

# **The Royal Regiment of Canadian Artillery Strategic Capabilities Assessment**

## **Executive Summary**

This Strategic Capabilities Assessment is about the identification and prioritization of *capabilities* that will ensure The Royal Regiment of Canadian Artillery (RCA) is relevant, employed and valued by the Canadian Army in the future 5 to 20-year timeframe. It articulates strategic long-term goals, capabilities and priorities of effort for the RCA in order to facilitate unity of thought, purpose and action. All aspects of this capabilities assessment are founded on the imperative of contributing to the future success of the Canadian Army in operations.

The current and future security environment is a picture of instability and uncertainty denoted by emerging threats such as weaponized Uninhabited Aerial Vehicles (UAVs) (drones) and the requirement to have effective counter Intelligence Surveillance Target Acquisition Reconnaissance (ISTAR) capabilities. The divestment of all ground based air defence assets over the past 15 years has resulted in no in-service Army weapon capability to counter the increasing threats from UAVs of all natures and the threat of rocket, mortar and artillery attack.

Long-range surveillance and target acquisition as well as long range precision strike will remain key capabilities for the Canadian Army that support both lethal and non-lethal operations and provide early warning and protection from land and air based threats to the deployed army.

Pressure to reduce or reallocate personnel will threaten the already low personnel strength of the RCA. Every artillery position must tangibly demonstrate that it is relevant to future requirements. The small establishments and manning levels of regular regiments present a high risk to sustained operations or larger surge missions. Therefore, it is imperative that the capability of the reserve force to provide well-trained soldiers and detachments be maintained.

It is currently unclear who leads the targeting function, however, at the battle group and brigade group levels, the RCA brings the expertise, the indirect fire assets, the surveillance and target acquisition assets, the air and fire support coordination capacity and many of the communications channels to effectively execute this increasingly complex and vital capability.

The RCA remains networked primarily by voice communications. Key digital communications linking the sensor to the shooter have not been fielded. The lack of progress in digitization of artillery command and control networks greatly hampers the effectiveness of ISTAR assets and the sense to act cycle.

## **Priorities of effort**

The following priorities of effort reflect capabilities that encompass the necessary equipment, personnel, doctrine and training to make these capabilities operationally effective.

1. Ground based air defence weapon capability against all natures of airborne threats including UAVs and indirect fire projectiles, 24/7, all weather, economical in personnel and sustainment costs.
2. Long endurance beyond line of sight surveillance and target acquisition systems networked into the intelligence and command decision cycle, economical in personnel and sustainment costs.
3. Long range precision strike, 24/7, high accuracy, low risk of collateral damage, economical in personnel and sustainment costs
4. Stewardship and development of the targeting function with improved effectiveness in the joint and combined environments.
5. Digitization of the artillery command and fire control system to reduce the sense to act cycle to almost real time.
6. Continued provision to the reserve component of the RCA of the guns and other systems and resources required for it to help generate and to sustain stipulated artillery organizations.

## **Key messages**

- The RCA has been and will remain a key and effective member of the Canadian Army.
- It is a family of regular and reserve soldiers that depends upon well-trained reservists to deploy and sustain operationally effective artillery organizations.
- The RCA is much more than guns and guaranteed close support to infantry – it provides beyond line of sight persistent surveillance and target acquisition, fire support coordination, airspace coordination, economical 24/7 long range precision strike, and synchronization of targeting.

- The lack of defence against mortar, gun, rocket, air and UAV threats is a high and increasing risk to Army mission success and to the lives of our soldiers.

## **Intent of this Strategic Capabilities Assessment**

This Strategic Capabilities Assessment is about the identification and prioritization of *capabilities* that will ensure The Royal Regiment of Canadian Artillery (RCA) is relevant, employed and valued by the Canadian Army in the future 5 to 20-year timeframe. It articulates strategic long-term goals, capabilities and priorities of efforts for the RCA to provide a roadmap to facilitate unity of thought, purpose and action.

## **Key Parameters**

All aspects of this capabilities assessment are founded on the imperative of contributing to the future success of the Canadian Army in operations.

This document contains detail at the tactical and operational employment levels but is not solution specific in terms of equipment types, quantities or organizational detail.

