

# ADVANCE U.S. INTERESTS BY GIVING UKRAINE THE WEAPONS IT NEEDS NOW

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MAY 3, 2023

## INTRODUCTION

As Ukraine prepares to launch its much-anticipated spring counteroffensive, some in Washington are casting doubt on what Kyiv can achieve.<sup>1</sup> Ukrainian forces no doubt will face considerable challenges, but their battlefield prospects hinge largely on the level of support they receive from the West. The United States and its allies can and must do more to aid Ukraine. Helping Kyiv defeat Russian President Vladimir Putin’s unprovoked aggression and liberate Ukrainian territory is not only the right thing to do but will enhance U.S. and allied security.

To be sure, the Biden administration and America’s Western allies deserve credit for providing Kyiv with substantial amounts of military aid. This support enabled the Ukrainian military to stay in the fight and eventually retake swathes of territory in the country’s east and south. As Kyiv prepares for its spring counteroffensive, the Western coalition has expanded its assistance to help Ukraine restore its “territorial integrity,” as President Joe Biden declared in January.<sup>2</sup> Of the over \$35 billion in U.S. military aid committed to Ukraine since February 2022, nearly half has come since December. Washington has provided new capabilities, such as Bradley infantry fighting vehicles and Stryker armored personnel carriers, as well as combined-arms training for Ukrainian troops. Allies have also stepped up, providing — after much debate — tanks and other armored vehicles.

Yet Ukraine still faces gaps in key areas. The United States and its allies can resolve at least some of these shortcomings if they muster sufficient political will. This additional aid would not be charity but a prudent investment in U.S. national interests. By exhausting Russian forces, America’s Ukrainian partners are diminishing the most immediate threat to the NATO alliance. Supporting Ukraine also strengthens deterrence of China and other authoritarian powers contemplating military action against their smaller neighbors.

The success or failure of Kyiv’s upcoming counteroffensive will likely determine the future trajectory of the war. If it succeeds, Ukraine will not only liberate additional territory but will likely also attract further Western support. This would put Kyiv in a strong position for future fighting and any eventual peace negotiations. But Vladimir Putin is betting that if the counteroffensive fails, U.S. resolve will falter amid calls to push Kyiv into premature peace talks.

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1. Jonathan Lemire and Alexander War, “Biden’s team fears the aftermath of a failed Ukrainian counteroffensive,” *Politico*, April 24, 2023. (<https://www.politico.com/news/2023/04/24/biden-ukraine-russia-counteroffensive-defense-00093384>)

2. President Joe Biden, The White House, *Remarks to the Press*, January 25, 2023. (<https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/01/25/remarks-by-president-biden-on-continued-support-for-ukraine>)

Instead, by maximizing support for Ukraine now, the West can help Ukraine shorten the war and make good on the aid already invested. This memo identifies four essential forms of support Kyiv will need for its counteroffensive and beyond. This is not the only assistance Ukraine requires, but it is urgent.

First, the United States and its allies should provide more armored fighting vehicles to fill out the three army corps Kyiv is forming. Ukraine will need these vehicles, along with additional mine-clearing and bridging equipment, to overcome heavily entrenched Russian defenses.

Second, the West needs to address gaps in Ukraine's air and missile defenses. Otherwise, the Russian Air Force may gain greater latitude both to support Russian ground troops and to strike deep behind the front lines. This could disrupt Ukraine's counteroffensive.

Third, the Biden administration should grant Kyiv's longstanding requests for Army Tactical Missile System (ATACMS) missiles. This would allow Ukraine to strike key Russian military targets far beyond the range of its current Western-supplied rocket artillery systems, undermining Russia's ability to resist attacking Ukrainian forces.

Finally, to help ensure Ukraine has enough artillery ammunition to sustain high-intensity operations, the administration should send Kyiv cluster munitions. While critics note that these munitions can endanger civilians, Ukraine's elected leaders believe the rewards outweigh the risks. Washington should respect that judgment.

Ukraine stands a good chance of liberating more of its territory in the months ahead. But it needs the tools to do so. While Ukrainians are fighting for their homeland, their efforts contribute directly to the security of NATO and America's national interests.

## **ARMORED FIGHTING VEHICLES**

The Ukrainian military will need a large number of armored fighting vehicles (AFVs) during its upcoming counteroffensive, not to mention follow-on phases of the war. The United States and its allies have already pledged a considerable number, comprising a wide variety of infantry fighting vehicles (IFVs), armored personnel carriers (APCs), tanks, and other armored vehicles. IFVs are key for supporting tanks and dismounted infantry, while APCs enable troops to move with greater security, although they generally have limited firepower.

Currently, Kyiv does not have enough armored vehicles. "For our counterattack to be successful, we require an increase in such supplies," Ukraine's prime minister explained to Secretary of Defense Lloyd Austin during an April 12 visit to Washington.<sup>3</sup> The Ukrainian military will need many AFVs, along with mine-clearing and bridging equipment, to break through Russian lines and then exploit those openings. Without sufficient armored vehicles, Ukrainian troops will likely suffer higher casualties even if their counteroffensive ultimately proves successful.<sup>4</sup>

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3. Prime Minister Denys Shmyhal, U.S. Department of Defense, *Remarks Before Meeting With Secretary of Defense Lloyd Austin*, April 12, 2023. (<https://www.defense.gov/News/Transcripts/Transcript/Article/3360231/secretary-of-defense-lloyd-austin-hosted-bilat-meeting-with-denys-shmyhal-prime>)

4. A former Ukrainian commander noted as much last month. See: "Former Aidar commander gives four requirements for successful Ukrainian counter-offensive," *The New Voice of Ukraine* (Ukraine), April 2, 2023. (<https://english.nv.ua/nation/the-four-requirements-of-successful-ukrainian-counteroffensive-according-to-former-aidar-commander-50314980.html>)

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*“For our counterattack to be successful, we require an increase in ... supplies” of armored fighting vehicles, Ukraine’s prime minister explained to Secretary of Defense Lloyd Austin during an April 12 visit to Washington.*

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One can estimate how many AFVs Ukraine needs based on the number of new brigades it is building ahead of the counteroffensive. According to media reports, Kyiv is forming three new army corps, each with six maneuver brigades — or 18 in total — plus support units. The new brigades include several thousand troops apiece, equipped largely using Western aid.<sup>5</sup> These reports track with open-source evidence confirming that since late last year, Ukraine has sought to stand up or fill out at least that many mechanized infantry brigades and similarly equipped marine and air assault brigades.<sup>6</sup> Ukraine is also expanding existing units into nine assault brigades under its National Guard<sup>7</sup> and apparently intends for at least some of them to contain mechanized units.<sup>8</sup>

The typical Ukrainian mechanized infantry brigade includes three mechanized infantry battalions, a tank battalion, and various other sub-units (artillery, engineer-sapper, logistics, etc.). At least on paper, each mechanized infantry battalion should have around 40 IFVs or 45 APCs. The tank battalion should have 40 tanks.<sup>9</sup>

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5. “Ukraine is building up its forces for an offensive,” *The Economist* (UK), March 6, 2023. (<https://www.economist.com/europe/2023/03/06/ukraine-is-building-up-its-forces-for-an-offensive>); Yaroslav Trofimov, “Ukraine, Russia Gird for a Decisive Spring Campaign After a Bloody Winter,” *The Wall Street Journal*, March 13, 2023. (<https://www.wsj.com/articles/ukraine-russia-gird-for-a-decisive-spring-campaign-after-a-bloody-winter-a3beef16>). This goal aligns with the target set in a September 2022 article authored by General Valeriy Zaluzhnyi, the Ukrainian military’s commander-in-chief, and Lieutenant General Mykhailo Zabrodskyi, first deputy chairman of the Ukrainian parliament’s national security, defense, and intelligence committee. They said Ukraine needed to form “one or more operational (operational-strategic) groupings of forces consisting of 10 to 20 combined arms brigades, depending on the intent and ambitions of the Ukrainian Command.” They noted that this “could be done exclusively by replacing the main types of armament available to the already existing brigades with modern ones, provided by Ukraine’s partners.” General Valeriy Zaluzhnyi and Lieutenant General Mykhailo Zabrodskyi, “Prospects for Running a Military Campaign in 2023: Ukraine’s perspective,” *Kyiv Post* (Ukraine), September 8, 2023. (<https://www.kyivpost.com/post/1369>). At least one of the three army corps may be a reserve corps.

6. Author review of official social media accounts associated with these brigades as well as public crowdfunding requests pertaining to the brigades. Ukraine appears to be standing up at least 13 mechanized infantry brigades as part of its Ground Forces while creating three more on the basis of existing units. Kyiv is also forming an air assault brigade and at least two marine brigades, equipped similarly to its mechanized infantry brigades. In addition, Ukraine is standing up a “jaeger” infantry brigade plus an infantry brigade (probably light) under the Ukrainian Air Force.

7. Ukrainian Ministry of Internal Affairs, Press Release, “У «Гвардії наступу» з’явиться нова дев’ята бригада – «Хартія» [The ‘Offensive Guard’ will have a new ninth brigade – ‘Charter’],” April 11, 2023. (<https://mvs.gov.ua/uk/news/u-gvardiyi-nastupu-ziavitsia-nova-deviata-brigada-xartiia>)

8. See, for example: First Presidential Brigade, *Facebook*, March 17, 2023. (<https://www.facebook.com/NGU3027/posts/pfbid04knurDUMRyXL7RbaHAh25PAKf88XoEKFmLdvAWvFQd5jXib9WAvyEq5HL6TSdHYyl>); @nvua\_official, *Telegram*, April 15, 2023. ([https://t.me/nvua\\_official/47918](https://t.me/nvua_official/47918)); @lobbyxArmy, *Telegram*, April 13, 2023. (<https://t.me/lobbyxArmy/95>)

9. Those 40-45 vehicles are spread across three mechanized infantry companies and various other sub-units. Each company includes three platoons of three vehicles, plus the command vehicle. APC companies should also have an anti-tank platoon equipped with three APCs. Some brigades have more than three mechanized infantry battalions or also have a motorized infantry battalion. [*General Tactics “Mechanized (Tank) Battalion in General Military Combat”* (Kyiv: Ukrainian Ministry of Defense, 2016). ([https://www.ifnmu.edu.ua/images/studentam/pidgotovka\\_oficeriv\\_zapasu/literatura/kurs\\_lekcii.pdf](https://www.ifnmu.edu.ua/images/studentam/pidgotovka_oficeriv_zapasu/literatura/kurs_lekcii.pdf)). Ukraine has adopted the NATO-style four-tank platoon, although some Western countries have sent Kyiv 31-tank battalions, using the Russian-style three-tank platoon. See: “На Рівненщині визначили кращий танковий взвод Сухопутних військ ЗСУ [The best tank platoon of the Ground Forces of the Ukrainian Armed Forces was determined in the Rivne region],” *Suspilne* (Ukraine), September 4, 2021. (<https://suspilne.media/161110-na-rivnensini-viznacili-krasij-tankovij-vzvod-suhoputnih-vijsk-zsu>). In a tank brigade, the numbers are reversed: three tank battalions and a mechanized infantry battalion plus other sub-units. But based on open-source evidence, Ukraine does not appear to be forming any new tank brigades.

This comes out to at least 120 IFVs/APCs and 40 tanks per brigade. Thus, to fully equip the 18 maneuver brigades Kyiv is forming for its three army corps (not to mention the various other units it is forming), Ukraine would need at least 2,160 IFVs/APCs and 720 tanks. Admittedly, this is a tall order. Perhaps anticipating as much, General Valerii Zaluzhnyi, commander-in-chief of the Ukrainian military, offered a more modest target in December: 600 to 700 IFVs and 300 tanks. (He did not specify a number of APCs.)<sup>10</sup> Units can fight with less than their full complement of armored vehicles, albeit with reduced combat effectiveness.

While the West has pledged a significant number of AFVs, Ukraine is still short. Since October,<sup>11</sup> Washington and its allies have promised Kyiv at least 369 IFVs and 603 APCs, including 109 Bradley IFVs and 90 Stryker APCs from the United States. The allies have pledged nearly 420 tanks of various types plus a reported 40 French assault vehicles. As of late April, open-source evidence indicated that at least 199 IFVs and 403 APCs had reached Ukraine, had arrived in Europe for training with Ukrainian troops, or would arrive imminently. For tanks, that number is at least 207 plus at least some of the French assault vehicles.<sup>12</sup> (See the appendix for a detailed breakdown.)

