



## Canada's Hyper-Fixation on Hypersonic Technology

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### Introduction

Hypersonic weapons have received significant attention by the Canadian security and defence community. Academic, think tank, and policy discourse about North American security frequently point to these advanced missiles as new and emerging threats to the continent that the North American Aerospace Defence Command (NORAD) must adapt to. This technological focus has also led to speculations about how Russia could use them to attack North America, as well as their destabilizing potential in an era of great power competition.

However, these assertions are exaggerated. There is little evidence to suggest that Russia has the ability or intent to directly attack North America. Focusing purely on Moscow's hypersonic capability, which is questionable at best, has ignored key considerations about its conventional military doctrine, and limited capacity to sustainably produce these missiles in war time. These constraints do not mean that Canada should stand by and do nothing as Russia continues to develop and deploy hypersonics, but Ottawa's policy choices must be based on what Moscow *will likely* do, instead of what it *could* do.

### Overhyping Technology

Identifying this hyper-fixation on technology is necessary to course-correct not only how we discuss hypersonic weapons, but also emerging threats more broadly, which currently assumes that trending issues like cyber and quantum are inherently new in nature. Instead, they are part of a persistent problem in international relations where states innovate to obtain an advantage over their adversaries.<sup>1</sup> There is nothing *new* or *emerging* about this issue. While technology does contribute to innovation, they only play an indirect role, with political and geographic factors making an equal, if not greater, contribution.<sup>2</sup>

However, the Canadian security and defence discourse frequently bases its threat assessments on the impacts of hypersonic technology on North American security. For example, hypersonic weapons are considered to be one of many capabilities that render the continent potentially more vulnerable than it was during the Cold War.<sup>3</sup> Attention is also placed on their global range, which gives Russia



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the ability to attack Canada from its own Arctic territory, and potentially target vulnerable economic infrastructure in the Canadian North.<sup>4</sup> Furthermore, these weapons would allow Moscow to directly strike American soil to disrupt Washington's ability to respond to acts of conventional military aggression in Europe.<sup>5</sup>

Another concern is the impact of hypersonic weapons on the strategic environment. Because they cannot be classified as a ballistic or an air missile, it is challenging to track, identify, or intercept them.<sup>6</sup> This issue would have two implications. First, Canada's policy of non-participation in ballistic missile defence (BMD) will be rendered problematic, and further ignorance of this new reality will risk marginalizing NORAD's role in continental defence, where the U.S. would make decisions without consulting Canada.<sup>7</sup> Second, hypersonic weapons will blur the line between offence and defence, since anti-hypersonic interceptors would also provide an anti-satellite capability.<sup>8</sup>

However, this discourse assumes that hypersonic technology alone can incentivize Russia to attack Canada or the United States, without giving thought to whether Moscow's conventional military doctrine prescribes such a strike. This does not include Russia's official Military Doctrine, which is an official policy document that states Moscow's views about the nature and character of war, rather than providing a guideline for deploying troops.<sup>9</sup> Even though a hypersonic weapon *could* be used to attack North America, it does not automatically mean Russia is considering such an action, especially since it is fighting a protracted war in Ukraine. Suggesting otherwise, based on appraisals of new and emerging technology, results in a misinformed discourse that focuses on countering threats that unlikely exist.

### **Constraints on Russia's Hypersonic Capability**

There are three reasons why this discourse is flawed. The first is that it fails to account for Russia's military constraints. No state has unlimited resources,<sup>10</sup> and the Kremlin is no exception. Despite the sensationalism surrounding hypersonic weapons as a new and potentially destabilizing capability, they are currently a niche, expensive technology, which will not be deployed en masse anytime soon.<sup>11</sup> This reality is demonstrated by the low sample size of hypersonic weapons used in Russia's bombing campaign in Ukraine. According to Table 1, within the total number of projectiles launched against Ukrainian infrastructure from May 2023 to May 2024, hypersonics consist approximately 3.7% of them.