The document is unclassified to permit wide distribution.

The term “capability” is intended to encompass equipment, personnel, doctrine and training.

This is an Artillery Senate document and is therefore not subject to editing or modifications from any other entity; however, it reflects current Canadian Armed Forces roles and missions as well as Canadian Army doctrine to the greatest degree possible.

## **The Strategic and Historical Context**

### **The Post-Cold War Period of Reductions and Divestment**

With the end of the Cold War in 1990, the Government of Canada announced the closure of Canada’s NATO bases in Germany, and the complete withdrawal of all Canadian Army and Air Forces by 1994. Although Canadian Armed Forces (CAF) personnel continue to serve in small numbers in Europe to this day, the end of a permanent forward presence in Europe, which had been maintained since 1951, represented a significant step-change in the force posture of the CAF.

Simultaneously, the institution of the CAF was challenged in two opposing directions. First, the desire for a peace dividend resulted in major force reductions. Second, as the world adjusted to a new security environment without two powerful

competing super powers, the CAF embarked upon numerous international deployments, spanning the globe, from the Balkans, to the Middle East and Africa, to Afghanistan, which introduced the requirement for significant expeditionary capabilities over strategic distances as a new normal for CAF missions.

To support overall force reductions, the RCA was reduced in size significantly. The 1<sup>st</sup> Regiment Royal Canadian Horse Artillery (1 RCHA) was “repatriated” to Canada from Germany, while 3 RCHA was reduced to nil strength and transferred to the Supplementary Order of Battle. After being briefly disbanded, 4 Air Defence Regiment was also repatriated and re-established in Canada as a relatively small Total Force (regular and reserve personnel) unit, with sub-units and personnel dispersed across numerous bases. Further institutional amalgamations continued throughout the 1990’s, with the reduction of the RCA Battle School in Shilo to detachment size, and the amalgamation of the Air Defence and Field Artillery Schools into a single institution in 1996.



Figure 1 - The M109 SP - Live Fire Training

Reductions in both capacity and capabilities also occurred – the four M109 self-propelled gun batteries in Europe disappeared, leaving six M109 batteries spread across the three regular force regiments, along with one 105mm battery in each regiment. The RCA also lost its airborne battery capability with the re-rolling of E Battery (Para) to the M109 role.

During this period the strength of the RCA declined from a peak of 2538 regular force non-

commissioned members in 1990, to a low of 1449 in 1996, before slowly climbing back to 1559 regular force non-commissioned members in 2006 - an overall reduction of 39% from 1990. The RCA also assumed the mortar role in 2002 which had previously employed approximately 450 infantrymen.

Between 1990 and 2006, the Non - Commissioned strength of the RCA declined by 39%.

The Kennedy Commission in 1953 recommended the transfer of the anti-tank role to the Armoured Corps, the disbandment of coastal artillery and the reduction in field and air defence artillery by one half. Following the Suttie Commission in 1964, the overall RCA reserve structure was reduced to 23 militia regiments and 7 independent militia batteries. That structure did not change significantly following the end of the Cold War.

Now stationed solely in Canada, the RCA found itself equipped with legacy Cold War equipment less appropriate for the Army’s new expeditionary role. Thus, the RCA participated in only the final stages of operations in the Balkans, and faced significant shortfalls in its capabilities when first deployed in Afghanistan. Nevertheless, over time, some of this legacy equipment was divested, and as operations in Afghanistan continued for a decade, the RCA slowly began to acquire more modern expeditionary capabilities suitable for counter-insurgency operations.

The RCA, throughout all of the post-cold war period, continued to be active in domestic operations from avalanche control to ice storms, G8 and G20 conferences and the Olympics.

The reserve units of the RCA underwent little structural change in the years following the Cold War. A notable exception was the re-rolling of three units (two field artillery and one infantry) to Air Defence to create a Very Low Level Air Defence capability in the Army Reserve. Although successful, for the large part, the removal from service of first the Blowpipe and then the Javelin weapons system left the three units (18<sup>th</sup> Air Defence (AD) Regiment, 1<sup>st</sup> AD Regiment, and 58e Batterie de défense aérienne) without equipment and resulted in their returning to the field role. In the remaining field artillery units, the 105mm C1 howitzer was replaced by the 105mm C3 howitzer and in the Maritimes, by 105mm LG1 howitzers no longer required by the Regular Force. Reserve gunners served on virtually all major domestic and overseas deployments during this period to include major commitments to the war in Afghanistan. In that theatre Reserve gunners served with their Regular counterparts in a fully integrated manner and assumed key roles in deployed batteries on many occasions.

