regiment of École d›artillerie canadienne

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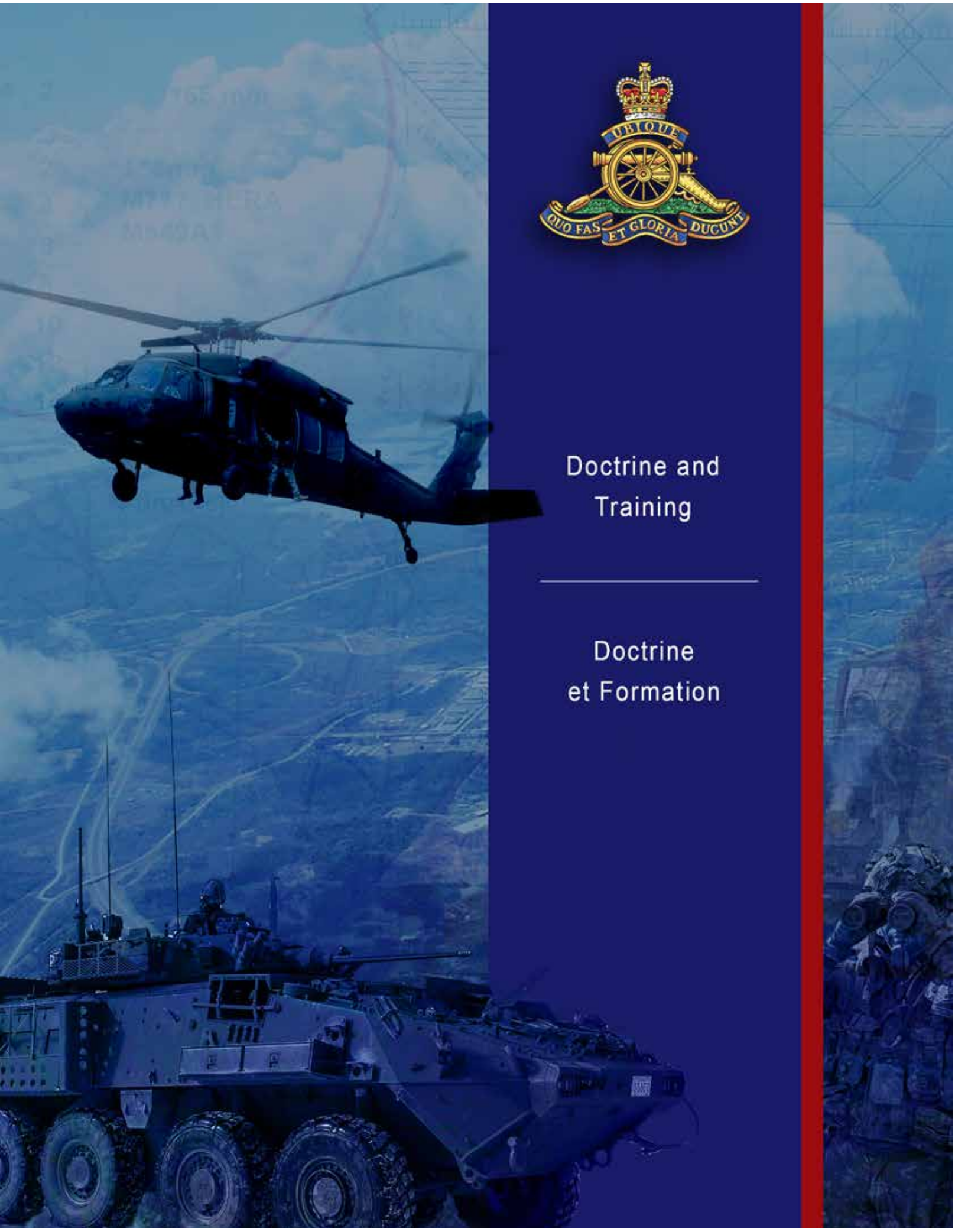

Doctrine and Training

Doctrine et Formation

A KNIFE TO A GUNFIGHT:

THE CANADIAN APPROACH TO INDIRECT FIRE

Capt C.D. Skelsey

In the event of a global conflict escalating to a peer on peer or near-peer war which sees Canada's involvement, the Canadian Army is at a severe disadvantage concerning indirect fires. Specifically, the army lacks the indirect fire capability to affect targets in the enemy's depth in support of its Brigade Groups. Shaping the enemy prior to the close fight has always provided a distinct advantage in global warfare and has led to the development of large artillery arsenals worldwide. However, comparing the Canadian artillery capabilities to both allies and potential adversaries, it is clear that the Canadian Army is out-ranged, out-gunned and outclassed. This paper will seek to establish why the Canadian Army needs a deep fires capable shooter and demonstrate the outcome of not being competitive in a near peer environment drawing on recent conflicts and personal experience of the author.

INTRODUCTION

In 1914, as the world entered a conflict that would shape the next century, the French Army was about to learn a lesson about artillery at the cost of thousands of lives. At the outset of the war, French generals thought their 7.5cm breech loading field guns would prove to be adequate for the upcoming war based upon their high rate of fire, accuracy and effectiveness against infantry. With the shift from mobile to siege warfare, it soon became apparent that the German army had superior indirect fire capability as its heavy howitzers were able to inflict significantly more damage and casualties from extended ranges. Through the application of superior indirect firepower, the German army was able to strike and destroy soldiers in depth completely destroying whole companies of infantry before they could be committed to the close fight. Limited by its flat trajectory and short range, the French 75 lacked the capability to engage in indirect fire in depth or counter battery missions resulting in the immediate need for a deep fires capability[1]. The ability to affect the enemy in depth through the use of long range fires has always provided a distinct advantage on the battlefield. The consequences of not having the capability to affect your enemy's depth, is a lesson the Canadian Army is at a severe risk of learning in the event of a conventional war with a near pear adversary.

METHOD/APPROACH

In order to understand the capability gap, we need to establish what the Canadian Army considers deep fires and how it foresees them being employed. This paper will consult the Canadian Defence Policy along with Army/Artillery doctrine to set the scope of the current situation. I will then consult the doctrine currently being utilized by a potential near peer adversary along with lessons learned from observed battles in order to emphasize the requirement for a deep fires capability in the modern era. The paper will then shift to discuss the acknowledgement of a gap in the same capability by our allies and finally conclude with a real world example of the effects of not being able to employ deep fires in a conventional fight.

DISCUSSION

Canadian doctrine defines deep fires as "the application of fires beyond the close battle area, independent of manoeu-

vre, to support higher-level objectives."[2] Deep fires provide key contributions to deep operations by attacking high pay-off targets (HPTs) and other enemy resources in depth that may support or sustain their forces in the close battle. The key distinction between deep fires and fire support is the disconnect of artillery assets from the ground manoeuvre environment for which they are supporting. In general, deep fire assets are often used by a higher formation such as a division to conduct strikes and shaping in support of a lower manoeuvre formation such as a brigade. However, as this paper will discuss, it is becoming more apparent that many nations are beginning to utilize these assets at the brigade level in support own their own deep fight.

Canada's defence policy, Strong Secure Engaged, emphasizes that the Canadian Army is structured on training and maintaining up to Brigade Group level manoeuver elements in order to provide the flexibility to support small missions while remaining ready to conduct large operations[3]. These Brigade Groups can be tasked tailored for the needs of an operation but are generally composed of Artillery, Armour, Infantry, Engineer and Combat Service Support organizations. It states "Combinations of these units operate together in battle groups to provide the joint force with the requisite firepower, mobility, protection, sustainment, and command and control functions to effectively coordinate their employment."[4] Currently, The Royal Regiment of Canadian Artillery consists of five regular force units, three of which are close support to the Brigade Groups utilizing 155mm M777 towed howitzers. Although a General Support Regiment does exist, it nor the close support regiments possess any fire support asset capable of conducting deep fires in support of combat operations. To say that these Brigade Groups currently possess the required amount of indirect firepower for a conventional near peer conflict is a bold statement considering the capabilities of potential adversaries.

The devastating lethality of indirect fire support remains as apparent as ever in modern conflicts with the war in Ukraine serving as a prime example. In a figure eerily similar to that of World War I, artillery is accounting for approximately 80 percent of all causalities in the conflict[5]. In July of 2014, during the battle of Zelenopillya, in an attack that served as a wakeup call for most modern armies, a single Russian artillery strike destroyed two Ukrainian mechanized battalions in a matter of minutes[6]. Utilizing massed fires from forty 9K51M, upgraded versions of the BM-21, Russian separatist forces were able to neutralize a combat force representing approximately one third the size of a Canadian Brigade Group's combat power before it was even committed to a fight. The increase in use of UAVs has assisted deep fires during the conflict and enabled a greater amount of fire power to be brought to bear against targets in depth resulting in devastating losses for the Ukrainian army.

Examining the employment of artillery assets as described in the Russian Way of War, we observe that Russian howitzer artillery is sited as close as 1km from the FLOT (forward line of own troops) in both offensive and defensive operations[7]. In doing this, the Russians are able to maximize the use of their artillery's range and better effect their Brigade's deep fight. In order to further support their manoeuvre elements at the Brigade level, the Russian Army utilizes Brigade Artillery Groups (BAGs) consisting of two howitzer battalions and a rocket battalion. This overwhelming amount of artillery assets provides a three to one ratio of indirect fire compared to a standard Canadian Brigade Group with its one close support Regiment. In the event of a need for greater firepower, the Russian Army through the use of Divisional Artillery Groups (DAGs) is able to both reinforce BAGs directly or strike targets in depth using DAG fires. Comparing the integral support available to a Russian Brigade versus a Canadian Brigade Group, it is clear that the Canadian Brigade Group is significantly outgunned and outnumbered. In the event of a near peer conflict, deep fires effects, specifically against hostile artillery and target acquisition assets, remain crucial to the survival of our own artillery and manoeuvre forces.

The conflict in Afghanistan spoiled the Canadian Army with regards to the employment of its indirect fire resources. The newly acquired M777 howitzers could outrange any enemy indirect fire capability and strike targets in depth with impunity. In post-Cold War conflicts, NATO dominance of the air led to the increased employment of Close Air Support (CAS) as means of conducting deep strikes in support of combat operations ultimately leading to the downsizing of indirect fire capabilities. However with the adoption of A2/AD (Anti access/Area denial) strategies, the notion of NATO air dominance can no longer be relied upon to be the weapon of choice for the deep fight.

With no integral deep fires capability, the Canadian Army must currently look to its NATO allies to provide fire support augmentation and deep strikes. However, Canada is not alone in its lack of capability, with the United States Army acknowledging that their IDF capabilities, specifically their range capabilities, are falling behind those of both Russia and China.[8] Col. Chris Compton, the Chief of Concepts and Development Division of the US Army Fires Center of Excellence, illustrated that the "Divestiture of Fires capability and force structure has left the Army at a disadvantage against peer and near-peer threats who have continued to invest in long range fires."[9] The post-Cold War period saw the US Army suffer a 70 percent overall reduction in field artillery platforms and the elimination of corps and DIVARTY structures.[10] In 2015, as part of a response to modern conflicts, the US Army returned to utilizing a DIVARTY construct with its integral fire support battalions in support of its fighting divisions. This construct, combined with a Division Fires Command (DFC) contains a MLRS Battalion with the sole purpose of conducting deep shaping fires in support of the Division[11]. In addition to the MLRS battalion, the DFC has an assigned extended range cannon artillery battalion

to provide increased flexibility and lethality to support the division in the close fight, the Brigade deep fight. Understanding the need for a deep fires capability, "the DFC specifically addresses the current lack of organic long-range fires capability for shaping the [division] close fight."[12] With our strongest ally acknowledging its own difficulty to compete with potential adversaries, the Canadian Army can no longer justify its own omission of deep fires capability nor rely on others.

With the employment of deep fire artillery at the Regimental or Brigade level within a Canadian Division highly unlikely, how would the Canadian Army employ a long range shooter? Following a restructure, The Royal Regiment of Artillery in the United Kingdom disbanded its MRLS dedicated Regiment, 39th Regiment RA, with the individual batteries of MLRS transferred to existing howitzer units. This same principal could be applied to The Royal Regiment of Canadian Artillery augmenting the already existing two batteries of howitzers in each close support Regiment with a third battery of long range artillery whether an extended range version of the M777 or rocket artillery. There exists the possibility to utilize 4th Artillery Regiment (General Support) as an actual general support regiment by providing it with a deep fires capable weapon system and then attaching a battery to support each of the Brigades in support of combat operations. The best case scenario would see the Canadian Army adopt both options, increasing the overall flexibility of Canadian indirect fires and drastically multiplying the firepower able to be fielded by a Canadian Brigade Group. The acquisition of a deep fire capability may not even require the addition of an entirely new weapon system into the Canadian arsenal. Recently, the United States Army has been testing the M777 Extended Range modification which utilizes a 55 calibre barrel and experimental projectile providing an increase in range to more than 40km[13]. Whether rocket artillery or extended range howitzer, the ability to incorporate these long range shooters at the Brigade level has been proven by our NATO allies and is well within the realm of possibility for the Canadian Army.

In May of 2018, I had the opportunity to work as a Fires Liaison Officer for 1 Canadian Mechanised Brigade Group (1 CMBG) embedded with the 1st Infantry Division (1 ID) headquarters and DIVARTY during the international exercise Joint Warfighting Assessment (JWA) held in Germany. It was there where I witnessed firsthand the detrimental mentality of having to rely solely on allied support in order to influence the Canadian deep fight. The exercise saw a multinational division under the command of the 1 ID with a brigade from the UK, Germany, France and Canada. Out of all the brigades, 1 CMBG had the least amount of integral fire support with only one Regiment of M777 towed howitzers and no deep fight capability. The UK and German Brigades each had their own integral MLRS and the French brigade had multiple regiments of the Caesar self-propelled howitzer with its operational range of 42-50km using extended range projectiles. 1 CMBG's task was to conduct a feint, main effort of the Division and draw as much attention from the OPFOR as possible; a task which saw 1 CMBG pitted against a force ratio of 1:6 while on the offensive. During phase one, 1 RCHA was reinforced with a Regiment of Pz2000s and MLRS from the German brigade, this provided 1 CMBG with the ability to strike targets in depth and assist with maintaining momentum of its manoeuvre forces. Once the reinforcing units were lost, 1 CMBG became increasingly bogged down, overwhelmed and destroyed as the enemy was able to commit forces unharmed by friendly deep fires with impunity. Despite still having access to multiple GSR units from DIVARTY, 1 CMBG was not able to utilize these divisional assets due to the intensity of the artillery battle being fought at the divisional level. Without the ability to strike the enemy's depth, 1 CMBG was unable to hinder the enemy's freedom of manoeuvre and was easily overwhelmed by superior firepower. Although a mere computer simulation, JWA provided a glimpse into the reality of engaging in a near peer conflict without adequate integral fire support at the brigade level.

CONCLUSION

As we look to the future with the possibility of a near peer conflict ever looming, the Canadian Army must ensure that it is fully prepared to meet the opposition across all domains of combat. The lack of long range indirect fire support capable of supporting the deep fight constitutes a significant disadvantage that will be leveraged against the Canadian Armed Forces with devastating consequences. Whether through an addition to the direct support artillery Regiments or through the employment of a General Support Regiment, the Canadian Army requires a long range indirect fire support asset able to support its Brigade Groups in combat operations. With such a crucial gap in capability, in the event of a near peer conflict, the lives of thousands of Canadian soldiers will rely on equipment and a capability that the Canadian Army does not possess. In the words of Field Marshall Montgommery; "the harder the fighting and the longer the war, the more the infantry, and in fact all arms, lean on the gunners". A warning that the Canadian Army must heed and strive to ensure that its gunners are properly equipped for the task.

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OFFICER/NCO RELATIONSHIP AT THE TROOP LEVEL

WO J.P. Hamilton

The Sr NCO is meant to give sound technical expertise to their junior officers not take over their command. The Royal Regiment is in need of a revamp of the training environment to shift from instruction to education. In order to fulfill the intent of the leadership of the Royal Regiment, the Sr NCOs need to put aside the old and embrace a new manner of conducting day to day operations.

INTRODUCTION

There is a problem in the Royal Regiment with the relationship between the Sr NCO and the junior officer. There has been a power struggle between the two parties for many years and one party must be in the right, and the other in the wrong. This article is intended to explore this problem and get to the bottom of it so we can learn from our mistakes and move forward, to grow as a Royal Regiment. The argument will focus mainly on the reconnaissance party and command post of the gunline as that is my expertise as well, it is where the most intimate relationships between Sr NCOs and junior officers occur. The Royal Regiment requires a shift in our training strategy for our Sr NCOs to rectify this problem. We will explore the current climate of this relationship through the leadership of the Royal Regiment. We will also see through the evolution of our publications that there are authors that are pushing for more power for the Sr NCOs. Lastly, we will explore how there is a fundamental flaw in the way we train our Sr NCOs that in my opinion adds fuel to the fire by not educating our Sr NCOs and focuses the main effort in the wrong direction.

DISCUSSION

"Tech WOs throwing junior officers out of the CP"[1] is a powerful statement and gives a visual perspective to this power struggle. If the officer is charged by Queen Elizabeth II to command over all subordinates, how is it that the subordinate is able to throw their commander out of their specific work place? "The WO at the time was really angry, spent his time yelling instead of explaining"[2]. This is a toxic environment to be in, as well as teaching the young soldiers in the battery that the junior officer has no place on the gunline and that it is run by the Sr NCOs. In my experience, this extreme is not overly prevalent, but nonetheless it is the environment today's Sr NCOs grew up in and cannot be dismissed.

"...discipline is transmitted by officers through NCOs to the men. The importance of NCOs giving their all to support their officers cannot be too far stressed. It is vital for the maintenance of discipline. The NCO being the backbone of the unit must have similar qualities of leadership to those of their officers."[3]

Leadership of the past understood the importance of the Sr NCOs support for their jr officers. In addition to this support, today's leadership of the Royal Regiment intend the relationship to be a mentor/mentee relationship wherein the Sr NCO mentors the junior officer. "I do believe that we should focus on mentoring"[4], "the NCO needs to be trustworthy and willing to mentor"[5], "another important function of the TLT [tactical leadership team] is mentorship"[6], and "in my honest opinion this relationship should be more mentoring"[7]. This speaks volumes to the intent of how it should be a common goal to achieve throughout the Regiment. The senior leadership of the Regiments understand this important relationship, however there appears to be a disconnect.

Going back to 1990, in the GPOs Aide Memoire there is seldom a reference to the Sr NCO in the position of a technical supervisor as it pertains to the reconnaissance party or the command post. The technician was left to their own devices while conducting their drills, while the officer checked their work through our drills of double checking data such as the compass verification of the director. Viewing a quick action, there was only a requirement for a three person crew: GPO, Tech 1, and Tech 2. Tech 1 conducted the CP operations, the Tech 2 conducted the director drills and the GPO controlled everything. Where was the Sr NCO? There was no mention of them.

In 1998, with the release of the current in use publication that supersedes the GPOs Aide Memoire, there is more of a presence of the Sr NCO in the CP and Recce Party. These Sr NCOs are labeled as their rank in the party they are in, such as the Recce Sgt, the Battery Tech Sgt, and the Tech WO. One can assume that with the dissolving of the Regt Survey Sections that attained regimental and theatre states of survey that there was a requirement to heighten the level of supervision of a battery recce technician that is now capable of attaining these levels of survey. In the command post, technological advances are a scapegoat to heightened supervision. The duties of these positions describe supervisory roles in their specific expertise. It makes sense to bring in personnel that can offer a technical expertise to the battlefield, personnel with years of experience that can provide a trained eye in their supervision and sound technical advice to their commanders as there is a push for increased precision and technological advancement.

Moving ahead further, the 2018 draft publication of Field Artillery Duties and Responsibilities in Land Operations further upgrades the Sr NCOs to commanders in their detachments. Rather than labeling the position as a Recce Sgt, they would now be known as a Recce Det Comd. Additionally, in the CP the Tech WO became the CP Det Comd and the Bty Tech Sgt became the CP Det 2IC. The title of a position is to describe ones duties, giving command where no command is held is moving in the wrong direction. The positions of command in a battery are the Gun Det Comd (gun detachment), GPO (gun position), BK (gun area), and BC (battery). This promotion of positions to commanders leaves no room for the junior officer to be part of the CP or Recce party which can only result in confusion of responsibilities.

Understanding that there has been a problem is step one, step two is understanding that the leadership does not intend to have a role reversal and intends to have the Sr NCO be given the skillsets and motivation to want to mentor their junior officer. This would require a culture shift and a review of the way the training system works for artillery courses. Currently, the main source of instruction from Gun Det 2IC to GA TSM is by student mutual. This material is previously held knowledge from Gunner to Bombardier level courses. To put this into perspective, 27% of the GATS course is conducted by student mutual, 15% is designated for the introduction of new material with the remaining 58% for assessments and exercises. This is the course that will allow one to be promoted to Sgt, become a technical advisor and be in a position that the senior leadership wants to mentor our junior officers. It appears that our main effort is to assess and exercise previously held knowledge vice educating our Sr NCOs academically to become a valuable asset to a junior officer (that can advise on more than the drills of a T16 or how to properly conduct a mission using MAPS).

This is not an easy fix, nor able to be rectified in a short period of time. An overhaul of our training system to provide education to our Sr NCOs, not instruction will be required. It appears appropriate to instruct a Jr NCM on the drills of an instrument, the Sr NCO needs to be educated to allow for the processing of information and the provision of sound technical advice.