*Table 1: Sample Sizes*

<b>Weapons</b>	<b>Civilian</b>	<b>Military</b>	<b>Unknown</b>	<b>Total</b>
Missiles	146	65	171	382
Drones	106	46	121	273
Hypersonics	10	9	6	25

The low rate of hypersonic attacks stems from Russia's limited ability to sustainably produce these new weapons. According to the Institute for the Study of War (ISW), by January 2024, Moscow could only manufacture four *Kinzhals* on a monthly basis.<sup>12</sup> Additionally, according to Ukrainian intelligence, by April 2024, Moscow only owned around 40 *Tsirkons*, with a production rate of ten per month.<sup>13</sup> Despite Russia's intentions to improve this low production rate by 2024,<sup>14</sup> its constraints remain an issue in 2025. Ukrainian intelligence notes that Moscow owns almost 150 *Kinzhals*, and can only produce 15 on a monthly basis.<sup>15</sup>

Second, a trend analysis of Russian strikes on Ukraine showcases the limited utility of hypersonics in military operations. Rather than displaying a revolutionary strategy, the Russian military incorporated them into an existing doctrine that prioritizes civilian infrastructure, with strikes on military assets playing a supporting role. According to Figures 1 and 2, drone and missile attacks on civilian targets either approximately meet or surpass 10 digits, whereas strikes on military infrastructure only breach the threshold twice.

Even though military attacks occur less frequently, they should not be disregarded. An additional comparison of the figures below showcases that the frequency of military attacks during June 2023 was not much lower than civilian strikes. The same month also saw a higher number of drone attacks on military infrastructure, compared to civilian sites.<sup>16</sup> Furthermore, a decrease in civilian attacks is juxtaposed with an increase in military attacks during April and May 2024.