Ukraine's backers also pledged over 2,000 infantry mobility vehicles (IMVs) since October. But these lack the protection offered by IFVs and APCs like the Bradley and Stryker, while the Bradley also provides superior firepower. The Bradley and Stryker also offer superior communications and situational-awareness systems.<sup>13</sup>

Additional donations are in the works, but many will not arrive for months or longer. Washington plans to deliver 31 refurbished Abrams tanks in the fall.<sup>14</sup> On April 20, Denmark and the Netherlands announced that they plan to procure 14 Leopard 2 tanks from a third party and deliver them to Ukraine in the first quarter of 2024, following refurbishment.<sup>15</sup> Denmark, the Netherlands, and Germany also intend to give Kyiv as many as 178 Leopard 1 tanks.<sup>16</sup> But just 25 will be available by the summer, with another 55 ready by year's end and another 20-plus in

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10. "An interview with General Valery Zaluzhny, head of Ukraine's armed forces," *The Economist* (UK), December 3, 2022. (<https://www.economist.com/zaluzhny-transcript>)

11. Western commitments geared toward Ukraine's counteroffensive began in earnest in December. But open-source evidence indicates Ukraine has used vehicles delivered earlier to fill out some of its newly formed brigades, such as the 47th Mechanized Brigade's M-55S tanks, delivered by Slovenia in October. So, this report uses the earlier cutoff date. "47th Separate Assault Brigade showcases M-55S tanks," *Ukrainian Military Center* (Ukraine), December 17, 2022. (<https://mil.in.ua/uk/news/47-shturmova-brygada-pokazala-tanky-m-55s>)

12. This open-source estimate closely matches the Pentagon's official figure. On April 21, Secretary Austin said Ukraine's foreign backers had "delivered more than 230 tanks" over the course of "just a few short months." It is unclear whether that figure includes the French AMX-10RCR assault vehicles. Secretary of Defense Lloyd Austin, U.S. Department of Defense, *Press Conference Following Meeting of Ukraine Defense Contact Group*, April 21, 2023. (<https://www.defense.gov/News/Transcripts/Transcript/Article/3370530/secretary-of-defense-lloyd-j-austin-iii-and-chairman-of-the-joint-chiefs-of-sta>)

13. Howard Altman, "This Is What Stryker Armored Vehicles Could Bring To The Fight In Ukraine," *The War Zone*, January 13, 2023. (<https://www.thedrive.com/the-war-zone/this-is-what-stryker-armored-vehicles-could-bring-to-the-fight-in-ukraine>). The infantry mobility vehicles pledged by the West are mainly up-armored HMMWVs (Humvees) and various types of mine-resistant ambush-protected vehicles, or MRAPs. Washington also committed to procure for Ukraine 250 M1117 Armored Security Vehicles, but these are designed primarily for a military police role.

14. Joseph Trevithick, "M1A1 Abrams Variant Will Be Given To Ukraine To Expedite Tank Deliveries," *The War Zone*, March 21, 2023. (<https://www.thedrive.com/the-war-zone/m1a1-abrams-variant-will-be-given-to-ukraine-to-expedite-tank-deliveries>)

15. "Denmark, Netherlands to donate 14 Leopard 2 tanks to Ukraine," *Reuters*, April 20, 2023. (<https://www.reuters.com/world/europe/denmark-netherlands-donate-14-leopard-2-tanks-ukraine-2023-04-20>)

16. German Federal Ministry of Defense, Press Release, "Bundesregierung erteilt Ausfuhrgenehmigung für Leopard 1 A5 Panzer [Federal government issues export license for Leopard 1 A5 tanks]," February 7, 2023. (<https://www.bmvg.de/de/presse/ausfuhrgenehmigung-leopard-1-a5-panzer-5579916>)

2024, the German defense ministry said in late March.<sup>17</sup> Finally, the Czech Republic is refurbishing 90 T-72 tanks for Ukraine, financed by the United States and the Netherlands. So far, 37 have reached Ukraine, a Czech official said last month.<sup>18</sup>

Sweden pledged around 50 IFVs in January but has given no word on the timeline.<sup>19</sup> Norwegian media reported the country's military is analyzing whether it can afford to donate its own IFVs to Ukraine.<sup>20</sup> Greece has given Kyiv 20 Soviet-made IFVs and plans to send another 20, backfilled by German-made Marder IFVs. But when Germany found itself without enough combat-ready IFVs to fulfill its own commitment to Kyiv, Athens paused its deliveries.<sup>21</sup> However, in early April, Greece's defense minister said Athens was ready to dispatch "another shipment."<sup>22</sup>

Kyiv can eventually use these vehicles to replace losses suffered during its counteroffensive, helping ensure it is not left vulnerable to a Russian counterpunch. At the same time, receiving new platforms will add to Ukraine's logistics and sustainment burden,<sup>23</sup> and securing sufficient ammunition for the Leopard 1's main gun, which uses a different caliber than that on the Leopard 2, may prove difficult.<sup>24</sup> The Leopard 1 also has thin armor, although tank-on-tank fights have been rare in the Russia-Ukraine war, and the Leopard 1 can still be useful as an infantry-support vehicle. Kyiv will need to weigh these issues against the need for additional capacity in its war of attrition with Russia.

But for its counteroffensive to succeed in the first place, Ukraine also needs more tanks and armored vehicles now. The United States and its allies can fill that gap by sending vehicles from their existing stocks to minimize delivery timelines. While some may not arrive until weeks after Kyiv launches its counteroffensive, they will still be useful. The Ukrainian military will face well-entrenched Russian forces and will likely need a steady supply of fresh units to replace losses and maintain momentum. Washington and its allies should aim to consolidate deliveries around as few different models as possible to minimize Ukraine's logistical and sustainment burden.

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17. German Federal Ministry of Defense, Press Release, "Deutsche Leopard 2 A6 in der Ukraine angekommen [German Leopard 2 A6 arrived in Ukraine]," March 28, 2023. (<https://www.bmvg.de/de/presse/deutsche-leopard-2-a6-in-der-ukraine-angekommen-5603190>)

18. "Czech Republic offers to expand programme of T-72 tanks modernisation for Ukraine on Ramstein meeting," *Ukrainska Pravda* (Ukraine), April 21, 2023. (<https://www.pravda.com.ua/eng/news/2023/04/21/7398944>)

19. "Sweden to send infantry fighting vehicles to Ukraine," *Reuters*, January 19, 2023. (<https://www.reuters.com/world/europe/sweden-send-infantry-fighting-vehicles-ukraine-2023-01-19>)

20. "Norway is considering the transfer of CV90 IFV to Ukraine," *Ukrainian Military Center* (Ukraine), February 1, 2023. (<https://mil.in.ua/en/news/norway-is-considering-the-transfer-of-cv90-ifv-to-ukraine>)

21. "Greece starts shipping the BMP-1 IFVs to Ukraine," *Ukraine Military Center* (Ukraine), October 19, 2022. (<https://mil.in.ua/en/news/greece-starts-shipping-the-bmp-1-ifvs-to-ukraine>); Stavros Ioannidis, "Τι συμβαίνει με τα ελληνικά Marder; Το παρασκήνιο της συνομιλίας Παναγιωτόπουλου - Λάμπρεχτ [What's up with the Greek Marder? The background of the conversation between Panagiotopoulos and Lambrecht]," *CNN Greece* (Greece), January 11, 2023. (<https://www.cnn.gr/politiki/story/345431/ti-symvainei-meta-ellinika-marder-to-paraskinio-tis-synomilias-panagiotopoulou-lamprecht>)

22. "Greece ready to send Ukraine another batch of IFVs, artillery rounds, bullets," *Ukrinform* (Ukraine), April 7, 2023. (<https://www.ukrinform.net/rubric-ato/3692873-greece-ready-to-send-ukraine-another-batch-of-ifvs-artillery-rounds-bullets.html>)

23. Lt. Col. James Hesson and Bradley Bowman, "Give Ukraine the tanks it needs, not a 'petting zoo,'" *Defense News*, February 10, 2023. (<https://www.defensenews.com/opinion/commentary/2023/02/10/give-ukraine-the-tanks-it-needs-not-a-petting-zoo>)

24. Thomas Newdick, "Germany Now Wants To Send Cold War-Era Leopard 1 Tanks To Ukraine," *The War Zone*, February 3, 2023. (<https://www.thedrive.com/the-war-zone/germany-now-wants-to-send-cold-war-era-leopard-1-tanks-to-ukraine>); "Bundesregierung genehmigt Ausfuhr von Leopard-1-Panzern [Federal government approves export of Leopard 1 tanks]," *Der Spiegel* (Germany), February 3, 2023. (<https://www.spiegel.de/politik/bundesregierung-erteilt-genehmigung-zur-ausfuhr-von-leopard-1-panzern-in-die-ukraine-a-a7b78a50-c6b2-4334-8b2d-52e19b9f27f9>); Georg Ismar and Georg Mascolo, "Help for Ukraine: The difficult question of ammunition," *Süddeutsche Zeitung* (Germany), February 2, 2023. (<https://www.sueddeutsche.de/politik/ukraine-panzer-munition-bundesregierung-1.5744165>)

## PRIORITIZE IFVs AND APCs

Although tanks receive a lot of press, donations of Western-made IFVs and APCs, such as the Bradley and Stryker, should take top priority. These vehicles outclass the legacy Soviet-made IFVs and APCs standard within Ukraine's mechanized infantry units. As analyst Rob Lee has noted, this improvement is generally greater than the difference between Ukraine's Soviet-era tanks and the Leopard 2.<sup>25</sup>

Ukrainian troops face a shortage of IFVs and are clamoring for more.<sup>26</sup> Many nominally mechanized Ukrainian infantry battalions, including in newly formed brigades,<sup>27</sup> rely at least in part on IMVs in place of scarce IFVs and APCs.<sup>28</sup> Supplying additional Western IFVs and APCs would provide these units with better protection and firepower. It would also allow Kyiv to reserve more of its Western-supplied IMVs for highly mobile units (reconnaissance, special operations, anti-tank, etc.) currently equipped with civilian vehicles.<sup>29</sup>

The United States should aim to provide enough Bradley IFVs and Stryker APCs for an additional two brigades. According to *The Military Balance 2023*, the U.S. Army has around 2,400 M2A2/A3 Bradleys left plus another 2,000 older-model Bradleys in storage. The Army also has around 1,250 M1126 Stryker Infantry Carrier Vehicles left as well as over 400 of the M1256A1 variant.<sup>30</sup> Meanwhile, Germany should sprint to refurbish as many Marder IFVs as possible, although these vehicles likely will not arrive until after the counteroffensive.<sup>31</sup>

25. @RALee85, *Twitter*, January 25, 2023. (<https://twitter.com/RALee85/status/1618338685174550528>)

26. Franz-Stefan Gaddy, "Even More Than Tanks and Planes, Ukraine Needs IFVs," *Foreign Policy*, March 20, 2023. (<https://foreignpolicy.com/2023/03/20/ukraine-russia-war-tanks-leopard-ivf-infantry-fighting-vehicle-bradley>)

27. See, for example: 22nd Separate Mechanized Brigade, *Facebook*, April 4, 2023. (<https://www.facebook.com/22ombr/posts/pfbid02RgeureaTZDLGo5j3zfTXjAKUcVTKDsTRpquXkCxJbRmhWUysFRE5sLYHFB21Dnzil>); 47 OMBR "Magura," *Facebook*, March 20, 2023. (<https://www.facebook.com/47brigade/videos/760191825810409>)

28. See, for example: "Marines showcased assault of village on tanks and Turkish Kirpi APC," *Ukrainian Military Center (Ukraine)*, September 5, 2022. (<https://mil.in.ua/en/news/marines-showcased-assault-of-village-on-tanks-and-turkish-kirpi-apc>); @boris\_rozhin, *Telegram*, November 20, 2022. ([https://t.me/boris\\_rozhin/70839](https://t.me/boris_rozhin/70839)); @RALee85, *Twitter*, October 5, 2022. (<https://mobile.twitter.com/ralee85/status/1577790077811494912>)

