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## **LONG-RANGE INDIRECT FIRE (IDF) AND THE DEEP FIGHT: IMPROVE THE ARTILLERY SYSTEM WE HAVE**

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### **JCSP 45**

#### **Service Paper**

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Service Paper

**LONG-RANGE INDIRECT FIRE (IDF) AND THE DEEP FIGHT: IMPROVE  
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By Major N.Y. Skidmore

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## **LONG-RANGE INDIRECT FIRE (IDF) AND THE DEEP FIGHT: IMPROVE THE ARTILLERY SYSTEM WE HAVE**

### **AIM**

1. The lack of long-range Indirect Fire (IDF) in the Canadian Army (CA) limits the ability to conduct deep operations without the attachment of expensive, high-value and scarce allied enablers; thus, limiting the Brigade Group construct, as detailed in *Strong Secure Engaged* (SSE), “to prevail in the most difficult circumstances – with an advanced adversary.”<sup>1</sup> What follows is an evaluation of how the CA is unprepared for deep operations against said adversary and provides recommendations to ameliorate deficiencies, even without the acquisition of a long-range IDF platform.

### **INTRODUCTION**

#### **The Deep Fight**

2. Deep operations, or the deep fight, “dictate the terms for the close fight.”<sup>2</sup> Deep operations “expand the battle area in time and space, help to shape the close battle, make it difficult for the enemy to concentrate fighting power without loss, and diminish the coherence and tempo of his operations.”<sup>3</sup> Deep operations can be decisive, but most often shape in depth<sup>4</sup> to enable the close fight. The extent of a force’s ability to conduct deep operations “is dependent upon the commander’s means of acquiring information and engaging targets.”<sup>5</sup>

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<sup>1</sup>Department of National Defence, *Strong Secure Engaged: Canada’s Defence Policy* (Ottawa: Canada Communications Group, 2017), 36.

<sup>2</sup>Department of National Defence, B-GL-371-003/FP-001, *Field Artillery Operational Procedures*, (Ottawa: DND Canada, 2008), 129.

<sup>3</sup>North Atlantic Treaty Organization. NATO Allied Administrative Publication 39 (AAP-39), *Glossary of Land Military Terms and Definitions*, (Brussels: NATO, 2016) as cited in Department of National Defence, B-GL-300-001/FP-001, *Land Operations* (Ottawa: DND Canada, 1 Jan 2008), 108.

<sup>4</sup>Department of National Defence, B-GL-300-001/FP-001, *Land Operations* . . . ., 109.

<sup>5</sup>*Ibid.*

3. Against an advanced adversary, deep operations are not just part of the Act function. Counter battery fires in the deep fight eliminate the enemy artillery system, so rocket launchers, howitzers, mortars, air defence, surveillance and target acquisition (STA) systems and most importantly the command and control (C2) system that comprehensively links sensors to effects platforms. The neutralization of the enemy artillery system, as part of the Shield function, “protects a force, its capabilities, and its freedom of action.”<sup>6</sup>

### **An Advanced Adversary’s Artillery System**

4. The Russian warfighting machine invests heavily in the deep fight.<sup>7</sup> The Russian artillery system showcased during the annexation of Crimea is composed of layered and redundant sensors in intimate support of artillery; “a command and control system, which nets their input and delivers a strike order; and, an on-call ground-based delivery system which can produce strikes within short order.”<sup>8</sup> Russian artillery would be formidable even for advanced coalition partners.

5. The Russian Army continues an artillery-centric tradition with artillery battalions forming half of maneuver brigades.<sup>9</sup> Multi Launch Rocket System (MLRS) units have been attached intimately to tactical units.<sup>10</sup> Not only do conventional howitzers exceed standard NATO ranges,<sup>11</sup> the ratio of MLRS to tube artillery has increased dramatically in just 30 years to 3

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<sup>6</sup>Department of National Defence, B-GJ-005-300/FP-001, *Canadian Forces Joint Publication* (Ottawa: DND Canada, 2011), 12.

<sup>7</sup> John K. Foley. “Russia: A Casualty Adverse Army”. *Fires: A Joint Publication for U.S. Artillery Professionals*. (Washington: Headquarters, department of the Army. September – October 2017), 5.

<sup>8</sup>Phillip Karber. ““Lessons Learned” from the Russo-Ukrainian War.” (Draft Document). (The Potomac Foundation, 6 July 2015), 13.

<sup>9</sup>Grau, Lester., Bartles, Chuck. “Integration of Unmanned Aerial Systems within Russian Artillery” *Fires: A Joint Publication for U.S. Artillery Professionals*. (Headquarters, department of the Army), July-August 2016, 37.