Figure 1: Strikes on Civilian Targets

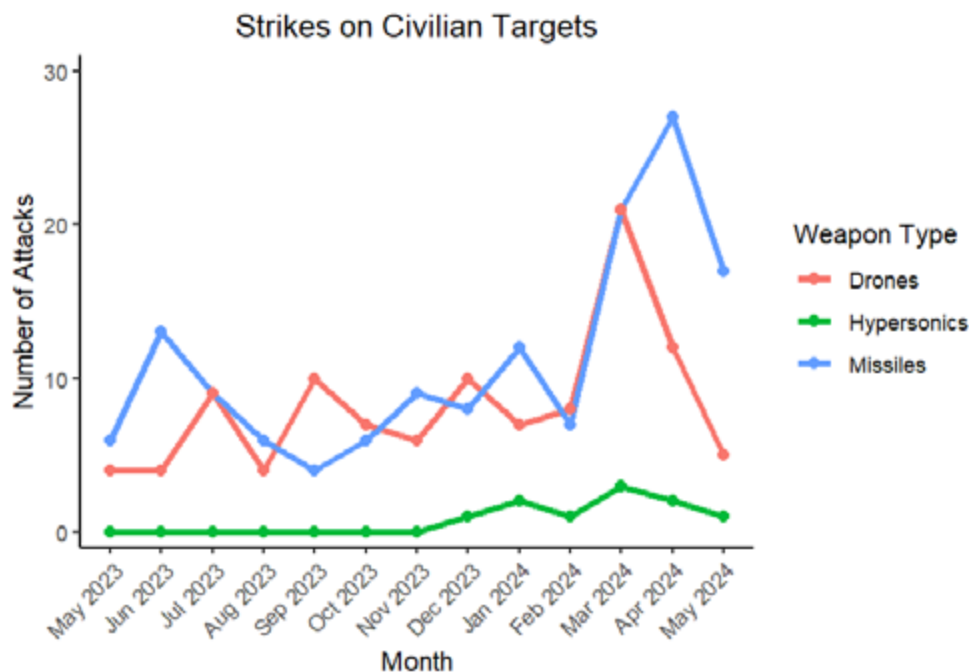
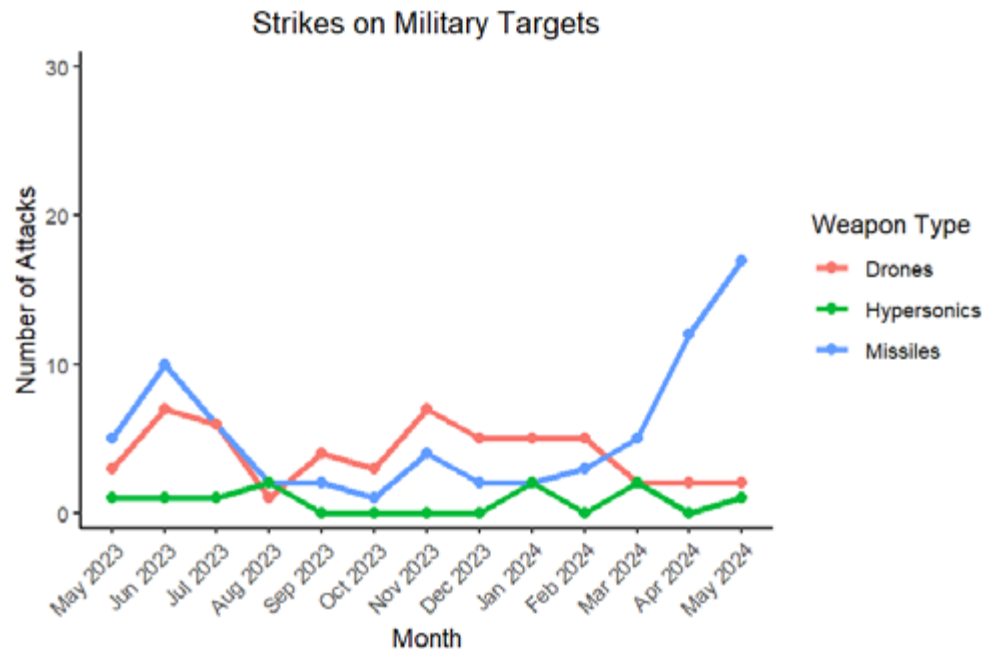


Figure 2: Strikes on Military Targets



Third, hypersonic missiles provide few technological advantages over current nuclear weapon systems. Many ballistic missiles are equally fast, with some capable of manoeuvring and receiving terminal guidance during the final stage of flight to improve accuracy.<sup>17</sup> Furthermore, ballistic missiles can already overwhelm most missile defences, and follow lower-altitude trajectories to compress warning timelines. Finally, the heat generated in flight by hypersonics makes them more visible to space-based sensors than existing cruise or ballistic missiles.<sup>18</sup>

Hypersonic weapons are also likely to travel more slowly than ballistic missiles upon reaching their targets, which makes them more vulnerable to interception.<sup>19</sup> Because hypersonics travel in the atmosphere, they are subject to air resistance, which imposes a drag force that restricts their speed, range, and manoeuvrability.<sup>20</sup> In contrast, because ballistic missiles travel in space, which has essentially no air density, they are not affected by this drag force. While this flight path extends beyond the atmosphere, increasing the trajectory's length, ballistic missiles reach the final phase of flight at higher speeds than hypersonics, and strike their targets more quickly.<sup>21</sup>

Furthermore, the accuracy of Russian hypersonics is limited. For example, the *Avangard* has a circular error probable (CEP) estimate<sup>22</sup> of 220 metres, compared to many of Moscow's intercontinental ballistic missiles that range from 220 to 500 metres, and the *Kinzhal* is slightly less accurate than existing nuclear-armed air-launched weapons.<sup>23</sup> While the *Tsirkon* – which currently does not have a known CEP estimate – could be used to attack ICBMs on American soil, they would have to be deployed close to the United States coastline because of their short range of 1,000 kilometres.<sup>24</sup> This strategy is problematic and unlikely, since Russian sea-based launch platforms would be vulnerable to attack by the U.S. Navy.<sup>25</sup>