29. See, for example, these UAV crews from the newly formed 13th Jaegar Brigade and 49th Artillery Brigade: 13th Separate Jaegar Brigade, *Facebook*, March 22, 2023. (<https://www.facebook.com/watch/?v=139076479102244>); 49th Separate Artillery Brigade, *Facebook*, April 2, 2023. ([https://www.facebook.com/permalink.php?story\\_fbid=pfbid02m9tQ4EY6u7dqjrcNRGKuvURKMH9hoiFtjNLJkWtZ6d8zJV2fcmM6wsZhEKZ7q3pol&id=100090530302068](https://www.facebook.com/permalink.php?story_fbid=pfbid02m9tQ4EY6u7dqjrcNRGKuvURKMH9hoiFtjNLJkWtZ6d8zJV2fcmM6wsZhEKZ7q3pol&id=100090530302068)). Ukrainian Special Operations Forces often use civilian vehicles. See, for example: Ivan Boyko, "Підрозділи ЗСУ отримали 30 авто від Олега Крота з холдингу ТЕCHIIA [Units of the Armed Forces received 30 cars from Oleg Krot from the TECHIIA holding]," *Unian (Ukraine)*, December 21, 2022. (<https://www.unian.ua/economics/other/pidrozdili-zsu-otrimali-30-avto-vid-olega-krota-z-holdingu-techiia-12085467.html>); "Підрозділ ССО отримав 4 позашляховики від волонтерів Жмеринщини [The SSO unit received 4 off-road vehicles from volunteers of the Zhmeryn Region]," *ArmyInform (Ukraine)*, July 5, 2022. (<https://armyinform.com.ua/2022/07/05/pidrozdil-ss0-otrymav-4-pozashlyahovyky-vid-volonteriv-zhmerynshhyny>)

30. *The Military Balance 2023* (London: International Institute for Strategic Studies, 2023). (<https://www.iiss.org/publications/the-military-balance>)

31. "Bundesregierung kündigt Lieferung von Marder-Panzern an [Federal government announces delivery of Marder tanks]," *Der Spiegel (Germany)*, January 5, 2023. (<https://www.spiegel.de/politik/deutschland/ukraine-krieg-bundesregierung-kuendigt-lieferung-von-marder-schuetzenpanzern-an-a-b6c8e74b-fd4c-4621-860f-b1fd207a6187>); "Bundeswehr stellt Gros der Ukraine-Marder aus ihrem Bestand [Bundeswehr removes most of the Ukraine Marders from their stock]," *Der Spiegel (Germany)*. (<https://www.spiegel.de/politik/deutschland/bundeswehr-stellt-gros-der-ukraine-marder-aus-ihrem-bestand-a-29b0dfdf-0f85-42b3-9144-1745d9c38240>)

## AMONG TANKS, PRIORITIZE THE LEOPARD 2

The German-made Leopard 2 is relatively easy to operate, supply, and maintain and has active production lines for ammunition and spare parts. Collectively, NATO allies possess over 2,000 Leopard 2 tanks, making it the best option for Ukraine. Kyiv needs these tanks both to expand its force and because Ukraine is running low on ammunition and spare parts for the Soviet-made tanks it currently uses.<sup>32</sup>

Thus far, however, Europe has struggled to deliver. In January, a Ukrainian official said a dozen countries had agreed to supply Kyiv with around 100 Leopard 2s.<sup>33</sup> But some European capitals have discovered they have fewer combat-ready tanks than anticipated, while others are reluctant to see their relatively small fleets depleted.<sup>34</sup>

To persuade European countries to donate more Leopard 2s to Ukraine, the United States could offer to replace them with Abrams tanks. In particular, Washington could try to redirect Ukraine's 31 Abrams tanks (expected to arrive in the fall) to a country willing to immediately transfer Leopard 2s to Kyiv. Ukraine would thus get its tanks sooner while avoiding the challenges of supplying and maintaining Abrams tanks.<sup>35</sup>

In February, a senior NATO official said Finland had indicated it might be willing to send some of its Leopard 2 tanks after completing its accession to NATO, which it now has.<sup>36</sup> Helsinki reportedly operates 100 Leopard 2s and has another 100 in storage.<sup>37</sup> Greece and Turkey each have over 300 Leopard 2 types but have yet to pledge any to Ukraine.<sup>38</sup>

In January, German media reported that Berlin would have around 29 Leopard 2s ready for transfer to Slovakia and the Czech Republic by this spring to replace tanks donated to Ukraine. The United States and Germany should encourage Bratislava and Prague to allow Berlin to postpone delivery to redirect these Leopard 2s to Ukraine.

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32. Tom Soufi Burrigide, "Ukraine expects to get 100 Leopard 2 tanks from 12 countries, once Germany approves: Senior Ukrainian official," *ABC News*, January 23, 2023. (<https://abcnews.go.com/International/ukraine-expects-100-leopard-2-tanks-12-countries/story>); Tim Lister, Fred Pleitgen, and Matthias Somm, "As a Russian offensive looms, Ukraine races to train military on new Western weapons," *CNN*, January 23, 2023. (<https://amp.cnn.com/cnn/2023/01/22/europe/ukraine-military-trained-western-weapons-intl-cmd/index.html>). In mid-March, Ukroboronprom announced it had started production of 125mm tank shells. But tank ammunition availability will likely remain an issue. @UOP\_Official, *Telegram*, March 14, 2023. ([https://t.me/UOP\\_Official/1045](https://t.me/UOP_Official/1045))

33. Tom Soufi Burrigide, "Ukraine expects to get 100 Leopard 2 tanks from 12 countries, once Germany approves: Senior Ukrainian official," *ABC News*, January 23, 2023. (<https://abcnews.go.com/International/ukraine-expects-100-leopard-2-tanks-12-countries/story>)

34. Bojan Pancevski, "Tanks Aren't Arriving in Ukraine Despite Promises From European Allies," *The Wall Street Journal*, February 9, 2023. (<https://www.wsj.com/articles/europeans-reluctance-to-give-ukraine-tanks-leaves-germany-out-in-the-cold-11675948197>); Erika Solomon, Steven Erlanger, Christopher F. Schuetze, "Scrounging for Tanks for Ukraine, Europe's Armies Come Up Short," *The New York Times*, February 28, 2023. (<https://www.nytimes.com/2023/02/28/world/europe/ukraine-tanks.html>)

35. Lt. Col. James Hesson and Bradley Bowman, "Give Ukraine the tanks it needs, not a 'petting zoo,'" *Defense News*, February 10, 2023. (<https://www.defensenews.com/opinion/commentary/2023/02/10/give-ukraine-the-tanks-it-needs-not-a-petting-zoo>)

36. Bojan Pancevski, "Tanks Aren't Arriving in Ukraine Despite Promises From European Allies," *The Wall Street Journal*, February 9, 2023. (<https://www.wsj.com/articles/europeans-reluctance-to-give-ukraine-tanks-leaves-germany-out-in-the-cold-11675948197>)

37. *The Military Balance 2023* (London: International Institute for Strategic Studies, 2023). (<https://www.iiss.org/publications/the-military-balance>)

38. *Ibid.*

Notably, German company Rheinmetall reportedly has another 22 Leopard 2s that can be ready by late 2023 or early 2024.<sup>39</sup> They could replace most of the 29 Leopard 2s intended for Slovakia and the Czech Republic.

Finally, Washington should push other Western nations to contribute financing for Czech refurbishment of additional T-72 tanks, which Ukrainian troops already know how to operate. In mid-April, a Czech official said his country could “increase the production rate by dozens more” tanks “if [international] partners are interested in financing this project.”<sup>40</sup>

## AIR DEFENSE

Ukraine faces a looming air defense crisis. It is running dangerously low on interceptor missiles for Soviet-made air defense systems that have held the Russian Air Force at bay and blunted the impact of Russian missile and drone strikes. If not filled, Ukraine’s air defense gap could grant Russia a major boost on the battlefield, helping it to support ground forces more effectively from the air and enabling strikes deep behind Ukrainian lines. While a medium-term gap may be unavoidable to some degree, the United States and its allies can take steps to mitigate it while working to shore up Ukrainian air defenses over the longer term. In the latest meeting of the Ukraine Defense Contact Group in April, Secretary Austin rightly pledged that Washington would “do everything [it] can to ensure that Ukraine has adequate ... ground-based air defense capability.”<sup>41</sup>

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Because Russia has failed to destroy most of Ukraine’s long-range S-300 (PS, PT, and V1 variants) and medium-range Buk-M1 surface-to-air missile (SAM) systems, Russian fixed-wing aircraft tend to stay outside their range.<sup>42</sup> When they do venture near the front lines, Russian aircraft typically fly low to avoid Ukraine’s long/medium-range air defenses, yet this renders them vulnerable to Ukrainian man-portable air defense systems (MANPADS), or shoulder-fired SAMs. Russian attack aircraft and helicopters tend to launch unguided rockets at a lofted pitch to increase range and minimize exposure to Ukrainian MANPADS. However, this reduces the effectiveness of Russian close air support for ground troops (although Ukrainian officials say Russian aircraft have recently begun using guided glide bombs from standoff ranges with greater frequency).<sup>43</sup> Ukrainian air defenses have also prevented the Russian Air Force from getting close enough to conduct air interdiction missions or strike key Ukrainian logistical infrastructure using unguided bombs.

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39. “Rheinmetall: 29 Ringtausch-Leoparden im Frühjahr fertig [Rheinmetall: 29 Ring-Exchange Leopards Ready in Spring],” *Süddeutsche Zeitung* (Germany), January 24, 2023. (<https://www.sueddeutsche.de/politik/konflikte-rheinmetall-29-ringtausch-leoparden-im-fruehjahr-fertig-dpa.urn-newsml-dpa-com-20090101-230124-99-332326>)

40. “Czech Republic offers to expand programme of T-72 tanks modernisation for Ukraine on Ramstein meeting,” *Ukrainska Pravda* (Ukraine), April 21, 2023. (<https://www.pravda.com.ua/eng/news/2023/04/21/7398944>)

41. Secretary of Defense Lloyd Austin, U.S. Department of Defense, *Press Conference Following Meeting of Ukraine Defense Contact Group*, April 21, 2023. (<https://www.defense.gov/News/Transcripts/Transcript/Article/3370530/secretary-of-defense-lloyd-j-austin-iii-and-chairman-of-the-joint-chiefs-of-sta>)

42. For a detailed account of the Russia-Ukraine air war, see: Justin Bronk with Nick Reynolds and Jack Watling, “The Russian Air War and Ukrainian Requirements for Air Defence,” *Royal United Services Institute for Defence and Security Studies*, November 7, 2022. (<https://static.rusi.org/SR-Russian-Air-War-Ukraine-web-final.pdf>)

43. Illia Ponomarenko, “Russia’s new guided bombs pose increasingly serious threat to Ukraine,” *The Kyiv Independent* (Ukraine), April 10, 2023. (<https://kyivindependent.com/russias-smart-bombs-pose-increasingly-serious-threat-to-ukraine>)



However, after over a year of high-intensity warfare, Kyiv is running critically low on interceptors for its Soviet-made SAM systems. Moscow's missile and drone strike campaign targeting Ukrainian critical infrastructure has exacerbated this shortage.<sup>44</sup> Once Ukraine runs out of these interceptors, which it does not produce, Russian aircraft will have much greater latitude at medium to high altitudes, out of MANPADS range. They will still have to watch out for Kyiv's Western-donated air defense systems, but much of Ukraine's airspace will be left undefended. Ukrainian fighter aircraft will continue to patrol but will remain outmatched by Russian advantages in missile range and radar performance.

So far, Russia's missile and drone campaign has continually damaged Ukraine's power grid but failed to cripple it. With Ukrainian air defenses heavily degraded, however, Moscow would stand a far better chance. Likewise, Russian aircraft could provide better support to ground troops, bolstering Russian assaults and helping to thwart Ukrainian attacks. Russian aircraft would also have greater latitude to fly deep into Ukrainian airspace to target key logistical nodes such as railheads and bridges that enable equipment and supplies to reach the front.

Granting Kyiv's requests for a Western fighter such as the F-16, while likely necessary over the medium to long term, would not solve Ukraine's near-term air defense problem. Retraining Ukrainian pilots on the F-16 would take at least six to 12 months, even on an accelerated timeline.<sup>45</sup> Training Ukrainian troops to maintain the aircraft will take even longer, meaning Western contractors would need to perform that role in the interim.

Moreover, while the F-16 would grant Kyiv additional capacity to offset attrition among its Soviet-made fighter fleet, the versions of the F-16 Washington would likely be willing to give Ukraine would not provide much additional capability. The United States would likely decline to share anything newer than the Block 30 version and the APG-68 radar, due to concerns that more advanced technologies could fall into Russian (and Chinese) hands. Washington would likely send Kyiv Advanced Medium-Range Air-to-Air Missiles, or AMRAAMs, older than the C5 version. Ukrainian F-16s would remain highly vulnerable to Russian SAMs, in turn preventing them from flying high and fast to exploit the full range of their new air-to-air missiles. Ukrainian fighters would also remain overmatched by advanced Russian aircraft armed with R-77-1 long-range and R-37M very-long-range air-to-air missiles.

