



Seizing the Initiative in Ukraine

Waging War in a Defense Dominant World

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THE ISSUE

Ukrainian forces retain the initiative in the war but advanced an average of only 90 meters per day on the southern front during the peak of their summer offensive, according to new CSIS analysis. Russia's extensive fortifications—which include minefields, trench networks, and support from artillery, attack helicopters, and fixed-wing aircraft—have slowed Ukrainian advances. In particular, Russia has expanded the size of its minefields from 120 meters to 500 meters in some areas, making Ukraine the most heavily mined country in the world today. Ukrainian military progress is still possible, but the United States and other Western countries need to provide sustained military aid and other assistance.

INTRODUCTION

The war in Ukraine has become a test of political will and industrial capacity between two competing blocks: allied countries aiding Ukraine, such as the United States and numerous countries in Europe and Asia; and axis countries aiding Russia, such as China, North Korea, and Iran. Despite Ukraine's efforts to liberate territory illegally seized by Russia, offensive operations have been slow. Some policymakers have erroneously argued that poor Ukrainian strategy has contributed to the slow pace of operations. According to proponents of this view, the Ukrainian military mistakenly focused on conducting operations along multiple fronts rather than on a single front in Zaporizhzhia Oblast.¹

To better understand military operations in Ukraine, this analysis asks three questions. What is the state of the offense-defense balance in the Ukraine war? What factors have impacted Ukrainian offensive operations? What are

the policy implications for the United States and other Western countries?

Ukrainian operations raise the age-old question in warfare about whether it is easier for militaries to seize territory or defend it. This phenomenon is called the “offense-defense balance,” and it refers to the relative strength between the offense and defense in warfare.² The main idea is that there are several factors, such as geography, force employment, strategy, and technology, that can influence whether the offense or defense has the advantage.³ When the *offense* has the advantage, it is generally easier for an attacking state to destroy its opponent's military and seize territory than it is to defend one's own territory. When the *defense* has the advantage, it is generally easier to hold territory than it is to move forward and seize it.⁴

This analysis utilizes several sources of information. To understand historical rates of advance, this assessment compiles data on offensive campaigns from World War

I through Ukraine's 2023 offensive.⁵ It also examines open-source data on fortifications, unit positions, and the attrition of military equipment. In addition, it uses satellite imagery and drone footage of the battlefield in eastern and southern Ukraine to understand the challenges of offensive operations. Finally, the authors conducted interviews with Ukrainian, U.S., and European military officials.

The analysis comes to three main conclusions. First, defense has the advantage in the war. This reality should not come as a major surprise. Carl von Clausewitz wrote in *On War* that "defense is a stronger form of fighting than attack" and that "the superiority of the defensive (if rightly understood) is very great, far greater than appears at first sight."⁶ Ukrainian forces averaged approximately 90 meters of advance per day during their recent push on the southern front between early June and late August 2023.

Second, the reason for the slow pace of advance was *not* poor Ukrainian strategic choices, as some have argued.⁷ Instead, it was likely caused by a Ukrainian change in force employment, especially the deliberate adoption of small-unit tactics, and the lack of key technology such as fighter aircraft for suppression of enemy air defense and close air support. In addition, Russia constructed substantial defensive fortifications, including minefields, and utilized attack helicopters, fixed-wing aircraft, and unmanned aircraft systems (UASs) against advancing Ukrainian forces.

Third, Ukraine still retains the initiative in the war, and the United States and other Western countries should provide long-term aid packages that help Ukraine strengthen its *defense* and prevent or deter a Russian counterattack in the future. They should also provide additional aid to help Ukraine on *offense* to maximize the possibility that it can retake as much territory as possible from Russia. After all, one of the United States' most significant adversaries, Russia, has been reduced to a second- or third-rate military power without a single U.S. military casualty. As many as 120,000 Russian soldiers have been killed, as well as over 300,000 wounded, and Ukrainian soldiers have destroyed a massive number of Russian weapons systems, from main battle tanks and fighter aircraft to submarines and landing ships.⁸ U.S. aid to Ukraine should continue even with U.S. support to

Israel likely to grow following the October 2023 Hamas attack, since Russia, Iran, and their partners represent a significant threat to U.S. interests.

The rest of this brief is divided into three sections. The first examines the state of the war and the strength of the defensive advantage in Ukraine. The second section explores the factors contributing to the defensive advantage. The third outlines several policy implications for the United States and other Western countries.