CONCLUSION

In conclusion, the relationship between Sr NCOs and junior officers has been under friction due to confusion of responsibilities. The leadership of the Royal Regiment has seen the worst of this situation and have a vision for the future, unfortunately our Sr NCOs are not equipped with the tools to fulfill this vision. Firstly, we must ensure the titles of the positions we hold properly describe our duties and responsibilities. We cannot call someone what they are not. Secondly, we must revamp our training strategy to educate our Sr NCOs academically on how to become a valuable asset of knowledge and experience. Current technology and access to a multitude of resources, there are many ways that this could be accomplished. Lastly, educate our Sr NCOs on how to properly mentor allowing for a smoother transmission of the technical expertise and experience from the Sr NCO to the junior officer. The ability to effectively communicate a detailed understanding of a craft is vastly different than reciting a checklist and informing on drills. Implementing these changes we will begin to understand our roles in the battery and work together in an efficient manner that has yet to be seen in the Royal Regiment.

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A REVIEW:
RECENT CANADIAN ARTILLERY DOCTRINE

Capt G. Chamberlain

This paper is a simple review of recent RCA doctrine. It compares each piece against the RCA keystone doctrine as well as other supporting doctrine. Ultimately it seeks to answer whether the doctrine will enhance or detract from the RCA and in most cases the answer is both. Recommendations are made to improve each piece of doctrine. The final conclusion is that the appropriate resources are not being applied to the development of doctrine and the RCAS as the center of excellence has duty to take ownership of the tactical level doctrine.

INTRODUCTION

The Royal Canadian Artillery School (RCAS) is the center of excellence for the employment of artillery within the Canadian Army. With such a lofty title comes great responsibility. That to train personal to operate in the most effective manner when conducting their roles as members of the Royal Canadian Artillery. The question then becomes how can a non-operational unit understand in detail what the most effective manner is, within a given set of circumstances?

The RCA has recently released several pieces of doctrine which the RCAS may use to answer the above question. Doctrine should provide the answer.

"Doctrine is the collective wisdom of our Army and the common language of our profession. It provides th#e lessons from generations of soldiers learned during hard fought battles, campaigns, and wars." [1]

Doctrine is not expected to have the exact answer in every particular circumstance but rather provide lessons learnt in the harshest of conditions that can then be extrapolated from. This is how well written doctrine that focus upon principles can become timeless, such as Prussian General Carl von Clausewitz's 'On War' becoming required reading of almost every army.

Tactics Techniques and Procedures (TTP) makes up another portion of doctrine which focuses on *how* operations are to be carried out. These are often the lessons learnt that discuss how to defeat the *last enemy*, where higher level doctrine discusses the commonalties in defeating all the previous enemies.

METHOD/APPROACH

Each piece of new doctrine has been reviewed in detail and compared to other new pieces of doctrine to see whether or not they support or contradict one another. In several cases this was insufficient as pieces of doctrine that have been key to the RCA for a number of years are set to be superseded. In these cases the question has become, is the new doctrine a significant improvement or has it missed the mark?

REVIEW OF LITERATURE

There have been several recent release of doctrine relevant to the RCA. The following five documents were identified as being of special significance;

Air Defense Artillery in Land Operations [2]. This is an approval draft released in 2017. It supersedes Air Defence Artillery Doctrine (1999). The stated aim "is to convey doctrinal, specifically TTP guidance, for the conduct of air defence artillery in land operations." OPI: ADC Act Firepower

Field Artillery Duties and Responsibilities in Land Operations [3]. This is an approval draft released in 2018. It supersedes Duties of the Battery Commander and Observer (1998) and Duties of the Regimental Headquarters and Gun Posistion (1998). The stated aim "is to explain how Field Artillery operates during land operations by enabling the

victory of the combined arms team through the integration of fires in the close support role." OPI: ADC ATC Arty. OCI: RCAS

Surveillance and Target Acquisition (STA) Artillery in Land Operations [4]. This was released in September 2016. It Supersedes Surveillance and Target Acquisition Battery in Land Operations (2012). The stated aim is "to explain how STA batteries (bty) and troops (tp) contribute to land operations." OPI: CTC RCAS

General Support (GS) Artillery in Land Operations [5]. This is an approval draft released in 2018. The stated aim is "to inform formation commanders and staffs, and their artillery commanders and artillery staffs with the necessary doctrine to provide and/or employ GS artillery fires to a formation." OPI: ADC ATC Arty. OCI: RCAS

Brigade Tactics [6]. This was released in 2017. It supersedes Land and Tactical Air Operations, Volume 1 – Land Formations in Battle, Book 1 (1987). The stated aim is "to provide keystone doctrine for the conduct of brigade-level operations within the Canadian Army (CA)." OPI: ADC Act

DISCUSSION

FIELD ARTILLERY DOCTRINE [7]

Although Field Artillery Doctrine is not a recent publication and was not specified for review, it is the Keystone Artillery doctrine which drives the subsequent publications. The aim of this manual is to outline the tactical doctrine for the employment of field artillery in battle. As this document defines it field artillery consists of gun, rocket, and missile units that provide surface to-surface fire support for the field force and locating field artillery and equipment that provide target acquisition, combat surveillance, and artillery intelligence. That STA is a part of field of artillery is a surprisingly often overlooked fact that was solidified in doctrine at least 20 years ago.

This is the artillery's Keystone doctrine and as such all subordinate doctrine should be in sympathy. In most part it is. Despite being 20 years old this doctrine is well written, principle based, and timeless. What's more it is succinct, clear, and easily understood. It should serve as example to aspiring doctrine authors.

RECOMMENDATIONS

There are no significant amendments that are immediately required.

Updating the language without changing the message may make it more accessible to new members of the RCA.

FIELD ARTILLERY DUTIES AND RESPONSIBILITIES IN LAND OPERATIONS

Is the most significant piece of new doctrine as it supersedes two pieces of doctrine that have been critical to the employment of artillery in the last 20 years including nine years of significant conflict in Afghanistan. The decision to re-write the doctrine regarding the employment of field artillery (excluding STA) instead of updating or amending is an interesting choice. Within RCAS there does not appear to be a concern that either 'BC and Observer' or 'RHQ and Gun position' have fundamental flaws that require a complete re-write. The significant issues that do exist in the superseded doctrine have not been addressed so the reader is left wondering what is benefit? And more significantly in this case, 'at what cost?'

It appears the author has attempted to create a one stop doctrine shop for all artillery fires conducted by a regiment. As an extreme example it goes so far as to attempt to explain indirect fire theory in less than three pages and provide diagrams of all arms skills such as target indication using the clock-ray method. At one end of the scale it provides nebulous and superfluous detail and at the other it virtually ignores an entire component of field artillery, STA.

Where this doctrine could have significantly advanced the RCA is through the solving of problems known to exist within the corp. Had the re-write detailed a comprehensive drill for regimental coordinated illumination missions, updated the danger close procedure to that used in Afghanistan, and absorbed the CIG directives that are appropriate to be cemented doctrine, then this piece of doctrine would have been a significant advancement for the corp. In contrast no significant issues have been addressed but even more significantly almost every example of artillery employment at the regimental level has been removed. Assumedly this was done to reduce the size of the text which is required but was done by in direct contradiction of the aim of the text by removing the "how to employ artillery" [8] components.

The failure to include CIG directives is one of the most significant issues and is further compounded by not removing the issue the directive seeks to solve. The safe and effective employment of artillery within a 'Danger Close' situation is the most significant act a FOO will likely undertake in their tactical career. The result of successful mission will be the preservation of Canadian lives and the respect and trust of the supported arms. The Danger close procedure included is not the most recent "CIG Directive 39 Operational Danger Close" [9]. The included procedure is simply titled "Danger Close Fire Missions" [10] but it does not state under what circumstances this 'non-operational' procedure should be used. That there is a procedure for operations and another for training is incredibly dangerous. This creates a situation where personal are effectively untrained the in correct procedure when going into combat. This mindset of safety in training exceeding safety in combat will ultimately result in more Canadian casualties.

Despite being an approval draft, the document is plagued by poor staff work and lazy uses of colloquial terms that will not stand the test of time. The following examples are but the tip of the iceberg;

- Diagrams clearly plagiarized without reference which use symbols not found in APP-6(C). [11]

- A method for determining errors on either 105mm or 155mm artillery systems is laid out in very specific detail but never references the orientation system it is applicable to.[12]
- ASL is used to describe the max ordinate to be provided to aircraft despite not being a recognized format for measuring altitude.[13]
- "current equipment" [14] is used on several occasions without any specific reference to what that equipment actually is.
- Line to Shoot Down to (LTSDT) is articulated in such a way that it generates confusion even amongst DP2 Artillery Officers.

Some readers may be of the mind to forgive some such errors as minor, but it is important to consider that this document may stand for the next 20 years as the prime reference for both training and the conduct of operations on which Canadian lives depend. Basic errors such as the above also significantly impact the credibility of the document. The reader is forced to consider 'if the basics are incorrect, can I trust the complex?'

There is a huge amount of explanation as to why things are done a certain way. Generally this is a positive thing however in the case of a tactical "how to employ artillery" document it becomes cumbersome and difficult to find actionable information. Furthermore the explanations are often incomplete or overly simplified in an effort to reduce volume. The result of this is the reader must seek out the prime reference for the required level of detail making the provided explanation obsolete or even contradictory.

When discussing 'Destruction' the text appears to confuse Destruction as an effect, Destruction of a piece of equipment, and Destruction as a technical procedure. The text also describes Neutralization as only having an effect "for the period of time that the rounds are falling" [15]. In all other tactical references this would be considered Suppression [16]. It goes on to say Neutralization can be achieved by blinding with smoke or firing at suspected positions. Again neither of these actions would be considered to neutralize within Canadian maneouvre doctrine or NATO doctrine. This is a but a few examples of a theme within recent RCA doctrine. That theme is the redefining common terms in manner specific to RCA. This is a dangerous practice that in the best case creates an additional burden of communication with supported arms and worst case results in complete misunderstanding leading dire consequences in combat.

Radar registration does not explain the principles behind the procedure. Instead it goes into such detail as where a technician should place their mouse cursor. This is likely to become entirely irrelevant with a software patch or the introduction of new equipment such as the Muti-Role Radar (MRR).

"The Battery Commander (Bc) And Forward Observation Officer (Foo) In Battle" [17] is a very valuable section. It needs to tie in with Artillery Operations and Battle Group operations and appears to do so in the most part. When planning and operation with the supported arm this should be used as a reference for those who lack experience in that specific operation. It will serve as an excellent guide of likely tasks for fire support.

"Non artillery Fire support" again should be less specific. Both the Close Air Support (CAS) [18] and Naval Fire Support (NFS)[19] procedures do not match the prime references [20] which Canada has agreed to use for their employment. Although sections on infantry equipment are accurate the equipment may change in the short term, as will TTPs of the weapon systems users. As such principles should be discussed not details.

The final section on NATO inter-operability is fundamentally flawed. All Canadian artillery doctrine should comply with the specific NATO agreements Canada has signed, and as such there is no reason detail such STANAGs. Where Canada has chosen not to follow a NATO STANAG then that STANAG has no place in Canadian Doctrine and should not be mentioned. The appropriate level of doctrine for STANAGs to be discussed is Capstone Doctrine not supporting doctrine such as this.

SUMMARY

Field Artillery in Land Operations poses a direct threat to the effective employment of artillery by the RCA. The addition of superfluous information at the cost of how to employ effective regimental fires is a poor decision that will see a reduction in capability of the corps as corporate knowledge based on experience is lost. A single volume that encompasses the required information for a regiment to operate effectively is possible but it must be created with that aim and that aim only.

RECOMMENDATIONS

Field Artillery Duties and Responsibilities in Land Operations is not accepted without significant re-work and subsequent peer review. The author believes that CO, BCs, and RCPOs of the operational regiments are the most appropriate personnel to conduct such a review.

An example of each type of mission at the battery and regimental level is included.

Use general but accurate terms that do not limit the shelf life of principles and procedures. i.e. Towed Howitzer opposed to LG1. Night Observation Device opposed to AN/PVS 14 MNVD.

CIG directives should not be referenced but rather written into doctrine. This is only appropriate where the CIG directive is not limited to a specific piece of equipment.

Where it is deemed necessary to discuss a specific piece of equipment it should be done as an appendix to the appropriate chapter and no further reference should be made in the main body. This will enable simple amend-

ments as equipment changes or more likely personal will disregard the appendix while still being able to use the overarching principles after the equipment is divested.

Explanations of "why" are removed and the document is focused on "the how to". References to the doctrine which explains the "why" in sufficient detail should exist as foot notes.

Non-artillery fire support is limited to principles of employment only. References to the appropriate doctrine should be included as footnotes.

NATO STANAGS should be removed outside of references.

BRIGADE TACTICS

Is well written, concise, and practically focused. It outlines what purpose artillery has in each brigade operation without dictating how the artillery will achieve it. The document seeks to provide supported arms with enough knowledge to plan in conjunction with artillery officers without the need to be educated during the process.

This document would be extremely valuable as a primary reference for the Forward Observation Officer course and the DP2 Artillery Operations Officer course or any time an understanding of what maneuver forces would be doing in a given operation is required.

The artillery doctrine that it most closely links in with is Artillery Operational Procedures. The two documents complement each other without contradiction.

Surprisingly it constantly reinforces the need for a detailed artillery sustainment plan. This is refreshing given it is often overlooked by the both the artillery and logistics corps.

This document doesn't currently require any input from the RCAS but it should be checked with each update or major change in employment of artillery to ensure it remains current and supports artillery doctrine.

RECOMMENDATIONS

- Use this as a prime reference on Artillery Operations and Forward Observer Courses.
- Review each amendment to ensure continued accuracy in regards to the employment of artillery.
- Review Artillery Operational Procedures in conjunction with this and ensure they remain complimentary.
- The format and layout of this document can serve as positive example of brevity and clarity in doctrine.

GENERAL SUPPORT ARTILLERY IN LAND OPERATIONS

General Support Artillery in Land Operations (GS Artillery) is written from the premise that Canadians may deploy in a multinational context where they are required to either plan the employment of GS artillery or may request the employment of GS artillery in support of Canadian operations and as such must have some doctrine from which to base those actions upon. This is a fundamentally flawed position as no other nation will allow Canadians to employ their GS artillery in accordance with Canadian doctrine. Furthermore the practicalities of having another nation's GS artillery unit learn Canadian doctrine so it may be employed by Canadians appears to have been completely overlooked.

The other more reasonable argument for Canadian GS Artillery doctrine is to maintain the knowledge within the institution in case of future establishment of a GS regiment. In this case GS Artillery in Land Ops meets its aim but also contains large volumes of information that will become immediately outdated or irrelevant on the establishment of Canadian GS Artillery.

It also steps well outside the scope of the document by including such frivolous details as a possible desk layout for a divisional HQ. The establishment of a divisional HQ will almost certainly not use artillery doctrine as it reference, and in addition will certainly not use the suggested desk layout provided.

There is a large duplication of effort. GS Artillery attempts to define artillery tactical tasks but in doing so re-words the definitions. All though the definitions appear to be technically correct they are verbose and potentially confusing where the standard definition is concise and well understood. This mistake is repeated with an attempt to redefine FSCMs in the author's own words. Which continue to be overly wordy and only confuses the readers understanding where the prime reference provides a sufficient explanation.

There is an example of a mission statement which could be given to a GS regiment [21]. It is unclear and appears to be a blend of an intent statement, specified tasks, and a mission statement. Such poor examples reduce the credibility of this document and of the wider RCA given this document is written with aim of informing formation commanders.

Targeting is not the sole remit of the RCA. There is school established specifically to educate the CAF on its employment which includes the provision of approved doctrine. Yet GS Artillery attempts to define the divisional targeting process to such detail that it indicates the secretary should conduct roll call at the start of targeting working group.

It claims to define the "best" clearance of fires drill. Noting that drills exist within specific organisations and are adapted to specific situations this claim is fundamentally flawed.

MLRS trajectories are included for a specific weapon system [22]. There is no guarantee this is the system the Canadian Army will eventually acquire nor is there a guarantee this will be the weapon system supporting a Canadian operation. Even if it were, Canadian GS Artillery doctrine would not be an approved reference for defining a trajectory to enable any tactical action.

SUMMARY

It is admirable that a gap was identified within Canadian artillery doctrine and that a solution was developed. However the reason that gap existed is because there is

no significant reason for Canada to have to its own unique general support artillery doctrine. This doctrine does not share any lessons learnt from previous conflict nor does it explain how to use a current capability. The staff effort that went into producing this publication could have provided far more benefit to the RCA had it been directed more appropriately.

RECOMMENDATIONS

This document be shelved until such time a need for it can be clearly articulated. The staff effort needed to fix this document would have a much larger benefit elsewhere.

Should it be continued, develop it with the aim of allowing Canadians to understand the general principles of employing GS artillery. Ensure those principles match Canada's allies who are most likely to have GS artillery deployed within a coalition operation and avoid specifics that can quickly become irrelevant or incorrect.

SURVEILLANCE AND TARGET ACQUISITION (STA) ARTILLERY IN LAND OPERATIONS [23]

There are several pages which appear to be more of an opinion piece similar to this article than to actual doctrine. The author laments the common misconceptions between STA and ISTAR within the wider Canadian Army and seeks to blame a fledgling ISTAR capability for many of problems existing within STA. The author goes so far to say STA is the only organization supporting ISTAR and as such indirectly insults the reconnaissance capabilities of the other corps. Such statements have no place in doctrine and do more harm to RCA than anyone else.

The organization chapter refers an "electronic battle box" retained on a CD-ROM for all doctrinal line diagrams. This is clearly 'copy & pasted' from the superseded version. Such oversights massively impact the credibility of a document.

There is an excellent description of types and capabilities of STA systems which are often misunderstood. This section should be provided to supported arms to enhance their understanding. Where this section is truly effective is that it is not tied to current equipment but principles of types of systems.

The chapter "STA at the General Support Level" [24] takes a wild deviation from both higher Canadian doctrine and allied doctrine. This chapter continues the theme that GS Regiment can exist without fire units which was seen in 'GS Artillery in Land Operations'. Field Artillery Doctrine states "The role of GS artillery is to provide additional fire for formations at all levels. General support artillery may be equipped and organized as gun or rocket units." [25]. When doctrine cannot sufficiently explain a concept or doctrine forces the employment of artillery to be ineffective then it is essential that doctrine be broken from or re-written. However this is not the case here. The concept of the Target Acquisition (TA) regiment [26] that usually exists within a GS Artillery Brigade is entirely complimentary with the current employment of 4th Artillery Regiment (General Support), RCA. 4th Regt (GS) is usually given the General Support tactical task which is common to all TA regiments. However it is as true for 4th Regt (GS) as it is for any other artillery unit that they can be allocated DS, R, GSR, or GS regardless of their name. This chapter appears to have been written to justify some unfortunate nomenclature and is 'the tail wagging the dog' in truest sense. The danger here is this ongoing justification is now driving doctrine and procedures that are separating the RCA from their allies and are decreasing inter-operability.

Throughout the AWLS chapter it refers to the specific piece of equipment as "the AWLS". It goes on to give very specific ranges, capabilities, and requirements which will be outdated on the introduction of a new AWLS system. When this new equipment is introduced the lack of specific nomenclature will likely create confusion in reference to the new systems capabilities and requirements.

The chapters on Weapon Locating Radar intermingles general principles of employment alongside system specific information which will again create confusion with the introduction of new equipment such as the MRR (not included in these chapters).

The artillery intelligence chapter is generally well written and will certainly aid those conducting an often under fulfilled role. The only significant issue is the discussion of the enemies artillery groups. The author appears to have written this section to aid the layman in the conduct of their duties during exercises by templating a fictional enemy.

The section on Counter-battery Threat Levels (CBTL) is well written and should be provided to supported arms to be used within their training. This will enhance the understanding of supported arm commanders when operating in a Counter-battery threat environment.

When discussing the use of artillery movement orders for STA several issues are raised with the format. Doctrine is not the place for development to take place but rather the expression of the final product. Either the move orders need to amended prior to the release of doctrine, the move orders are left out of doctrine, or they are correct. Discussion of solutions or work arounds is entirely inappropriate.

The chapters on the current STA systems (UAS, AWLS, Radar) are well written but suffer the same issues as other recent artillery doctrine. References to the specific equipment currently in service puts a limited shelf life on the publication.

SUMMARY

STA in Land Operations suffers from role creep. Where it stays at the tactical level it is full of useful information that would greatly benefit from being separated into principles and equipment specific sections. However it often slips into commenting on higher level policy well beyond the scope of the document. Where it seeks to redefine general support artillery regiments it strongly contradicts other Canadian and allied doctrine.

RECOMMENDATION

STA in land operations is not accepted without significant re-work and subsequent peer review. The author believes that CO, BCs, and RCPOs of the operational regiments are the most appropriate personnel to conduct such a review. This includes both close support regiments and 4th Regt (GS).

The scope of the document should be at the tactical level enabling the employment of STA assets within a brigade or smaller organization. Elements of higher level policy discussion should be discussed elsewhere.

Where it is deemed necessary to discuss a specific piece of equipment it should be done as an appendix to the appropriate chapter and no further reference should be made in the main body. This will enable simple amendments as equipment changes or more likely personal will disregard the appendix while still being able to use the overarching principles after the equipment is divested.

The elements highlighted as useful to supported arms training should be provided to their corps specific schools and to Canadian Army Command and Staff College.

AIR DEFENSE ARTILLERY IN LAND OPERATIONS

The requirement for GBAD forces to operate and communicate effectively with NATO command and control relationships is paramount. At the NATO Summit in Warsaw 2016, Heads of State and Government underlined the importance of interoperability to the success of the Alliance.[27]

On 17 May 2017, STANAG 2618 JCG GBAD (EDITION 1) was released. This STANAG states that NATO Standard ATP-82 Allied Doctrine for Ground-Based Air Defence is to be adopted. One of the most significant elements of the document is that when deploying as a NATO force all Ground Based Air Defense (GBAD) will be centralized under a GBAD Task Force (TF) and a single GBAD TF Commander. ATP-82 also requires that any GBAD contributions must use the NATO Command & Control (C2) structure. This is significant as Canada continues to use Artillery Tactical Tasks when employing its currently fictional air defense assets. Not only are the these tactical tasks seen as inappropriate by members of Canadian Air Defense but they do not meet the "Minimum Capability Requirement (MCR)" to deploy as part of a NATO mission.