### **The Royal Regiment Today**

Today, the RCA is largely reflective of the demands that have been most recently placed upon it. Regular force regiments are small from an historical perspective, but possess a broad range of capabilities from Forward Joint Terminal Air Controllers, to enhanced Forward Observation, to the 81mm mortar, to Surveillance and Target Acquisition (STA) Systems, to the firepower of the M-777 towed howitzers (10 per Regiment, of which 8 have detachments, the other two being operational reserve guns). Despite acquiring new equipment during the war in Afghanistan, the RCA remains networked primarily by voice communications. Key digital communications elements linking the sensor to the shooter have not been fielded.



**Figure 2 - F Troop, B Battery, Supporting Combat Operations in Afghanistan, September 2008**

Combined, the three regular force field regiments possess the same number of gun detachments as did 1 RCHA in the Germany era, although their ability to accurately target these systems is significantly enhanced. These same detachment members (and often those assigned to the STA role as well) provide the regular force mortar capability. These most recent enhancements are largely a legacy of improvements introduced to the RCA to support operations in Afghanistan, and are therefore fragile capabilities that will degrade over time.

Finally, with the divestment of the Air Defence Anti-tank, 35mm Gun/Skyguard and Javelin Air Defence Missile Systems, the Canadian Army no longer possesses a ground based air defence capability. Air Space Control, Air Defence expertise and a limited Tactical Uninhabited Aerial Vehicle (UAV) capability represent the current capabilities of the newly renamed 4<sup>th</sup> Regiment (General Support) RCA.

Although discussed internally during the height of the operations in Afghanistan, neither a counter gun, rocket and mortar sensor capability nor a long-range precision strike rocket capability has been introduced. A new medium range radar and a new SUAV will be fielded by 4 (GS) Regiment in the next few years thus creating a beyond line-of-sight air surveillance and a counter gun, rocket and mortar sensor capability.

The reserve force regiments and batteries continue to be equipped with the venerable 105mm C3 howitzer, acquired in the early 1950s and modified with a longer barrel in the 1990s. Reserve regiments are capable of augmenting regular regiments with well-trained soldiers and, with some conversion training, capable M777 and STA detachments.

*To advance new capabilities, the RCA will have to demonstrate its clear overall relevance and utility both at home and abroad.*

In the reserve force, the impact of Army Reserve Establishment 2013, which saw the established strengths of reserve artillery units cut by more than half in many cases, has reduced the force generation capacity of reserve units and made personnel retention and integration with regular gunner units all the more important.

### **The Royal Regiment in the Future**

To prepare for the future, and to play its essential role within the overall combined arms team of the Canadian Army, the RCA needs to develop its capabilities within the context of both domestic circumstances, as well as the challenges

of future international operations across the spectrum of conflict.

The RCA will face some of its greatest challenges over the next 20 years at home in Canada. Resources for new capabilities, and even the maintenance of current capabilities, will remain scarce. While defence funding will likely remain relatively constant, the demands upon the Capital Equipment Program will continue to grow as delayed procurements increase the gap between needs and resources. Consequently, the replacement of legacy capabilities cannot be taken for granted. Projects will experience intense scrutiny, and extensive oversight. Capability proposals will be measured against Departmental Capability Based Planning models, and evidence based reasoning will be scrupulously demanded of all proposals.

Significant human and capital resources will therefore need to be applied to pre-definition capability acquisition work. Moreover, competing personnel demands of new CAF capability in such domains as cyber and large UAVs will emerge and necessitate personnel re-allocation decisions. These demands will certainly place pressure on the greater Army for reallocation decisions, and there is no doubt that any pressure on the Army will inevitably place demands on the RCA. Therefore, every Artillery position needs to tangibly demonstrate that it is relevant to modern requirements and proportional to mission demands. Although some new requirements, such as in cyber and space domains, can and may be met with civilian personnel, the risks of combat and the legal restrictions on the employment of civilians in the application of deadly force imply the use of military personnel for most artillery functions.