Therefore, while Washington and its allies should begin laying the groundwork now to equip Ukraine with Western-made fighters, they will have to look elsewhere to address Kyiv's near-term air defense requirements. The most immediate task is to replenish Ukraine's stocks of Soviet-made air defense systems and interceptors. Unfortunately, options here are limited. Slovakia has already donated its sole S-300PMU battery to Ukraine.<sup>46</sup> Bulgaria and Greece also operate the S-300PMU and S-300PMU1, respectively. But Sofia has flatly refused to

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44. John Hardie, "Iran Aids Russia's Imperialist War Against Ukraine," *The Algemeiner*, November 22, 2022. (<https://www.algemeiner.com/2022/11/22/iran-aids-russias-imperialist-war-against-ukraine>)

45. Jamie Hunter and Tyler Rogoway, "This Is How Long It Would Really Take Ukraine's Pilots To Convert To F-16s," *The War Zone*, February 8, 2023. (<https://www.thedrive.com/the-war-zone/this-is-how-long-it-would-really-take-ukraines-pilots-to-convert-to-f-16s>)

46. Joseph Trevithick, "Ukraine Situation Report: Slovakia's Donated S-300 Surface-To-Air Missile System Is On Its Way," *The War Zone*, April 8, 2022. (<https://www.thedrive.com/the-war-zone/45139/ukraine-situation-report-slovakias-donated-s-300-surface-to-air-missile-system-is-on-its-way>)

transfer its S-300s,<sup>47</sup> while Greece insists its S-300s must be promptly replaced by U.S.-made Patriots,<sup>48</sup> which are already in short supply.

Washington could, however, try to persuade Greece by offering to move it higher up on the Patriot delivery queue. Athens could jump Switzerland, which plans to buy five Patriot fire units but has refused to send much-needed Gepard air defense ammunition to Ukraine.<sup>49</sup> At the very least, the United States could ask that countries unwilling to relinquish entire systems instead donate any spare interceptors that can be fired by Ukraine's existing systems.

In addition, if they have not already, the United States and its allies should look into helping Ukraine refurbish any old S-300 or Buk-M1 interceptors it has in storage. Meanwhile, Kyiv and its backers should explore how to launch production of these interceptors in a NATO country.<sup>50</sup> The West should also ensure Ukraine has enough missiles for Buk launchers it has modified or will modify to fire the RIM-7 Sea Sparrow, which is more plentiful.<sup>51</sup>

The transatlantic allies should likewise strive to ensure Ukraine has enough missiles for its Western-donated NASAMS medium-range air defense systems, balancing against the need to maintain sufficient U.S. and allied stocks. To get Kyiv more NASAMS launchers, the United States could offer to backfill immediate donations using the six NASAMS batteries Raytheon is currently building for Ukraine.<sup>52</sup> Washington has (unsuccessfully) made this proposal to Middle Eastern allies but could offer a similar deal to countries such as Spain or Australia.<sup>53</sup>

Furthermore, the West could expand deliveries of MIM-23 Hawk medium-range SAM systems, building on the handful already delivered or pledged by the United States and Spain.<sup>54</sup> These systems are outdated, offering limited range and lacking sophisticated guidance. But they would be better than nothing and could at least complicate

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47. "Bulgarian parliament approves military aid to Ukraine," *Associated Press*, December 9, 2022. (<https://apnews.com/article/politics-bulgaria-moscow-rumen-radev-ukraine-government-125de4ab26d01dfd89421ffbf9c7b8d2>)

48. "Greece is ready to transfer S-300 to Ukraine if the US deploys Patriot air defense systems in Crete," *Greek City Times* (Greece), December 17, 2022. (<https://greekcitytimes.com/2022/12/17/greece-is-ready-to-transfer-s-300-to-ukraine-if-the-us-deploys-patriot-air-defense-systems-in-crete>); Vassilis Nedos, "No transfer of S-300s to Ukraine," *Ekathimerini* (Greece), February 22, 2023. (<https://www.ekathimerini.com/news/1205258/no-transfer-of-s-300s-to-ukraine>)

49. Raytheon, Press Release, "Raytheon Technologies awarded \$1.2 billion contract to provide Patriot air defense system to Switzerland," April 3, 2023. (<https://www.raytheonmissilesanddefense.com/news/2023/04/03/rtx-awarded-contract-to-provide-patriot-air-defense-system-to-switzerland>); Ryan Brobst, John Hardie, and Bradley Bowman, "World leaders should press Switzerland on arms deliveries to Ukraine," *Defense News*, January 17, 2023. (<https://www.defensenews.com/opinion/commentary/2023/01/17/world-leaders-should-press-switzerland-on-arms-deliveries-to-ukraine>)

50. During the Soviet era, Ukraine's Zhulian Machine-Building Plant "Vizar" assembled 5V55 interceptors for the S-300.

51. Thomas Newdick and Tyler Rogoway, "Sea Sparrow RIM-7 Surface-To-Air Missiles Are Headed To Ukraine," *The War Zone*, January 6, 2023. (<https://www.thedrive.com/the-war-zone/sea-sparrow-rim-7-surface-to-air-missiles-are-headed-to-ukraine>)

52. Mike Stone, "Pentagon awards Raytheon \$1.2 bln contract for Ukrainian NASAMS," *Reuters*, November 30, 2022. (<https://www.reuters.com/world/us/pentagon-award-12-bln-contract-raytheon-ukrainian-nasams-source-document-2022-11-30>)

53. Lee Hudson, "U.S. looks to shift air defense systems from Middle East to Ukraine, Raytheon chief says," *Politico*, December 1, 2022. (<https://www.politico.com/news/2022/12/01/raytheon-air-defense-ukraine-middle-east-00071687>)

54. "Spain will send two more Hawk air defense systems to Ukraine," *Ukrainian Military Center* (Ukraine), November 10, 2022. (<https://mil.in.ua/en/news/spain-will-send-two-more-hawk-air-defense-systems-to-ukraine>); U.S. Department of Defense, Press Release, "Biden Administration Announces Additional Security Assistance for Ukraine," February 3, 2023. (<https://www.defense.gov/News/Releases/Release/Article/3287992/biden-administration-announces-additional-security-assistance-for-ukraine>)

operations by Russian aircraft. Romania, Greece, Turkey, and soon-to-be NATO member Sweden, along with Japan and Taiwan, all possess MIM-23 variants.<sup>55</sup>

In addition to bolstering Ukraine's defenses, Washington should attack this problem from the offensive side. Kyiv could degrade Russian air power by targeting airbases housing Russian aircraft operating in and around Ukraine. The Ukrainian military has already conducted several successful strikes against Russian airbases, apparently using one-way attack drones.<sup>56</sup> But to conduct an effective strike campaign targeting Russian airbases, Ukraine will need enhanced long-range precision-strike capabilities.

This should include the ATACMS, as discussed in the next section. But as FDD's Ryan Brobst has argued, the West could also help Ukraine build inexpensive long-range one-way attack drones akin to the Iranian-made Shahed-136/131.<sup>57</sup> Various Ukrainian organizations are already developing drones along these lines but lack the ability to produce them en masse.<sup>58</sup> That is where a Western company could step in.

## ATACMS

The Army Tactical Missile System, or ATACMS, would enable Ukraine to strike high-value Russian military targets, such as key logistics nodes, command posts, and air bases, far beyond the range of its current rocket artillery. Even a small number of these missiles could help Ukrainian forces degrade Russia's ability to resist their advances. Kyiv has been asking for ATACMS for about a year now, but the Biden administration continues to refuse. The administration's arguments against giving Ukraine ATACMS are shaky. Moreover, by denying Kyiv this key capability, Washington makes the war more likely to remain a protracted war of attrition, which could play to Moscow's advantages over time.

ATACMS is a short-range ballistic missile that can be fired from the M142 High Mobility Artillery Rocket System (HIMARS) and from the M270 Multiple Launch Rocket System (MLRS). Ukraine already operates HIMARS and MLRS, provided by the United States and United Kingdom, respectively,<sup>59</sup> as well as German and French variants

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55. *The Military Balance 2023* (London: International Institute for Strategic Studies, 2023). (<https://www.iiss.org/publications/the-military-balance>)

56. Howard Altman, "Ukraine Strikes Back At Bomber Base Deep Inside Russia," *The War Zone*, December 26, 2022. (<https://www.thedrive.com/the-war-zone/ukraine-strikes-back-at-bomber-base-deep-inside-russia>); Ukraine's attack against Saki Air Base in Crimea may have also involved drones. See: @RALee85, *Twitter*, August 23, 2022. (<https://twitter.com/RALee85/status/1562176368900726784>)

57. Ryan Brobst, "How to help Kyiv go on a drone offensive," *C4ISRNET*, February 7, 2023. (<https://www.c4isrnet.com/thought-leadership/2023/02/07/how-to-help-kyiv-go-on-a-drone-offensive>)

58. "Укроборонпром' успішно випробував ударний дрон на 1 тис. км [‘Ukroboronprom’ successfully tested an attack drone at a distance of 1,000 km]," *Vesti.ua* (Ukraine), January 13, 2023. (<https://vesti.ua/uk/strana-uk/ukroboronprom-uspishno-viprobuvav-udarnij-dron-na-1-tis-km>); "Винахідник із Кривого Рогу створив аналог дронів-камікадзе Shahed. Він у 10 разів дешевший за іранський дрон і літає на 300 км: відео [An inventor from Kryvyi Rih created an analogue of Shahed kamikaze drones. It is 10 times cheaper than the Iranian drone and flies 300 km: video]," *Dev.ua* (Ukraine), December 29, 2022. (<https://dev.ua/news/triam-1672308890>); "Науковець повідомив про перший в Україні ракетний запуск безпілота — відео [Scientist reports first rocket launch of a drone in Ukraine — video]," *The New Voice of Ukraine* (Ukraine), February 12, 2023. (<https://nv.ua/ukr/ukraine/events/zapusk-bezpilotnika-v-ukrajini-vpershe-zapustili-dron-za-dopomogyu-raketi-video-50303767.html>)

59. U.S. Department of Defense, Press Release, "DOD Announces Additional Security Assistance for Ukraine," March 20, 2023. (<https://www.defense.gov/News/Releases/Release/Article/3334472/dod-announces-additional-security-assistance-for-ukraine>); UK Ministry of Defence, Press Release, "UK to gift multiple-launch rocket systems to Ukraine," June 6, 2022. (<https://www.gov.uk/government/news/uk-to-gift-multiple-launch-rocket-systems-to-ukraine>)

of MLRS,<sup>60</sup> although the United States modified the donated HIMARS so they cannot fire ATACMS.<sup>61</sup> Modern ATACMS variants have a range of up to 300 kilometers (186 miles) and carry a 500-pound unitary warhead.<sup>62</sup> This means they can hit targets at roughly three to four times the range of the munitions currently fired by Ukraine's Western-supplied rocket artillery, with a warhead approximately 2.5 times bigger.<sup>63</sup>

Ukrainian forces could use ATACMS to strike logistics nodes, command-and-control posts, and other high-value targets deep behind the front lines. For example, Russia's logistics hubs in the occupied cities of Luhansk and Dhzankoi lie beyond the range of Ukraine's current Western-supplied rockets but would make easy targets for ATACMS. The Ukrainian military could also strike Russian air defense systems as well as airbases from which Russian aircraft conduct combat air patrols or provide close air support for ground forces. Perhaps most important, Ukraine could strike the Kerch Bridge, the main supply route for Russian forces in southern Ukraine.

As General Christopher Cavoli, the top U.S. commander in Europe, reportedly explained to lawmakers in February, these longer-range missiles would facilitate Ukraine's counteroffensive.<sup>64</sup> An ATACMS strike campaign would undermine not only Russia's offensive potential but also its ability to resist attacking Ukrainian forces.<sup>65</sup> Indeed, Ukraine's previous counteroffensives in the country's east and south succeeded in part due to HIMARS/MLRS strikes targeting Russian logistics and command and control. However, the Russians have adapted, including by moving their supply depots and command-and-control posts beyond the range of Ukraine's current Western supplied rocket artillery.<sup>66</sup> Ukraine thus needs a longer-range system to achieve similar disruptive effects.