Air Defense Artillery in Land Operations states "The Commanding Officer (CO) of an ADA unit normally uses tactical tasks to identify the priority of effort and liaison requirements between AD batteries and supported formations/units."[28] This is not case in practice. In discussion with air defenders within the RCAS the most effective way to convey the required information is to use command relationships. The only reason to use artillery tactical tasks is to communicate with an artillery commander in a language they are more comfortable with. When communicating with the supported arms Artillery Tactical Tasks are rarely mentioned. The removal of Artillery Tactical Tasks will bring this document in line with the NATO doctrine Canada has agreed to use and reduce confusion within the RCA.

Chapter 3 is devoted to the current and emerging threats. If an update to this document is 19 years in the making as the last one was, then this information is likely to 18 years out of date before it is amended. Having said that, this chapter is well written and full of valuable information and analysis. It should be made readily available through another format.

One of the more aspirational claims of Air Defense Artillery in Land Operations is that Canada "relies on allies and coalition partners to counter ballistic missiles and satellites" [29] and lists the threats Canada will defend against as UAVs, Rotary and Fixed Wing aircraft, Rocket Assisted Munitions, and Cruise missiles[30]. Perhaps the author has inside knowledge of a multi-billion dollar AD upgrade program but no research has unearthed such a commitment.

Where this doctrine is actually very effective is in the preservation of AD principles and maintaining base knowledge required to reinvigorate the capability once an investment can be made. The chapters on 'Employment and Deployment'[31], 'ADA in Operations'[32], and "Airspace Control"[33] are all well written full of detailed and relevant information. The chapter on AD planning is particularly well written as it aids the reader to plan with any AD system.

SUMMARY

Whilst the AD capability is being rebuilt is the time to ensure that doctrine supports its effective employment. AD worldwide is in a state of flux with NATO's release of new doctrine and USA's discussion of "Multi-domain Operations". Canada is uniquely placed in that the lack of current capability enables the flexibility to have cutting edge doctrine without significantly burdening current operations with drastic change. Whilst it Air Defense Artillery in Land Operations is generally well written it is a victim of massive change amongst Canada's allies and should be amended whilst it is in a position to be done so easily. Once new AD systems are bought into service and are using the current doctrine, change will be significantly more difficult to enact.

RECOMMENDATIONS

This publication should be immediately adopted as a prime reference for AD instruction within RCAS. The areas which require amendment are not significant to the level of instruction conducted within RCAS.

- Remove the discussions of capability and policy.
- Publish the analysis of the current threat in another medium.
- Make amendments required to meet ATP-82.
- Be prepared to review and include multi-domain operations as soon as it is adopted by the US Military.

CONCLUSION

It is obvious from the most recent releases of artillery

doctrine that the time and resources required to develop effective doctrine are not being allocated. The importance that the doctrine RCA will use to fight and train with, be of the highest possible standard, cannot be understated. Doctrine should encompasses the hard won lessons of past combat experiences and provide a reference for those who cannot immediately access the guidance of experts. Some of the doctrine review in this paper achieves this, much does not.

It is unfortunate that best piece of doctrine reviewed in this paper does not belong to the artillery. Brigade Tactics is well written, concise and informative and should be introduced into training within the RCAS. Air Defense Artillery in Land Operations can be effective as training aid so long as the commentary and policy elements are avoided. Surveillance and Target Acquisition (STA) Artillery in Land Operations has some very useful information but it requires a re-work to put that information into a useable format prior to adoption by the RCA. General Support (GS) Artillery in Land Operations is currently a detriment to the RCA and a significant rework would still add little benefit to the corp and none to the RCAS. As such it should be not be developed any further and the staff resources should be directed to a more beneficial endeavor. Field Artillery Duties and Responsibilities in Land Operations poses a significant threat to the effective employment of field artillery and should not be made available to the wider RCA until it has undergone a massive rework.

The final recommendation of this paper is that the RCAS takes ownership of the tactical level doctrine used by the RCA and dedicates staff effort to critically reviewing that doctrine and ensuring that it will drive improvement across the RCA.

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LIGHTWEIGHT COUNTER MORTAR RADAR:

DOCTRINE, TRAINING AND EMPLOYMENT REVIEW

WO C.J. Harrison

The Lightweight Counter Mortar Radar (LCMR) was procured as a static, Forward Operating Base (FOB), counter mortar radar capable of operating in Counter Insurgency (COIN) operations. It was used to fill the void of a Weapons Locating Radar (WLR) during the conflict in Afghanistan1. The employment method during that time required minimal training and enabled the battlefield to locate the indirect fire threat that was present during that era. The ongoing development of the present day LCMR (the AN/TPQ-49.1), both software and firmware upgrades, have created a hole in WLR doctrine and the training system for the LCMR. The current level of training for the LCMR is inadequate to meet the future operational requirements, and with near-peer and peer-peer conflicts knocking at the door of the North Atlantic Treaty Organization (NATO), the level at which our primary users are trained is not enough to effectively employ and deploy the capability. The future of the LCMR training rests in a decision of whom will be the future primary users, the Primary Reserves (PRes) or Regular Force Artillery. Regardless of whom the primary users will be, within the current spectrum of operations there is a requirement for an LCMR Detachment Commander course.

INTRODUCTION

Current doctrine is very unclear on how to tactically employ the LCMR. Our doctrinal publication, Surveillance and Target Acquisition (STA) Artillery in Land Operations, has limited information on how to properly employ the system in a battery context as well as supporting a unit or formation. The highest level that speaks to WLR employment is within the Combat Team in Operations publication however, it simply states that "the FOO/JTAC party is also the combat team commander's link to a variety of artillery surveillance assets"2 and continues on to mention all STA resources, not specifically the LCMR. In all doctrine publications reviewed, nowhere does it state how to employ the system during offensive, defensive, stability, and enabling operations.

Because of this lack of doctrine, the primary users are required to adapt to the changing situations on the battlefield without proper training or guidance. Without proper doctrine we limit our ability to develop an effective training plan. This training is required so the Detachment Commander can effectively integrate, advise, employ, and deploy the system during all types of operations. Contributing to the lack of doctrine is the Tactics, Techniques, and

Procedures (TTPs) that the close support regiments are documenting but not submitting for review. Without the submission of these TTPs to the Royal Regiment of Canadian Artillery School (RCAS), they cannot be formally analyzed and verified which could lead to improper employment of the LCMR or, documented and added to future doctrinal publications. Doctrine drives training and whether the LCMR is employed by the PRes or Regular Force Artillery, the lack of doctrine limits training and leads to inexperienced and improperly trained Detachment Commanders.

TRAINING

The current training cycle for the LCMR is one (1) Primary Combat Function (PCF) operator course over an eight (8) day training period. While this proves to be sufficient to force generate operators, it does lack a significant amount of training material required to employ the capability in today's battlespace. Recent changes to the Training Plan (TP) have partially adapted to the present employment methods, i.e. command relationship and the role and organization of a Combat Team lectures, however the depth and allocation of time is minimal in comparison to what is taught on other artillery courses [Observation Post Detachment Commander, (OPDC)] with similar duties. The close support regiments were surveyed as the current primary users. When asked what the biggest shortfall of the training is, a unanimous return was the inability of the detachment commander to liaise, advise, and brief unit and formation commanders. The end state of the operator course is to produce operators capable of technically deploying the kit, not tactically employing it.

When a member of the Royal Regiment of Canadian Artillery (RCA) has the Acoustic Weapons Locating System (AWLS) Detachment Commander qualification and the LCMR Operator qualification, they are considered to be qualified as a Detachment Commander for an LCMR3. Once a review of the TP and courseware for the AWLS Detachment Commander course was conducted, it was found that the training is minimal and does not fully encompass the requirements of an LCMR Detachment Commander. The training structure for the LCMR does not sufficiently include unit and formation level employment, nor the LCMR detachment commander responsibilities. These skills are being learned 'on the fly' at the close support regiments. Understanding how the LCMR is being employed at these levels is vital to the success of the STA Artillery integration in modern battlespace.

RESERVE FORCE GENERATION

Understanding the capabilities, training structure, and employment requirements will aid in the decision on who will be the primary users of the kit. Some believe that the LCMR should be force generated by the Primary Reserves (PRes) only. Of all the STA systems, the LCMR is the most suited to do so given the current training structure. Currently, there are three (3) reserve units that are mandated to force generate an LCMR capability, 7 Toronto Regiment, 20th Field Artillery Regiment, and 62e Régiment d'artillerie de campagne3. The biggest shortfall of the current time is the PRes units require support from the regular force STA batteries to conduct their training. This is due to lack of kit and trained personnel. While there are plans to supply the reserves with LCMRs in the near future, the problem arises of actual versus perceived employment. Many are still under the perception that the LCMR is being employed like the Afghanistan era, when it is actually being used to support the various types of operations. The PRes will look to doctrine for answers on how to employ the LCMR in the full spectrum of operations. The current lack of doctrine for this system will force the PRes to fall back on what little operational experience exists within the unit.

Given the actuality of its employment, the question then arises will the PRes be able to force generate a capability able to support Regular Forces exercise and operations, or would it be better to augment the Regular Force with reserve personnel?

CONCLUSION

The future of the LCMR lies in our ability to fully integrate this capability into the unit and formation levels. Attending and observing how the close support regiments are employing the LCMR throughout unit and formation training events will assist in our ability to develop our doctrine and training. Once we understand the requirement of the field force, the decision of who will be the primary users can be made. As the Centre of Excellence (COE) we have an obligation to understand how the LCMR is being employed, develop a Detachment Commander course and only then can we fully enable and integrate this capability into the modern battlespace.

ENDNOTES

1. MATFLASH, Lightweight Counter Mortar Radar reaches Full Operational Capability, Assistant Deputy Minister Materiel, 2018.
2. Combat Team in Operations, B-GL-321-006/FP-001, chap 1, section 5, para 0140.
3. Master Warrant Officer A. Tullett, Master Gunner RCAS

NCM DP 1 TRAINING

WO J.W. Simpson

Upon completion of Developmental Period 1 (DP 1), every DP 1 gunner is considered to be at their Occupational Function Point. Currently, every gunner who leaves the course is qualified to work as a detachment member on a gun-M777 for the regular force and either the LG1 or C3 for the army reserve (ARes). However, this requires all Regiments to immediately train them on other skills particular to the career streams such as MRR Operator, SUAS Operator in 4th Regt GS, Artillery Communicator, Driver common to all, Mortar, CP Tech, Recce Tech, etc in a Close Support Regiment (CS Regt).

This article will explore various ways to make the DP 1 course better suit all streams and Regiments within the Royal Regiment. A recommendation will be made, based on analysis of questionnaire answers from RSMs and key members of the Royal Regiment of Canadian Artillery, on the DP 1 Gunner course and if it requires any modifications to better serve the artillery and its soldiers upon arrival to one of the four Regiments. The current DP 1 course should not change. A newly qualified DP 1 Gunner should spend 1 – 2 years in a gun battery before being streamed. This will allow their Regiment to qualify them with Primary Combat Function (PCF) courses and allow them to display interest in the stream they may best serve the corps in. Pulling the lanyard for the first time signifies your entrance to the Gunner Family, and pulling the lanyard on your last round puts the stamp on a career of service to the Guns.

METHOD/APPROACH

Multiple Training Plans (TPs) of the DP 1 Artilleryman course were used as a TP comparison, as well as a questionnaire that was emailed to RSMs and other key personnel in the Artillery through the RCA Master Gunner. This questionnaire was developed by discussing this topic with various members of the Royal Canadian Artillery School (RCAS) and taking notes as to where the conversation lead, and then asking these questions in subsequent discussions to have the conversation continue to evolve into the six question questionnaire that was finally decided on.

The questionnaires were collected, answers were recorded and follow up questions were asked, if required.

REVIEW OF LITERATURE/SOURCES

A review of various TPs from 2007 through to the current one (last modified 13 Dec 2017), reveals two major changes. First, the DP 1 course used to cover material that the Basic Military Qualification Land (BMQ-L) now covers (C9, C6, Grenades and M72), so this must have been removed from the Gunner course because the Soldiers Qualification (at the time) covered this material already, and if the soldiers

attended an SQ/BMQ-L then the unit running the DP 1 could run the DP 1 Gunner course with 25 less days on the schedule. The second major change was that the History and Traditions, RCA fund, trade progression and Regimental organization still has allotted time in the schedule but the TP dedicates it as afterhours training. These topics were deemed too important to get rid of altogether, yet the lack of scheduled timings is questionable.

DISCUSSION

Is there a better way to shape DP 1 training without losing focus on the Regimental, cultural and disciplinary requirements to DP 1 training? Other combat arm trades have created courses to better meet their needs, such as the Armoured DP 1 which covers generic armoured skills as opposed to qualifying them on a specific vehicle. This allows them to post new soldiers to any Armoured Unit and not have to worry about what their primary vehicle is. The Infantry run their DP 1 courses without the need for a BMQ-L because they cover all of that material in a more specialized manner during the DP 1 Infantryman course.

Answers were provided on a series of questions about this subject.

On the topic of considering when streaming should happen, responses indicate that DP 1 Gunners should be streamed after the soldier has had time to grasp Gun Area drills and procedures, approximately 18-24 months, and they have an understanding of the Artillery Battlespace. This will give their Chain of Command the opportunity to load them on Primary Combat Function (PCF) courses such as Artillery Communicator, driver wheel, etc so they can be employed in any stream.

By spending one to two years in a gun battery in a CS Regiment, new gunners would grasp the basics of the artillery and witness what happens on the gun area side when the STA or OP streams initiate a call for fire. This time would also allow them to be qualified in some PCF courses to make them better employable in all artillery streams, as well as demonstrate their capability and desires to perform in other streams.

There have been discussions about streaming the DP 1 course and creating four versions. During their time in a Gun Area Battery (GA Bty), the soldier will be qualified PCF courses such as driver wheel or arty communications. This will benefit the GA Btys and minimize training needed for a member to move from one stream to another. Doing so allows the soldier to concentrate only on the specialized courses. This allows the chain of command to identify individuals who are competent, capable, ready, and willing to work within the other streams. When a soldier arrives to Fourth Regiment General Support (4th Regt GS), they are not employable until completion of a PCF course. This puts additional stress on the regimental training cell to coordinate that training.

Clearly the current model allows three of the four Regiments to have qualified gunners while the 4th Regt GS is required to run an 11 day MUAS, 22 day AWLS course, or an artillery communicator course to employ their new troops. This puts one Regiment at a disadvantage for immediate employment of DP 1 Gunners. This is an obvious disadvantage of the current model. However, with the way the current DP 1 course model is laid out, every BMQ-L qualified soldier enters the Gunner family on this course the same way, pulling the lanyard on the current howitzer in use. This illustrates that at the end of the day, each gunner has that in common, which is an advantage.

Clearly, the needs of CS and GS units require different skills which has led to streaming. This raised the question, is it the Royal Regiment or the individual that chooses the stream they are trained in?

It needs to be a balanced approach between both parties. manning requirements need to be balanced throughout the Regts and the RSMs balance the skills amongst their Btys. Individual wants must be considered as well, or retention and morale issues arise.

The RCA requires the right people in the right jobs with the right qualifications at the right time. If people don't participate in their career future, then there is a risk of having retention and morale issues with Gunners losing faith in their chain of command.

With these considerations, the question arises do we need streams, or could we transform Regiments to look more like they did before the 2010 Artillery Transformation?

Arty transformation was necessary due to the fact of all of the new capabilities that were received and the RCA will obtain in the future. STA equipment is extremely technical and requires progression solely within a stream. The OP stream requires an extensive amount of training to be a successful OPDC that can step up to perform the FOO duties. Modern BKs, TCs and TLs are junior, inexperienced officers that require GA stream Sr NCOs to mentor them so they can grow. Without streams we would be training people often on various equipment to plug the gaps as required to achieve our missions. This would create a pool of people all qualified various kit but with no experience or competence in any of them.

The artillery has been successful at evolving its capabilities with modern battlefield requirements. Streams are required so that vehicle, technology, equipment and procedures can be specialized and soldiers can be experts in specific aspects of the Artillery. Being a jack of all trades isn't as beneficial to the corps as having experts in each stream.

Accepting the need for streams, some considerations emerge.

4th Regt GS has many requirements that no other unit has or is even aware of, including currency requirements, air crew medicals, Div level ASCC, 4 levels of Tactical data link, Div FSCC, Div STACC, and AD deployment in a training roll.

This creates unique challenges with the current DP 1

course and the qualification that new gunners posted to their Regiment have. The current DP 1 course does not help them generate immediately deployable gunners as it does the CS Regiments. However, with very early identification by course staff, a select number of new gunners could be selected for this unique unit, and with a short PCF course they would be useful members of 4th Regt GS.

Would having Gunners of all ranks that are more well-rounded in all aspects of the Artillery, yet less specialized, increase ability to deploy, function better when under manned, or would it create skill fade and not be an efficient use of the member's career time?

At the Sgt rank and below, there would be too much skill fade. With the duration of DP courses, there is not enough time in a soldier's career to cross pollinate streams. Being a specialist in a specific stream enables gunners to achieve mission success and have credibility when working within a joint operational environment. Warrant Officers and Master Warrant Officers ought to be well-rounded gunners in all aspects of the artillery. These ranks are not required to be experts on the equipment when deployed outside of a Regiment, however they need to be the experts on the capabilities and employability of these resources, for example, at Extra Regimentally Employed (ERE) postings, Canadian Joint Operation Command (CJOC), etc.

Cross streaming at the Warrant Officer level is an interesting idea. This would enhance the ability for all WO & MWO across the corps to be able to advise Commanders inside and outside of the Regiments on all things Artillery. There is no need for each WO and MWO to be qualified TSM in each stream, but having each WO in the corps attend a course like the Assistant Instructor in Gunnery (AIG) course would generate a more well-rounded and knowledgeable senior echelon of artillery NCOs.

CONCLUSION

The DP 1 course hasn't had a major overhaul to meet current Artillery requirements in quite some time. Based on that information, and expertise of CWO Campbell, CWO Gallant, CWO Milligan and CWO Keating, the following COAs for the future of the DP 1 Gunner course arose for discussion.

• COA 1

Do not require Artillery soldiers to attend BMQ-L, instead cover that material in a longer DP 1 Gunner course and add Artillery Communicator to the program. This will allow all new DP 1 Gunners to be employable and deployable in all four Regiments upon being posted there.

• COA 2

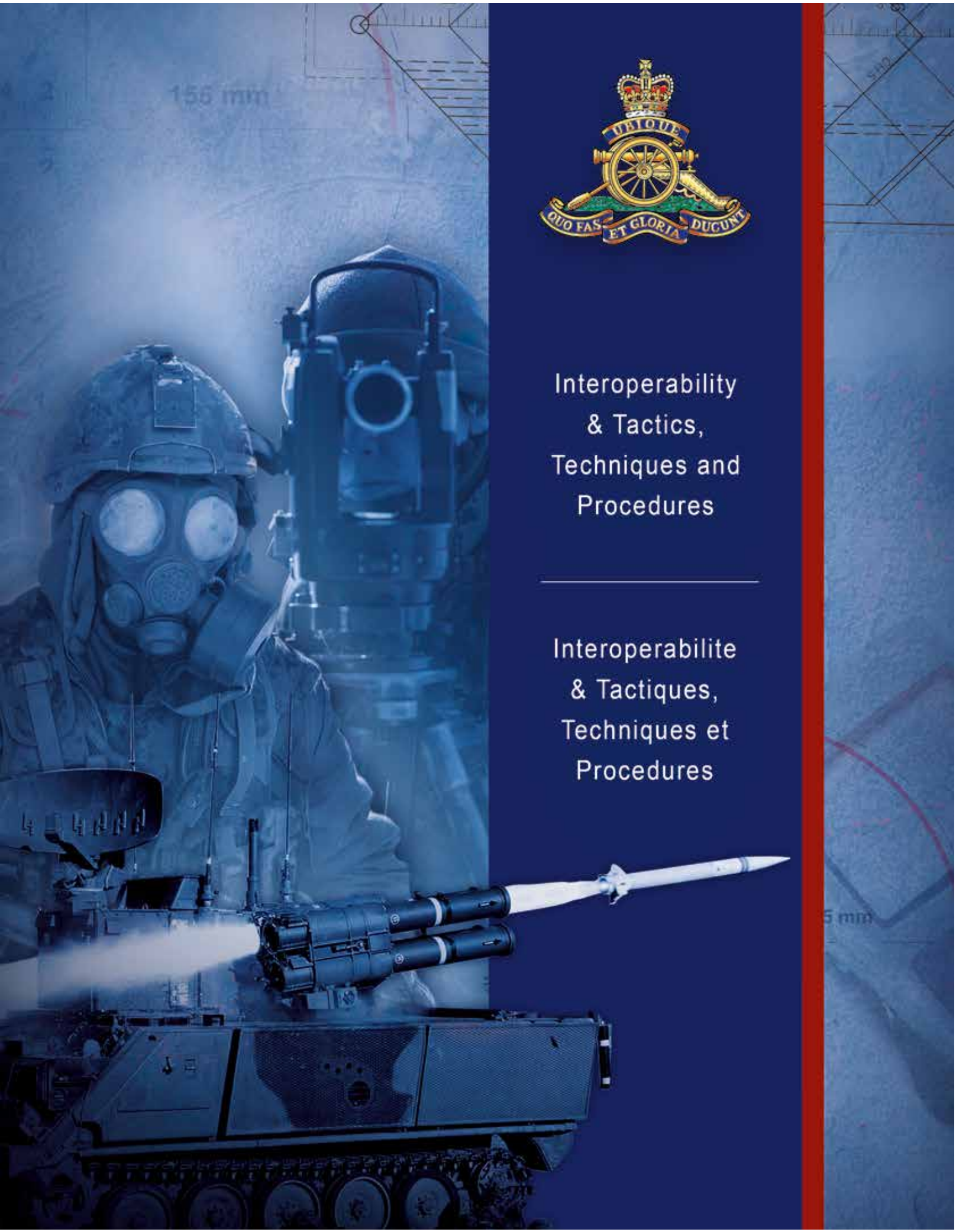
Do not change the current DP 1 course, but develop a supplemental training package to qualify 4th Regt GS's DP 1 soldiers on the MUAS. This will enable the 4th Regt GS to employ and deploy new soldiers, as well as continue to give the new soldiers the understanding of the Artillery battlespace and what it takes to operate the equipment that they will be issuing calls for fire from later on in their careers.