To advance new capabilities for the RCA in this difficult domestic defence procurement environment, the RCA will have to demonstrate its clear overall relevance and utility both at home and abroad. The RCA will also have to rigorously prioritize its requirements, identify core capabilities, and use the Unforecasted Operational Requirement process at times to close urgent gaps. Leveraging approved common Army projects, which can enhance overall Artillery capability, will also be essential.

Internationally, security challenges will be even more daunting than during the relatively stable period of the Cold War. Emerging, and re-emerging powers will challenge the military capacity of the United States. Previously dictatorial states will continue to fracture along tribal, religious and ethnic lines. *Overall, the picture is one of instability and uncertainty.*

While Canadians, in general, proved resolute in their support of CAF operations in Afghanistan, political leaders became more attuned to the political risks associated with international interventions. Canadian governments will be reluctant to deploy CAF ground troops on combat missions. However, where reasons to do so are compelling, they will expect assurances that capabilities and capacities are adequate for the mission.

*Certain threats such as weaponized UAVs may be much more significant in the future.*

Barring forward basing of land forces for the foreseeable future, the starting point for Canadian Army operations over the next 20 years is that they will be expeditionary, over long strategic distances, and they will therefore be primarily based on medium-weight or even light forces. The Canadian Army could face state and non-state adversaries. Proliferation of advanced conventional weapons may provide our opponents, of whatever nature, with comparable or even superior tactical capabilities. The Hezbollah, for example, have been able to challenge even the most sophisticated and heavy weight capabilities of the Israeli Army. Certain threats such as weaponized UAVs may be much more significant in the future.

When the Canadian Army is deployed for combat, the capabilities and areas of expertise of the RCA are highly relevant to the political sensitivities related to minimizing casualties. With some current gaps in capability, the RCA can play a major role in overall Force Protection including: air defence early warning; counter-rocket, artillery and mortars; long range, 24/7, economical, all weather strike; as well as significant contributions to the situational awareness of a force due to the ISTAR components that the RCA can contribute to the overall system.

That said, there will remain some serious gaps in capability, in particular, defence against indirect fire and airborne threats including commercially available small UAVs capable of delivering Improvised Explosive Devices and conducting surveillance against friendly troops.

### **The Reserve Force**

It is important to note that the organization of the three close support regular regiments is comprised of 20% reservists. Within the Army, the RCA is one of the few Corps that depend upon reservists as an integral part of their establishment. Artillery reserve units successfully reinforced the regular regiments with trained augmentation during operations in Afghanistan due to the training offered by the C3 howitzer fleet. These competent soldiers were only capable of fulfilling their role due to earlier investments in sufficient training and equipment to ensure that they were capable of quickly augmenting the regular force when needed.

Institutionally, the RCA is supported by a school which depends upon significant instructor augmentation to accomplish their mission. As noted above, the regular force RCA regiments are now much less capable of providing this individual augmentation due to a high training tempo and a lack of personnel depth in all areas.

The high readiness components of the RCA span a broad spectrum of capability, but are, in the present context, challenged by significant capacity issues given the overall strength of the regular force units and the diverse range of systems fielded. Therefore, the sustainability of the RCA for enduring missions, and for missions of a larger scale, depends upon the additional capacity of a competent and capable reserve force, supported by sufficient institutional investment in equipment to support the total capability.

### **Attributes of success**

Within the Army, the roles and missions of the CAF are supported through four lines of operations in the Canadian Army Operational Framework (CAOF), namely; Prepare the Force, Modernize the Force, Sustain the Force, and Foster Engagement. Key to the CAOF is the notion that all Army activities and priorities will support one or more of the following three Army objectives:

- Deliver a strong multi-purpose and combat effective Force;
- Develop a proud and relevant Force able to conduct Adaptive Dispersed Operations (ADO); and
- Protect a ready and deployable Force across the spectrum of conflict.