DEFENSE DOMINANCE

In early June 2023, Ukraine began a counteroffensive to retake territory illegally occupied by Russian forces in the Zaporizhzhia and Donetsk Oblasts. Ukraine retains the operational initiative, but its relatively slow pace of advance and the trade-offs it has made to preserve personnel and equipment indicate that the defense has significant advantages.

This section examines Ukraine's efforts across three main fronts in summer 2023. First, Ukrainian offensive operations were primarily concentrated along the southern front, in the Zaporizhzhia Oblast and western portions of the Donetsk Oblast. Second, Ukraine was on the offensive in various locations along the eastern front in the Donetsk Oblast. Third Ukraine conducted raids across the Dnipro River in the Kherson Oblast, although it did not conduct larger military operation in the region. In addition, Russia and Ukraine were engaged in attacks using missiles, UASs, and special operations forces beyond the front lines in such areas as Crimea.

Southern Front: Beginning in June 2023, Ukraine pursued two main lines of attack on the southern front: one toward the city of Melitopol and other toward the city of Berdiansk. Both cities are transit routes and logistical hubs for Russian forces throughout southern Ukraine and Crimea, the disruption of which represents significant strategic value to Ukraine. However, Ukraine's progress on the southern front was slow, though deliberate.

Ukraine's most significant advance was around the town of Robotyne, in the direction of Melitopol. Ukraine advanced a total of roughly 7.6 kilometers from early June to late August 2023—an average of approximately 90 meters per day.⁹ This advance was slow even when compared with historical offensives in which the attacker

did not draw major benefit from surprise or from air superiority. The Ukrainian offensive did, however, continue to move forward, unlike many historical examples in which the attackers were thrown back.

Ukraine also moved slower than in its previous offensives against Russia, in which it faced less organized defenses. In its 2023 counteroffensive, Ukraine faced a system of *fortified defenses*—extensively prepared trench lines, minefields, and other fieldworks.¹⁰ During its 2022 counteroffensive in the Kherson Oblast, Ukraine advanced 590 meters a day on average through *prepared defenses*—systems that include fortifications but that nevertheless were limited by time and resource constraints. Around the same time, Ukraine advanced rapidly in a counteroffensive in the Kharkiv Oblast, moving forward 7.5 kilometers a day on average and overcoming *hasty defenses*—systems constructed either in contact or when contact is imminent with opposing forces, and that therefore depend on enhancing the natural terrain.

Figure 1 shows the average rate of advance for selected combined arms offensives, such as Galicia, the Somme,

Gorzia, and Belleau Wood during World War I; Leningrad and Kursk-Oboyan during World War II; Deversoir (Chinese Farm) during the Yom Kippur War; and Ukraine in 2022 and 2023. Cases were selected from a universe of offensive campaigns lasting more than one day in which the attacker advanced, did not achieve substantial or complete surprise, and did not benefit from air superiority. In addition, cases were selected to ensure variation in geography, technology, time period, attacking and defending forces, and average advance. A much larger number of cases were also consulted, though not included in Figure 1.¹¹