• COA 3

Do not change the current DP 1 course for gunners that will be posted to one of the three Close Support Regiments and develop a second DP 1 STA Gunner course. The DP 1 STA Gunner course could be run once every year to supply 4th Regt GS with employable and deployable Gunners that only have STA knowledge.

COA 1 is recommended, offering a balanced approach to addressing the challenge. A course should be developed to take a BMQ qualified soldier and qualify them a DP 1 Gunner, including the material covered in the BMQ-L and Artillery Communicator. This will allow all Regiments to be able to employ and deploy new DP 1 Gunners upon entry to their units while maintaining common skill sets.

Being qualified on the current howitzer and understanding how it functions is a baseline knowledge that all Gunners must be familiar with. Every stream is centered on the Gun Area. STA sensors and OPs are used in order to issue calls for fire from the Guns, therefore this course must be the root for all Gunners. Other aspects of this course are employed in all other streams as well, some examples are weapon characteristics, local defense theory and force protection. COA 1 will allow all new gunners to be immediately employable in all Regiments.



Interoperability & Tactics, Techniques and Procedures

Interoperabilite & Tactiques, Techniques et Procedures

FIRE SUPPORT FOR A CANADIAN DIVISION:

ARMING THE GENERAL SUPPORT REGIMENT

Capt E.C.McDonald

The title of 4th Artillery Regiment (General Support), RCA is currently somewhat of a misnomer. Our doctrine states that General Support (GS) artillery executes fires in support of the operation as a whole, enabled by friendly Surveillance and Target Acquisition systems. Yet at the time of writing, 4 Regt (GS) has no indirect fires capability and is essentially a locating artillery regiment. Lacking the capacity for long range, precision and massed fires associated with GS artillery, the RCA is not able to properly support the CAF's ability to train and fight at the Division level. This paper outlines the needs of an indirect fire weapon system for a GS Regiment by considering themes including the requirements for extended range, precision and massed fires, survivability and mobility. The systems best aligned to meet this need are the M270 Multiple Launch Rocket Systems (MLRS) and the M142 Highly Mobile Artillery Rocket System (HIMARS) currently in use by many allied nations around the world. The multi-functionality of these systems to employ a variety of munitions including tactical ballistic missiles makes them stand out from other options like extended range cannon artillery. Finally, the concept of employment for future RCA MLRS or HIMARS should mirror allied doctrine to enable rapid integration in a multinational force.

INTRODUCTION

Despite the Royal Regiment of Canadian Artillery currently having a General Support (GS) Regiment on its order of battle, considering the absence of an indirect fire (IDF) weapon system for this unit and the equipment currently in use, 4th Artillery Regiment (GS), RCA, is more appropriately termed a locating artillery or Surveillance and Target Acquisition (STA) Regiment[1]. Our doctrine (albeit in draft format) acknowledges that a GS Regiment is one which is retained at higher levels of command, normally a Division and above, to assist in shaping and to engage high payoff targets at extended range with fires[2]. GS units are responsive to force field artillery HQ as well as target acquisition artillery and play a large role in the counter-fires battle. A unit normally in GS may also be used to reinforce other artillery units in the battle space[3]. For these reasons, the IDF weapons used in a GS Regiment must be capable of tenants such as extended range, precision and massed fires and be able to fight effectively in a high counter-fire threat environment, while still being capable to support the manoeuvre brigades fight. This paper will first outline the considerations and requirements for a future IDF weapon system to provide fire support to a Canadian Division by a GS Regiment. Second, this paper will discuss some systems best aligned to this task and briefly outline a concept of employment.

APPROACH

Several considerations for IDF weapon characteristics will be outlined first individually using both Canadian and foreign doctrine as well as professional sources to identify required metrics. These characteristics will then be discussed together to assist in determining both in production systems best aligned as well as a concept of employment for this capability.

RANGE

As mentioned, GS artillery will be employed to shape the enemy at long range, provide counter-fire support as well as reinforce other artillery units from a lower artillery HQ. To accomplish all of these tasks, it needs a large range band, meaning a short enough minimum range that it can still engage a specific 'line to shoot down to' and support manoeuvre forces, yet a long enough range that it can provide effects in depth. Current Russian doctrine sees the formation of Brigade Artillery Groups (BAGs) made up of usually two howitzer battalions and often one Multiple Launch Rocket System (MLRS) battalion. The BAG will establish firing positions 3-5 km wide, 1-2 km in depth and 2-4 km from their Forward Line of Own Troops (FLOT)[4]. Further, Russian Division Artillery Groups (DAGs) will be positioned forward to support their main effort and many of their systems will be tasked to support BAGs. Engagement to these ranges is achievable by Direct Support (DS) artillery however their fires should be responsive to their own observers in support of friendly manoeuvre and counter-fires left to units in a GS role. A GS unit may also find themselves in a General Support Reinforcing (GSR) or potentially even a Reinforcing (R) role. Therefore its position in the battle space as well as its minimum engagement range should enable it to provide support to the manoeuvre brigades as required.

A minimum engagement range is significant as extended range cannon and rocket artillery may not have the flexibility to engage at all distances due to ballistic limitations associated with propellants, projectiles and the weapon system itself being designed for longer ranges[5]. Current Canadian practice is to site our close support artillery one third of its range behind the FLOT so that two thirds of its range is beyond the FLOT[6]. The maximum range of conventional in service ammunition is 30 km[7]. Acknowledging that Regiment in GS would likely be positioned farther behind the FLOT than close support artillery, an assumption that an overlap of one third of the close support artillery's maximum range would be appropriate, provides a minimum achievable range of 20 km with the provision that closer engagements could be planned for by prior positioning or deliberate use of shorter range ammunition.

The need to shape the enemy is the essence of why higher artillery formations exist. Yet the exact maximum range at which this ought to be conducted at for a division fight is difficult to define, especially given that modern conflicts may not occur in a linear battle space. In the process of reviewing international IDF capabilities the divide appears to be between IDF weapons which are still capable of supporting manoeuvre with some volume of fire and IDF weapons which are capable of greater effects with single munitions. This divide is the separation of weapon classes between ballistic missiles and other 'conventional artillery'. At the lower end of the ballistic missile spectrum are Tactical Ballistic Missiles (TBM) which tend to have maximum ranges between 150 and 300 km with several systems having minimum reported ranges of roughly 60 to 80 km[8]. The minimum end of the range band associated with this divide could be considered the maximum conceivable range required for a GS level IDF weapon, yet the ability for a 'conventional artillery' system to also engage with TBMs would provide a significant multi-functional advantage.

PRECISION AND MASSED FIRES

The need for precision as a way to mitigate unintended weapons effects is here to stay in modern warfare and the requirement for some form of guidance specifically in IDF weapons is becoming more of a necessity based on the developing threat environment. IDF is susceptible to detection from enemy target acquisition systems and first round accuracy with the ability to conduct a fire mission without adjustment is becoming more essential[9].

The RCA has committed considerable effort into developing a precision capability by procuring options such as the M982 EXCALIBUR projectile and the M1156 Precision Guidance Kit (PGK) fuze. The EXCALIBUR projectile boasts Circular Error Probable (CEP) of 10 metres or less, depending on variant, at all ranges[10] while the M1156 currently has a CEP of 50 metres which the manufacture intends to reduce to 30 metres in the future[11].

The need for multiple options of precision fires reflects the different niches they are required to fill. EXCALIBUR projectiles are generally reserved to strike mensurated coordinates with a limited number of rounds while a PGK fuze equipped projectile are considerably less expensive and are better suited to precise massed fires. The need for equivalent options for precision munitions for a GS IDF weapon mirrors the same need which has been developed for close support artillery.

However, the capability for land-based precision fires alone does not set it apart from air forces and navies which also possess precision weapons capable of striking land targets. What does set land-based fire support apart is the delivery of scalable effects which are directly responsive to the manoeuvre battle in a way that aircraft or ship delivered effects could never be. The ability for artillery to rapidly mass fires on a scale not possible by other elements, in accordance with the commander's plan is what has earned artillery the title of the 'King of Battle'[12].

Canadian artillery doctrine states that fires for effect are most effective when "the greatest possible weight of fire (is) brought to bear on the target during the first three minutes of the engagement"[13]. This statement reflects the ever present need for the combination of accurate and massed effects. Massed effects can be achieved by engaging with more weapon systems or more ammunition and in some cases, specific types of munitions. Given the context that a Division only has so many IDF resources and the implications which exist by engaging with all of them at once, the most appropriate way to provide massed fires is

to deliver more ammunition out of fewer weapon systems in the shortest period of time. To accomplish this, automated auto-loading cannon artillery or multi-tube rocket artillery is ideal. However, there is a compromise as these types of systems are generally not capable of long durations of sustained fire due to a limited number of rocket tubes or projectile/propellant magazine capacity. Favouring short durations of intense fire at the expense of the ability to provide sustained fires would make an IDF system less suitable to reinforce or directly support manoeuvre forces, this is not the primary function of GS artillery.

The use of specific types of munitions, namely dual purpose or antipersonnel improved conventional munitions will not be addressed in detail in this paper. These types of munitions would serve to significantly augment the effects of massed fires however they tend to have a high failure rate and produce a lingering explosive hazard. Given Canada's strict adherence to the Ottawa Treaty, as well as the Convention on Cluster Munitions, DND and CAF have instituted prohibitive actions will prevent these munitions from future use by the CAF[14].

SURVIVABILITY AND MOBILITY

With the current threat posed by STA equipment, especially the proliferation of unmanned aerial vehicles (UAV) on the battlefield, used by regular and irregular forces as well as civilian factions, the survivability of IDF units has become a significant challenge. Russian artillery have begun using a "multi-circuit reconnaissance-fire system" capable of linking IDF weapons with an automated command and control system and a variety of STA assets resulting in a detection-to-engagement time as low as 3 to 4 minutes[15]. To survive with such a threat, IDF systems of all natures must be able to rapidly deliver the effects required and quickly displace to avoid detection from airborne sensors or engagement from counter-fires. As the rapid delivery of effects has already been covered in the previous section, this section will focus on mobility as it applies to survivability.

Weapon system capabilities aside, the aforementioned threat has resulted in many changes in Tactics, Techniques and Procedures (TTPs) for armed forces around the world. The old adage of 'shoot and scoot' tactics has now become the norm. Within the RCA, deployment methods like hides and firing points or manoeuvre deployments are seeing resurgence in Latvia on Op REASSURANCE and during annual Brigade exercises like Ex MAPLE RESOLVE[16]. Using the M777 lightweight towed howitzer as an example, this weapon was particularly effective during the War in Afghanistan with its airmobile capability as a virtue to mobility given the Improvised Explosive Device (IED) threat on the roads. Yet our current Corp of Gunners are challenged to keep up with the pace of mechanized brigade groups using towed howitzers especially when using manoeuvre and firing point deployments. Although no IDF weapon systems are universally versatile, its mobility characteristics should complement the method of deployment in order to be truly effective. For the aforementioned deployment methods, this means self-propelled artillery.

But settling on self-propelled artillery presents the question of wheeled versus tracked chassis as this difference does affect where and how the weapon system should fight. Tracked artillery has the flexibility to manoeuvre in a greater variety of locations than wheeled artillery. This flexibility lends itself to deploying farther forward in friendly lines where the availability of ideal hides and firing points will likely be limited by the number of units in close proximity and thus less than ideal locations must suffice. Conversely, wheeled artillery while less suited to rough ground has the advantage of being able to generally travel faster on suitable ground when compared to tracked vehicles. This has the benefit of being able to site the firing points or reloading points farther away from the hide for the same amount of travel time. Wheeled vehicles have other mobility related benefits such as their generally lighter weight making recovery without a dedicated armoured recovery vehicle easier as well as being easier to transport via a cargo aircraft into theatre.

The choice of tracked versus wheeled chassis really depends on the concept of employment for the IDF weapon system which will be discussed later. It is also worth mentioning that systems such as a gun mounted, digital survey and fire control management system as well as a wireless method of fire orders transmission are an absolute necessity in order to enable the deployment types and compliment the mobility of the system as a whole.

DISCUSSION

Returning again to range, considering the range bands of other international division level artillery systems, a band between approximately 20 and 70 km is an appropriate distance for GS artillery to be expected to deliver effects. In the past, cannon artillery such as the German rail guns of the First and Second World Wars have been built with a maximum range of 130 and 65km respectively[17]. More recently, significant effort is being put into developments like the Extended Range Cannon Artillery (ERCA) project which claims ranges of up to 70 km from an M777A2 once all upgrades are in effect[18]. Yet the mobility compromises in terms of mass, and size associated with of long range cannon artillery are significant. However, the greatest compromise in terms of range for cannon artillery is being married to the calibre of ammunition itself. Many modern rocket artillery systems make use of modular rocket pods with ammunition manufactured pre-loaded in self-contained pods of one or more tubes. The concept of modular ammunition enables a practically limitless future development of different calibre rocket ammunition to suit a variety of needs including different ranges. Furthermore, modularity of this nature allows for the possibility of using the same IDF system to deliver TBMs in place of rockets.

This multi-functional capability of modern rocket artillery cannot currently be replicated by long range cannon artillery and thus modern rocket artillery has a clear advantage in terms of flexibility and potential maximum range.

In terms of precision fires capability, both cannon and rocket artillery have a maturing technology of guided projectiles with various tolerances in precision that would be needed by a GS artillery unit. Nearly all Guided MLRS (GMLRS) rockets are large enough to contain some form of Inertial Navigation System (INS) working in tandem with Global Positioning System (GPS) guidance or stand-alone in a GPS denied environment[19]. The EXCALIBUR projectile shares the same GPS/INS guidance while the PGK fuze only relies on GPS for guidance and thus is susceptible to failure in a GPS denied environment.

When considering the capability to mass fires, MLRS and automated auto-loading cannon artillery have comparable rates of fire and could complete a significant method of engagement in less than three minutes and begin to displace. The main practical benefit of MLRS over cannon artillery is the ability to deal with a misfire. MLRS will complete the engagement even if one or more rockets fails to fire, while an automated auto-loading cannon must take the time to conduct either automated or human operated misfire drills in order to complete the engagement. The traditional workaround is to double scale a gun however automated auto-loading cannon artillery may not possess the magazine capacity to compensate.

Finally, the discussion of survivability as a function of mobility and the question of tracked versus wheeled chassis, should not only complement the IDF systems concept of employment but also the physical environment of expected operation as well as the context of other vehicle fleets. Despite Canada having huge variety of geography within its borders and the potential for future conflicts to arise in literally any physical environment, the CAF has a long trend preferring the procurement of wheeled vehicles over their tracked counterparts. This trend is not a point of further discussion however, it is a segue to the point that if the CAF is to procure one GS IDF weapon system, it ought to be able to perform effectively in as many environments within Canada and abroad and this is clearly best achieved by a tracked vehicle.

Yet there are significant merits to wheeled vehicles, being easier to transport by air, recover, maintain and use effectively during training. In the context of the CAF fleet of almost entirely wheeled vehicles, small groups of tracked vehicles in the battle space at an approximate location an enemy would expect to encounter GS artillery is a significant combat indicator and one which completely works against the overall goal of survivability.

SYSTEMS BEST ALIGNED

Taking into account all the considerations and requirements previously outlined, the systems best aligned are the tracked M270 MLRS and the wheeled M142 HIMARS MLRS. These MLRS are able to engage with the latest GMLRS rockets like the M31 and M31A1 with a range of 70 km. Other models of rockets are currently in development such as the GMLRS Extended Range (GMLRS-ER) as part of the Precision Strike Missile[20] which could see ranges out to 150 km[21]. Both of these systems are also multi-functional with the capability to fire the MGM-140 Army Tactical Missile System (ATACMS), a TBM, the most recent versions of which have a reported range of up to 300 km[22]. A portion of the in production rocket ammunition for these systems contains bomblets and is in contravention to the Convention on Cluster Munitions. However, the same convention does allow exemptions for sub-munitions of certain designs or sizes;[23] therefore the development of compliant munitions is a possibility. Other benefits to these systems are the M270 is in use by a number of other NATO allies[24] and both systems are in wide spread use in the armed forces of The United States. Both considerations are significant in terms of logistical and maintenance support as part of a coalition or Combined Joint Task Force.

CONCEPT OF EMPLOYMENT

The way in which a GS Regiment would fight with either of these two systems would not be drastically different from the manner in which our close support artillery fights when using hides and firing point deployments. The approval draft for GS Artillery in Land Operations is influenced by ATP 3-09.60, Techniques for MLRS and HIMARS in Operations, as well as other US, UK and Canadian doctrine[25] and is a solid foundation for the development of further TTPs. An effort should be made to align Canadian doctrine and TTPs with that of allied nations like The United States of America and The United Kingdom to enable rapid integration in a multinational force. Finally, of particular relevance to these systems employment is the absolute necessity to make full use of digital fires. To properly enable these weapons to fight effectively, the RCA must fully embraced digital fires and together with industry, developed a way to integrate the software on these weapons with the Indirect Fire Control Software Suite (IFCSS).

CONCLUSION

Procurement of an IDF system such as the M270 MLRS, the M142 HIMARS or other future variants with similar or better capabilities for range, precision, massed fires and mobility would serve the Royal Regiment of Canadian Artillery well as an IDF weapon for a GS Regiment. The virtues of multi-functionality and compatibility with NATO allies set these systems apart from other international options. The failure to arm our GS Regiment denies the RCA and the CAF as a whole a critical capability which will be invaluable in future conflicts.

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5. Many rocket artillery systems have a minimum engagement range due to the fixed volume of propellant. Extended range cannons can also encounter difficulty achieving a specific line to shoot down to as a result of local crests.
6. This is not recorded anywhere in Canadian Artillery Doctrine or RCAS publications. This is part of the 'oral tradition' of the RCA.
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HOW CAN THE FSCC WO COURSE BE TRANSFORMED TO BETTER SUIT THE CANDIDATES NEEDS

WO E.R. Levesque

The current course program that the Canadian Armed Forces (CAF) follows to Force Generate (FG) Fire Support Coordination Center Warrant Officers (FSCC WO) is flawed. The number of candidates being prepared to take on the FSCC WO position once the course is completed is lowering each year due to lack of experience and a basic knowledge of the FSCC prior to attending the course. When combining these issues with the increasing number of students that feel they are not ready to fill in that role, it is only a matter of time before the CAFs FSCC WO capability will fail. In this paper, I will identify and provide recommendations to address the problems identified within the FSCC WO course.

INTRODUCTION

Before discussing the relevancy of the (FSCC) WO Fire Support Coordination Center FSCC WO course, we must first understand the role of the FSCC and what is required from it. The FSCC is a single location in which are centralized communication facilities and personnel incident to the coordination of all forms of fire support plans, coordinates and executes a fire support plan that integrates all the available fire support with the information flowing from the wide variety of sensors in the ISTAR system. The fire support plan is synchronized with and compliments the supported formation or unit plan and delays, disrupts, destroys and pre-empts enemy forces[1]. The FSCC WO is to assist the Fire Support Coordination Center Officer (FSCC O) on organizing and operating the BG/Bn FSCC the effective synchronization of direct, indirect, integral and supporting lethal and non-lethal effects in support of the BG/Bn Commander's plan. Providing advice to the CoC on the effective application or non-integral effects based capabilities and the application, through technical expertise, of lethal and non-lethal effects on a tgt. The FSCC O also links the battle group/task force with non-integral fire support through the provision of specialized communications capabilities/procedures and during independent battery operations, the coordination terrain requirements for all artillery resources deployed in the battle/group task force area.[2] In this brief I will be determining how effective the last 10 serials of the FSCC WO course was and present three different recommendations on how to improve it.

METHOD/APPROACH

The effectiveness of the FSCC WO course was determined by sending a survey to 50 people who completed the FSCC WO course or the legacy Artillery Operations (Arty Ops) course. It was a simple, anonymous, survey containing four questions. First being; what year did you complete the course? Second; what do you think was presented well on the course? Third; what are things you would like to see added/removed from the course? Fourth; did you feel that you were prepared to be an FSCC WO and assist the FSCC O in the FSCC?

Also, current qualification standard/training points (QS/TP) and end of course reports (ECR) of both the FSCC WO course and the Arty Ops course were used to identify deficiencies there might be in the FSCC WO course (using my own experience of taking a BG FSCC through high readiness with the Lord Strathcona's Horse (LDSH) Battle Group (BG) as the FSCC WO and my employment in C/S 95 as part of the 1st Royal Canadian Horse Artillery (1RCHA)). Reaching out to members within the CAF who have experienced employment within the FSCC, the deficiencies within the course were identified. Issues that have been brought forward by candidates and research will aid in rectifying the deficiencies in the FSCC WO course.