For the RCA to contribute effectively to the CAOF, there are a number of key attributes for success of which the primary and most important is relevance. The following list of attributes for success not only underpins the Army's activities and priorities in the CAOF, but they must also be nested within the core capabilities of the RCA, and when combined, they will create synergy for the RCA to be a highly relevant combat arm for the Army:

- Employability and routinely employed in support of all six missions in the CFDS and all four lines of operations within the Army. Gunners should be deployed on all missions assigned to the CA, even when employed in non-traditional roles. Contributing to the Disaster Assistance Response Team is a prime example.

*Artillery capabilities must be broad from lethal to non-lethal, effective against multiple and diverse threats, while minimizing collateral damage.*

- An organization that is agile, adaptable, robust, rapidly deployable and sustainable in order to maintain a minimum operationally viable capability indefinitely.

- As a combat arm, the RCA must be responsive to global threats and evolving security challenges. In particular, the doctrine and capabilities of the RCA must not only meet current global threats, but be continuously

evolving to adapt to the changing security environment. The RCA must be ready to fight a future war with future capabilities, and not a future war with yesterday's capabilities.

- Artillery organizations, as a system of systems must be flexible to task tailor a broad range of capabilities to support up to full spectrum operations, at an appropriate level of readiness. Artillery capabilities must be broad from lethal to non-lethal, effective against multiple and diverse threats, while minimizing collateral damage.
- The RCA must be affordable in terms of being lean, agile, and highly efficient, particularly in personnel and support costs. Any planned changes must be made within the current resource operating envelope as it is unlikely that any additional personnel resources will be received from the Army.

- Artillery capabilities and doctrine must contribute to and integrate with the Whole of Government approach to operations (Joint, Interagency, Multinational, and Public - JIMP), with particular emphasis on jointness with Special Forces, the Royal Canadian Navy and Royal Canadian Air Force.
- As a small army operating in a coalition environment, the RCA must maintain close relationships with our Allies. Artillery systems must be interoperable with our NATO and ABCA Allies, paying particular attention to the USA as our closest ally.

## **The Army's approach to the future operating environment:**

The Canadian Army's approach to operating in the future environment has been well documented and continues to be adjusted in three keystone doctrinal publications; *Advancing With Purpose*, *Waypoint 2018*, and *Land Operations 2021*. The strategy for building the Army of Tomorrow is centred on a three phase process: positioning - resetting baseline functions, aligning – acquiring essential capabilities for success, and transformation - leveraging technology for Adaptive Dispersed Operations (ADO).

ADO is the focal point upon which the Army will develop its tactical doctrine for the conduct of operations in the Army of Tomorrow. Moreover, ADO seeks to gain an operational advantage over adversaries through the employment of adaptive land forces alternatively dispersing and aggregating throughout the multidimensional battlespace.

In comparison to campaigns fought in the past, ADO is a completely different operating concept of fighting. It combines the complexities of multidimensional conflict across a multidimensional battlespace with a purpose built adaptive organization in terms of time, space and purpose. It will be enabled through technology to network soldiers and leaders with integrated information systems, weapons and effects-producing platforms that will see substantial gains in battlefield effectiveness. The key distinguishing element between the Army of Today and the Army of Tomorrow will be the integration of robust, persistent information networks linking soldiers, sensors, combat platforms and commanders.

ADO has been extensively shaped by Army experience in the Balkans and Afghanistan which refined Canadian Army doctrine and tactics in counter-insurgency operations. Nevertheless, the nature of the international security environment remains largely unpredictable and volatile. The RCA must also retain its ability to operate against near-peer and equal opponent forces.

## **Royal Regiment capabilities critical to future Canadian Army success**

The concept of ADO provides significant opportunity for the RCA to contribute to Army operations across the full spectrum of conflict and to remain credible into the future. However, artillery leadership at all levels must fully understand the context of this future

battlespace and know how, as the Army's experts in firepower and effects, to exploit it using all the technological resources available and the unique skillsets derived from our core capabilities.

The one characteristic that sets artillery apart from other firepower assets is the guarantee of fire, regardless of advancements in technology and future manoeuvre concepts. The term "guarantee" equates to the certainty that an effect will be available when it is required. This quality must be the foundation for future artillery capability development to support the Canadian Army in the future across all five operational functions; Sense, Act, Command, Shield and Sustain.