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*Giving Ukraine ATACMS would facilitate its upcoming counteroffensive, according to General Christopher Cavoli, head of U.S. European Command and Supreme Allied Commander Europe.*

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By softening up Russian defenses, ATACMS could also help Ukraine shift toward an emphasis on maneuver rather than the artillery-centric attritional warfare that has largely dominated the conflict thus far. Washington hopes that Ukrainian forces can utilize Western-donated armor and U.S.-provided combined-arms training to

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60. "Germany says it will deliver two more multiple rocket launchers to Ukraine," *Reuters*, September 15, 2022. (<https://www.reuters.com/world/europe/germany-says-it-will-deliver-two-additional-multiple-rocket-launchers-kyiv-2022-09-15/>); @DefenceU, *Twitter*, December 30, 2022. (<https://twitter.com/DefenceU/status/1608807072073940994>)

61. Michael R. Gordon and Gordon Lubold, "U.S. Altered Himars Rocket Launchers to Keep Ukraine From Firing Missiles Into Russia," *The Wall Street Journal*, December 5, 2022. (<https://www.wsj.com/articles/u-s-altered-himars-rocket-launchers-to-keep-ukraine-from-firing-missiles-into-russia-11670214338>)

62. U.S. Army, "Army Tactical Missile System," accessed April 25, 2023. (<https://asc.army.mil/web/portfolio-item/atacms>). A unitary warhead means the missile carries a single large warhead rather than numerous smaller submunitions.

63. U.S. Army, "Guided Multiple Launch Rocket System (GMLRS) Dual-Purpose Improved Conventional Munition (DPICM)/Unitary/Alternative Warhead," accessed April 25, 2023. (<https://asc.army.mil/web/portfolio-item/guided-multiple-launch-rocket-system-gmlrs-dpicmunitaryalternative-warhead>); Joe Gould and Meghann Myers, "US to send more HIMARS precision rocket systems to Ukraine in latest package," *Defense News*, July 20, 2022. (<https://www.defensenews.com/pentagon/2022/07/20/us-to-send-more-himars-precision-rocket-systems-to-ukraine-in-latest-package>)

64. Alexander Ward and Paul McLeary, "F-16s, longer-range missiles could help Ukraine beat Russia, U.S. general privately tells lawmakers," *Politico*, February 18, 2023. (<https://www.politico.com/news/2023/02/18/f-16s-and-long-range-missiles-ukraine-russia-00083572>)

65. John Hardie, Bradley Bowman, and Ryan Brobst, "Countdown to counteroffensive: Give Ukraine ATACMS before it's too late," *Breaking Defense*, February 14, 2023. (<https://breakingdefense.com/2023/02/countdown-to-counteroffensive-give-ukraine-atacms-before-its-too-late>)

66. "An interview with General Valery Zaluzhny, head of Ukraine's armed forces," *The Economist* (UK), December 3, 2022. (<https://www.economist.com/zaluzhny-transcript>); Thomas Gibbons-Neft and Natalia Yermak, "Two Cities, Two Armies: Pivot Points in the Fight in Ukraine's East," *The New York Times*, September 26, 2022. (<https://www.nytimes.com/2022/09/26/world/europe/ukraine-donbas-russia-lyman-bakhmut.html>); @Tatarigami\_UA, *Twitter*, January 12, 2023. ([https://twitter.com/tatarigami\\_ua/status/1613611530464919560](https://twitter.com/tatarigami_ua/status/1613611530464919560))

fight more like the United States, relying on maneuver to take territory rather than massive amounts of artillery fire.<sup>67</sup> This could reduce Ukraine's expenditure of artillery ammunition, making the fight more sustainable as Western stockpiles dwindle.<sup>68</sup> Although Moscow has been forced to conserve artillery shells,<sup>69</sup> it retains a quantitative advantage in artillery fires and is racing to ramp up artillery shell production.<sup>70</sup>

To date, however, Ukrainian forces have executed successful maneuver operations only where Russia's defenses were weak. But Kyiv will likely have no such luxury in the months ahead. The Russians have built fortified defensive lines across the battlefield and have heavily mined potential Ukrainian avenues of advance.<sup>71</sup> According to Ukraine's military intelligence chief, mobilization has roughly doubled the number of Russian soldiers in Ukraine,<sup>72</sup> who have a shorter front line to defend following Russia's retreats last fall. Moscow no longer suffers the crippling shortage of manpower that facilitated Ukraine's stunning counteroffensive in Kharkiv Oblast last September.<sup>73</sup>

The Biden administration is belatedly moving to provide Kyiv with a different long-range precision-strike system, but it will not be ready for many months and has just half the range of ATACMS. In February, following months of deliberation, the Biden administration decided to send Ukraine the Ground Launched Small Diameter Bomb.<sup>74</sup> That system, which has a range of roughly 150 kilometers, could strike some of the same targets as ATACMS, although it has a much smaller warhead. But it will not arrive in Ukraine until the fall,<sup>75</sup> and fielding the system in substantial numbers will take even longer. ATACMS therefore remains the best option.

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67. Karen DeYoung, Dan Lamothe, and Isabelle Khurshudyan, "Inside the monumental, stop-start effort to arm Ukraine," *The Washington Post*, December 23, 2022. (<https://www.washingtonpost.com/national-security/2022/12/23/ukraine-weapons-biden/>); Natasha Bertrand, Alex Marquardt, and Katie Bo Lillis, "The US and its allies want Ukraine to change its battlefield tactics in the spring," *CNN*, January 24, 2023. (<https://www.cnn.com/2023/01/24/politics/ukraine-shift-tactics-bakhmut/index.html>)

68. Daniel Michaels and Nancy A. Youssef, "Ukraine's Troops Will Need Fewer Bullets and Shells After Training, U.S. Hopes," *The Wall Street Journal*, February 14, 2023. (<https://www.wsj.com/articles/ukraines-troops-will-need-fewer-bullets-and-shells-after-training-u-s-hopes-62081a97>)

69. Natasha Bertrand, Oren Liebermann, Alex Marquardt, "Russian artillery fire down nearly 75%, US officials say, in latest sign of struggles for Moscow," *CNN*, January 10, 2023. (<https://edition.cnn.com/2023/01/10/politics/russian-artillery-fire-down-75-percent-ukraine/index.html>)

70. @mod\_russia\_en, *Telegram*, March 28, 2023. ([https://t.me/mod\\_russia\\_en/6640](https://t.me/mod_russia_en/6640))

71. See: @bradyafr, *Twitter*, March 14, 2023. (<https://twitter.com/bradyafr/status/1635725244852838400>)

72. Isabelle Khurshudyan, "Ukraine intel chief predicted Russia's war. He says Crimea will be retaken," *The Washington Post*, January 31, 2023. (<https://www.washingtonpost.com/world/2023/01/31/kyrylo-budanov-ukraine-intelligence-boss-interview/>)

73. John Hardie, "Ukraine's Counteroffensives in Kharkiv and Kherson and the Road Ahead," *FDD's Long War Journal*, September 26, 2022. (<https://www.longwarjournal.org/archives/2022/09/ukraines-counteroffensives-in-kharkiv-and-kherson-and-the-road-ahead.php>); Mari Saito, Maria Tsvetkova, and Anton Zverev, "Abandoned Russian base holds secrets of retreat in Ukraine," *Reuters*, October 26, 2022. (<https://www.reuters.com/investigates/special-report/ukraine-crisis-russia-base/>); Isabelle Khurshudyan, Paul Sonne, Serhiy Morgunov, and Kamila Hrabchuk, "Inside the Ukrainian counteroffensive that shocked Putin and reshaped the war," *The Washington Post*, December 29, 2022. (<https://www.washingtonpost.com/world/2022/12/29/ukraine-offensive-kharkiv-kherson-donetsk/>). A shortage of manpower, particularly infantry, likely also facilitated Ukraine's (much slower and more hard-fought) gains in Kherson Oblast prior to Russia's withdrawal. See: @RALee85, *Twitter*, October 4, 2022. (<https://twitter.com/ralee85/status/1577209610275954688>)

74. Mike Stone, "Exclusive: U.S. weighs sending 100-mile strike weapon to Ukraine," *Reuters*, November 28, 2022. (<https://www.reuters.com/business/aerospace-defense/100-mile-strike-weapon-weighed-ukraine-arms-makers-wrestle-with-demand-sources-2022-11-28/>); Brigadier General Pat Ryder, *Press Briefing*, February 3, 2023. (<https://www.defense.gov/News/Transcripts/Transcript/Article/3288141/pentagon-press-secretary-brig-gen-pat-ryder-holds-an-on-camera-press-briefing>)

75. Anthony Capaccio, "US to Send Ukraine Boeing's Ground-Launched, GPS-Guided Bombs," *Bloomberg*, February 2, 2023. (<https://www.bloomberg.com/news/articles/2023-02-03/us-to-send-ukraine-boeing-s-ground-launched-gps-guided-bombs>). See also: John Hardie and Bradley Bowman, "Send the Ground-Launched Small Diameter Bomb to Ukraine," *Breaking Defense*, December 19, 2022. (<https://breakingdefense.com/2022/12/send-the-ground-launched-small-diameter-bomb-to-ukraine/>)

Despite the clear military rationale, the White House continues to refuse Kyiv's pleas for ATACMS. The administration has offered two justifications. First, since last spring, the administration has argued that providing Ukraine with the capability to strike nearly 200 miles inside Russian territory could lead Moscow to escalate.<sup>76</sup> The fear is that Russia could retaliate conventionally against NATO or use a tactical nuclear weapon against Ukraine.

Regarding the former, Putin appears keen to avoid a direct conflict with the United States and NATO, particularly when the bulk of Russia's military is tied up — and badly degraded — in Ukraine. Indeed, even as Washington and its allies have plied Kyiv with weapons, Moscow has responded with plenty of hostile rhetoric but no tangible steps that indicate any readiness for a wider conflict.<sup>77</sup>

Russian nuclear escalation against Ukraine, such as a demonstrative use or battlefield employment of a tactical nuclear weapon, is more plausible, yet precedent suggests an ATACMS strike alone would not be a probable trigger. Despite his nuclear saber-rattling, Putin refrained from nuclear use even after Ukraine conducted numerous strikes in Crimea and within Russia proper.<sup>78</sup> Nor did Putin employ nuclear weapons when Ukraine embarrassed Moscow by retaking swathes of territory in Kharkiv and Kherson oblasts. The Biden administration itself has reportedly recognized that strikes against Russian targets in Crimea likely would not trigger Putin's nuclear threshold.<sup>79</sup> A strategic collapse of Russian forces on the battlefield might lead Putin to consider extreme measures, yet ATACMS strikes alone would not have that kind of strategic impact.