## **Policy Recommendations**

### **1. Avoid Adopting a Deterrence by Denial Posture**

Canada should continue modernizing NORAD's radar systems. Even though Russian conventional hypersonic missiles will unlikely attack North America, obtaining the Arctic and Polar Over-the-Horizon-Radar systems are necessary to upgrade the command's surveillance capabilities.<sup>26</sup> However, this effort should primarily be done to reinforce deterrence by punishment, by ensuring NORAD can detect incoming nuclear weapons.

Indeed, scholars have claimed that nuclear deterrence is moving beyond traditional concepts of mutual vulnerability.<sup>27</sup> Arguments have also been made in favour of incorporating deterrence by denial – which increases the cost of aggression – alongside deterrence by punishment – which threatens retaliation – suggesting that it is more credible against new threats.<sup>28</sup> Furthermore, because conventional hypersonic missiles are not constrained by traditional nuclear deterrence postures, there are no mechanisms to discourage Russia from using them, and NORAD would be unable to stop an incoming attack.<sup>29</sup> Thus, to defend against these threats, some experts argue that Canada would have to consider joining the United States' Golden Dome initiative, which aims to provide an integrated air and missile defence system of systems to defend Alaska and the continental U.S. from air, aerospace, and space-based threats.<sup>30</sup>

However, these assertions are misguided for five reasons. First, in the conventional realm, it is necessary to deny “an aggressor [their] battlefield objectives.”<sup>31</sup> but attempting to apply this logic to the nuclear realm risks confusing deterrence with defence, which are fundamentally different concepts. Deterrence is not achieved by defensive capabilities, but by promising punishment that nullifies the value of the aggressor's gains. In contrast, defensive forces promise that the aggressor will destroy itself by trying to overcome them.<sup>32</sup> Second, considering that the Golden Dome initiative is estimated to cost 175 billion USD,<sup>33</sup> it is far too expensive for Canada to make any contributions other than modernizing NORAD's radar systems.

Third, applying denial capabilities to the nuclear realm does not dissuade an adversary from attempting to undermine them. On the contrary, states that feel disadvantaged by missile defenses will be incentivized to develop countermeasures, with a clear example being the Kremlin's development of hypersonic missiles to bypass the United States' BMD systems.<sup>34</sup> Fourth, because Russia cannot sustainably produce enough hypersonics as it persists fighting a protracted war in Ukraine, it is highly unlikely that Moscow would consider striking Canada or the United States with a conventional hypersonic missile, since it would only trigger Article 5 and bring NATO into direct military conflict with Russian forces in Europe.

Finally, Canada is still protected against nuclear threats by the United States' nuclear deterrent. Despite the Trump administration strongly urging American allies to be responsible for their own defence, Undersecretary of Defense for Policy Elbridge Colby has signaled that Washington will most likely adhere to the 2018 Nuclear Posture Review, which affirms the U.S.'s commitment to maintaining extended deterrence.<sup>35</sup> This statement demonstrates to adversaries that it will respond to the use of military force against allies.<sup>36</sup> Considering Canada's long-lasting alliance with the United States since 1940, characterized

by a defence relationship that seeks to ensure mutual physical security,<sup>37</sup> Ottawa is also protected by Washington's nuclear triad, and should not excessively worry about nuclear-armed Russian hypersonic weapons.