Regarding the Act function, the guarantee of fire must include all-weather and day/night capabilities and a robust sustainment concept. It must include a high degree of availability with indirect fire assets able to achieve the ranges required for close support to manoeuvre and long-range precision strike.

The Sense function is critical to finding the enemy and to enable a wide range of possible effects. The RCA must ensure our STA capabilities support manoeuvre and are fully integrated with intelligence processes. It must also develop capabilities to counter enemy airborne surveillance and target acquisition systems.

From the perspective of Command, the guarantee of fire equates to process efficiencies that authorize fire equal to the tempo of operations in the future battlespace and, therefore, must include a fire support command and control system that is both integrated into CAF mission networks and also interoperable with our common coalition partners. This implies a digitized command and control system that is capable of supporting the decision cycle from sense to shoot with little or no delay. Guarantee of fire must include the protection of joint fire support command and control systems, surveillance and target acquisition systems and guidance systems against electronic attack.

The Command aspect includes the synchronization by the gunners at Battle Group, Brigade and Division levels of all aspects of targeting. It is currently unclear who leads the targeting function however the RCA brings the expertise, the indirect fire assets, the STA assets, the air and fire support coordination capacity and many of the communications channels to effectively execute this increasing complex and vital capability.

The shield function is a particular area where the gunner community must be poised to contribute. Combat experience in Afghanistan has proven that although armies fight as a coalition, they must equally be ready to survive alone. In line with that quintessential

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guarantee of organic fire support, protecting Canadian soldiers from the full spectrum of indirect and air threats, is an inherent artillery capability and one that is critical to mission success in ADO.

The importance of the Sustain function cannot be understated. The RCA must be able to move, shoot, support manoeuvre effectively and survive on an increasingly complex and dangerous battlefield. Doctrine and tactics must adapt to new sensors, vehicles, delivery systems and communications. The RCA, as stated earlier in attributes of success, must be lean and highly efficient in personnel and sustainment costs.

### **Close support to manoeuvre**

This remains the vital ground of the RCA. If this critical capability is jeopardized, the credibility and perceived relevance of the RCA within the Army will be significantly reduced. This capability will remain a priority to the Army for all deployments into a threat environment for the foreseeable future. The guaranteed provision of fire in this situation highlights the RCA's need to refine and adapt the tactics, techniques and procedures required to be highly operationally effective, regardless of delivery system.

*Successful integration and coordination is a function of the professional competence of the staff, as well as, the technological equipment available to assist the staff in managing the information necessary to make timely and decisive decisions.*

### **Fire Support and Effects Coordination**

The indirect fire system must be integrated into the activities of the force it is supporting. Artillery commanders and staff must know where, when and what effect is required. This occurs through liaison between manoeuvre commanders and their staffs at all stages of planning and subsequent execution. At the tactical level, fire support coordination includes the synchronization of fire support with the control of airspace, control of surveillance and target acquisition assets, all in support of friendly forces.

The RCA must continue to provide leadership to fire support coordination, air support coordination, and ISTAR coordination at the Battle Group, Brigade Group and higher levels as these capabilities are key enablers to successful ground operations.

Successful integration and coordination is a function of the professional competence of the staff as well as the technological equipment available to assist the staff in managing the information necessary to make timely and decisive decisions. It is recognized that technology is an important element of creating a fully integrated, digitized and network

enabled staff that can support the commander and the Army. In addition, the RCA must remain committed to training our operational and tactical staff such that they are able to provide advice that is legally and ethically precise in the delivery of lethal and non-lethal effects.

### **Persistent Tactical Surveillance and Target Acquisition Artillery**

STA artillery consists of tactical intelligence, surveillance, target-acquisition and reconnaissance (ISTAR) sensors that are commanded and controlled by the artillery. They are primarily used to detect, track, assess and, where appropriate, cue strike assets. STA artillery resources support the commander's decision-making process and are a large component of the larger tactical-level ISTAR framework. It provides commanders with surveillance and targeting information across the battlespace.