Moreover, Washington could mitigate the risk of escalation by conditioning the provision of ATACMS on a Ukrainian commitment to use the missiles only against targets in occupied Ukrainian territory. This includes the Donbas and Crimea, which the United States and almost every other country recognize as sovereign Ukrainian territory. Kyiv has honored a similar commitment pertaining to its current Western-provided rocket artillery.<sup>80</sup> While this restriction hardly seems fair given that Russia continues to strike civilian targets across Ukraine, it would strike a balance between the twin goals of helping Kyiv defeat Kremlin aggression and avoiding escalation.<sup>81</sup>

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76. Joseph R. Biden Jr., "President Biden: What America Will and Will Not Do in Ukraine," *The New York Times*, March 31, 2022. (<https://www.nytimes.com/2022/05/31/opinion/biden-ukraine-strategy.html>); "US not prepared to provide Ukraine with ATACMS," *The Kyiv Independent* (Ukraine), July 23, 2022. (<https://kyivindependent.com/us-not-prepared-to-provide-ukraine-with-atacms>); Jack Detsch, "Biden Is Still Worried About Poking the Russian Bear," *Foreign Policy*, June 8, 2022. (<https://foreignpolicy.com/2022/06/08/us-russia-war-ukraine-military-defense>)

77. See, for example: "Cargo with weapons transferred to Ukraine to become legitimate targets of Russian troops - Lavrov," *Interfax* (Russia), March 18, 2022. (<https://interfax.com/newsroom/top-stories/76987>)

78. See, for example: Leo Sands, "Saky airfield: Ukraine claims Crimea blasts responsibility after denial," *BBC* (UK), September 7, 2022. (<https://www.bbc.com/news/world-europe-62821044>); Veronika Melkozerova, "Drone attack hits Russia's Engels airbase for second time in a month," *Politico Europe* (Belgium), December 26, 2022. (<https://www.politico.eu/article/russia-ukraine-war-vladimir-putin-drone-attack-hits-russias-engels-airbase-for-second-time-in-a-month>)

79. Helene Cooper, Eric Schmitt, and Julian E. Barnes, "U.S. Warm to Helping Ukraine Target Crimea," *The New York Times*, January 18, 2023. (<https://www.nytimes.com/2023/01/18/us/politics/ukraine-crimea-military.html>)

80. Peter Beaumont, "US says Ukraine will not use US-supplied rocket systems to hit Russian territory," *The Guardian* (UK), June 1, 2022. (<https://www.theguardian.com/world/2022/jun/01/us-says-ukraine-will-not-use-us-supplied-rocket-systems-to-hit-russian-territory>)

81. Ryan Brobst, John Hardie, and Bradley Bowman, "Why Washington should provide ATACMS weapons to Ukraine," *Defense News*, August 31, 2022. (<https://www.defensenews.com/opinion/commentary/2022/08/31/why-washington-should-provide-atacms-weapons-to-ukraine>)

The administration's second reason for not sending ATACMS is its claim that the United States simply lacks enough of these missiles to spare. *Foreign Policy* reported in December that Pentagon officials had argued as much to deflect congressional pressure to provide ATACMS. In February, *Politico* reported that Pentagon officials had delivered this message directly to their Ukrainian counterparts.<sup>82</sup> General Mark Milley, chairman of the Joint Chiefs of Staff, said something similar in late March.<sup>83</sup>

This argument seems dubious. Lockheed Martin has reportedly produced over 4,000 ATACMS of various types for the U.S. military and its allies. Although the United States has launched roughly 600 in combat,<sup>84</sup> thousands remain in U.S. and allied stockpiles. The National Defense Authorization Act for Fiscal Year 2023 authorized the Pentagon to engage in a multi-year contract to buy 1,700 ATACMS, which can backfill any missiles sent to Ukraine. Since Russia launched its 2022 invasion, the Pentagon's Defense Security Cooperation Agency has greenlit Australia,<sup>85</sup> Estonia,<sup>86</sup> Lithuania,<sup>87</sup> Poland,<sup>88</sup> the Netherlands,<sup>89</sup> and Morocco<sup>90</sup> to buy a total of 211 ATACMS. What is more, the U.S. military is already planning to replace ATACMS with the more capable Precision Strike Missile, expected to reach initial operating capability this year.<sup>91</sup>

The Ukrainian military could achieve significant military effects with even a small number of ATACMS. Congress would be wise to press the Pentagon to prove it cannot afford to send Kyiv even a few dozen of these missiles.

Washington has invested billions of taxpayer dollars in helping Ukraine claw back its territory. More important, the United States has a vital interest in defeating Russia's aggression. It would be foolish to deny Kyiv a key capability that can help it make good on America's investment.

82. Paul McLeary, Lara Seligman, and Alexander Ward, "U.S. tells Ukraine it won't send long-range missiles because it has few to spare," *Politico*, March 13, 2023. (<https://www.politico.com/news/2023/02/13/u-s-wont-send-long-range-missiles-ukraine-00082652>)

83. Kevin Baron, "The Missile Ukraine Wants Is One the U.S. Says It Doesn't Need," *Defense One*, March 31, 2023. (<https://www.defenseone.com/threats/2023/03/ukraine-victory-unlikely-year-milley-says/384681>)

84. John Ismay, "The Missile Ukraine Wants Is One the U.S. Says It Doesn't Need," *The New York Times*, October 6, 2022. (<https://www.nytimes.com/2022/10/06/us/ukraine-war-missile.html>); Paul McLeary, Lara Seligman, and Alexander Ward, "U.S. tells Ukraine it won't send long-range missiles because it has few to spare," *Politico*, March 13, 2023. (<https://www.politico.com/news/2023/02/13/u-s-wont-send-long-range-missiles-ukraine-00082652>)

85. U.S. Defense Security Cooperation Agency, Press Release, "Australia – HIMARS Launchers," May 26, 2022. (<https://www.dsca.mil/press-media/major-arms-sales/australia-himars-launchers>)

86. U.S. Defense Security Cooperation Agency, Press Release, "Estonia – M142 High Mobility Artillery Rocket System (HIMARS)," July 15, 2022. (<https://www.dsca.mil/press-media/major-arms-sales/estonia-m142-high-mobility-artillery-rocket-system-himars>)

87. U.S. Defense Security Cooperation Agency, Press Release, "Lithuania – M142 High Mobility Artillery Rocket System (HIMARS)," November 9, 2022. (<https://www.dsca.mil/press-media/major-arms-sales/lithuania-m142-high-mobility-artillery-rocket-system-himars>)

88. U.S. Defense Security Cooperation Agency, Press Release, "Poland – High Mobility Artillery Rocket System (HIMARS)," February 7, 2023. (<https://www.dsca.mil/press-media/major-arms-sales/poland-high-mobility-artillery-rocket-system-himars-0>)

89. U.S. Defense Security Cooperation Agency, Press Release, "The Netherlands – M142 High Mobility Artillery Rocket System (HIMARS)," February 16, 2023. (<https://www.dsca.mil/press-media/major-arms-sales/netherlands-m142-high-mobility-artillery-rocket-system-himars>)

90. U.S. Defense Security Cooperation Agency, Press Release, "Morocco – High Mobility Artillery Rocket Systems (HIMARS)," April 11, 2023. (<https://www.dsca.mil/press-media/major-arms-sales/morocco-high-mobility-artillery-rocket-systems-himars>)

91. Bradley Bowman, Ryan Brobst, and John Hardie, "Biden's latest weak excuse for not sending ATACMS to Ukraine," *Washington Examiner*, February 18, 2023. (<https://www.washingtonexaminer.com/opinion/bidens-latest-weak-excuse-for-not-sending-atacms-to-ukraine>)

## ARTILLERY AMMUNITION

The Ukrainian military, like its Russian adversary, relies heavily on artillery. However, Ukraine faces a shortage of artillery ammunition. In March, Ukrainian President Volodymyr Zelenskyy said artillery rounds, along with the systems to shoot them, are the “number one” thing his military needs.<sup>92</sup> Washington can take two steps to help fill that gap. First, the Biden administration should provide Ukraine with cluster munitions, specifically the Dual-Purpose Improved Conventional Munition (DPICM). Second, the Pentagon should reevaluate U.S. requirements for a potential war with Russia, thereby freeing up additional U.S. aid for Kyiv.

Prior to Moscow’s 2022 invasion, Russia destroyed a significant portion of Ukraine’s artillery ammunition stocks in covert operations,<sup>93</sup> even sabotaging Eastern European suppliers of ammunition to Ukraine.<sup>94</sup> Russian operatives also bought up ammunition from private sellers to prevent it from going to Kyiv. That effort continued following the full-scale invasion, along with strikes against Ukrainian ammunition depots and defense factories.<sup>95</sup>

Ukraine was already running low on Soviet-standard 152mm and 122mm artillery shells by last summer.<sup>96</sup> Its stocks of those shells are now nearly exhausted. Washington and its allies have scoured the Earth for additional sources of Soviet-standard ammunition,<sup>97</sup> and some factories in Eastern Europe have resumed or boosted production.<sup>98</sup> Ukraine, in cooperation with NATO partners, has even established limited production of 152mm and

92. Presidential Office of Ukraine, Press Release, “Everything must be done to reduce Russia’s ability to produce weapons - Volodymyr Zelenskyy,” March 3, 2023. (<https://www.president.gov.ua/ru/news/potribno-zrobiti-vse-shob-zmenschiti-mozhливosti-rosiyi-vigot-81405>)

93. “Катастрофа в Ічні: дурні не вчаться навіть на п’яти помилках [Disaster in Ichna: fools do not learn even from five mistakes],” *ZN.ua* (Ukraine), October 19, 2018. ([https://zn.ua/ukr/internal/katastrofa-v-ichni-durni-ne-vchatsya-navit-na-p-yati-pomilkah-291542\\_.html](https://zn.ua/ukr/internal/katastrofa-v-ichni-durni-ne-vchatsya-navit-na-p-yati-pomilkah-291542_.html))

94. Boris Mitov and Nikolay Lavchiev, “Bulgarian Blasts, Russian Agents, And The War On Ukraine,” *Radio Free Europe/Radio Liberty*, March 21, 2023. (<https://www.rferl.org/a/bulgaria-arms-depot-blasts-russia-ukraine-war-investigation/32322902.html>); “How GRU Sabotage and Assassination Operations in Czechia and Bulgaria Sought to Undermine Ukraine,” *Bellingcat*, April 26, 2021. (<https://www.bellingcat.com/news/uk-and-europe/2021/04/26/how-gru-sabotage-and-assassination-operations-in-czechia-and-bulgaria-sought-to-undermine-ukraine>); “Senior GRU Leader Directly Involved With Czech Arms Depot Explosion,” *Bellingcat*, April 20, 2021. (<https://www.bellingcat.com/news/2021/04/20/senior-gru-leader-directly-involved-with-czech-arms-depot-explosion>)

95. Isabelle Khurshudyan and Paul Sonne, “Russia targeted Ukrainian ammunition to weaken Kyiv on the battlefield,” *The Washington Post*, June 24, 2022. (<https://www.washingtonpost.com/world/2022/06/24/ukraine-ammunition-russian-sabotage-artillery>); Jack Detsch and Robbie Gramer, “Russian Troops Are Taking Putin’s Orders to Demilitarize Ukraine Literally,” *Foreign Policy*, May 4, 2022. (<https://foreignpolicy.com/2022/05/04/russia-demilitarize-ukraine-arms-facilities>)

96. Isobel Koshiw, “We’re almost out of ammunition and relying on western arms, says Ukraine,” *The Guardian* (UK), June 10, 2022. (<https://www.theguardian.com/world/2022/jun/10/were-almost-out-of-ammunition-and-relying-on-western-arms-says-ukraine>); Thomas Gibbons-Neff, Andrew E. Kramer, and Natalia Yermak “Shortage of Artillery Ammunition Saps Ukrainian Frontline Morale,” *The New York Times*, June 10, 2022. (<https://www.nytimes.com/2022/06/10/world/europe/ukraine-ammo-shortage-artillery.html>)

97. John Ismay and Eric Schmitt, “Seeking Arms for Ukraine, Pentagon Buyers Scour Eastern European Factories,” *The New York Times*, April 25, 2022. (<https://www.nytimes.com/2022/04/25/us/ukraine-pentagon-arms-buyers.html>); Justin Scheck, “She’s a Doctor. He Was a Limo Driver. They Pitched a \$30 Million Arms Deal,” *The New York Times*, October 6, 2023. (<https://www.nytimes.com/2022/10/06/world/europe/ukraine-private-arms-deals.html>); Lara Jakes, “How a Tiny NATO Nation Tackled a Big Problem: Arming Ukraine,” *The New York Times*, February 17, 2023. (<https://www.nytimes.com/2023/02/17/world/europe/luxembourg-weapons-ukraine-nato.html>)

98. Thomas Gibbons-Neff, Justin Scheck, and Boryana Dzhambova, “Bulgarian Factories and Secret Task Forces: How the West Hunts for Soviet Arms,” *The New York Times*, February 23, 2023. (<https://www.nytimes.com/2023/02/23/world/europe/ukraine-weapons-ammunition-bulgaria.html>); Philip Volkmann-Schluck, “Bulgaria to the rescue: How the EU’s poorest country secretly saved Ukraine,” *Politico Europe* (Belgium), January 18, 2023. (<https://www.politico.eu/article/bulgaria-volodymyr-zelenskyy-kiril-petkov-poorest-country-eu-ukraine>)



122mm artillery shells,<sup>99</sup> although their quality is questionable. Still, demand far outstrips supply, leaving Ukraine overwhelmingly reliant on Western supplies of NATO-standard artillery ammunition, primarily 155mm shells.

