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The Royal Canadian Artillery: Fighting Yesterday's War Today

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Self-propelled artillery has been a topic of much interest in recent times, as the ongoing Russo-Ukrainian war highlights its importance in a modern battlefield. Canada does not currently possess self-propelled platforms; close support units are equipped instead with the towed M777 155mm Howitzer. Despite the notable efficacy of the M777 in the counter-insurgency context of the War in Afghanistan, Canada's current artillery capabilities are not ideal in the context of conflict with a peer or near-peer adversary. Although self-propelled artillery is a point of debate amongst soldiers of the modern day, the function of artillery that is both mobile and diverse to act as a force multiplier is not a new concept.

The word howitzer, synonymous with artillery in the modern era, is derived originally from the Czech word of *houfnice* which was an early artillery piece first used by military thinker and General Jan Žižka in the 15th century Hussite Wars. Žižka would use what would come to be known as Wagenburg tactics. These saw the use of either armoured wagons containing infantry soldiers armed with crossbows, pikes, and handheld cannons, or wagons equipped with artillery cannons. The wagons could be fired on the move, reflecting an early version of self-propelled artillery.<sup>1</sup> Employing Wagenburg tactics, Žižka was able to use the wagons as a force multiplier to achieve victory against the combined force of the armour-plated, well-trained knights of the Papacy and Holy Roman Empire.<sup>2</sup> This tactical development would continue to be used, often in conjunction with heavier siege cannons which were used to break enemy resolve and force the adversary's hand in an attack, thus creating a layered artillery effect.<sup>3</sup> Although modern wars are not fought with plate-armoured horses or knights, the ancient strategic value of having highly mobile artillery pieces remains – a capability that Canadian artillery lacks.

Canada's artillery was not always constrained to a single platform, as the value of a layered, mobile artillery fire support system was recognized and implemented in the past. During the Italian Campaign of the Second World War, Canada employed a variety of artillery systems to achieve different effects that – when used in concert – created effective and scalable support for manoeuvre elements.<sup>4 5</sup> The importance of the Italian Campaign in this argument is that it was the first instance of sustained combat at the Divisional level that the Canadian Army faced in the war, and would thus become a proving ground for tactics.<sup>6</sup> When looking at the Canadian order of battle for the Italian campaign, these strengths become quite clear. In the deep fight, the Medium Regiments of Canadian Artillery (armed with 5.5 inch and 4.5 inch medium guns) were able to deliver effects, while the 25-pounders of the field artillery regiments provided close support to infantry elements. While in support of armoured regiments, the Canadian-built Sexton

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<sup>1</sup> Sidney E. Dean, "Žižka's Wagenburg: Mobile Fortress of the Hussite Wars," *Medieval Warfare* 6, no. 1 (2016): pp. 43-46.

<sup>2</sup> Árpád, F.A. "The Effects of King Sigismund's Hussite Wars on the Art of War ." *AARMS* 9, no. 2 (2010).

<sup>3</sup> Raul-Alexandru Todika, "A Few Considerations Concerning the Presence of Hussite-Style War Wagons as Part of John Hunyadi's Army," *Acta Musei Napocensis. Historica* 56 (2021): pp. 9-26.

<sup>4</sup> Canadian Military Headquarters in Great Britain. *From Pachino to Ortona: The Canadian Campaign in Sicily and Italy, 1943*. Vol. 2. Ministry of National Defence, 10-14.

<sup>5</sup> Crake, J.E.A. "The Organization of First Canadian Army." CMHQ Report, December 12, 1946. <https://www.canada.ca/en/department-national-defence/services/military-history/history-heritage/official-military-history-lineages/reports/military-headquarters-1940-1948/organization-1st-canadian-army.html>.

<sup>6</sup> McAndrew, William J. "Fire or Movement?: Canadian Tactical Doctrine, Sicily--1943." *Military Affairs* 51, no. 3 (1987): 140-45. <https://doi.org/10.2307/1987517>.

25-pounder self-propelled gun was used to keep up with aggressive manoeuvre over challenging terrain. With the threat of armour and air assets in mind, Canada also procured anti-tank and anti-air weapons in order to effectively counter the enemy's ability to fight.<sup>7</sup> <sup>8</sup> Having this wide magnitude of capabilities and mobile ability is a battle-proven method in the employment of artillery assets; given the current equipment of the Royal Regiment of Canadian Artillery (RCA), this is a lesson learned and seemingly forgotten with time.

During the Cold War, Canada employed those principles to the development and utility of its artillery assets. The artillery had anti-air capabilities, batteries of eight M109 self-propelled howitzers, pack howitzers for airborne capabilities, in addition to a host of other assets such as the MGR-1 Honest John surface-to-surface nuclear-capable missile (SSM) system. These capabilities all but disappeared following a decrease in funding in the 1990s and early 2000s with the shift in focus from near-peer conventional warfare to asymmetrical warfare at the end of the Cold War. This created a chasm in the RCA's capabilities that has yet to be filled.<sup>9</sup> The circumstances of the past four decades have left the Canadian artillery vastly ill-prepared for battle in a peer conventional context, which – with NATO feeling the pressure of adversarial action – is a burgeoning threat on a global scale.