DISCUSSION

Prior to the Afghanistan years there were a lot more opportunities for soldiers to be employed in different jobs, but operational tempo created a tendency for soldiers now to stay in more fixed roles. This gave FSCC WO candidates a chance to learn key positions and become familiar with them so that FSCC WO candidates, selected to go on course, would have experience to aid them in fully understanding the material. Unfortunately, tasks and rotations increased which gave less time for soldiers to learn other positions, let alone master their own position within the OP.

After 2008 the FSCC WO course was created for NCMs while the Arty Ops course was created for the officers. There was a slow but steady increase over the years in how candidates did not feel comfortable to work within an FSCC for most students that have completed the course after 2008 (see figure 1). The FSCC WO course has changed twice to make it easier for the candidate to better understand the material within the allotted time given for the FSCC WO course (25 training days). We cannot assume that all soldiers have had the same opportunities and exposures to different jobs within their stream. We, as instructors at the Royal Canadian Artillery School, are the ones that have to adapt to today's military and make sure we produce the best product out of this school.

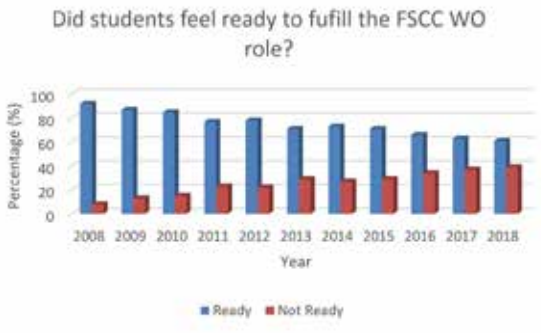

Figure 1 – data source: survey started and completed 2018

There were two main reasons that candidates did not feel confident after the course (see figure 2). The first being that there is not enough time spent covering what the responsibilities of an FSCC WO are in detail. The candidates would like more description on what other positions (engineers, intelligence, ASCC, TACP) are available within the FSCC and how they can benefit them. The candidates feel that this information was presented too fast, more like a Personal Development (PD) session than an actual lecture. The second reason was that the candidates desire a better understanding of combined arms staff planning tools rather than being placed in a day prior to the Computer Assisted Exercise (CAX).

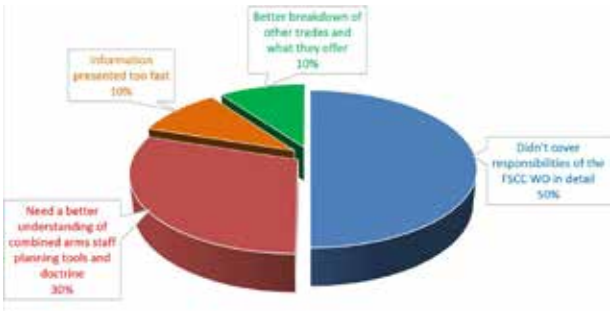

Figure 2 – data source: survey started and completed 2018 and ECR from 2014,2017 and 2018

RECOMMENDATION 1
PREREQUISITES

If we at the school make it a prerequisite of future candidates of the FSCC WO course to be placed within an FSCC position, whether it being a tech or shadowing the FSCC WO for an exercise or two, the candidate would be exposed to the basics of the FSCC WOs roles and responsibilities. Doing this, the candidate would also be part of the planning process and production of an annex D (fire support annex) for the BG prior to coming on the course. That way, the information given to the student would seem less abrupt and there would be a more cohesive flow. Also, the candidate will be completing a pre course package that will be signed off by the CO prior to attending the course. The pre course package would contain Fire support control measures FSCM, move orders, coordination with other agencies and tactical symbols.

"The Writing of orders and the OPP process covered on the course was not delivered and practiced in a way to ensure the students understood the full process. They showed us how it was done, we imitate, but had no clue how to do it on our own. I believe the best way to fix this is to ensure the FSCC WO and Arty Ops are combine IOT give the future FSCC WO the opportunity to share their experience with the Officers on the course."[3]

RECOMMENDATION 2
EARLY INTRODUCTION ON OTHER COURSES

Another look at this would be to start implementing the FSCC course breakdown into the OP courses prior to the

FSCC WO course. For example, introducing some basic Intelligence Preparation of the Battlefield (IPB) and Operational Planning Process (OPP) and explain the different positions within the FSCC and what information they can provide for us (different trades offer different information) to the OP DET 2 i/c course. Also, we can implement more advanced levels of IPB and OPP to the OP Detachment Commander (OPDC) course. This way candidates would already be exposed to the material that is going to be presented on course. Doing this would negate having to extend the course to allow students to better grasp the material presented. This method would also give us the option to merge the FSCC WO course with Arty Ops since candidates would already be taught the information presented on the FSCC WO's course prior to attending and would allow a better merge of both courses.

"Any success I had on exercise was a result of my FSCC WOs being able to do both. As a BC supporting a British armored recce BG and a Canadian armored BG on their roads to high readiness, I did not have enough manning for a FSCC officer, which meant that my FSCC WO was required to play both roles at the BG HQ while I spent most of my time in the CO's 9TAC. This meant he was the fires POC on the ground while running current ops – dealing with:
1) FOO party admin requirements;
2) the supported arms RSM and CP WO;
3) the Arty Regt; and
4) Any planning being done by both units."[4]

RECOMMENDATION 3
MERGING OF FSCC WO AND ARTY OPS

Third, running the FSCC WO course earlier than the Arty Ops course. This way we can shorten the FSCC WO course since the instructors will only be covering the role of the FSCC WO and start introducing IPB and OPP to the candidates. Once the initial FSCC WO portion is complete, it will merge into the Arty Ops course. Once both courses merge, candidates from the FSCC WO begin a more detailed look into doctrine and all other planning extremities. In this scenario the final CAX will still be at the same time and the FSCC WO candidates will be there from the beginning with the officers to work on the planning process.

CONCLUSION

The RCA expect FSCC WOs to be proficient in current ops and be able to replace the FSCC O in planning if situation dictates. However, results indicated that FSCC WO candidates had difficulty with understanding the duties of the FSCC WO and understanding the combined arms staff planning tools and doctrine. The time has come to make changes, understanding that there will be costs to adding prerequisites, early introduction on earlier course within the stream or merging the FSCC WO and Arty Ops. Unfortunately, the one thing that these recommendations have in common is that this is not going to be a quick fix and requires the support of the school, regiments and down to the individual soldier. We need to remind ourselves of the importance that an FSCC WO brings to the battle. If we do not listen to past students and make the appropriate changes to better suit future candidates, then we will find ourselves lacking in one of the most important positions within the artillery.

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- H. LCol Stimpson
- I. Maj Hunt W.H.
- J. WO Normand S.
- K. Past/future students
- L. Survey completed by past students

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WHAT'S IN A NAME?

FROM COUNTER-BATTERY TO COUNTER-FIRES

Capt M.A. Bernhardt

The nomenclature of Counter-Battery and Counter-Mortar currently in use by the Royal Canadian Artillery is intellectually limiting and does not align with the Canadian Army's way of maneuver warfare. Implementing the updated NATO terminology of Counter-Fires will not only allow us to align ourselves with our allies but will allow us to throw off this stunted delineation and focus on the effects the supported commander requires us to achieve.

INTRODUCTION

In many a discussion I have had with fellow artillery officers on the topic of counter-battery operations the conversation typically begins with a comment from my peers of "Isn't Counter-Battery the Divisions' responsibility and not typically done by a Close Support Regiment?"

By rights they are not wrong. By Canadian Doctrine Counter Battery is a divisional and corps responsibility. That being said, they are missing part of the bigger picture [as] Field artillery units in direct support of brigades are responsible for the conduct of counter-mortar (CM) operations[1]. This speaks to an issue that exists within the nomenclature of Counter Battery Fires in the Canadian Field Artillery Doctrine.

Precise naming conventions may sound like a pedantic or insignificant consideration however especially within the military that could not be further from the truth. When I was a young lieutenant I can recall having a conversation with one of the Warrant Officers in my battery about what a new Troop Commander was supposed to do where his response was "As a troop commander your job is to command the troop... The Army is a simple organization... It names things for what they are and what they do". Broadly speaking this can be seen to apply to our Counter Battery Doctrine as well.

In line with that, if you were to ask someone what they believed the difference was between Counter Battery and Counter Mortar fires they would likely respond with the elegantly simple answer that "one destroys batteries of guns and the other destroys mortars". Given the terminology this is an entirely reasonable assumption. This attritional, equipment-focused answer does not however align with the Canadian Army's adherence to maneuver warfare and effects based operations.

DISCUSSION

By definition the purpose of Counter Battery is to limit the enemy's ability to provide fire to support their own operations or to interfere with ours. If we follow along with the ideas of effects based operations (read targeting) it quickly becomes obvious that physical destruction of firing units is not the only method by which to achieve the intent of limiting the ability of the enemy to support its operations. For example, attacks on target acquisition systems and resupply lines will undoubtedly have an impact in limiting the enemy's ability to project fire support. While this involves the kinetic engagement of enemy indirect fires units consider also, the impact of responsive counter battery fire on the psychological plane. Other effects such as suppressive fires would allow you to achieve some tangible effects on the enemy, allowing you to get inside the enemy's decision action cycle and force them to accept increased risk in certain areas.

Hand in hand with this line of reasoning is possibly the most-underappreciated aspect of counter battery fire its capacity to limit the enemy's ability to interfere with our [operations][2]. The ability of Counter Battery to perform the SHIELD combat function is often overlooked and represents

the capability to project effects into the battle space. In this respect it helps to consider Counter Battery fire in the same realm as Suppression of Enemy Air Defense (SEAD). The intent behind SEAD is to create conditions for further exploitation by follow on air platforms. In that same vein the intent behind Counter-Battery is able to provide the operational conditions needed to conduct ground operations. Both of these actions are both inextricably linked to their respective domains. SEAD serves to enable Air Operations just as Counter Battery enables ground operations. This comparison is further reinforced by the fact that SEAD is a Counter Battery [CB] Task.[3] Using the quintessential example of Vimy Ridge the pre D-day destruction of over 80% of the German guns helped ensure this attack was successful[4]. Additionally, assets were held back from the famed creeping barrage to engage German guns when they were detected after H-hour to help further shield friendly forces from enemy shelling.

An additional issue with our current nomenclature is that it separates counter-Mortar and Counter-Battery into two separate, distinct tasks. By our own doctrine a Field Artillery Regiment in Direct Support of a formation is only concerned with countering enemy mortars.[5] As such it ought to concern itself only with the detection and prosecution of Enemy Mortars while Divisional Artillery focuses on guns only. This black and white distinction does not allow for the shades of grey that exist on the battlefield. Given that the typical role of a field artillery regiment is to … engage targets of immediate concern to the brigade and its units[6]. An apparent disconnect thereby exists between the role of a field Artillery Regiment and the separation of the Counter Battery and Counter Mortar tasks. Enemy artillery systems will absolutely be a target set of interest to a brigade commander and the answer that "Counter Battery is division's responsibility" simply will not suffice. With all this in mind we can return to our current doctrinal delineation of Counter Battery vs Counter Mortar and re-examine its applicability to our operations.

If we look to the potential battlefields of tomorrow it further reinforces our inability to push the "Counter Battery is division's responsibility" mantra any further. If a conflict were to break out in Eastern Europe the RAND Corporation estimates that Russia, even by optimistic circumstances would possess an initial advantage of 4-to-1 in cannon artillery and 16-to-1 in rocket artillery[7]. The situation is such that the Chief of Staff of the US Army, while testifying before congress admitted that both US and NATO forces in Eastern Europe were outranged and outgunned by potential adversaries.

With this it's clear that in a potential conflict we cannot necessarily count on divisional artillery to be there all the time to come to our rescue and engage of the enemy artillery. There will likely come a time where it becomes pertinent to engage enemy guns with our own guns in order to achieve the effects required of us in order to support our commander. This flies directly in the face of our current doctrine which has the hard break between responsibilities. While Economy of Effort must remain a guiding principle throughout, we must accept that there is a requirement for there to be at least some overlap in responsibilities in order to address the concerns of the supported commander by providing them with solutions and mitigations to risks.

So where does this leave our doctrine? I would propose that Counter Battery and Counter Mortar are no longer useful terms. As illustrated above they place arbitrary limits on areas of responsibility that do not align with the overall role of a CS Regt in direct support to a brigade and furthermore I would suggest that they are intellectually limit us in that the equipment-focused, attritional nature of the terms hinders us from fully realizing the vast array of means by which we could achieve our intended results.

SO IF NOT COUNTER BATTERY AND COUNTER MORTAR THEN WHAT TERMINOLOGY SHOULD BE USED TO ENCOMPASS THIS FUNCTION?

NATO is in the process of formally adopting the singular term of Counter-Fires in place of Counter-Battery. This term resolves many of the issues that come from our current terminology. Counter-fires is not, by name, tied to equipment nor brings about the mental image of physical destruction of specific equipment. By NATO doctrine "Fires" (coupled with Maneuver) is one of the primary warfighting functions for the conduct of operations[8]. Countering a warfighting function, such as countering fires, is more of a conceptual proposition than a direct instruction (like Counter-Battery). This concept inherently requires an "effects based" mindset. There are any number of ways to counter a warfighting function and it is possible to achieve the desired effects via different means. Take Counter-Intelligence (The counter to another of NATOs warfighting functions) as an example. You can counter-intelligence through deception, active denial of information and misinformation. Similarly, to counter enemy fires can be accomplished this through physical destruction, suppression, limitation of target acquisition ability, degrading supplies and even maneuver based considerations such as tempo and dispersion.

Consider for a moment fighting against a Canadian Brigade as a peer adversary. A legitimate method to counter our fires capability (being towed howitzers) would be to use high tempo dispersed attack. As we are now concerning ourselves with countering a warfighting function let us take an impartial step back and consider other solutions. The critical weakness of our fires warfighting function is our mobility and survivability. By pushing the FEBA back as quickly as possible and reducing the initial groupings in contact the enemy could effectively neutralize our fires system in forcing us to consistently move in ever increasing bounds and rarely presenting a sufficient force package to meet our target selection standards. In this way our fires

function would effectively be hamstrung into inaction and effectively neutralized. This simple example shows how it is possible to achieve desired effects via alternative means when you fully consider the critical weakness and vulnerabilities of your adversary and seek to exploit them with whatever means you have available. There are many times more resources that are able to counter the fires warfighting function than there are to counter gun batteries.

It is important to note in using the term Counter-Fires, there is no equipment based task distinction. Again, while economy of effort is a guiding principle and delineation will be indicated by the higher artillery headquarters and is inherently more flexible in that these delineations can be tied to any number of factors and does not preclude a field artillery regiment from engaging targets of immediate concern to the brigade and its units.[9]

To this effect the adoption of the incoming NATO terminology (and STANAG) of counter-fires should become part of Canadian Field Artillery Doctrine. Adopting the terminology will allow us to distance ourselves from the outdated and arbitrary delineation that currently exists within our doctrine and allow Field Artillery Regiments at all levels to better meet the requirements of their supported commander.

Accepting a new, less intellectually limiting name will not dramatically increase the responsiveness or effectiveness of our counter fires in of itself. Counter-fires requires planning and detailed integration into the overall fire support plan. A counter-fires plan cannot exist in a vacuum or as an entirely separate plan, it must be nested within the overall fires plan in order to be effective in its execution. The specific basis of counter-fires planning is artillery intelligence which is one of the critical roles and tasks of Surveillance and Target Acquisition Artillery (also known as Locating Artillery). It is only through a detailed and thorough analysis of the enemy fires function that we can determine what the critical weaknesses of the enemy fires system are and how best to counter it.

The relationship between Artillery Intelligence and Counter Fires can be encompassed within the Army Targeting Cycle.

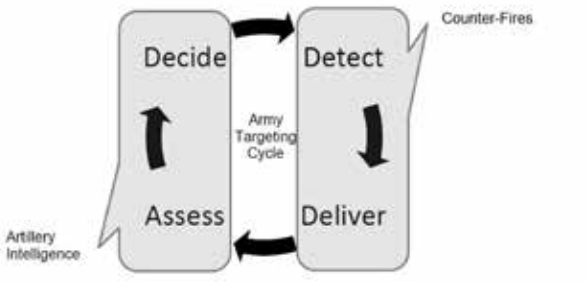

Figure 1 – Relationship between Artillery Intelligence, Counter Fires and the Army Targeting Cycle

Artillery Intelligence provides the inputs required to conduct Counter-Fires and further refined information to amend plans in the exact same way as regular intelligence feeds maneuver operations.

Ultimately fire planning and targeting/counter-fires planning are two separate but complementary processes with targeting being the means of achieving the integration between the fire support and ISTAR plans[10]. If we do not accept that counter-fires are a viable part of the overall fires plan and thereby plan it in a similar level of detail and ensure it is closely integrated within the fire support plan, then any and all counter-fires that are conducted will be ad hoc and inconsistently executed. It is through this harmonization that an effective counter fires plan can be borne.

In the words of Dwight Eisenhower "I have always found that plans are useless, but planning is indispensable"[11].

Drawing upon the importance of integrating fire support and ISTAR is improving our ability to execute counter-fires is centered on the shooter to sensor link. Closing the sensor to shooter link in sufficient time to react to enemy fire and deliver the effect desired remains an important part of counter-fires system. There are two primary ways this can be addressed to improve the reaction of counter-fires.

First is to focus on improving the shooter to sensor link by removing any unnecessary relay stations. Facilitating the shooter to sensor link as quickly and efficiently as possible will enable better responsiveness. To go a step further and authorize STA sensors to conduct direct calls for fire with firing units within specific parameters presents another readily available option. Through the planning process it will be possible to identify those specific conditions and potentially allocate the appropriate firing units based on time and space.

With the increased push towards digital fires, it is vital that STA sensors are included readily in the digitization efforts. A digital fire mission from a FOO to a Gun Battery is all well and good but in the grand scheme of things is relatively easy when compared to a potential Counter-Fires engagement. A detection from an STA sensor would have to be routed back to the STACC for collation. From there it be sent to the FSCC for allocation or potentially to the Divisional Artillery Headquarters for prosecution. Following this it would progress to the specific firing unit for prosecution. All this would need to be repeated again to provide any corrections our additional information back to the firing unit. Right now this is being done entirely by voice, which in addition to taking substantially longer than a digital message, introduces multiple entry points for additional human error, further corrupting the process.

WITH ALL THIS IN MIND, WHAT CAN THE ROYAL CANADIAN ARTILLERY TO ADDRESS THESE AREAS?

The adoption of the incoming NATO terminology of Counter-Fires in place of the existing Counter-Battery and Count-

er-Mortar terms in our current doctrine is the most obvious and impactful place to start. This will bring us in line with our major allies, being the United States and NATO. As well, by removing the explicit equipment-based delineation, it will enable us to consider Counter-Fires as a flexible spectrum of different targets, methods and effects to be targeted in order to achieve the overall effects required by the supported commander vice a hard-and-fast attritional, equipment based approach that is rigid and thereby stunts our thinking on how to achieve the required effects.

Coupled with this we need to acknowledge the fundamental shift in focus for that Canadian Army has undertaken in recent years with regards to potential adversaries. Counter-Fires [Battery] is one of the six primary tactical functions of Field Artillery, alongside and level with the other more well understood functions of Close Support, Attrition, Interdiction, Coordination and Target Acquisition. While the years of conflict in Afghanistan required the conscious employment of the other five tactical functions there was little persistent requirement to focus major efforts on Counter-Fires was decidedly a lesser threat, however, with even the most cursory look to the current threat environment it is easily apparent that the situation has changed dramatically. No matter where you look we face potential adversaries that possess significant and capable artillery forces which more often than not, dramatically overmatch our own and allied systems in terms of overall strength and equipment capabilities. To this effect, Counter-Fires must be acknowledged as one of the primary tactical functions of the Field Artillery and given the corresponding level of attention and resources as the other tactical functions of the Field Artillery.

That attention requisite of a tactical function comes in deliberate planning of Counter-Fires. It is only through conscious planning with the intent to actually counter enemy fires will we be able to execute anything resembling an effective Counter-Fires plan. This plan needs to be fully integrated into the overall fires plan just as the fire support and target acquisition plans must be integrated together.

Part of this Counter-Fires planning includes planning the engagement of Counter-Fires targets via the shooter to sensor link. Ultimately closing that link and removing unnecessary elements from it will speed up Counter-Fires. This planning also includes the integration of sensors into the overall digital fires suite. If these sensors are left out of this loop it will only serve to hinder our ability to execute Counter-Fires.

CONCLUSION

Counter-Fires represents an opportunity for the Royal Canadian Artillery to make an impactful update to its doctrine. Most of the answers to the issues surrounding Counter-Fires already exist either within our own doctrine or are incoming in allied doctrine. With the adoption of Counter-Fires as the official term and giving Counter-Fires the same attention and resourcing that is given to the other tactical functions of the Field Artillery this will better enable the Royal Canadian Artillery to assist in the defeat of the enemy with indirect as part of the all-arms battle.[xii]

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JOINT FIRES OBSERVER:

BRIDGING THE GAP BETWEEN FIRE SUPPORTER AND JOINT TERMINAL ATTACK CONTROLLER

WO N.S.P. Bennett

The mismanagement of the JTAC capability over the last 10 years has led our program to the brink of becoming combat ineffective. Dwindling resources, a lack of experienced candidates coupled with the expected attrition rate of JTACs and JTAC Instructors in the coming years will only continue to perpetuate the problem. This paper will argue the requirement for the Canadian Armed Forces (CAF) to establish a Joint Fires Observer (JFO) program in an attempt to stoke the fire of our joint fires capability.