But Washington and its allies are struggling to meet Kyiv's needs. In March, Defense Minister Oleksiy Reznikov said Ukraine expends around 110,000 155mm shells a month, or roughly 3,700 per day. If they "were not limited by the amount of available artillery shells," Ukrainian forces could fire more than five times as many shells, Reznikov stated. Although Moscow has also had to conserve shells as the war has dragged on, Reznikov said Russia still fires several times more than Ukraine.<sup>100</sup>

Washington has already sent or promised Ukraine over 1.5 million 155mm artillery shells and more than 450,000 105mm rounds.<sup>101</sup> But U.S. stocks are dwindling.<sup>102</sup> The same goes for European countries, many of which began the war with paltry stockpiles of artillery ammunition.<sup>103</sup> In mid-March, an EU official told *Politico* that the bloc had thus far sent Ukraine a total of 350,000 155mm artillery shells.<sup>104</sup>

As NATO Secretary-General Jens Stoltenberg noted in February, Ukraine expends artillery shells "many times" faster than the West can make them.<sup>105</sup> The United States and Europe, like Russia, are working to increase production. But it will take time. In January, *The New York Times* reported that the Pentagon aimed to increase U.S. monthly production of unguided 155mm artillery shells from 14,400 to 90,000 by 2025.<sup>106</sup> In late March, however, Army Under Secretary Gabe Camarillo said U.S. monthly production capacity would reach 24,000 by year's end, hit 75,000 in 2025, and take until 2028 to reach 85,000.<sup>107</sup>

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**99.** "Ukroboronprom establishes the production of 122-mm and 152-mm shells," *Ukrainian Military Center* (Ukraine), November 4, 2022. (<https://mil.in.ua/en/news/ukroboronprom-establishes-the-production-of-122-mm-and-152-mm-shells>); "The first since 1991 domestically produced 152-mm Ukrainian ammunition departs to the frontline," *Euromaidan Press* (Ukraine), December 5, 2022. (<https://euromaidanpress.com/2022/12/05/the-first-since-1991-domestically-produced-152-mm-ukrainian-ammunition-departs-to-the-frontline>); State Concern "Ukroboronprom," *Facebook*, March 22, 2023. (<https://www.facebook.com/ukroboronprom/posts/524006216569510>)

**100.** Andy Bounds, "Ukraine asks EU for 250,000 artillery shells a month," *Financial Times* (UK), March 3, 2023. (<https://www.ft.com/content/75ee9701-aa93-4c5d-a1bc-7a51422280fd>)

**101.** U.S. Department of Defense, "Fact Sheet on U.S. Security Assistance to Ukraine," April 4, 2023. (<https://media.defense.gov/2023/Apr/04/2003192566/-1/-1/1/UKRAINE-FACT-SHEET-APR-4.PDF>)

**102.** Jim Sciutto, Jeremy Herb, Katie Bo Lillis, and Oren Liebermann, "US is running low on some weapons and ammunition to transfer to Ukraine," *CNN*, November 17, 2022. (<https://www.cnn.com/2022/11/17/politics/us-weapon-stocks-ukraine/index.html>); Gordon Lubold, Nancy A. Youssef, and Brett Forrest, "U.S. Reaches Deep Into Its Global Ammunition Stockpiles to Help Ukraine," *The Wall Street Journal*, March 16, 2023. (<https://www.wsj.com/articles/u-s-reaches-deep-into-its-global-ammunition-stockpiles-to-help-ukraine-8224d985>)

**103.** Steven Erlanger and Lara Jakes, "U.S. and NATO Scramble to Arm Ukraine and Refill Their Own Arsenals," *The New York Times*, November 26, 2022. (<https://www.nytimes.com/2022/11/26/world/europe/nato-weapons-shortage-ukraine.html>)

**104.** Jacopo Bargiazzi, "EU nears deal to restock Ukraine's diminishing ammo supplies," *Politico Europe* (Belgium), March 15, 2023. (<https://www.politico.eu/article/ukraine-war-european-union-ammunition-supplies-deal>)

**105.** Secretary General Jens Stoltenberg, NATO, *Remarks Ahead of NATO Defense Ministerial*, February 14, 2023. ([https://www.nato.int/cps/en/natohq/opinions\\_211689.htm](https://www.nato.int/cps/en/natohq/opinions_211689.htm))

**106.** John Ismay and Eric Lipton, "Pentagon Will Increase Artillery Production Sixfold for Ukraine," *The New York Times*, January 24, 2023. (<https://www.nytimes.com/2023/01/24/us/politics/pentagon-ukraine-ammunition.html>)

**107.** Sam Skove, "US to Sextuple 155mm Production, Improve Arms Factories," *Defense One*, March 28, 2023. (<https://www.defenseone.com/policy/2023/03/us-sextuple-155mm-artillery-shell-production-replenish-stocks-sent-ukraine/384542>); Jen Judson, "US Army eyes sixfold production boost of 155mm shells used in Ukraine," *Defense News*, March 28, 2023. (<https://www.defensenews.com/digital-show-dailies/2023/03/28/us-army-eyes-six-fold-production-boost-of-155mm-shells-used-in-ukraine>); Steve Beynon, "'We've Got a Ways to Go': Pentagon Seeks Massive Ammo Boost as War in Ukraine Rages On," *Military.com*, March 29, 2023. (<https://www.military.com/daily-news/2023/03/29/weve-got-ways-go-pentagon-seeks-massive-ammo-boost-war-ukraine-rages.html>)

Europe, which produces around 20,000 to 25,000 155mm shells per month,<sup>108</sup> faces similar delays. The European Union has agreed to provide Ukraine with 1 million artillery rounds, taking half from existing stocks or pending orders and jointly procuring the rest while also working to increase production capacity.<sup>109</sup> But European governments have been slow to finalize contracts with industry, and officials and industry executives say shortages of key inputs will prevent European firms from ramping up artillery shell production for up to three years.<sup>110</sup>

Consequently, Kyiv's "shell hunger" will likely persist and may even worsen over the medium term. This shortage has undermined Ukraine's efforts to repel Russian advances in places such as Bakhmut.<sup>111</sup> If not resolved, it could also hamstring Kyiv's upcoming counteroffensive, which will likely require Ukrainian forces to expend more munitions than when they were playing defense. Kyiv estimates it will need at least 356,400 shells per month — just under 12,000 per day — to achieve its military objectives, according to Reznikov.<sup>112</sup>

In March, a senior Pentagon official described recent U.S. artillery ammunition pledges, intended to help shore up Ukraine's supplies for the counteroffensive, as a "last-ditch effort" due to Western shortages. This suggests deliveries may wane.<sup>113</sup> A reported deal to borrow half a million 155mm shells from South Korea could buy the United States greater flexibility.<sup>114</sup> But the fundamental problem remains.

## SEND DPICM TO UKRAINE

Washington has a large supply of artillery ammunition that it has yet to tap: DPICMs. Effective against both infantry and armored vehicles, the DPICM is a type of warhead that breaks apart and releases smaller explosive submunitions, or bomblets, increasing lethality. The United States reportedly possesses almost 3 million DPICMs, according to a March 21 letter from the top Republicans on the House and Senate armed services and foreign affairs committees. They noted that "DPICM could help fill a key gap for Ukraine's military."<sup>115</sup> Many of the DPICM rounds in U.S. stocks can be fired by Kyiv's Western-donated 155mm or 105mm artillery systems. While some are probably past their shelf life, Ukraine would benefit greatly from even a few hundred thousand.

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108. Phil McCausland and Dan De Luce, "Ukraine is running low on ammo. Europe faces pressure to produce more." *NBC News*, March 3, 2023. (<https://www.nbcnews.com/politics/national-security/ukraine-running-low-ammo-europe-faces-pressure-produce-rcna73231>)

109. Jacopo Barigazzi, "EU plan to buy Ukraine shells hits legal snag over who gets the money," *Politico Europe* (Belgium), April 5, 2023. (<https://www.politico.eu/article/eu-plan-ukraine-artillery-shell-155mm-war-russia-zelenskyy-putin>)

110. Henry Foy, Barney Jopson, and Guy Chazan, "Explosives shortage threatens EU drive to arm Ukraine," *Financial Times* (UK), March 19, 2023. (<https://www.ft.com/content/ae0e1a1-c464-4af9-a1c8-73fbc46ed17>)

111. Igor Kossov, "Ukrainian soldiers in Bakhmut: 'Our troops are not being protected,'" *The Kyiv Independent* (Ukraine), March 5, 2023. (<https://kyivindependent.com/national/ukrainian-soldiers-in-bakhmut-our-troops-are-not-being-protected/>); Thomas Gibbons-Neff, Lara Jakes, and Eric Schmitt, "Ukraine Burns Through Ammunition in Bakhmut, Putting Future Fights at Risk," *The New York Times*, March 16, 2023. (<https://www.nytimes.com/2023/03/16/world/europe/ukraine-ammunition-bakhmut.html>)

112. Andy Bounds, "Ukraine asks EU for 250,000 artillery shells a month," *Financial Times* (UK), March 3, 2023. (<https://www.ft.com/content/75ee9701-aa93-4c5d-a1bc-7a51422280fd>)

113. Thomas Gibbons-Neff, Lara Jakes, and Eric Schmitt, "Ukraine Burns Through Ammunition in Bakhmut, Putting Future Fights at Risk," *The New York Times*, March 16, 2023. (<https://www.nytimes.com/2023/03/16/world/europe/ukraine-ammunition-bakhmut.html>)

114. Hyonhee Shin, "South Korea to lend 500,000 rounds of artillery shells to US -report," *Reuters*, April 12, 2023. (<https://www.reuters.com/world/south-korea-lend-500000-rounds-artillery-shells-us-report-2023-04-12>)

115. Senator James E. Risch, Senator Roger F. Wicker, Representative Michael T. McCaul, and Representative Mike D. Rogers, *Letter to President Joseph R. Biden, Jr.*, March 21, 2023. ([https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/03-21-23\\_dpicm\\_letter%20\(1\).pdf](https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/03-21-23_dpicm_letter%20(1).pdf))

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*“DPICM could help fill a key gap for Ukraine’s military,” argue Sens. James Risch (R-ID) and Roger Wicker (R-MS) and Reps. Michael McCaul (R-TX) and Mike Rogers (R-AL).*

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Kyiv has been asking for DPICMs since last summer.<sup>116</sup> But the Biden team has demurred,<sup>117</sup> likely fearing criticism from within the Democratic Party and in parts of Europe. Cluster munitions are controversial because some of their submunitions often fail to detonate, leaving behind unexploded ordnance, which can harm unsuspecting civilians or friendly troops. Like the United States, neither Ukraine nor Russia has joined the Convention on Cluster Munitions, which bans parties from using, producing, stockpiling, or transferring these weapons. Poland and Romania, through whose territory Washington would likely deliver the DPICMs to Ukraine, also have not joined.<sup>118</sup> Both Russia and Ukraine have already used cluster munitions in the war,<sup>119</sup> so giving Kyiv DPICMs would not break new ground from a normative perspective.

As the lawmakers noted in their letter, the U.S. military relied on similar cluster munitions to counter Soviet advantages in manpower, artillery, and armor during the Cold War. The Russian military today enjoys similar numerical advantages against Ukraine, employing some of the same Soviet-era vehicles the DPICM was designed to defeat. These munitions would likely be especially effective against the infantry-heavy assault units Russia has used to advance in Bakhmut and has increasingly employed elsewhere on the battlefield as well.<sup>120</sup> Sending DPICMs now would also enable Kyiv to conserve more of its traditional artillery shells, which would pose less of a threat to Ukrainian troops advancing across the battlefield during their counteroffensive.<sup>121</sup>

Ukraine’s elected representatives understand the dangers that cluster munitions pose. But facing an existential threat from Russia, they believe the rewards outweigh the risks. The many atrocities committed by Moscow’s troops make clear that Kyiv can best protect its citizens by repelling the Russian invaders. Plus, as Ukrainian officials argue, the Ukrainian military would be firing DPICMs in areas that are already largely depopulated and littered with unexploded ordnance.<sup>122</sup>

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**116.** Natasha Bertrand, Alex Marquardt, and Zachary Cohen, “Exclusive: Biden administration weighs Ukrainian requests for access to US stockpile of controversial cluster munitions,” *CNN*, December 8, 2022. (<https://www.cnn.com/2022/12/07/politics/ukraine-cluster-munitions-us-war-russia/index.html>); Jack Detsch and Robbie Gramer, “Turkey Is Sending Cold War-Era Cluster Bombs to Ukraine,” *Foreign Policy*, January 10, 2023. (<https://foreignpolicy.com/2023/01/10/turkey-cold-war-cluster-bombs-ukraine>)

**117.** Lara Seligman and Alexander Ward, “Biden administration has ‘concerns’ about providing Ukraine cluster munitions,” *Politico*, December 9, 2022. (<https://www.politico.com/news/2022/12/09/biden-administration-ukraine-cluster-munitions-00073316>)