<sup>10</sup>Karber. ““Lessons Learned” . . . .”, 20.

<sup>11</sup>*Ibid.*, 20.

MLRS to every 4 traditional tubes.<sup>12</sup> Russian artillery has evolved to win artillery superiority in the deep fight with intimate and responsive mass fires.

6. Sensors are prized enablers, attached intimately in large numbers.<sup>13</sup> Over 14 different designs (fixed wing and some “copter”) spanning tactical and operational ranges were employed by Russia in the Annexation of Crimea. Russia was able to “identify target complexes, net multiples sensor inputs, and produce a mass strike with high-lethality area fires.”<sup>14</sup> Russia invests<sup>15</sup> in a robust artillery system, capable of enemy attrition in depth to produce favorable conditions in the close fight.<sup>16</sup>

### **CA Deep Fires System**

7. At present the CA possesses part of a deep fires support system composed of:
- a. STA. The recently acquired CU-172 BLACKJACK Small Unmanned Aerial Systems (SUAS) and AN/MPQ-504 Medium Range Radar (MRR), that will enable detection for deep operations beyond the range of existing sensors;
  - b. Increasing Interoperability. Individual Training (IT) spearheaded at the tactical-level to increase CA skills to leverage other nation’s joint enablers.<sup>17</sup> Also, increasing participation in coalition joint fire planning exercises;<sup>18</sup> and

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<sup>12</sup>*Ibid.*, 18.

<sup>13</sup>Russian UAS units are only manned with volunteer professionals: Grau, Lester., Bartles, Chuck. “Integration of Unmanned Aerial Systems within Russian Artillery” ....., 32.

<sup>14</sup>Grau, Lester., Bartles, Chuck. “Integration of Unmanned Aerial Systems within Russian Artillery” ....., 12-13.

<sup>15</sup>Rearmament of missile brigades will be complete by 2020. The BM-30 Smerch (Whirlwind) (DPICM, sub-munition, top-attack munition and thermobaric warheads) used in Russo-Ukrainian War will be upgraded: “Russia: Russian Rocket Artillery to be Rearmed with Upgraded Launchers by 2020.” *Asia News Monitor*, 30 May 2017.

<sup>16</sup>Grau, Lester., Bartles, Chuck. “Integration of Unmanned Aerial Systems within Russian Artillery” ....., 36

<sup>17</sup>Jeremy Ricketts. “Naval Gunfire Liaison Course” (Briefing Note for 5<sup>th</sup> Cdn Div Comd, 4 Regt (GS), 6 June 17), 1 – 3; Jared Gargano. “OUTCAN Training Request – Joint Fire Planning Course” (Briefing Note for 5<sup>th</sup> Cdn Div Comd, 4 Regt (GS), 22 Aug 2017), 1-4.

- c. Improving C2 systems. Canada recently joined a NATO cooperative viewed as a potential solution for NATO fires interoperability, the Artillery Systems Cooperation Activities (ASCA)<sup>19</sup>, which integrates the fire support systems of multiple nations into one interface.<sup>20</sup>

Despite the elements of a fires system existing or being acquired in Canada, and even with the generosity of our coalition partners, there remain noteworthy capability gaps. What follows is an articulation of those gaps.

## **DISCUSSION**

### **Deep Strike Capability**

8. Despite CA ability to accurately acquire targets in depth, the CA is unable to strike them in the brigade's deep fight. Our inability to shape the brigade deep fight with integral fires means we are reliant with Air Power alone or coalition partners. Long-range IDF systems are vulnerable to enemy attack, ammunition is expensive and difficult to transport, and it will be highly demanded by its own forces. Before and during the close fight, the Canadian Brigade Group may have little influence on shaping operations that directly enable the close fight.

### **Precision Solutions**

9. The appetite for precision munitions has grown since their inception. Militaries and governments are enamoured with the results of fewer rounds and the reduced risk to civilians.

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<sup>18</sup>Adam Hope. "4 Regt (GS) Participation in Ex Dynamic Front," (Briefing Note for Comd CCSB, 4 Regt (GS), 18 April 2018), 1-3.

<sup>19</sup>Macauley, D.A. Letter Requesting ASCA partnership as an observer nation. National Defense Headquarters, Ottawa, 7 July 2016.

<sup>20</sup>Simplified in other words, ASCA is like the Skip the Dishes software application on your phone, but instead of ordering supper you are ordering indirect fire from another nation. You can order in French, through a German division, to fire an Italian howitzer in near real time: *Ibid.*, 1-3.: Kevin McCaney. Defence Systems Battle Space Tech. <https://defensesystems.com/Articles/2015/10/14/Army-ASCA-Bold-Quest-fire-support-system.aspx> accessed 9 Oct 2019 Oct 14, 2015.