The effectiveness of a fully integrated and networked ISTAR system will enable the RCA to contribute across all of the operational functions: Command, Act, Sense, Shield and Sustain. Alternatively, the risk of allowing the ISTAR system to degrade or not be supported by the defence procurement process risks exposing our soldiers to threats that cannot be defeated, neutralized and/or interdicted. Therefore, long-range surveillance and target acquisition is a very high priority of effort that supports both lethal and non-lethal engagements throughout the area of operations, as well as, providing the inherent warning and protection from land and air based threats to the deployed army. Our ISTAR systems must be able to survive on the battlefield and we must have the capability of denying the enemy use of ISTAR systems, in particular airborne systems.

### **Precision Fire Support**

The Army's requirement for precision fire is largely dependent on range and accuracy. Accurate fire, delivered at a precise time and point of the commander's choosing can produce an effect not only at the tactical, but also at the operational level of a campaign. Precision strike also reduces the risk of collateral damage and can possibly reduce the logistic burden of the land force by using less ammunition to achieve the desired effects. Precision fire is a fundamental part of the higher commander's ability to influence operations.

Area precision fire will be a force multiplier under the Army's ADO concept in a non-contiguous battlespace that does not delineate between deep, close or rear operations. In close combat, there will always be a need to neutralize or suppress areas where the enemy is known to be but cannot be accurately located. In terms of near-peer threats, engaging an enemy with similar capability to ours will require this type of concentrated fire.

*Precision is not simply achieved through a single unity warhead. It is achieved through accurate persistent STA capability, an effective targeting and fire support coordination process, and ultimately an effective delivery system.*

Precision is not simply achieved through a single unity warhead. It is achieved through accurate persistent STA capability, an effective targeting and fire support coordination process, and ultimately an effective delivery system. The artillery must continue to educate the Army to look at precision munitions as another tool in the tool box, available to be selected as required, and not held back for special release authority or to be used only for certain targets. Likewise, the notion of accurate neutralization or suppression must remain in the gunner lexicon and be planned for with confidence during the fire planning process.

It is recognized that the ability to improve precision fire is a function of technology and having a coherent training program that is synchronized with an effective procurement strategy. The close support units should be able to provide timely and precise fire as part of their traditional close support role; however, there is a requirement to provide training opportunities to expose new soldiers and reinforce the techniques and lessons specific to these types of missions and munitions. It cannot be assumed that these missions are without special considerations. Therefore, training and improving all aspects of long-range precision strike must be an important priority of effort.

*The absence of any ground-based air defence weapon system places mission success and the lives of our soldiers at high risk.*

### **Ground-Based Defence Capability Against All Air Threats**

Countering enemy threats from the air is an implied part of the fire support system, but with a defensive mission: to protect the security and tactical freedom of the force. The threat from air systems is rapidly evolving. The ground-based air defence artillery role is becoming increasingly relevant in the current operating environment, and more so in that of ADO. The RCA must continue to impress upon the CAF leadership that, for the Army to have freedom of manoeuvre on future operations, it must have organic force protection from the full spectrum of air threats;

from aircraft to locally purchased and readily accessible commercial UAVs, as well as to indirect fire threats such as mortars and rockets. Although it is unlikely that a system will be procured in the near future that will be able to counter the full spectrum of these threats, it behoves the RCA to continue to aggressively study the requirements and pursue for the Army a solution to this increasing and high risk threat.

There is also a rapidly evolving requirement to protect and shield friendly forces from counter-ISTAR/counter-surveillance systems. This role is a critical operational capability deficiency for both domestic and deployed operations based on the ubiquitous and pervasive nature of commercially available mini-UAVs, as well as, the threat posed from weaponized UAVs that are now available to most nations.

Although the upcoming fielding of a medium range radar will improve air surveillance and locate hostile indirect fire delivery systems, the Army has no ground-based air defence weapon system and this places mission success and the lives of our soldiers at high risk.

### **Firepower in the Joint and Combined Environment**

The RCA is the subject matter expert in this realm and, without a CAF appointed lead, should continue to participate actively in, if not lead, joint fires working groups and the development of effective joint targeting procedures. The integration of joint fire support is a complex process, even more so when operating within a coalition environment. Recent coalition operations have proven that firepower in land operations is increasingly a joint and combined activity that involves a combination of land, air and naval fire, as well as the coordinated use of target acquisition data from all sources. Successful application of joint fire is the result of an effective joint targeting process in order to determine engagement priorities; locate, identify and track targets; allocate assets; engage the enemy; and, subsequently, assess the battle damage inflicted.