When discussing the lapse in development of the RCA compared to our various NATO allies, one major area of difference can be seen with equipment. The current armament of Canada's Regular Force artillery is the M777 Towed Howitzer. The M777 is a 155mm howitzer initially designed by Vickers in 1980; the first-ever deployment of the weapon to a theatre of war was not until 2006 was by A Bty, 1 RCHA in support of Operation Archer during the Afghan War (Ibid).<sup>10</sup> The M777 was designed to be employed as a lightweight, airmobile system in order to be "frequently moved and re-deployed, maximizing survivability, without encountering the IED risks faced by self-propelled systems."<sup>11</sup> In a counter-insurgency environment this type of weapon system is ideal, but despite its success as an airmobile gun, its characteristics are not wholly suitable when deployed in a modern conventional battlespace.

The use of airmobile artillery implies that the nation or force using it possesses air superiority or, parity at the very least, in order to deploy the system as intended. Its airmobile capabilities and associated design and construction has resulted in challenges in its use as a towed howitzer. A lack of a propulsion-capable auxiliary power unit (APU) makes its elevation and traverse substantially slower than modern, purpose-built towed howitzers as these functions must be carried out by soldiers on a handwheel, which proves to be taxing in sustained

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<sup>7</sup> Grebstad, David. "The Guns of Sicily The 1st Canadian Divisional Artillery in Operation Husky." *Canadian Military History* 23, no. 1 (June 5, 2015): 1.

<sup>8</sup> Hogg, Ian Vernon, Ian Vernon Hogg, and Ian Vernon Hogg. *British & American Artillery of World War 2*. London & Melbourne: Arms and armour Press, 1978.

<sup>9</sup> Haynes, Alex D. "The Force Employment Concept and the Infantry: A Proposal." *Canadian Military Journal* 9, no. 2 (2006): 38.

<sup>10</sup> Blacktail. "M777." *Military Today*. Accessed March 23, 2023. <http://www.military-today.com/artillery/m777.htm>.

<sup>11</sup> "M777 Lightweight Towed 155mm Howitzer." *Baesystems.com*. Accessed March 23, 2023. <https://www.baesystems.com/en-ca/product/m777-lightweight-towed-155mm-howitzer>.

operations.<sup>12</sup> The use of titanium in its construction – while durable – is not as flexible as steel, with the corollary being that in extreme conditions the metal is more prone to fatigue. Additionally, since titanium is harder than steel, it is significantly less cost effective to have replacement parts fabricated. Lastly, the pursuit of weight reduction meant that the lighter howitzer has a much more violent recoil, necessitating recoil-absorption mechanisms, which results in rapid deterioration of the weapons system in combat conditions.<sup>13</sup> Even with the advanced developments to make the M777 a superior airmobile weapon, it was still too heavy to be towed by most lightweight transport helicopters and patrol vehicles such as the UH-60 Blackhawk or a High Mobility Multipurpose Wheeled Vehicle (HMMWV).<sup>14</sup> While the M777 excels as an airmobile weapon that could easily be deployed between Forward Operating Bases (FOBs) in the desert, compared to other towed and self-propelled howitzers of the modern conventional era of warfare, it not only lacks the firepower but also the ease of use that is essential for quickly engaging a peer or near-peer adversary.

Canadian artillery doctrine is evolving to suit the needs of the potential theaters of operation in 2023. The limiting factor of modernizing the artillery, however, is that the M777 howitzer is a detriment to the efficiency of the new doctrine. Modern methods of occupying gun areas in Canadian doctrine include Firing Points and Manoeuvre Deployments, which both require the rapid occupation and evacuation of multiple gun areas within a few kilometers' vicinity of each other, harkening back to Cold War tactics. The purpose of firing points and manoeuvre deployments is to offset the risk of counter-battery (CB) fire, which in theory is a tactically sound method of being able to provide indirect fire to forward elements while protecting the gun line. The M777 makes this process extremely difficult to achieve in a short amount of time and is physically taxing on our gunners. We train with the understanding that, in a modern conflict, CB fires can be expected on the gunline within no more than seven minutes of the first round being fired from our occupied position. The achievement of survivable fire and movement within this timeline requires rigorous training in mounting the nearly 10,000-pound M777 onto a Gun Tow vehicle and vacating the position efficiently, while battery reconnaissance must constantly verify artillery manoeuvre areas that will support the immense size of an M777 Battery; all while operating in a battery that is generally understaffed with an already daunting tempo on exercise or operation.

Even with a highly trained and motivated Battery, seven minutes is an extremely difficult timing to achieve with the M777. When dealing with the threat of CB fire, time is of the essence for the survivability of the guns and of the supported arms. This time is again influenced by external factors such as terrain, weather, equipment, and personnel state, which can greatly affect the speed in which a position is vacated. Spending half of that precious time to raise and attach a heavy and unwieldy gun to the truck can ultimately be the difference between life or death for soldiers. Doctrinally, the RCA is recognizing the importance of fire and manoeuvre in an era where the gunline is susceptible to CB fire and strikes from adversary howitzers and multiple

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<sup>12</sup> Blacktail. "M777." Military Today. Accessed March 23, 2023. <http://www.military-today.com/artillery/m777.htm>.