INTRODUCTION

The current model that the Canadian Armed Forces (CAF's) follows to Force Generate (FG) Joint Terminal Attack Controllers (JTACs) has proven unsustainable. The success rate is lowering each course due to diminishing resources and a lack of joint fires knowledge among the students attending the course. When combining these issues with the attrition rate of JTACs, it is only a matter of time before the CAFs JTAC capability will fail. The JTAC capability is hovering at the breaking point; if nothing is done to combat the current situation, the program will continue to edge closer to the point of no return. JTAC training is influenced by many factors, air support availability and effectiveness of simulation, time and resources to include funding. Most of these items are beyond the control of any single formation. But what can be influenced is the training plan, selection of suitable personnel, and development of those identified candidates. The creation and implementation of a Joint Fires Observer (JFO) program as a prerequisite for JTAC training within the CAF will provide a pool of potential candidates with requisite baseline knowledge of joint fires and Close Air Support (CAS) capable of successfully bridging the gap between fire supporter and JTAC. Thus improving the success rate on the Basic JTAC Course, increasing the FG of suitable candidates leading to growth and long-term sustainment of the capability.

METHOD/APPROACH

Before we can discuss how a JFO program would increase the CAFs joint fires ability, we first need to understand what a JFO is and what they bring to the battlefield. JFOs provide a capability to exploit opportunities that exist in the operational environment where a trained observer can efficiently support air to surface fires, surface to surface fires, and facilitate targeting. A JFO is defined as a certified/qualified Service member trained to request, control, and adjust surface-to-surface fires, provide timely and accurate targeting information in support of CAS to a JTAC, forward air controller (airborne) [FAC(A)], or directly to aircraft when authorized by the controlling terminal attack controller (TAC), and perform autonomous terminal guidance operations (TGO)[3]. It is important to note that a JFO does not replace a JTAC. The JFO adds war fighting capability but does not circumvent or nullify the need for a qualified TAC during CAS operations. The term TAC refers to either a JTAC or FAC(A) with terminal attack control authority. A TAC is required to provide terminal attack control for live CAS missions[2]. Trained JFOs, in conjunction with JTACs, will assist maneuver commanders with the timely planning, synchronization, and responsive execution of CAS with the JTAC[3].

In order to gain a better understanding of the training deltas within the JTAC program, I decided to approach the problem from an analytical point of view. The Royal Canadian Artillery School (RCAS) maintains statistical data for

every JTAC courses since 2009, which displays the success rates of students from each Brigade (Bde). I compared these numbers to the Field force unit's individual pre-course packages to find best practices. Briefing notes and service papers have been written on the CAFs JTAC management in an attempt to rectify the manning deficiency. Curious to see any impact these documents have had on the issue, requests were sent to the units lead JTACs and the Air Land Integration Cell (ALIC) to gather historical data for manning over the last 3 years. Finally, I decided to reach out to our coalition partners (Australia and New Zealand) to see how they prepare their soldiers for success on the JTAC course and how the use of a JFO program aids their overall capability.

DISCUSSION JFO

JFO is a two week course that provides select joint personnel with standardized and joint certified training to engage targets with joint fires through the detailed integration with TACs and Fire Support Teams (FSTs). Students who graduate this course will be able to request, control, and adjust joint mortar, Field Artillery (FA), and Naval Surface Fire Support (NSFS) systems; provide targeting information for Type 2 or 3 CAS mission, and joint fire support planning at the company level[4] in absence of a JTAC on the ground. The course combines classroom lectures and simulation with no requirement for live ammunition or aircraft. Not unlike JTACs, upon completion of the course, JFOs are subject to evaluations every 18 months and a semi-annual currency requirement consisting of 6 CAS and 6 surface-to-surface Calls For Fire (CFF) events. The primary difference between JTAC and JFO initial and continuation training is that all JFO training can be completed with the use of a simulator. Just like the JTAC course, Canada is already a signature to the JFO Memorandum of Agreement (MOA) which governs the minimum training standard and currency of the JFO. All recognized JFO courses are accredited by the US Joint Fire Support Executive Steering Committee (JFS ESC). In 2011, a Training Needs Analysis (TNA) was initiated by the Director Artillery with the intent to start the first serial of the JFO course in fall 2012[5], but due to resource requirements in the MOA at the time, the program was cancelled.

CANADA'S JTAC MANAGEMENT

The current CAF Force Employment (FE) model situates JTACs as part of the artillery observation battery. JTACs and Forward Observer Officers (FOOs) are employed in the field as FOO/JTAC teams, sharing a Light Armored Vehicle (LAV). In the CAF, the JTAC skill set is not considered a Primary Combat Function (PCF), and is executed as a secondary duty[6].Since 2009, the RCAS has trained 211 personnel (Canadian and Foreign) on the JTAC Course with an average success rate of 71%. However, since 2015 that number has dropped significantly each year with a current average success rate of 51% (figure 1). During that timeframe, courses with limited Alpha Jet support during the Gagetown air phase have seen a staggering success rate as low as 33%. It would be irresponsible not to note that in 2013, in an attempt to fill the ever-growing requirement for JTACs, the minimum rank for the JTAC course was lowered to the rank of Corporal (Cpl) / Bombardier (Bdr).

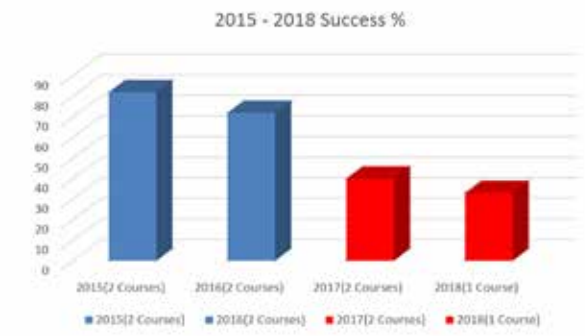

Figure 1 – 2015-2018 success %. Displays yearly decline of successful students, red indicates below 50%.

Speaking with students attending the JTAC course, they mentioned that the amount of information required to retain during the academic phase was overwhelming for most. It has always been a common understanding that Non-Commission Members (NCMs) make the ideal candidate for the JTAC course as Commissioned Members (CMs) are often pushed out of the job rather quickly. On average, CMs spend roughly 20 months in a JTAC roll due to career advancement. The issue is that the average person who attends the course is usually a Master Bombardier (MBdr) only qualified Observation Post Detachment 2IC, which has limited material explaining joint fires. Even on senior courses ran at the RCAS, CAS is seldom integrated correctly, mainly due to a lack of understanding and the absence of the Subject Matter Experts (SMEs) during the planning phase.

To combat the failure rate; a selection process was implemented and outlined in Canadian Army Order (CAO) 24-05 JTAC. However, the selection process has never been validated due to zero monitoring for accuracy since its conception. For the most part, once a soldier identifies themselves as being interested in the JTAC course, it is up to the unit JTAC to prepare the individual for a future course depending on tempo and availability of both parties. In the past, soldiers identified as potential students would travel with the JTAC during exercises or CAS events to build their experience level but due to the growing cost of training; this practice has become rare. These individuals are often called Radio Operator, Maintainer and Drivers (ROMADs), which is an internationally recognized term for a 'JTAC assistant'[7].

Recommendations made through briefing notes in the past attempted to include limited 'JTAC assistant' familiarization training as part of the Op Detachment Member course to develop JTAC awareness at the entry level[8]. In my opinion, this may help raise a soldier's interest in the JTAC role but with the current tempo, unless they are employed

in a party with a JTAC, they will never get the opportunity to practice any of the material taught.

Once selected, JTAC applicants must successfully complete the JTAC Pre Course training package prior to the commencement of a JTAC Course[9]. Although the pre course material is directed by the RCAS, nothing binds units to a schedule or timeframe to conduct the course. This results in varied pre-course packages being delivered at each unit to prepare students for the course With the pre-course not formalized, students aren't protected by Canadian Forces Taskings, Plans and Operations (CFTPOs) when conducting this training and commonly miss parts of the package because of other taskings. On multiple occasions, students have arrived at the RCAS for the JTAC Course only to tell the staff that, although the pre-course training had been completed, it was conducted using a phased approach limiting the student's ability to properly absorb the material.

After reviewing each of the units pre-course packages with the success rates of their students, it was clear that a more structured course, complete with time tables and tests provided the best results. A JFO program would provide the solution with a Qualification Standard (QS) and Training Plan (TP) to follow, ensuring all students attending JTAC arrive with a common and recognized baseline knowledge of joint fires and CAS.

The slow bleed out of the CAFs JTAC capability has been observed from within the JTAC community over the last 10 years. Working groups have been trying to find ways to combat the down fall with little success. In 2016 it was directed that the CAF would maintain 16 JTACs per Bde[10]. Each of the Bdes have struggled to reach this number (Figure 2), the trend is a decline in numbers. In my opinion, this stems from the increased failure rate of the course over the last few years and not having bodies to replace the soldiers moving out of the JTAC role.

Figure 2 – JTAC Manning. Displays what each Bde could look like post APS 2019 compared to 2017.

Published in 2016, LCol Penney suggested that "Trends among NATO partners indicate that the future demand for JTACs will increase and training resources will diminish"[11]. Two years later, the diminished resources directly contributed to the number of students that were able to complete all JTAC courses in 2018, the Royal Canadian Air Force (RCAF) lowered its number of supported air hours resulting in 0 of 12 finishing JTAC 1802 within the prescribed TP/QS timeline. JTAC training is challenging, resource intensive and the current CAF JTAC FE and FG models have proven unsustainable; during the past five years amidst combat operations, the CAF trained 45 JTACs at the cost of $42.9 million and today has lost 44 personnel to career management issues[12]. When this management problem combines with the increased number of soldiers failing the JTAC course, it is obvious that CAFs JTAC program is broken.

COALITION PARTNERS JTAC MANAGEMENT

Australian Defence Force (ADF) and New Zealand Defence Force (NZDF) both have a JFO capability. Like many other nations, they use the JFO as a force multiplier on the battlefield, while also using this capability to prepare soldiers for future JTAC courses. Both the NZDF and ADF select soldiers from their FOO parties to attempt the 2 week JFO Course. JTACs are then sourced from the pool of JFOs once they have gained experience employed in the position. It's important to note that not every JFO needs becomes a JTAC, but instead, rolled back into their career progression within the artillery.

Staff Sergeant (SSgt) Kingi from the NZDF and Warrant Officer Class 2 (WO2) Freckleton from the ADF, both expressed their belief that soldiers who hold the JFO qualification have a distinct advantage when attempting the JTAC Course. Since 2015, NZDF has loaded 4 JFO qualified students on the JTAC course at the RCAS and achieved a 100% success rate. Strictly, the only students from New Zealand that have been unsuccessful on the Canadian course have been those not qualified JFO. Canada on the other hand has loaded 44 students during that time frame, with a return of 26, achieving a success rate of 63%.

The United States Marine Corp (USMC) plans to greatly boost the lethality and responsibility of one of its most fundamental building blocks of combat power by ensuring Marines can accurately direct and control mortar, field artillery, naval surface fire support and provide accurate targeting data for CAS. The USMC plans to qualify at least one JFO in every rifle squad who will work in conjunction with a JTAC. The USMC wants a total of 1,122 JFOs across the Corp. For the USMC, the minimum rank for JFO training is Lance Corporal and a Sergeant to become a JTAC[13].

CONCLUSION

The CAF and The Royal Regiment of Canadian Artillery (RCA) have attempted to use a broken tourniquet to hold our JTAC capability together. It is clear that the phrase "practice makes perfect" couldn't be any more relevant than to the preparation of students for the JTAC course. The artillery commander must be an expert in the application of

fire power, understanding the employment of all supporting weapons, including artillery and mortars, anti-tank weapons, machine-guns, tanks, Naval Fire Support (NFS) and CAS[14]. In the world of joint fires, amateurs deconflict and professionals integrate. The RCAS is currently in the business of teaching our current and future experts to deconflict fires, not integrate them.

Moving forward, the CAF must invest in the JFO capability. Although this alone won't fix the current JTAC management issue, it will however provide a joint fires enabler to the combat team absent of a JTAC on the ground, bolster the success rate of students on the JTAC course and increase overall situational awareness on joint fires. For JFOs who never advance to become a JTAC, the JFO qualification will provide them with a better understanding of how to integrate joint fires as they continue to advance through their career as an Observation Post Detachment Commander (OPDC) and set the conditions for them to excel in a Fire Support Coordination Cell (FSCC) as the FSCC WO. The added war-fighting capability, experience and training provided by the implementation of a JFO program within the CAF is a low drag, high impact initiative that will breathe life into a strategic enabler that is bleeding out by: creating a sustainable pool of suitable JTAC candidates and improve the success rate on courses leading to increased FG and FE no matter the resource constraints of the future.

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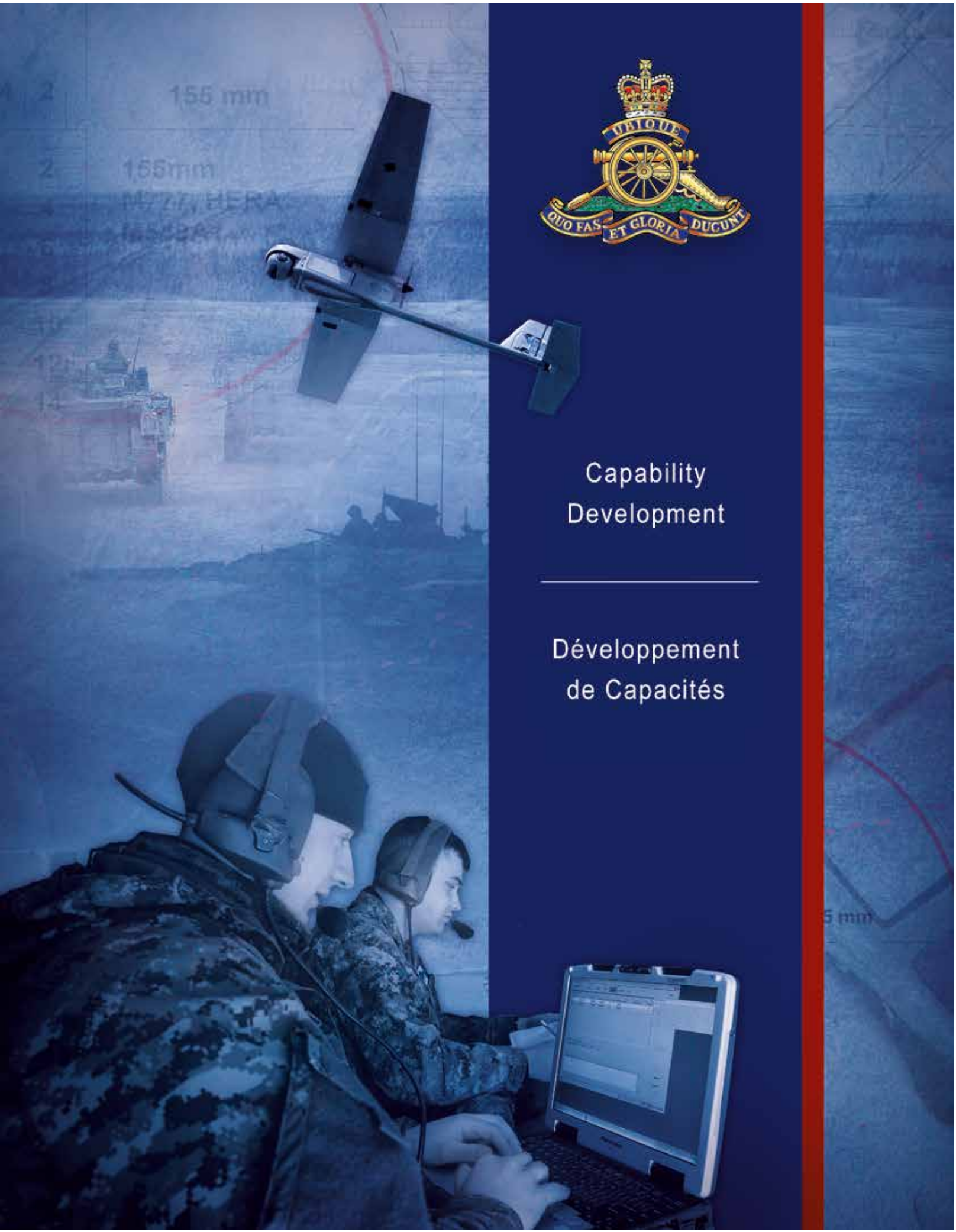

Capability Development

Développement de Capacités

THE APPLICATION OF:

TARGETING AT A BRIGADE LEVEL ACROSS THE SPECTRUM OF CONFLICT

Captain R.P. Walker

Canadian and allied doctrine indicate that many processes of the targeting process are employed at the divisional level or higher; however, targeting continues to have a vital role at the brigade level, as it facilitates the integration and synchronization of effects within a defined battlespace. Targeting must remain modular and scalable to provide flexibility to a brigade operating throughout the spectrum of conflict and be able to adapt to the situation it is placed in. There will be certain circumstances where only the targeting cell is sufficient but there are also circumstances where it may be desired to establish a joint targeting centre. Factors including but not limited to planning timeline, area of operation design, resources and the campaign theme must be carefully considered when determining if the organic targeting cell is sufficient or if augmentation is required to facilitate a joint targeting centre.

INTRODUCTION

Arianian artillery is firing from within a built up area during a major combat operation and with guidance to minimize collateral damage. This scenario which normally spurs the discussion of if the brigade should undergo a dynamic targeting process[1] or if they should engage under a combat engagement. The importance of targeting can be viewed as second in importance only to the tactical decision-making process but how joint targeting can be utilized at the brigade level remains a concept that we continue to define. Canadian and allied doctrine indicate that many processes of the targeting process are employed at the divisional level or higher; however, targeting continues to have a vital role at the brigade level, as it facilitates the integration and synchronization of effects within a defined battlespace. The purpose of this article is to demonstrate how the targeting process can be employed at a brigade level while utilizing both land and joint targeting principles after judicious analysis of factors while adhering to doctrine.

So, what exactly is targeting? As defined by Canadian Forces Joint Publication (CFJP) 3-9 Targeting, it is the "process of selecting and prioritizing targets and matching the appropriate response to them, taking into account operational requirements and capabilities[2]. There are two processes that can be used within targeting – land targeting and joint targeting. Even though both processes have similar aims and methodologies such as "Decide, Deliver, Detect and Assess (D3A)"[3] they differ significantly in resource requirements, time required and at which headquarters level they can be applied to in different operations.

DISCUSSION

Within Canadian Army doctrine, specifically Field Artillery Operational Procedures, targeting is identified at the brigade level as a process that "assists the brigade commander by determining which enemy assets must be acquired and attacked to ensure the success of the mission"[4]. Canadian doctrine further identifies that brigade targeting is a function of the division close operation and utilizes products created from division as part of their own targeting refinement[5]. Targeting at a brigade level is able to function when there is a division supporting a brigade; however, what happens when there is no division present to support? Situations where a division is not supporting a targeting effort or providing guidance into targeting may be found in peace support or counter-insurgency (COIN) environments or even when the higher headquarters[6] is unable to produce such products to support a Canadian lead brigade or battle group. An example of this can be found in our current operations in Latvia. The Canadian contribution to this operation under the North Atlantic Treaty Organization (NATO) is focused around training and posturing to demonstrate NATO solidarity. If an escalation of force were to rapidly develop, the ability to support targeting efforts would rely upon the battle group creating their own targeting products as there is a lack of targeting that is conducted at the

higher headquarters. Without targeting products to refer to during training, effects that members may contribute to are desynchronized and increase the decision time required against certain elements. To prevent this from occurring, as part of the enhanced Forward Presence battle group in Latvia (eFP BG Latvia), they created no-strike lists among other targeting products to support ongoing multi-national training[7]. The products that were created were a part of the land targeting cycle that is carried out and not a part of the joint targeting cycle. Because there was no joint targeting centre found at higher levels, no joint targeting cycle was conducted to identify and create the products for lower levels to utilize such as the brigade or battle group. A similar situation could arise if there was no division deliberate or dynamic targeting capability; the responsibility may fall upon the brigade to coordinate resources to support the processes if the situation required it to do so. When the targeting process is carried out correctly, it will result in a well-planned, synchronized fight that supports the commander's decisions and their ability to complete the mission[8].

When we conduct land targeting, there is no minimum level that this process can take place. It can be seen similar to an estimate – we can conduct the estimate in a written formal process demonstrating what we are thinking throughout or, during many situations, we can conduct a combat estimate and draw deductions without formally putting pen to paper to list out every deduction. The same can be seen when it comes to conducting land targeting – brigade headquarters staff will conduct the Operational Planning Process (OPP) to determine what they need to affect to facilitate success, and prevent the enemy from achieving their own success. Similarly, even at the platoon level, the commander will conduct their own evaluation of what they need to target such as neutralizing a fire base instead of trench number three for example. It can be said that this basic function of targeting will prevail regardless of the level of headquarters. The Land Targeting draft has identified the requirement for targeting to be found at each level and thus should have targeting cells spanning from strategic to tactical levels of command[9]. What will differ is where the joint targeting cycle will be supported – the complete evaluation of systems and creation of deliberate target packages or conducting dynamic targeting.