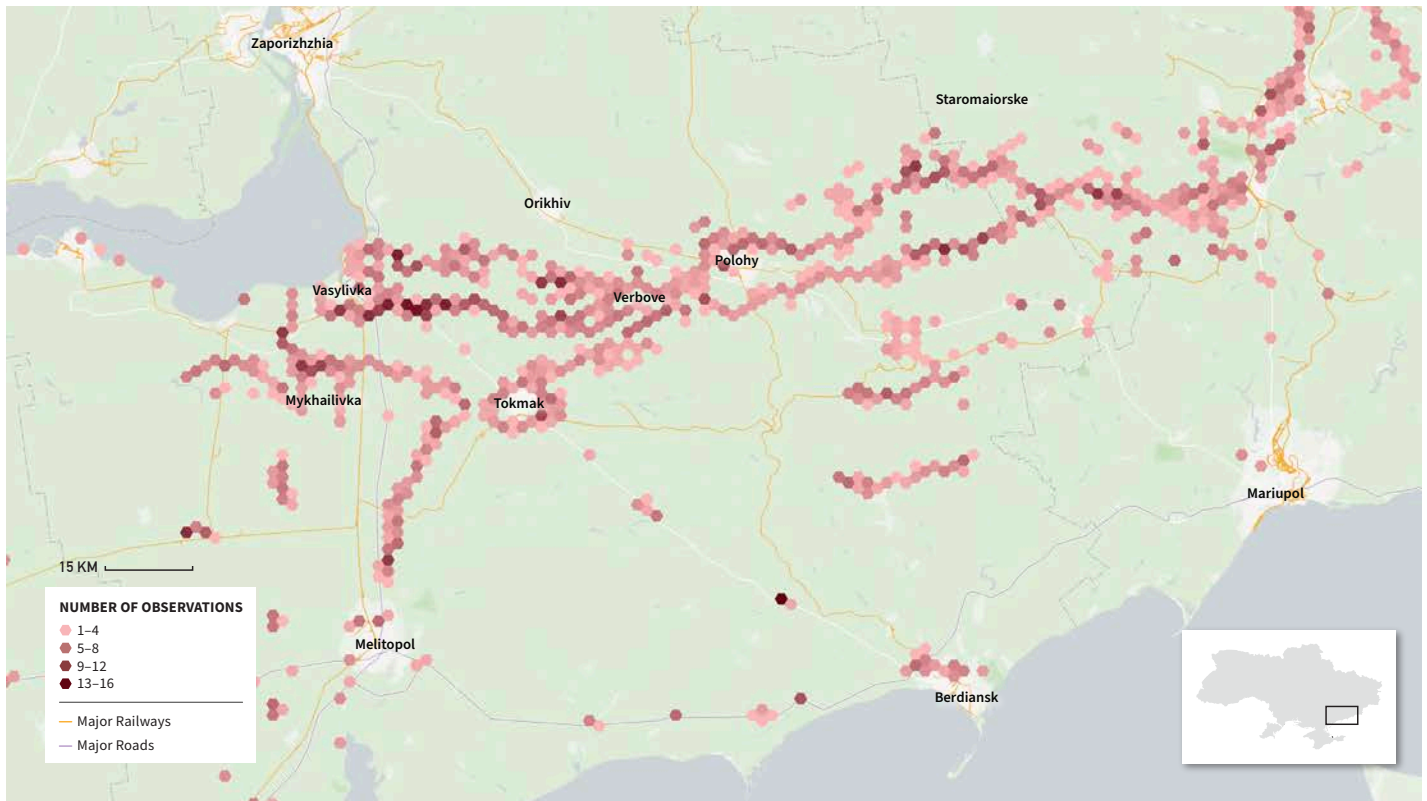
Slow progress on the southern front does not mean that Ukraine is failing or will fail in its objectives. It merely indicates that seizing terrain is difficult, probably more so than in its previous offensives. It is possible that Ukraine's rate of advance may accelerate if it can overcome Russia's defensive positions near the current front lines or if the Russian military experiences operational or strategic collapse. Such changes in fortune are not unprecedented in modern warfare. The Allied breakout from Normandy in Operation Cobra followed 17 days of grinding combat

Figure 1: Rates of Advance for Selected Combined Arms Offensives, 1914–2023

Dates	Offensive	Attacker	Defender	Defense	Average Advance (meters per day)
August 23–September 11, 1914	Galicia	Russia	Austria-Hungary	Hasty	1,580
July 1–November 19, 1916	Somme	France and Great Britain	Germany	Fortified	90
August 8–August 18, 1916	Gorzia (Sixth Isonzo)	Italy	Austria-Hungary	Fortified	500
June 1–June 26, 1918	Belleau Wood	United States	Germany	Fortified and Prepared	410
January 12–January 30, 1943	Leningrad	USSR	Germany	Fortified	1,000
July 5–July 15, 1943	Kursk-Oboyan	Germany	USSR	Prepared	3,220
October 15–October 17, 1973	Deversoir (Chinese Farm)	Israel	Egypt	Hasty	5,000
September 6–September 13, 2022	Kharkiv	Ukraine	Russia	Hasty	7,400
August 29–November 11, 2022	Kherson	Ukraine	Russia	Prepared	590
June 4–August 28, 2023	Robotyne	Ukraine	Russia	Fortified	90

Source: CSIS analysis of open-source imagery of combat in Zaporizhzhia, Kherson, and Kharkiv Oblasts; and Robert L. Helmbold, "CDB90," in *A Compilation of Data on Rates of Advance in Land Combat Operations* (Bethesda, MD: U.S. Army Concepts Analysis Agency, 1990), <https://apps.dtic.mil/sti/pdfs/ADA220426.pdf>. CDB90 is based on information collected over a period of several years by the Historical Evaluation and Research Organization and revised by the U.S. Army Concepts Analysis Agency.