<sup>13</sup> Blacktail. "M777." Military Today. Accessed March 23, 2023. <http://www.military-today.com/artillery/m777.htm>.

<sup>14</sup> Blacktail. "M777." Military Today. Accessed March 23, 2023. <http://www.military-today.com/artillery/m777.htm>.

launch rocket systems (MLRS), but the limiting factor in properly executing that doctrine lies in the equipment of the modern Canadian gun batteries, specifically the M777 Howitzer.

The root of the changes in the RCA's doctrine is based on a change of modern threat. The Russian artillery operates with manoeuvre in support of fires and are at the forefront of their strategic-level planning while the howitzers and MLRS outrange and outnumber our capabilities. For example, the Russian 2S35 Koalitsiya-SV can range 40 kilometers at a rate of nine to 16 rounds per minute.<sup>15</sup> The reality for the RCA is that we cannot compete with the quantity of artillery our foreign adversaries have based on personnel and budget restraints, so we therefore must doctrinally be a superior corps that is adaptive and reactive in the face of an adversary that can use sheer volume of fire at long range.<sup>16</sup> The adaptation and procurement of lighter direct support guns and self-propelled artillery systems is the solution to enabling success on the modern battlefield, in conjunction with manoeuvre type deployments such as firing points. This change to our armament would increase our survivability when faced with CB while simultaneously enabling the Canadian artillery to reposition quickly and provide responsive and swift indirect fire to our supported arms.

With the shift of operational focus from counterinsurgency to conventional war, there has been an increased requirement for armies to ensure their field artillery remains mobile, reliable, and able to provide appropriate firepower. Within NATO and allied nations, many weapon systems exist which meet these needs, whilst others have exceeded expectations through experience in battle. Of note, two stand out above the rest which could greatly benefit the RCA: the Swedish ARCHER, and the French Caesar. The ARCHER is a fully automated 155mm self-propelled howitzer manufactured by BAE Systems in Sweden. The system can range targets up to 40 kilometers away with standard ammunition, and up to 60 kilometers with precision projectiles. The system's cab is fully armoured with bullet and fragmentation-proof windows and includes a remote-controlled weapon system with a 7.62 general purpose machine gun, in addition to externally mounted situational awareness sensors. The ARCHER is known for its ability to deploy rapidly, taking approximately 20 seconds for the weapon to come into action. A system like this is of the utmost importance when operating in a high CB threat environment and utilizing manoeuvre deployments.<sup>17</sup> <sup>18</sup> The Caesar is also a 155mm self-propelled howitzer. The weapon was developed by Nexter Systems in France, with the French Army having first received the Caesar in 2008. The system is currently used by many other countries including Denmark and Czech Republic.<sup>19</sup>

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<sup>15</sup> Satam, Parth. "Russia's 200 Year-Old 'Artillery First' Doctrine That Devastated Ukraine Even Outranges & Outguns US Systems." Latest Asia, Middle-East, EurAsian, Indian News, June 24, 2022. <https://eurasianimes.com/russias-200-year-old-artillery-first-doctrine-that-devastated-Ukraine/>.

<sup>16</sup> Dr. Thomas Withington. "The Art of Countering Artillery Fires in Ukraine." Armada International, Dec 16, 2022. <https://www.armada-international.com/2022/12/the-art-of-countering-artillery-fires-in-ukraine/>.

<sup>17</sup> "Archer FH77 BW L52 Self-Propelled Howitzer." Army Technology, February 3, 2022. <https://www.army-technology.com/projects/archerhowitzer/>.

<sup>18</sup> "ARCHER Mobile Howitzer." Baesystems.com. Accessed March 23, 2023. <https://www.baesystems.com/en/product/archer>.

<sup>19</sup> "Caesar 155mm Artillery System." Army Technology, November 22, 2022. <https://www.army-technology.com/projects/caesar/>.

The current state of the RCA's equipment leaves Canada vastly underprepared for a modern peer or near-peer conventional threat. Rather than looking to past conflicts to inform the procurement of weaponry, it is critical that the current global threat informs these decisions and processes. With the M777 quickly becoming outdated as a close-support weapon, in addition to logistical challenges in the sourcing of parts and maintenance of these guns, the RCA should not focus solely on updating doctrine and tactics but also on the development and procurement of equipment that reflects the modern battlespace. Canada relies on our allies for their mobile and diversified capabilities – the deep fight, air defense, and the ability to unmask their guns and conduct fire and manoeuvre – when there is a Corps full of Canadian Gunners champing at the proverbial bit to do the same. Artillery has been by far the most crucial asset in the winning of wars for centuries. Critical thinking, agility, and adaptability can only go so far in increasing survivability and success on the M777 gunline; advancements by way of suitable equipment ought to be the way forward.

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