To understand how targeting doctrine impacts operational needs, it needs to be understood how it is to be applied. In the preface of CFJP 3-9, it identifies clearly that "doctrine is not policy and does not have legal standing; however, it provides authoritative and proven guidance, which can be adapted to suit each unique situation"[10]. Despite doctrine identifying that the processes normally occur in certain situations and that it is usually held at a specific level, such as at division level, it is not binding organizations to act in a certain manner. What should matter most is that it is complementary to the military decision making process to enhance efficiency and promote better synchronization[11]. When we review the joint targeting cycle, there are considerations that are required in order to facilitate the use of the cycle, but we are not restricted as to what headquarter level the process can be employed. To understand some of the considerations, we must consider the environment at which these processes are being applied to. When we train on courses or in the field, we primarily train in major combat campaign themes[12].There are very little opportunities to train within other campaign themes.Most regiments train along major combat themes and even the certification exercise for brigades, Exercise MAPLE RESOLVE trains almost exclusively to major combat. To understand how a brigade can utilize a joint targeting centre, we must look at campaign themes other than major combat such as Counter-Insurgency (COIN) or Peace Support. In these campaign themes, the structure and organization of Land Forces will differ[13]. In order to maintain flexibility, the Land Force is designed to uphold two principles when trying to organize for battle: modularity and scalability[14]. Every operation will have different factors that will require consideration to meet the desired end state and thus will require a degree of flexibility when determining the land force structure to support it. Modularity allows building blocks to come together to achieve balance towards an operation. Scalability will permit a force to change in size without impacting its capabilities towards the operation. We can relate this to a square peg in a round hole. If the peg can change shape (applying modularity), it can meet the requirements of the operation – the round hole in this instance; however, without changing its size (scalability), it still may not fit. Similarly, a smaller square peg may be able to fit but there will be capability gaps in supporting the operation.

The importance of having a flexible approach to supporting targeting is exercised through the use of targeting cells and centres. The difference between a cell and a centre is that a cell is established from within its own organization while a centre is established to support with a functional area or expertise that it does not possess internally[15]. These cells and centers provide the ability for targeting to be modular and scalable without compromising the role it has to the land force. We must maintain the mindset that our doctrine provides us the flexibility to exercise this and can be viewed with how the targeting cell can change. Targeting must be able to adapt to a changing scale as it moves across the spectrum of conflict as it moves from major combat, a formation level fight to COIN, a company or smaller fight[16]. The change in these roles does not occur overnight but there are factors to be considered when applying modularity and scalability to facilitate the effective synchronization of effects.

With most training being conducted for major combat, we define our Area of Operation (AO) to be contiguous and linear where the majority of our threat is well beyond the Forward Line of Own Troops (FLOT). In a situation where

the AO is non-contiguous, and the brigade is likely to be larger than in a contiguous design, a targeting centre that has the capacity to support joint targeting processes would be beneficial in providing a complete synchronization of effects within the AO. To better understand the impact of an AO type, a comparison must be made to what the maximum sizes for an AO could be. In 2010, Defence Research and Development Canada – Centre for Operational Research and Analysis (DRDC-CORA) conducted a study investigating different factors and produced a theoretical maximum size for the different AO structures[17].

This study established the sizes of these AO's for a Battle Group, but it could be inferred as to the size of what a brigade would occupy. This gives better insight into some of the reasons why during major combat in a contiguous, linear AO, a brigade may not be interested in a joint targeting centre, be it deliberate or dynamic. A joint centre requires a sufficient AO size and time to permit it to operate with sufficient foresight required to synchronize and match appropriate responses to the threat. A factor that needs to be considered for non-contiguous AO's and its application towards targeting centres is the proximity of troops. During major combat operations, it is understood that soldiers are in close proximity to the threat and the threat against them is likely or highly probable thus falling under what is considered a combat engagement or under self-defence. There are certain conditions where a dynamic and deliberate targeting centre will become more practical and useful to use. One of these conditions is the size of the AO. The larger the AO, the greater the chance for a target to appear that does not pose an imminent or immediate threat against friendly forces and thus requiring a greater analysis into factors for striking. A situation like this may be apparent is Iraq for instance. In the retaking of Mosul, ISIS fighters or Vehicle Borne Improvised Explosive Devices (VBIED) within Mosul can be considered as a combat engagement or under self-defence (situation dependent and within prescribed rules of engagement); however, a VBIED that is located 100+ km away may not pose the same threat and warrants engagement through the use of a dynamic targeting centre. The difference between these two situations is the time available to engage the targets and proximity to friendly forces. In the situation where the target is within Mosul, this target can easily move to place friendly soldiers at risk thus time is limited. The situation where the VBIED is located 100+ km away from friendly soldiers, the amount of time for the vehicle to move to a position where it poses an immediate or imminent threat is much greater. Consequently, the dynamic targeting process can be carried out to facilitate a better evaluation of the factors such as better fidelity on weapon effects, how the target relates to known intelligence, what the follow-on implications are of striking the target, and the coordination with other units or resources to synchronize an effect. This does not mean that these factors are not weighed during a combat engagement but in that it occurs in a much faster method and risk is accepted to protect the lives of friendly soldiers. Thus, time is a consideration that must be weighed when looking to utilize a dynamic targeting centre.

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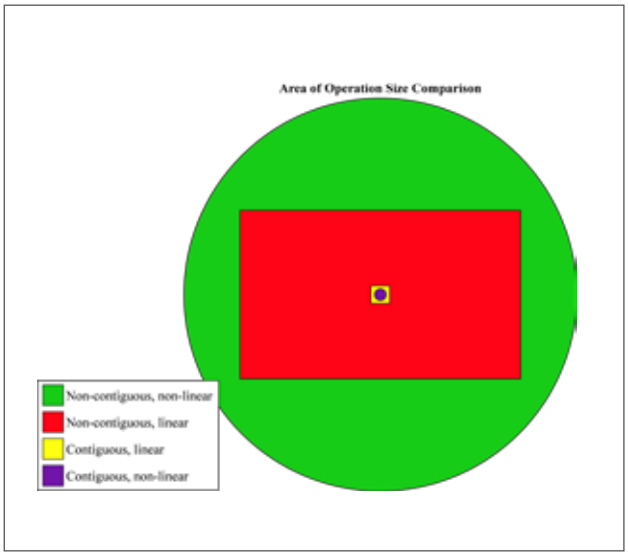

Battle Group Area of Operation Sizes	
Contiguous, linear	6 km frontage x 6 km depth
Non-contiguous, linear	100 km frontage x 50 km depth
Contiguous, non-linear	Circle with 2.5 km radius
Non-contiguous, non-linear	Circle with 70 km radius

Figure 1 – Area of Operation Size Comparison. The area proportions are in relation to AO types given the maximum area that a Battle Group could manage taking into account factors such as indirect and direct fire support, casualty evacuation, resupply, C3, reinforcement, surveillance capability, and aggregation of forces and conduct of collective activities within prescribed timeframes[18]. The large green circle has a radius of 70 km while the smallest purple circle in the center has a radius of 2.5 km. This figure is in appropriate proportions to its relative size.

to use. One of these conditions is the size of the AO. The larger the AO, the greater the chance for a target to appear that does not pose an imminent or immediate threat against friendly forces and thus requiring a greater analysis into factors for striking. A situation like this may be apparent is Iraq for instance. In the retaking of Mosul, ISIS fighters or Vehicle Borne Improvised Explosive Devices (VBIED) within Mosul can be considered as a combat engagement or under self-defence (situation dependent and within prescribed rules of engagement); however, a VBIED that is located 100+ km away may not pose the same threat and warrants engagement through the use of a dynamic targeting centre. The difference between these two situations is the time available to engage the targets and proximity to friendly forces. In the situation where the target is within Mosul, this target can easily move to place friendly soldiers at risk thus time is limited. The situation where the VBIED is located 100+ km away from friendly soldiers, the amount of time for the vehicle to move to a position where it poses an immediate or imminent threat is much greater. Consequently, the dynamic targeting process can be carried out to facilitate a better evaluation of the factors such as better fidelity on weapon effects, how the target relates to known intelligence, what the follow-on implications are of striking the target, and the coordination with other units or resources to synchronize an effect. This does not mean that these factors are not weighed during a combat engagement but in that it occurs in a much faster method and risk is accepted to protect the lives of friendly soldiers. Thus, time is a consideration that must be weighed when looking to utilize a dynamic targeting centre.

When trying to create an effect against the enemy, whether it is to destroy, neutralize, isolate, and/or disrupt, dynamic targeting compared to combat engagements or engaging the enemy under self-defence is considerably longer. The determination between combat engagements and dynamic targeting are also blurred in that the identification and engagement of targets by unmanned aerial vehicles (UAVs) are conducted under both types of targeting methodologies and the equipment is now found at lower levels of headquarters. Some UAV's such as the RQ-11B Raven-B, a class I UAV, are suited to support combat engagements and rarely dynamic targeting situations. Other UAVs such as a RQ-21 Blackjack, a class I UAV, are able to support different roles within targeting to include combat engagements, dynamic targeting and under some circumstances deliberate targeting. Class III UAVs such as an MQ-1 Predator or MQ-9 Reaper will focus on targeting in a deliberate role; however, they can easily be moved to support a dynamic targeting function (such as identification of a VBIED during the development of a deliberate target) or under a combat engagement (such as responding to support troops in contact or in an urban setting). The brigade will at least utilize UAVs such as the RQ-21 Blackjack thus it has the flexibility to undertake any of the targeting roles if required.

Even though UAVs can support both types of engagements, other factors will determine if a joint targeting centre is required such as risk acceptance for collateral damage, the environment (open terrain versus urban areas), and what the intent is among others. The time it takes to engage the enemy using these processes must be carefully considered as to not permit the enemy from exploiting our decision action cycle in addition to slowing the accomplishment of the mission. Certain areas, such as built up areas, may require a greater level of analysis (such as collateral damage estimation, civil-military co-operation impacts, and potential loss of intelligence development) to determine the secondary and tertiary consequences of creating an effect against the enemy; however, it must be weighed with the window of opportunity to provide the effect balanced with the commander's intent and the risk they have accepted. Every major combat operation will eventually decrease along the spectrum of conflict and transition into COIN or peace support operations; however, evaluation and analysis must be completed to balance how rigorous the process is with the acceptance of risk required to create an effect against the enemy.

To facilitate whether a joint targeting centre is established or the inherent targeting cell is sufficient for land targeting, the amount of resources and integration the brigade possesses must be considered. To conduct dynamic or deliberate strikes, there needs to be an established level of resourcing within theater. This requires a robust intelligence section, assets that are capable of conducting tasks to support both dynamic and deliberate strikes (such as UAV's and aircraft), and a communications structure in place to facilitate the command and control. Some coordination requirements are similar to most planning functions that the land force already performs but the foresight requirement for supporting deliberate targeting is much greater. When looking at an operation during major combat, the brigade is operating anywhere within a 72 hour period due to the changing situation and proximity to known enemy forces. To facilitate and support deliberate strikes, a minimum of 72 hours is required when looking at striking in addition to the amount of time required to develop and synchronize with post-strike exploitation. Furthermore, developing a deliberate target can take weeks or even months depending on the situation and requires resourcing to support. When evaluating the timeline within which a brigade operates within counter-insurgency or peace support, the timeline will fluctuate and may permit the brigade to plan and operate beyond 72 hours. An example of this occurring is during Operation ENDURING FREEDOM X-XI where the brigade targeting team led Task Force Rakkasan through a four week deliberate targeting process[19]. Even though there was a requirement for deliberate targeting, the brigade needed to conduct this process themselves to facilitate their commander's intent. As identified in the Land Targeting draft publication[20] this leaves the option for the

brigade to conduct joint targeting; however, the resourcing is still required. If a corps or division is in theatre able to support then they will likely take on these roles of conducting dynamic and deliberate targeting and brigade will be limited to nominating targets and coordination for the effect[22]. However, if they are absent or unable to support, the brigade will need to be resourced from its National Support Element in order to conduct these processes.

Another option is to have a targeting centre at a national level thus fulfilling the role that a division or corps would normally have. Canada has established the Joint Targeting Intelligence Centre (JTIC) in Ottawa to support deployed units that either do not currently have a targeting centre or in support of Canadian Special Operations Forces Command elements. The centre comprises mostly of intelligence officers and operators which is vital for the production of actionable information, but it also is supported by geomatic technicians, gunners, engineers and civilian public servants[23] which can provide a holistic view on the situation. This provides deployed units with a mitigation option if they were to not establish their own centre in theater. Because resourcing and staffing for a targeting centre can be intensive, higher levels of command will normally have greater access to enhanced intelligence collectors and will naturally facilitate greater synchronization of information and effects. This lessens the burden that lower level headquarters like a brigade has if it needs to remain small and mobile or if the operation requires a dedicated targeting centre. If Canada were placed into a situation where a brigade level targeting centre were to be established, it does not nullify the need for the JTIC but simply requires a method for effective communication and synchronization between the two centres.

Outside of the actual equipment required to conduct targeting (such as computers, software, etc.), effective communications needs to be established. For instance, using my experience with dynamic targeting on Operation INHERENT RESOLVE, class II and IIIUAV feeds (SUAS and larger) can be used for a multitude of purposes: provide an overview of the situation to the commander, assist with Collateral Damage Estimation (CDE) (such as providing the ability to conduct a Pattern of Life override or to define the height of a building), enabling the intelligence section to determine function and intent, contributing to legal requirements for the legal advisor (LEGAD), and providing a post-strike assessment. A brigade headquarters will likely have access to class I and II UAS but depending on the situation may not have the equipment or bandwidth available to display class III UAV feeds. If the headquarters is unable to display the live feed, then the dynamic targeting capability will likely need to be held at a higher level or risk must be accepted such as allowing air crew to perform a collateral scan prior to strike, the LEGAD relying other analysts to establish positive identification or another element to conduct a post-strike assessment. The limitations on the communication with the UAV's will affect the efficiency of a targeting centre such as limiting how much deliberate target development can occur due to flight time, the range at which the headquarters can affect out to, and the value of information the UAV can provide. Class III UAV's can provide a wide range of sensors available to facilitate target development in both a deliberate and dynamic role of targeting but a class I or II may not be able to provide sufficient intelligence to proceed with creating an effect. An example of this would be having only Full Motion Video (FMV) where you need to have imagery analysts to identify what the sensor is observing to provide positive identification (PID) of targets whereas a UAV sensor that can provide radio frequency analysis provides collaborating intelligence for PID. Without an established communications structure to transmit this information to the headquarters can result in ineffective use of the equipment and delay any desired effect.

An area of contention during exercises is the use of deliberate targeting processes at the brigade level[24]. On some courses there can be an expectation that students at a brigade must complete the deliberate target package to be later used in a strike against it. Arguably, this is not realistic, given consideration to the major combat campaign theme that most courses concentrate on. Artillery Operational Procedures identifies that the targeting team at brigade will nominate targets to division headquarters, but this is in reference to targets that cannot be acquired or attacked with brigade assets. To exercise a situation where staff officers would require to undergo the joint targeting cycle, the scenario would need to focus around COIN or peace support with additional support in the form of an All Source Intelligence Centre (ASIC), additional UAS support, theater support in the form of aircraft and prioritization for deliberate targeting, and an enhanced ISTAR section among other enablers. Regardless, the brigade targeting officer should not be focusing on the creation of deliberate target packages. Additional augmentation to produce and create these packages is required through the ASIC. The brigade targeting officer should remain in their role and perform their tasks as outlined in Artillery Operational Procedures. The most that staff officers at brigade level could be expected to fulfill during major combat training is to provide synchronizing efforts when deliberate targets are to be struck with their own manoeuvre plan.

Field Artillery Operational Procedures[26]and US Army Techniques Publication (ATP) 3-60[27]demonstrate what the essential elements to a brigade targeting cell that would be consistent throughout any operation. The publications also indicate what may augment the cells to facilitate a modular and scalable targeting centre that is able to function within the defined environment[28]. For ease, Figure 2 demonstrates what is considered as the core members of a targeting cell along with augmentees. Within the cell, the core members with, depending on the situation, supplementary members

compose the targeting cell. They are already present within the brigade HQ and do not normally require additional personnel to support. If the situation requires a joint targeting role to be adopted such as the addition of a dynamic targeting role, augmentation is required to facilitate the coordination needed and analysis of factors. Representation from the Royal Canadian Air Force (RCAF), Royal Canadian Navy (RCN) and possibly U.S. Marine Corps (USMC) will increase while technicians will permit the now centre to provide a greater level of information to support an effect. Not all of these positions need to be filled in order to meet a minimum threshold level of a joint targeting centre, however there are some that are required to fulfill certain processes such as the dynamic process. For example, in the dynamic process there will be a requirement of a CDE analyst, LEGAD, Precision Strike Suite – Special Operations Forces (PSS-SOF) operator, and Tactical Air Control Party (TACP), but a Naval Gunfire Liaison Officer (NGLO) or USMC LO are not necessarily required. If the deliberate process were to be supported, it would require those of the dynamic but also a weaponeer tech as they require a greater level of analysis but have sufficient time to develop such targets. In all circumstances, an analysis must be completed to determine the level of synchronization and integration required to meet the targeting requirements of the commander.

CONCLUSION

Targeting at the brigade level needs to remain modular and scalable to support the Land Force. To do this, an analysis needs to be conducted to evaluate the factors at which either the current brigade targeting cell is sufficient or if augmentation is required for the formation of a joint targeting centre. There will be certain circumstances where only the targeting cell is sufficient but there are also circumstances where it may be desired to establish a joint targeting centre. Such circumstances are summed up in figure 3 and provides a framework to work with (understand that it is not a solution to all situations and further considerations must be examined to finalize the decision). It is understood that during major combat there will be sufficient resources at higher levels of command and most threats are immediate or imminent; there is no requirement for a targeting cell to conduct dynamic or deliberate targeting beyond coordinating any strikes with manoeuvre. However, during counter-insurgency and peace support operations, there will likely be a requirement for such a centre due to the changes in the Area of Operation, resource availability and complexity of the environment. Canadian doctrine complemented with allied doctrine provides the foundation in how integration with targeting is to occur but regardless of if joint targeting or land targeting is conducted, it is understood that it is a vital process in which enables the brigade to complete its mission regardless of the campaign theme. Next time that Arianian artillery is firing within a built up area during a major combat operation, the division joint targeting centre should be utilized as it is prepared and equipped to meet the commanders intent. If there is no joint targeting centre established then consideration must be made to establish one at the brigade.

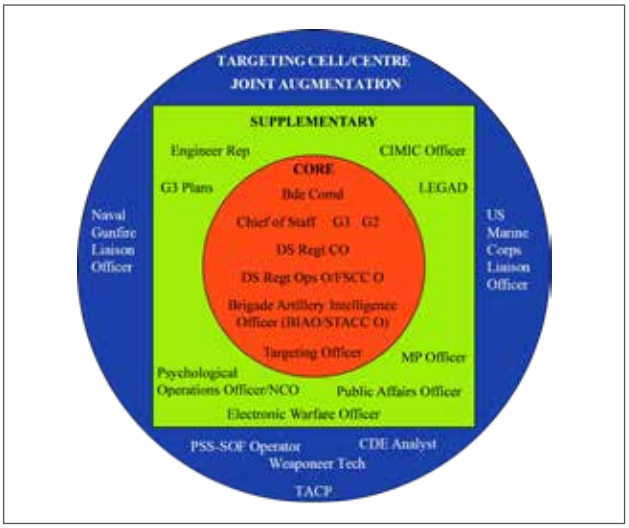

Figure 2 – Targeting Cell/Center Positions. The core staff are normally always required. If the brigade commander cannot be present then the Chief of Staff would be able to attend on their behalf. Similarly, the DS Regt CO would normally be the chairperson but if they are unable to attend, the Ops O would fulfill this role.

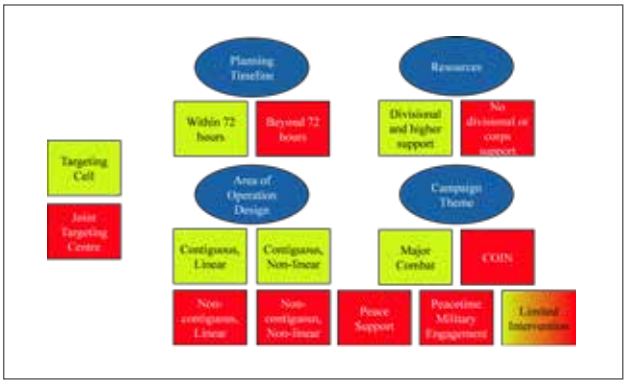

Figure 3 – Framework on the considerations for the establishment of a joint targeting centre. The considerations outlined above are those which are easily recognizable and discussed throughout the paper. Green indicates that the current targeting cell that a brigade provides is sufficient while red indicates that a joint targeting centre may be required to enhance the synchronization of effects and provide support to the commander's intent. This is not an answer to every situation but provides a possible solution to best support a brigade – these considerations are not to be decided upon in isolation from other factors/considerations. It is possible to have a situation where both a targeting cell and joint targeting centre is indicated through this diagram; however, the additional analysis will provide better fidelity on the requirement and if it is feasible.

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ARTY TRANSFORMATION:
CLOSE SUPPORT REGIMENT ORGANIZATION

WO J.R. Huntington

In this paper I will define the current construct of a Close Support Regiment in terms of Observer Batteries effectiveness, or whether it should be reverted back to before Arty Transformation came into effect. It will indicate the advantages, disadvantages and the potential ways forward. The current structure allows for direct and unimpeded training of observers from the leadership perspective, as well as career succession and management while previous methods of having observers attached to gun Batteries would sometimes restrict an observation teams ability to integrate and coordinate with manoeuver elements. Inevitably the transformation was beneficial for the CS Regiments and with some refinement to the leadership and accountability within observer batteries, they will continue to be successful.

INTRODUCTION

Observers are an integral and highly valuable asset to a Close Support (CS) Regiment, and their affiliated supported units. The ability for an observation team to incorporate their expertise within a Company, Squadron or other Regiments has always been vital to the success of what a Close Support Regiment delivers. Traditionally, observation teams were dedicated to individual gun batteries where, when the requirement for a Brigade stand up was proposed, the battery with the integral observation teams would be attached to a designated combat unit, and conduct operations as directed.