Joint U.S. doctrine reflects this shift in thinking: “Situational awareness, coupled with precision fires, frees commanders to act against multiple objectives.”<sup>21</sup> The demand to offer precision solutions is high.

10. Many long-range IDF systems offer precision and area firing solutions. Even with the CA’s extended-range guided M982 Excalibur round, which offers a precision solution at 40 km, there are downfalls:

- a. Russian conventional artillery ranges match our Excalibur;<sup>22</sup>
- b. Excalibur is not suited to be used in large, successive quantities (time to fire it);
- c. Jamming susceptibility.

The CA, and arguably SOF, lack surface-to-surface precision solutions for when Air Power is unavailable.

## STA

11. Unlike the existing STA systems within the Royal Canadian Artillery (RCA), which reside at the Close Support regiments,<sup>23</sup> the SUAS and MRR provide the range required to detect in depth. The SUAS boasts a 12-hour time on station and can fly 100 km from its Ground Control Station (GCS).<sup>24</sup> The towed MRR boasts considerable detection range.<sup>25</sup> Hence, their placement in the artillery General Support regiment, where they will enable the brigade deep fight, detecting beyond the reach of close support assets.

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<sup>21</sup>United States. Joint Chiefs of Staff. Doctrine for the Armed Forces of the United States. *Joint Operations: JP 3*. Washington, D.C.: Joint Chiefs of Staff, 2017, 133.

<sup>22</sup>Grau, Lester., Bartles, Chuck. “Integration of Unmanned Aerial Systems within Russian Artillery” ...., 36.

<sup>23</sup> The STA systems at the Close Support regiments, attached at brigade, are the Acoustic Weapons Locating System (AWLS), Light Weight Counter Mortar Radar (LCMR) and CU-179 Raven-B Mini UAS.

<sup>24</sup>David Pugliese. “Canadian Army to Acquire new drones-system to be based out of CFB Gagetown”. Ottawa Citizen. Last accessed 10 Oct 18. <https://ottawacitizen.com/news/national/defence-watch/canadian-army-to-acquire-new-drones-system-to-be-based-out-of-cfb-gagetown>

<sup>25</sup>The author cannot find an open source document with its range.

12. MRR functions as an air surveillance and counter-munitions radar but cannot efficiently provide coverage for both simultaneously.<sup>26</sup> It is an active radar. To improve active radar survivability, they are normally would be cued by a passive system, like the CA Acoustic Weapon Locating System (AWLS); however, AWLS lacks the depth of range.

13. Another downfall is the lack of redundant systems. Canada will purchase 10 MRR<sup>27</sup> and has purchased two SUAS systems, with potential for a third.<sup>28</sup> 4<sup>th</sup> Regiment (General Support) (4 Regt (GS)) will struggle to deploy a troop while simultaneously achieving operator High-Readiness (HR) over prolonged deployments. Without curtailing participation in HR exercises, SUAS operator currency and IT in unit lines will be extremely challenging for the unit which continuously has a sub-unit at HR. Surging both systems overseas would cripple Force Generation (FG) at home. UAS are fragile by nature. Damage during tactical training and deployments is inevitable, especially while fielding new platforms. Thus, SUAS will require a “robust in-service support plan”<sup>29</sup> to succeed.

14. More pressing still is how these sensors enable the supported arm with useful and timely information. The SUAS communicates through existing Land Command Support System (LCSS); however, the MRR, in its dual role, must pass air tracks through Tactical Data Link

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<sup>26</sup> In the ground surveillance mode it “detect[s] hostile projectiles, such as rockets, mortars and artillery to determine their impact location and locate their origin.” In air surveillance mode it will “track hostile and friendly aerial vehicles, including fixed wing and rotary wing aircraft, unmanned aerial vehicles (UAVs), cruise missiles and anti-radar missiles so that land forces can take appropriate action”. 4 Regt (GS) continues to test its limits in the field: PPI Consulting Limited. Public Services and Procurement Canada. “Medium Range Radar Systems and In-service Support: Fairness Monitor Contractor’s Final Report”. (Ottawa: PPI Consulting Limited. 28 April 2015), 1.1 Project requirement.

<sup>27</sup>Maj Andrew Nicholson (2IC 4 Regt (GS)), email correspondence with author, 13 Oct 19.

<sup>28</sup>Each system has two GCS, a maintenance shelter, five aircraft, and a portable launch and recovery system. Due to the aerial vehicles “open-architecture configuration”, 16-foot wingspan, and eight-foot body, the system can carry sensor payloads of 25 pounds. The U.S. Marines are using it beyond full-motion video, with an infrared marker, laser range finder and communications relay package: Mike Rees. “RQ-21A Blackjack SUAS Undergoes Operational Testing.” (Unmanned Systems Technology. 29 Jan 2014 accessed 8 Oct 19).