## **2. Provide Air Defences and Long-Range Strike Capabilities for the Canadian Army in Latvia**

Consequently, while Ottawa should not discard its pledge to invest in air and missile defences, they should not be stationed in North America, since it will only further convince Russia that the West is attempting to undermine its nuclear deterrent.<sup>38</sup> Additionally, obtaining "ground-based air defences to defend critical infrastructure" on the continent<sup>39</sup> is not the best use of national resources, since the likelihood of a conventional or nuclear attack on Canada is low. Instead, these new capabilities should be provided to Operation REASSURANCE's Land Task Force, which is stationed in Latvia.<sup>40</sup> Despite announcements to invest in short-range air defences to counter adversarial aircraft and drones, the Canadian Army still lacks the capability.<sup>41</sup>

Additionally, countering hypersonic weapons will not be the only concern for the Canadian Armed Forces (CAF) stationed in Europe, since Russia has a larger stockpile of conventionally-armed ballistic and cruise missiles.<sup>42</sup> Exacerbating this issue is that although Moscow prioritizes attacking civilian infrastructure, it does not neglect strikes on military targets. While they likely play a supporting role in Russia's precision-strike doctrine, Canadian service members in Latvia still require sufficient defences. The best system available to meet these needs is the Patriot system. Not only has Ukraine employed it to intercept Kinzhal missiles, but it can also defeat enemy aircraft, tactical ballistic missiles, and cruise missiles.<sup>43</sup>

The Department of National Defence should also fulfill its promise to provide long-range missiles for the CAF by continuing to collaborate with the United States to obtain twenty-six HIMARS systems, which can launch missiles from approximately 80 to 500 kilometres.<sup>44</sup> This option is not without drawbacks. First, they are highly expensive, with the potential contract costing approximately \$2.4 billion. Combined with purchasing Patriots, which have a price tag of over 1 billion USD for one system,<sup>45</sup> it will already be a costly order. Second, placing a significant number of HIMARS in Latvia would be perceived by Russia as provocative. Historically, Moscow has been fearful of being technologically inferior to Western militaries, especially that of the United States, believing that new precision-strike technologies – as was used in Iraq and Serbia in 1991 and 1999, respectively – would eventually be employed against Russian soil.<sup>46</sup>

However, they are less destabilizing than drones, which are cheaper to manufacture, as demonstrated by Russia's arms production.<sup>47</sup> Much of Moscow's military capabilities, including nuclear weapon storage facilities, air bases, air defences, and early-warning radar systems, are stationed near Ukraine, and are vulnerable to drone attacks that can be launched from NATO-aligned countries with little warning. Drones can even travel as far as Moscow itself, and bypass Russian air defence systems.<sup>48</sup> The Ukrainian military has also used drones to attack Russian aircraft, including nuclear bomber jets, some of which were stationed as far as the Arctic.<sup>49</sup> Thus, Moscow will likely perceive the mass deployment of drones near its

border as escalatory, and spark fears in the Kremlin about similar operations being carried out by Western militaries against Russia.

Furthermore, the risk of escalating already hostile relations with Russia, through the deployment of HIMARS in Europe, can be minimized by not directly stationing these systems in Latvia, while ensuring their prompt delivery to the CAF, should deterrence fail. One solution would be engaging with Poland to store them on Polish soil, near the Lithuanian border, and collaborating with Poland, Lithuania, and Latvia to invest in resilient logistics infrastructure to transport these systems to the Latvia brigade as soon as possible.

### **Conclusion**

The Canadian security and defence community needs to course-correct how it discusses hypersonic weapons, and emerging threats in general. It should start by discarding the term “emerging threats” altogether. Not only does it disregard adversarial intentions in favour of technological hype, but it also gives the illusion that current security challenges are new in nature, instead of being a variant of the same problem. In an anarchic international system that is inherently competitive, states are always seeking new ways to obtain an advantage over their competitors.<sup>50</sup> As Kenneth Waltz explains, “The possibility that conflict will be conducted by force leads to competition in the arts and the instruments of force.”<sup>51</sup> There is nothing new or emerging about this reality. Hypersonic weapons are merely an evolution in precision-strike weaponry and nuclear weapon delivery systems,<sup>52</sup> not a superweapon with the inherent power to destabilize international politics, and it is time we stop treating them as such.

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