This format began transformation in 2005, when operations in Afghanistan intensified. The Artillery transformation proceeded with proposed changes to the structures in order to support the Army Transformational process. By 2008, it became evident there was a misunderstanding between what the Royal Regiment of Canadian Artillery (RCA) was being asked to achieve, and the Army's mandate. This lead to the restructuring of the RCA in order to produce greater flexibility along all lines of operation by 2009, based on direction from the Chief of Land Staff (CLS) and Director of Artillery (D Arty). Concurrent with the stand up of Surveillance and Target Acquisition (STA) Batteries, it would include the creation of Observer Batteries, removing them from organizational manning within gun batteries, and implementing a new chain of command.

This article will seek to highlight both the advantages and disadvantages of this current arrangement, and potential ways forward for future generations of gunners within the Royal Regiment.

METHOD/APPROACH

The initial steps for analysis involved communicating with key leadership within the Close Support units and culminating their independent experiences pertaining to the current and previous constructs with relation to observers. This was done with specific attention to the validity within the current unit structures, ranging from personnel who have had previous experience, as well as current serving members and my personal experience within both constructs. Further, with assistance from the Chief Instructor in Gunnery (CIG) of the Royal Canadian Artillery School (RCAS), empirical data was gathered which outlined the process of the transformation, timelines, and way forward for the Royal Regiment. Upon comparison of this data and the feedback from the Close Support Regiments, validation of the necessity and institutional issues for the current Regimental structure with OP Batteries will be analyzed.

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REVIEW OF LITERATURE/SOURCES

In the 2010 to 2011 timeframe, the creation of the OP Batteries within the Close Support Regiments came to fruition with the implementation of Z-Battery in 1 RCHA, Y-Battery in 2 RCHA and V Battery in 5 RALC [1]. "This construct was created in order to improve the force generating capacity of Forward Observation Officer (FOO) and Joint Terminal Attack Controller (JTAC) resources. It would seek to deliver continuation training critical to the FOO parties and JTAC currency requirements. However, these Batteries were to be a force generation entity only, and not to be deployed as a Battery, although the elements within are deployable. They are comprised of a Battery Commanders TAC, Battle Group Fire Support Coordination Center (FSCC), 9 FOO/JTAC parties (whose primary role was to provide fire support coordination). 3 JTAC teams (whose primary role was to provide Close Air Support (CAS), and lastly 2 Reserve Force FOO parties trained in dismounted operations, but with no JTAC capability." After conversations with the leadership of the CS Regiments, and with other members who have had experience with the observation batteries, many deductions came to fruition.

DISCUSSION

The current close support constructs have proven to be advantageous given their mandates. The demand from the Brigades to the CS Arty Regiments was to fully support in terms of guns, observers and STA. The solution was to create these new observer and STA batteries. It would allow for the Regiments to open positions for senior staff (Majors) to develop, mentor and train their assigned batteries [2]. "When employed properly, an OP battery produces without a doubt higher quality FOO parties." This ability to solely focus on their observation teams without having to also focus on the remainder of the battery, as in the old structure, allowed BCs much more flexibility in terms of opportunity training, courseware, affiliation support and career progression. The net result being FOO detachments that had a breadth of knowledge beyond that of previous generations.

The initiative to move to this structure was decided and implemented as a way to increase Regimental output to their Brigades [3]."In being separate from gun batteries, it is easier to control and manage qualifications required of an Observation Post Detachment second in command (OP Det 2IC), Observation Post Detachment Commander (OPDC), Fire Support Coordination Center Warrant Officer (FSCC WO), JTAC and Light Armoured Vehicle (LAV) courseware. The chain of command within the battery can manage Operational Tempo and train the FOO/JTAC parties independently." The focus was in developing competent, highly trained FOO and Joint Terminal Attack Controller (JTAC) detachments. The new construct allowed for the direct training and monitoring of detachments from the higher level of command, without having to shift focus beyond their scope of responsibility. The intent of the OP Battery was to force generate highly trained and prepared FOO and JTAC detachments, that can be easily employed in the all arms battle through integration and coordination of assets in a given battlespace [4]. "With having BCs paying attention to the training of their ATG, a better affiliation with the maneuver elements can be established, along with participation in CPXs, CAXs, exercise, etc." This affiliation would often lead to opportunities for courses such as basic recce patrolman that would otherwise be impossible to accommodate.

However, disadvantages of the current structure arose. Prior to the transformation, the individual gun battery chains of command were responsible for their integral OP detachments, as well as the gun line, command post, recce and echelons [5]. " It is hard to find the right position years (PY) that can make good OP Techs/OPDC. Prior to streaming, it was easy to move PYs between the FOO parties and gun line because we could closely monitor our PYs progress in order to determine if they were a good fit or not for a FOO party." This put a lot of responsibility on the higher leadership to monitor and determine qualification requirements for the observation teams. The mitigating factor in this construct was having the FOO, normally senior Captains, and the detachment Commanders, normally senior Non-Commissioned Officers (NCOs), forecast their detachments shortcomings, and requirements for needed qualifications.

The chain for this was usually short as the Battery Commanders traditionally centralized with the FOO detachments, while the Battery Sergeant Major's centralized with the gun line and echelon. Still, the overall management of the FOO detachments fell to the BCs and BSMs in terms of qualifications, readiness and deploy-ability. Being that the gun lines were larger in numbers, priority to run essential courseware fell in that direction, and observation team needs would sometimes be overlooked or pushed in order to affect other courseware. The end result would be FOO detachments with senior personnel that had limited qualifications and deploy-ability.

From a junior NCO perspective, the effect on the day to day life was marginal, other than having a new chain of Command. Senior NCOs however found themselves continuing their jobs as both detachment Commanders (OPDC) and in some cases, troop sergeant major (TSM). Officers aside from the Battery Commander (BC) and Battery Captain (BK), would begin their influx through the position of FOO. The turnaround time for some Captains as a FOO

would often times be less than 6 month, leading to inexperience in the Officer corp at the FOO level. Further, it meant that new FOO Captains were being employed in these positions having very little previous experience or time in rank. The end result would see the OP detachment Commanders, Sgts, maintaining and controlling the overall welfare, training and deploy-ability of their detachments. In training, during live fire combat team attacks, FOOs were often pulled prior to the live fire portion commencing, leaving detachment commanders to conduct the missions, manoeuver and control of detachments until redeployment.

Other issues that were quickly identified were the over-tasking of the new observer batteries. Understanding that all units had duties to fill, and tasks to manage, the request for more and more personnel from the Batteries lead to detachments being inter-mixed in order to achieve exercise aims. Often, OPDCs would have a party to train and manage, as well as being the TSM of two other parties. At the beginning of each exercise, predominately Ex Maple Resolve, Wainwright, they would trained together, but at the end would be dismantled and reassigned to other positions of other FOO parties or within the Regiments. This would negatively affect morale and overall control in terms of duty assignment, tasking and course progression. Consequently it led to teams that had not previously worked together, personality conflictions and who were lacking qualifications required to be effective.

In the past this had not been experienced as often. The demand from Artillery tactical groups (ATG) in terms of duties and tasking's was managed within an entire Battery context. There were times when some inter-mixing of teams would occur, but the view was to always revert back to the assigned teams in the end. The reality of the new observer Batteries in terms of force generation and secondary duty fulfillment sometimes meant sacrificing team cohesion for follow-on task requirements. Often having to fill tasks with personnel, while continually aiming to meet the demands of the Regiment in terms of observation team generation. Occasionally entire parties would be dismantled in order to fill assigned secondary duties, which led to reorganizing other FOO parties to accommodate the vacancies.

After careful examination of the details, some potential ways ahead could be discerned. Conversations with all Close Support Regiment Observer Batteries and their personnel, indicate recurring concerns. Even with the creation of the observer and STA batteries, the demands continue to grow in terms of task fulfillment, primary and secondary duties. Currently there are ongoing deployments to the Ukraine and Latvia which places high demand on ATGs, as well as deployments to places such as Iraq for close protection. While having deployments readily available is considered successful, the demand to generate FOO parties for these rotations increases. What we see happening is a continual cycle of the same personnel from one rotation to the next. This is an inherent inevitability given the lack of numbers in terms of personnel and equipment.

In order to accommodate the demands for FOO parties, the observer batteries have had to lean back on the gun batteries to supply personnel. The idea of selecting appropriate members is left to the gun battery chain of command, but the cost to them is also losing a potentially keen individual to another stream. Concurrently, once these new members are identified, they must immediately be indoctrinated into the observer stream through courseware. The training cycle can sometimes take months or even years to fully integrate new members.

To facilitate the demands of observer batteries, suggestions from senior staff have arisen [6]"I would recommend that the OP Batteries be given more PYs: 1x Master Warrant Officer (MWO), 1x Warrant Officer (WO), 2x Sgts, 2x Master Bombardier (MBdr) and 4x Bombardier/Gunner (Bdr/Gnr). With these extra position years (PYs), we can have a Battery Sergeant Major (BSM) as a MWO, a full Battery Quartermaster (BQMS), transport Sergeant and Pronto." The implementation of these new positions would allow for better leadership, control and management of the Batteries required assets, fleet and personnel. It would place accountability and resource management on the capable leaders in the battery.

CONCLUSION

The Observer Batteries across the Royal Regiment should continue to exist. Their focus, creating and training highly capable observers from both the NCO and Officer ranks, and implementing these capabilities into higher level training and integration with maneuver forces. The advantages of this structure outweigh the disadvantages in terms of career progression and quality of observers being generated. The recommendation to create the required positions to better align the observer Batteries from a leadership, control and accountability perspective will allow this structure to continue successful operational output.

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L'UTILISATION DU MRR

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L'emploi du AN-MPQ 504 (MRR) en support à une brigade n'est pas l'utilisation idéale de cette ressource. Le système doit être localisé trop près de la LAZB afin de pouvoir détecter l'ennemie en contre-batterie. De plus, une fois qu'il a radié, le temps de redéploiement pour une nouvelle location est beaucoup trop lent, et puis, finalement les gains en distance de son champ de détection en comparaison au AN/TPQ-49 RAML ne sont pas suffisamment significatifs pour exposer le MRR à tous ces risques. Cet article traite des différents modes d'utilisation du MRR en comparant les avantages et les inconvénients lorsque le MRR est utilisé en support à une division ou à une brigade. Les défis de son utilisation dans un contexte de réseau alliés plus large seront aussi abordés. En conclusion, vous serez en mesure de mieux comprendre mon point de vue sur une utilisation du MRR qui devrait être limitée en support à une division et en mode de surveillance aérienne seulement.

INTRODUCTION

Cet article a pour objectif de déterminer la meilleure utilisation possible pour le AN-MPQ 504 (MRR). Le Canada a reçu ses premiers MRR en avril 2018, mais les doctrines n'ont toujours pas été produites. Les principales questions répondues dans ce texte seront les suivantes : Quelles sont les limitations de son utilisation dans un contexte de support à une division ou une brigade? Quels sont les avantages et les inconvénients du MRR? L'utilisation du MRR comme un instrument de contre-batterie versus le radar de surveillance aérienne. La façon dont le MRR devrait être intégrer s'il était utilisé dans un contexte réseau allié plus large. Quelles sont les implications pour le lien "shooter-sensor" et l'exécution de la contre-batterie dans un contexte de division et de brigade? S'il est employé dans un contexte de brigade avec le Canada, est-ce que cela nuirait à son utilisation avec un réseau allié plus large et aurions-nous besoin d'avoir des TTPs/IPO différents? Pour le bien de cet article, la guerre conventionnelle a été privilégiée pour l'argumentatif puisque que je n'ai trouvé aucun problème à utiliser le MRR dans d'autres contextes lors de mes recherches.

MÉTHODE/APPROCHE

Comme il a été mentionné dans l'introduction, la doctrine pour l'utilisation du MRR est toujours en cours de production. Pour créer cet article, j'ai rencontré des gens du 4e GS Regt et des membres de la cellule AIG anti-aérienne, en particulier l'Adj Roache qui a travaillé au sein du système radar TPS-70 pendant quelques années, et de la cellule de surveillance d'acquisition d'objectifs de l'École d'Artillerie Royale Canadienne (ÉARC). J'ai aussi assisté à des démonstrations de déploiement et redéploiement du système MRR, et j'ai eu la chance de pouvoir assister aux essais effectués pour la transmission des données recueillies par le MRR. Le tout m'a permis d'arriver à mon idée finale sur l'utilisation du MRR au sein des Forces Armées Canadiennes.

DISCUSSION

Afin de bien comprendre quelles sont les limitations de son emploi dans un contexte de support à une division ou à une brigade nous nous devons de savoir quels sont les avantages et les inconvénients du MRR. Un des principaux avantages du MRR est sa capacité de pouvoir détecter plusieurs

cibles simultanément en mode de surveillance aérienne et/ou en mode de contre-batterie, soit 100 par minute[1]. Son champ de détection maximal en mode de surveillance aérienne est de 200 km et de 100 km en mode combiné. Pour ce qui est du mode de détection contre-batterie, on parle plutôt de 30 km lorsque l'antenne est utilisée de manière directionnelle (sectorielle), 20 km en rotation 360° et de 15 km en combiné. Ces capacités de détection sont basées sur l'utilisation optimale de « cross section ». La différence dans le type de calibre pourrait influencer ce champ de détection à la baisse. Comme les chiffres le démontrent, lorsque le mode de surveillance combiné est en fonction, cela réduit considérablement son rayon de détection. Donc, pour pouvoir bénéficier du maximum des capacités du système, celui-ci doit être employé en mode sectoriel. Cependant, l'utilisation du MRR de manière sectorielle implique qu'une excellente analyse du terrain doit être faite pour que l'antenne pointe dans la bonne direction et limiterait ses possibilités de détection à seulement cette portion du champ de bataille. Il serait donc plus avantageux d'utiliser l'antenne en radiation 360°, cela nous permettrait un champ de détection sur une portée de 20 km. Le mode de surveillance aérienne permet quant à lui de couvrir une distance de 200 km. Le MRR possède la capacité de pouvoir identifier l'allégeance des aéronefs en utilisant une antenne « IFF » ce qui est une bonne alternative lorsque la transmission avec l'antenne pour la surveillance aérienne n'est pas permise.

Les équipements de détection utilisant les radars possèdent une signature électronique vraiment distinctive et le MRR n'y échappe pas[2]. La signature électronique du système détectable sur près de 400 km en mode de surveillance aérienne et 60 km en mode de détection contre-batterie le rend vulnérable aux équipements de détection de guerre électronique. De plus, les opérateurs ont besoin d'environ 45 minutes afin d'accomplir le nécessaire pour permettre un changement de location. Dans un contexte de guerre conventionnelle où le système serait utilisé, la complexité de celui-ci de le changer d'emplacement rapidement après avoir mis fin à sa radiation augmenterait sa vulnérabilité face à l'engagement ennemi. Comme il a été démontré dans le document des leçons apprises de l'Ukraine: «RUSSIAN NEW GENERATION WARFARE HANDBOOK», les cibles détectées par leurs systèmes ISTAR sont attribuées à leurs éléments d'artillerie et engagées dans un délai de 10 à 15 minutes[3]. Pour contrer cette menace, les radars utilisent habituellement des plans de radiation, qui consiste à utiliser un radar en détection pour un cours laps de temps pendant que le prochain est en attente de radier. Une fois la radiation terminée, le radar change de location pour éviter d'être engagé par l'ennemi. Cependant, afin d'utiliser cette technique, nous devons avoir suffisamment de radar pour permettre la surveillance pendant que les autres systèmes sont en déplacement. Comme nous avons fait l'acquisition de seulement six radars[4] et que le système nécessite un délai aussi élevé, il ne serait pas possible de pouvoir exécuter cette technique avec le MRR.

Membre du 4e GS Regt exécutant la mise a niveau du MRR afin que le système soit en mesure de pouvoir radier.
Source : Cellule d'imagerie de la base de Gagetown photo prise par le Cpl Lapointe.

Une autre limitation du système est sa capacité de manœuvrer sur le terrain. Plusieurs véhicules sont requis pour l'utilisation d'un seul radar ce qui augmente son empreinte sur le champ de bataille. Le poids du radar (13 500 Kg) et le fait que le système doit être nivelé pour son utilisation font en sorte qu'il nécessite un terrain robuste et plat ce qui réduit considérablement les possibilités de déploiement sur un champ de bataille.

Si le système est utilisé en support à une division, il devrait être employé seulement en mode de détection aérienne puisque son champ de détection en contre-batterie serait trop court pour fournir de l'information aux sous-unités. Par contre, l'employer au niveau de brigade n'aurait aucune plus-value sur nos capacités de détection. Les systèmes devraient être déployés environ 2 à 5 km derrière la limite avant de la zone de bataille (LAZB) pour leur donner une possibilité de détection. Mais même en étant si près de la LAZB, ils n'auraient presque pas de capacités de détection pour les canons de 25 km de portés. Le fait d'être si près des lignes ennemies exposerait son délai nécessaire au redéploiement et la portée de sa signature électronique aurait plus de chance d'être détectée par les équipements de guerre électronique ennemis. En comparaison, le RAML ne demande que 10 min pour pouvoir changer de location après avoir mis fin à sa radiation, ce qui représente

35 minutes de moins que le MRR. La portée de la signature électronique du MRR en mode combiné est d'environ 200 km et elle est de 80 km pour le RAML. Les lecteurs pourraient être tentés de penser qu'un système comme le MRR permettrait un gain supérieur de distance de son champ de détection comparé au RAML et pourtant le gain net est d'à peine 5 km.

Selon moi, il me semble juste de dire qu'exposer le MRR aussi près des menaces ennemies pour un maigre gain sur nos capacités de distance de détection serait simplement une mauvaise utilisation de nos ressources. Il serait beaucoup plus judicieux d'utiliser le MRR le plus loin possible des lignes ennemies afin d'augmenter sa sécurité. De ce fait, l'utilisation du MRR en mode de surveillance aérienne en recul sur le terrain de bataille, au niveau de division et les RAML en contre-batterie en avant me semble la meilleure option pour maximiser le potentiel de nos ressources.

Suite au test effectué dernièrement par le 4e GS regt, le MRR est maintenant en mesure de partager ses données reliées à ses détections en utilisant le logiciel ASCC Assist. Par contre, ce logiciel est sous une restriction visuelle pour les « 5 eyes ». Donc, théoriquement, il possède la capacité de travailler dans un contexte de réseau allié plus large, mais l'information pourrait seulement être partagée aux pays suivants : la Grande-Bretagne, les États-Unis, la Nouvelle-Zélande et l'Australie. Si le Canada avait l'intention de travailler avec des alliés autres que ceux mentionnés précédemment, l'information obtenue via les MRR devrait être distribuée en utilisant d'autres moyens, ce qui augmenterait le délai de transmission de l'information et pourrait avoir des effets néfastes sur nos opérations. Il serait bon de se pencher sur le mode d'utilisation de transmission de l'information pour que celui-ci soit compatible avec les systèmes utilisés au sein des unités de commandement, exemple « tactical data link » (TDL). L'information requise par les radars utilisent habituellement un protocole appelé « Asterisc protocol ». Nous devons être en mesure d'utiliser ce protocole au sein des systèmes « land communication support system » (LCSS) pour permettre l'intégration des MRR au sein du futur programme situationnel des forces alliées « CP topaz ».

La meilleure façon d'intégrer le MRR dans un réseau d'alliés plus large, selon moi, serait la suivante : déployer le système en support à une division et en mode de surveillance aérienne uniquement. Nous serions en mesure de fournir une grande couverture sur la situation de l'espace aérien pour nos alliés tout en évitant d'exposer les faiblesses de nos systèmes, et notre défense en serait accrue en étant plus loin de la LAZB. Il est certain que pour respecter nos accords avec nos alliés des « 5 eyes », nos TTP/IPO devraient être adaptés en considération des pays avec lesquels nous pourrions travailler.

À mon avis l'exécution de la contre-batterie pour le MRR dans un contexte de division ou de brigade représente un grand défi. Les MRR étant attribués uniquement au 4e GS Regt, ceux-ci se doivent d'appuyer toutes les brigades du pays avec les MRR. Présentement, le 4e GS regt ne possède aucun système afin de compléter la boucle « shooter-sensor » et est donc, par défaut, dépendant d'autres unités afin d'accomplir un effet sur les cibles ennemies. Même l'entraînement représentera tout un défi. La contre-batterie pourrait être mise en pratique en exercice, mais le tempo déjà élevé du RCAS fait en sorte de laisser bien peu de chance à l'entraînement pour les MRR. Ceux-ci pourraient alors se tourner vers d'autres brigades afin d'accomplir cette tâche. D'ici à ce que le 4e GS Regt reçoive un système d'arme anti-aérien, le MRR ne pourra qu'être utilisé qu'à des fins de situations générales pour le mode de surveillance aérienne puisqu'aucun système anti-aérien n'est disponible.

CONCLUSION

En conclusion, le système MRR peut être utilisé dans un rôle de contre-batterie, mais ne devrait pas être utilisé ou le moins possible dans ce rôle. La lenteur à le déplacer après avoir mis fin à la radiation, son champ de détection réduit lorsqu'il est utilisé en mode combiné et la portée de sa signature électronique ferait en sorte de l'exposer beaucoup trop aux risques d'être engagé par les systèmes d'armes ennemis. Son incapacité actuelle de transmettre ces informations en temps réel au sein des opérations inter-agences ou interalliées est un facteur qui doit être travaillé pour maximiser l'intégration de ce système lors d'opérations. Je crois que la meilleure utilisation possible pour le MRR serait de l'utiliser strictement en mode de surveillance aérienne et au niveau de division afin d'éviter le plus de changement de location possible pour protéger nos systèmes. La tâche de détection de contre-batterie devrait rester au niveau des RAML, les RAML étant déjà employés assez près de la LAZB pour couvrir cette tâche.

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