<sup>29</sup>Maj Andrew Nicholson (2IC 4 Regt (GS)), email correspondence with author, 13 Oct 19.



(TDL) and ground detections through LCSS in near real-time. The holistic C2 network to enable that does not exist. A trial is scheduled next week with the goal of passing tracks simultaneously by 2019.<sup>30</sup> These impressive sensors were acquired without prioritizing their ability to communicate and integrate as part of the existing artillery system; they may yet prove unresponsive without a depth passive cueing system, a robust supply plan, and an expedient C2 connection.

### **C2 Network**

15. The network capability gaps go beyond the MRR's. However, SSE's stated investments to "[m]odernize land-based command and control, intelligence, surveillance and reconnaissance systems"<sup>31</sup> coupled with the formal momentum<sup>32</sup> behind joining our coalition partners in a united fires interface<sup>33</sup> are promising solutions to develop a better integrated and interoperable artillery system.

### **Training**

16. Without integral long-range IDF, the CA must be a proficient customer when it relies on coalition partners. An interoperable network is insufficient. Fires staffs and commanders must be able to proficiently plan and judiciously employ these systems. Gunners must attend NATO interoperability exercises that practice these skill sets with the experts that regularly employ them to ensure our competency, build relationships of understanding and ensure that Canadian fires capabilities are understood.

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<sup>30</sup>Andrew Nicholson (2IC 4 Regt (GS)), email correspondence with author, 13 Oct 19.

<sup>31</sup>DND. SSE..., 37.

<sup>32</sup>2500-1 (CA Interoperability Coord) D Comd CA Directive Canadian Army Interoperability, dated 16 September 2016.

<sup>33</sup>Adam Hope. "4 Regt (GS) Participation in Ex Dynamic Front," (Briefing..., 1-3.

17. 4 Regt (GS) staff attend many NATO artillery operability events, which are critically important. 4 Regt (GS) has secured seats and funding on a plethora of joint fires IT in the UK and the US, like the U.S. Naval Gunfire Liaison Course<sup>34</sup> and the U.K. Joint Fire Planning Course.<sup>35</sup> However, formalizing this training over the long term and expanding it to brigade fires staff, as they too conduct joint fires, is the mechanism to future institutionalization.

## CONCLUSION

18. The CA does not possess all the elements of a healthy deep fires artillery system that would enable it to fight in depth: it lacks a long-range IDF platform, STA platform redundancy, precision options, C2 systems, a passive depth sensor, and requires more widespread interoperability exercises and training. In deploying a Brigade Group under a coalition umbrella against an advanced adversary the CA would still struggle to interoperate with its partners and, inevitably, we may have limited control of how the close fight was shaped on our behalf. Meaning, there are implications of risk to our soldiers.

19. The capability gaps in our C2 structure has been identified and will be resolved in future: SSE prioritizes the CA C2, the MMR's C2 system is being trialed, and Chief of Army Strategy continues to support a full ASCA partnership. Tactical units continue to identify and secure funding for joint interoperability training events to build relationships, understand the extent of these capabilities and become more proficient in employing coalitional enablers that Canada does not possess.

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<sup>34</sup> Jeremy Rickets. "Naval Gunfire Liaison Course" (Briefing Note . . . ., 1-3.

<sup>35</sup>Jared Gargano. "OUTCAN Training Request – Joint Fire Planning Course" (Briefing Note . . . ., 1-4.

20. Ultimately Canada is a personnel-strapped and fiscally restrained nation that may not ever wish to possess all the capabilities of a deep fires system. However, it's imperative that the capabilities it does have can seamlessly bolster the coalition during deep operations. Therefore, recommendations that follow are not centered around the acquisition of a long-range IDF platform, but instead on improving those aspects that the CA does possess, so that it can bolster the coalition's prowess in the deep fight.

## **RECOMMENDATIONS**

### **Increased Requirement for Precision Solutions**

21. Without long-range IDF and with Excalibur munition limitations, Canada should explore new variants of extended range precision ammunition.

### **STA**

22. Canada should be prepared to explore further purchase of redundant platforms. Canada should explore a passive STA platform capable of cueing the MRR in depth.

### **C2 Network**

23. The holistic C2 network solution that is compatible with our coalition partners on whom the CA relies so heavily is critical to deep fires success and coalition integration. The CA C2 system solution must be interoperable with our coalition partners. Canada should become a full ASCA partner.

**Interoperability Training**

24. The CA needs to conduct IT and exercises for the deep fight. A holistic review for brigade and division staff is required.

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