It is important for the RCA to exercise stewardship of the joint targeting process at the tactical and operational levels such that the Land Component Commander has an effective and competent team responsible for the integration, coordination and execution of all joint fire assets that support the Battle Group and Brigade. The Senior Artillery Commander in this team must be responsible for the command of all artillery assets as well as the efficient synchronization of all aspects of fire support, air defence, airspace coordination, and STA/ISTAR.

### **Conclusions**

The current and future security environment is a picture of instability and uncertainty denoted by emerging threats such as weaponized UAVs and the requirement to effectively counter opposing ISTAR capabilities.

The divestment of all ground based air defence assets has resulted in no in-service Army weapon capability to counter the increasing threats from UAVs of all natures and the threat of rocket, mortar and artillery attack. The fielding of a medium range radar will provide an air surveillance and hostile indirect fire weapon locating capability but the Army will possess no air defence weapon system.

Long-range surveillance and target acquisition is a very high priority of effort that supports both lethal and non-lethal engagements throughout the area of operations, as well as, providing the inherent warning and protection from land and air based threats to the deployed army.

Long range precision strike is achieved through an accurate and persistent STA capability, an effective targeting and fire support coordination process, and ultimately an effective delivery system. Training and improving all aspects of long-range precision strike must be an important priority of effort.

The RCA remains networked primarily by voice communications. Key digital communications linking the sensor to the shooter have not been fielded. The lack of progress in digitization of artillery command and control networks greatly hampers the effectiveness of ISTAR assets and the sense to act cycle.

Pressure to reduce or reallocate personnel will threaten the already low personnel strength of the RCA. Every artillery position must tangibly demonstrate that it is relevant to future requirements. The small establishments and manning of regular regiments presents a high risk to sustained operations or larger surge missions. It is imperative that the capability of the reserve force to provide well-trained soldiers and detachments be maintained.

It will be exceptionally difficult to acquire new capabilities for the foreseeable future and almost impossible to acquire new delivery systems. Capability development efforts must focus on the most crucial and be scoped to be extremely efficient in manpower and sustainment costs.

It is currently unclear who leads the targeting function however, at the battle group and brigade group level, the RCA brings the expertise, the indirect fire assets, the STA assets, the air and fire support coordination capacity and many of the communications channels to effectively execute this increasing complex and vital capability.

The Senior Artillery Commander must be responsible for the command of all artillery assets as well as the efficient synchronization of all aspects of fire support, air defence, airspace coordination, and STA/ISTAR

## **Priorities of effort**

The following priorities of effort reflect capabilities that encompass the necessary equipment, personnel, doctrine and training to make these capabilities operational effective.

1. Ground based air defence weapon capability against all natures of airborne threats including UAVs and indirect fire projectiles, 24/7, all weather, economical in personnel and sustainment costs.
2. Long endurance beyond line of sight surveillance and target acquisition systems networked into the intelligence and command decision cycle, economical in personnel and sustainment costs.

3. Long range precision strike, 24/7, high accuracy, low risk of collateral damage, economical in personnel and sustainment costs
4. Stewardship and development of the targeting function with improved effectiveness in the joint and combined environments.
5. Digitization of the artillery command and fire control system to reduce the sense to act cycle to almost real time.
6. Continued provision to the reserve component of the RCA of the guns and other systems and resources required for it to help generate and to sustain stipulated artillery organizations.

## **Key messages**

- The RCA has been and will remain a key and effective member of the Canadian Army.
- It is a family of regular and reserve soldiers that depends upon well-trained reservists to deploy and sustain operationally effective artillery organizations.
- The RCA is much more than guns and guaranteed close support to infantry – it provides beyond line of sight persistent surveillance and target acquisition, fire support coordination, airspace coordination, economical 24/7 long range precision strike, and synchronization of targeting.
- The lack of defence against mortar, gun, rocket, air and UAV threats is a high and increasing risk to Army mission success and to the lives of our soldiers.

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