**118.** “States Parties and Signatories by region,” *Convention on Cluster Munitions*, accessed April 25, 2023. (<https://www.clusterconvention.org/states-parties>)

**119.** Joel Gunter, “Ukraine war: Evidence shows widespread use of cluster munitions in Kharkiv,” *BBC* (UK), June 12, 2022. (<https://www.bbc.com/news/world-europe-61778433>); Thomas Gibbons-Neef and John Ismay, “To Push Back Russians, Ukrainians Hit a Village With Cluster Munitions,” *The New York Times*, April 18, 2022. (<https://www.nytimes.com/2022/04/18/world/europe/ukraine-forces-cluster-munitions.html>)

**120.** Tim Lister, Frederik Pleitgen, and Victoria Butenko, “Deadly and disposable: Wagner’s brutal tactics in Ukraine revealed by intelligence report,” *CNN*, January 26, 2023. (<https://www.cnn.com/2023/01/23/europe/russia-wagner-tactics-report-ukraine-intl/index.html>). For an overview of Russian assault detachments, see: @Tatarigami\_UA, *Twitter*, February 26, 2023. ([https://twitter.com/Tatarigami\\_UA/status/1629722073487613953](https://twitter.com/Tatarigami_UA/status/1629722073487613953)); @Tatarigami\_UA, *Twitter*, March 12, 2023. ([https://twitter.com/Tatarigami\\_UA/status/1634799693598437378](https://twitter.com/Tatarigami_UA/status/1634799693598437378)). For examples, see: @sasha\_kots, *Telegram*, April 3, 2023. (<https://t.me/sashakots/39149>); @mod\_russia, *Telegram*, January 25, 2023. ([https://t.me/mod\\_russia/23745](https://t.me/mod_russia/23745))

**121.** John Hardie and Ryan Brobst, “U.S. Should Send Cluster Munitions to Ukraine,” *Foundation for Defense of Democracies*, March 28, 2023. (<https://www.fdd.org/analysis/2023/03/28/us-should-send-cluster-munitions-to-ukraine>)

**122.** Josh Rogin, “Ukrainians are begging for cluster munitions to stop the Russians,” *The Washington Post*, March 2, 2023. (<https://www.washingtonpost.com/opinions/2023/03/02/ukraine-russia-cluster-munitions-spring>)

Although U.S. law prohibits the transfer of cluster munitions whose submunitions have a “dud” rate exceeding 1 percent,<sup>123</sup> the president can use Section 614 of the Foreign Assistance Act to waive that prohibition.<sup>124</sup> Some DPICM rounds have a dud rate of just over 1 percent, according to Under Secretary of Defense for Policy Colin Kahl, a difference so minor it should not prevent their transfer to Ukraine.<sup>125</sup>

President Biden should respect Kyiv’s decision and send DPICMs now. If he does not, he may be forced to do so later as its ammunition shortage grows more dire, wasting valuable time, battlefield opportunities, and Ukrainian lives.

## UPDATE PENTAGON MUNITION REQUIREMENTS

Since last year, U.S. military and defense officials have pointed to munitions requirements for a potential war with Russia to argue Washington cannot afford to provide certain munitions to Kyiv. Pentagon officials reportedly first offered this justification with respect to ATACMS but later made similar arguments with respect to 155mm artillery ammunition, among other things.<sup>126</sup> It is time to revisit these requirements.

While the Pentagon should always ensure American warfighters have sufficient ammunition, there are also risks in being overly cautious. Russia’s military has lost an enormous amount of manpower and materiel in Ukraine, including millions of artillery rounds, and will likely need years to return to its pre-war strength. While the Kremlin theoretically could still launch a relatively small-scale invasion against NATO in Eastern Europe, Russia’s military will not pose the same conventional threat for some time. What is more, every Russian tank or artillery piece destroyed by a U.S.-donated shell is one that American or allied forces would not have to face in a potential war with Moscow.

For these reasons, members of Congress have pushed the Pentagon to update its assessment of U.S. munitions requirements for Russia-related contingencies.<sup>127</sup> In December, *The Wall Street Journal* reported that the Defense Department planned to review its requirements.<sup>128</sup> But on March 21, a bipartisan group of lawmakers on the Senate Armed Services Committee asserted that the Pentagon “has not reassessed its European theater warfighting requirements since Russia’s invasion of Ukraine and does not anticipate significantly changing them until FY2026.” The senators called on the Defense Department to “immediately undertake an urgent and comprehensive update to its warfighting requirements for confronting Russia in Europe.”<sup>129</sup>

In late March, General Milley testified that Secretary Austin had directed the U.S. military to review all its war plans and munitions requirements.<sup>130</sup> Congress should now press the Pentagon to complete that review in a timely manner.

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123. Consolidated Appropriations Act, 2023, Pub. L. 117-328. (<https://www.congress.gov/bill/117th-congress/house-bill/2617/text>)

124. Foreign Assistance Act of 1961, Publ. L. 87-195. (<https://www.govinfo.gov/content/pkg/COMPS-1071/pdf/COMPS-1071.pdf>)

125. Under Secretary of Defense Colin Kahl, *Interview With War on the Rocks*, February 24, 2023. (<https://warontherocks.com/2023/02/backing-ukraine-against-russia-with-colin-kahl-and-derek-chollet>)

126. Jack Detsch, “U.S. Plans for a Hypothetical War Limit Aid to a Real One,” *Foreign Policy*, December 9, 2022. (<https://foreignpolicy.com/2022/12/09/military-aid-ukraine-russia-munition-stockpile-shortages>)

127. *Ibid.*

128. Doug Cameron, “Pentagon Reviews Munitions Needs as Ukraine Drains Stocks,” *The Wall Street Journal*, December 9, 2022. (<https://www.wsj.com/articles/pentagon-reviews-munitions-needs-as-ukraine-drains-stocks-11670591163>)

129. Office of Senator Tom Cotton, Press Release, “Cotton Leads Bipartisan Letter Urging DoD to Update Warfighting Requirements to Fight Russia,” March 21, 2023. (<https://www.cotton.senate.gov/news/press-releases/cotton-leads-bipartisan-letter-urging-dod-to-update-warfighting-requirements-to-fight-russia>)

130. Lolita C. Baldor, “Milley: US has long way to go to build munitions stockpile,” *Associated Press*, March 29, 2023. (<https://apnews.com/article/ukraine-war-us-munitions-stockpiles-0d38850603f4264b7568d63d6e7e3d93>)

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*The Pentagon should “immediately undertake an urgent and comprehensive update to its warfighting requirements for confronting Russia in Europe,” Senators Tom Cotton (R-AR), Richard Blumenthal (D-CT), Roger Wicker (R-MS), and Angus King (I-ME) wrote in a recent letter to Secretary of Defense Lloyd Austin.*

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## **CONCLUSION**

The United States and its allies have rightly invested considerable resources in helping Ukraine fend off Russia’s invasion and liberate territory. As Kyiv prepares for its counteroffensive in what may prove to be the decisive phase of the war, Washington must do everything it can to help Ukraine make good on that investment. This means supplying Kyiv with more armor, addressing its missile defense gap, bolstering Ukraine’s long-range strike capabilities, and freeing up additional supplies of artillery ammunition.

The Ukrainian people are not asking Americans to fight for them, only for the weapons they need to defend their homes. By heeding that call, Washington advances vital interests both in Europe and beyond. Now is the time to act.

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## APPENDIX

### Estimated Tally of Western AFVs Provided to Ukraine Since Oct. 2022

Type	Vehicle	Donor	Pledged	Delivered	Notes
Tank	Leopard 2A4	POL	14	14	
Tank	Leopard 2A4	CAN	8	8	
Tank	Leopard 2A4	NOR	8	8	
Tank	Leopard 2A4	ESP	10	6	First six arrived in Poland for shipment to Ukraine in late April. The other four are under repair and will not be ready until the summer.
Tank	Leopard 2A6	DEU	18	18	
Tank	Leopard 2A6	PRT	3	3	
Tank	Strv 122 (mod. Leo 2A5)	SWE	10	0	Timeline is unclear.
Tank	Leopard 2A4	DNK, NLD	14	0	Will be procured from third party. Delivery expected in Q1 2024 following refurbishment.
Tank	Challenger 2	GBR	14	14	
Tank	M1A1 Abrams	USA	31	0	Expected delivery in fall 2023.
Tank	M-55S	SLV	28	28	
Tank	T-72EA	USA, NLD, CZE	90	37	Timeline for remaining tanks is unclear.
Tank	T-72M1/M1R	POL	28	28	
Tank	T-72M1	CZE	12	12	
Tank	PT-91	POL	31	31	
Tank	Leopard 1A5	DNK, DEU, NLD	100	0	Pledged ~25 by summer and ~55 more by EOY plus at least ~20 and as many as ~98 more in 2024.
ASLT	AMX-10 RCR	FRA	40	9-14	Timeline for remaining vehicles is unclear.
IFV	M2A2-ODS Bradley	USA	109	109	
IFV	Marder 1A3	DEU	40	40	
IFV	CV9040	SWE	50	Unknown	Timeline is unclear.
IFV	BMP-1A	GRC	40	20	Timeline for remaining 20 is unclear.
IFV	BVP-1	SVK	30	30	
IFV	BWP-1	POL	100	Unknown	Timeline is unclear. In January, POL defense minister said POL would send a brigade's worth. In April, Zelenskyy said POL would send 100.
IFV	YPR-765	NLD	Probably dozens	Unknown	NLD had pledged 196 by mid-April. Deliveries began in mid-2022. Unclear how many were sent since October.
APC	Stryker M1126 ICV/M1127 RV	GBR	90	90	
APC	FV432 Mark 3 Bulldog	GBR	20	20	
APC	ACSV	CAN	39	39	
APC	FV103 Spartan	GBR	20	20	

Type	Vehicle	Donor	Pledged	Delivered	Notes
APC	M113A3	USA	100	100	Assuming delivery because they were committed under Presidential Drawdown Authority (PDA) in early January.
APC	M113	ESP	40	40	Some are the self-propelled mortar version.
APC	M113A1-B	GBR	46	46	
APC	BvS 10	NLD	28	28	
APC	BV-206S	ITA	Unknown	Unknown	
APC	Valuk	SVN	20	20	
APC	KTO Rosomak	POL	200	0	POL agreed on April 1 to sell UKR 100, to be produced by industry. But Zelenskyy later said UKR would receive 100 “now” and 100 “later.” Unclear whether all will be new builds.
AUV	M1117 ASV	USA	250	≥ 37	Pledged in November under USAI, meaning they must be procured from industry.
Recce	Fennek	NLD	Unknown	Unknown	
IMV	MaxxPro MRAP	USA	200	200	Assuming delivery because they were committed under PDA in early October.
IMV	Cougar MRAP	USA	37	37	Assuming delivery because they were committed under PDA in Dec. At least some had definitely arrived by late March.
IMV	Unspecified MRAP	USA	289	289	Assuming delivery because they were committed under PDA in January-February. At least some appear to be Oshkosh M-ATVs, first seen in Ukraine in March.
IMV	Dingo MRAP	DEU	50	50	
IMV	Bushmaster	AUS	30	Unknown	Timeline is unclear.
IMV	Husky	GBR	~20-50	Unknown	At least some apparently were delivered.
IMV	Mastiff	GBR	~30-60	Unknown	At least some apparently were delivered.
IMV	Wolfhound	GBR	≤ 30	Unknown	At least some apparently were delivered.
IMV	Senator	CAN	200	Unknown	Roshel CEO said they will arrive before summer.
IMV	HMMWV	USA	1,183	1,183	Assuming delivery because they were committed under PDA in October-January.
IMV	HMMWV	LUX	28	28	
IMV	HMMWV	SLV	20	20	
IMV	Panthera T6	Unknown	≥ 12	≥ 12	
IMV	Bastion	FRA	20	Unknown	Contract with industry reportedly was nearly complete as of October 2022.
IMV	Iveco LMV	BEL	80	Unknown	
IMV	“Light tactical vehicles”	USA	100	100	Assuming delivery because they were committed under PDA in November.

Sources: author research and Oryx<sup>131</sup>

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**131.** Since the full-scale war began, the Oryx blog has conducted in-depth open-source research tracking deliveries of heavy equipment to Ukraine. See: Joost Oliemans and Stijn Mitzer, “Answering The Call: Heavy Weaponry Supplied To Ukraine,” *Oryx*, April 11, 2022. (<https://www.oryxspioenkop.com/2022/04/answering-call-heavy-weaponry-supplied.html>)