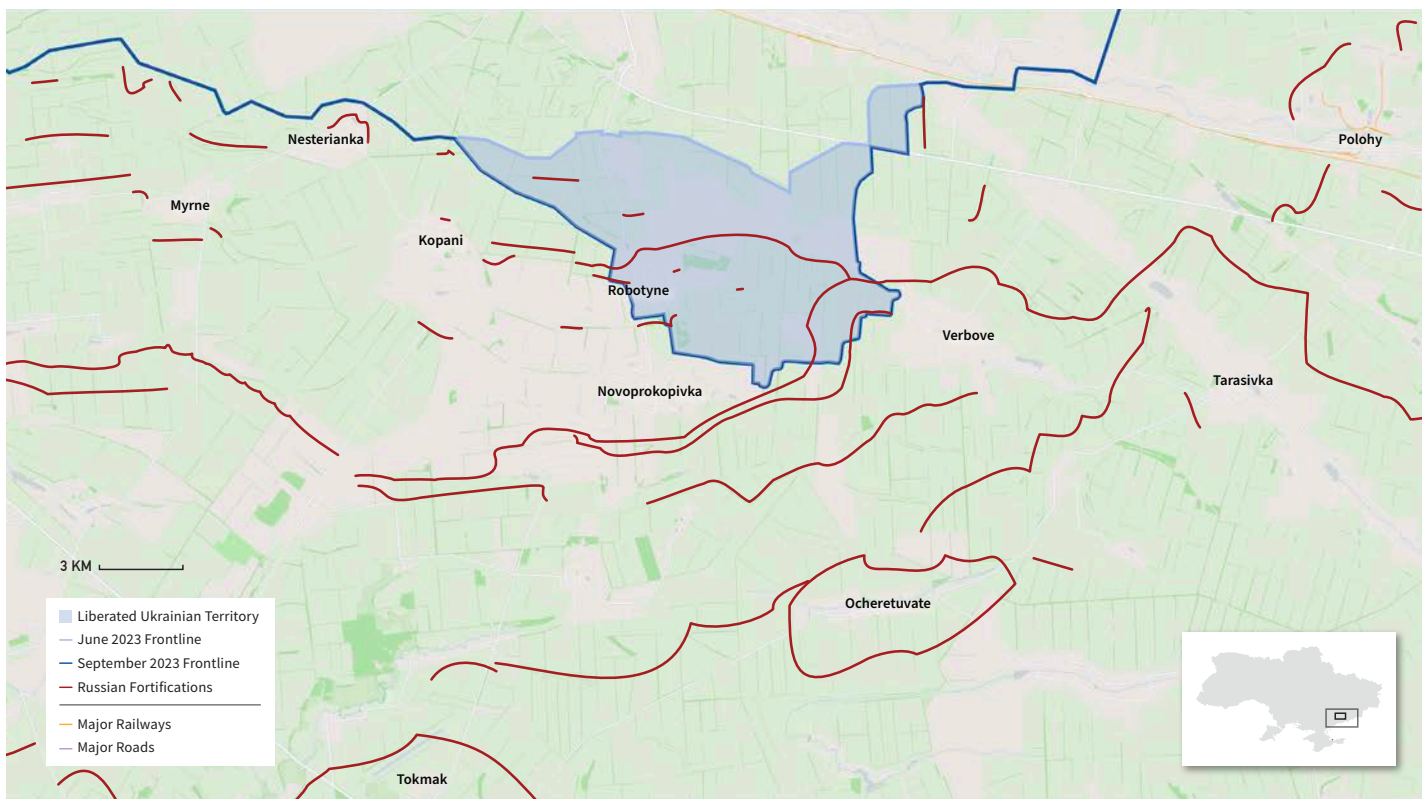
Figure 2: Russian Fortifications on the Southern Front



Note: Fortifications constructed before 2022 are not pictured.

Source: Brady Africk, "Russian Field Fortifications in Ukraine," Medium, bradyafrick.com, September 11, 2023, <https://read.bradyafrick.com/p/russian-field-fortifications-in-ukraine>

Figure 3: Ukrainian Advance and Russian Fortifications around Robotyne, Ukraine



Source: CSIS analysis of Sentinel-2 imagery, maps from the Institute for the Study of War, and Africk, "Russian Field Fortifications in Ukraine."

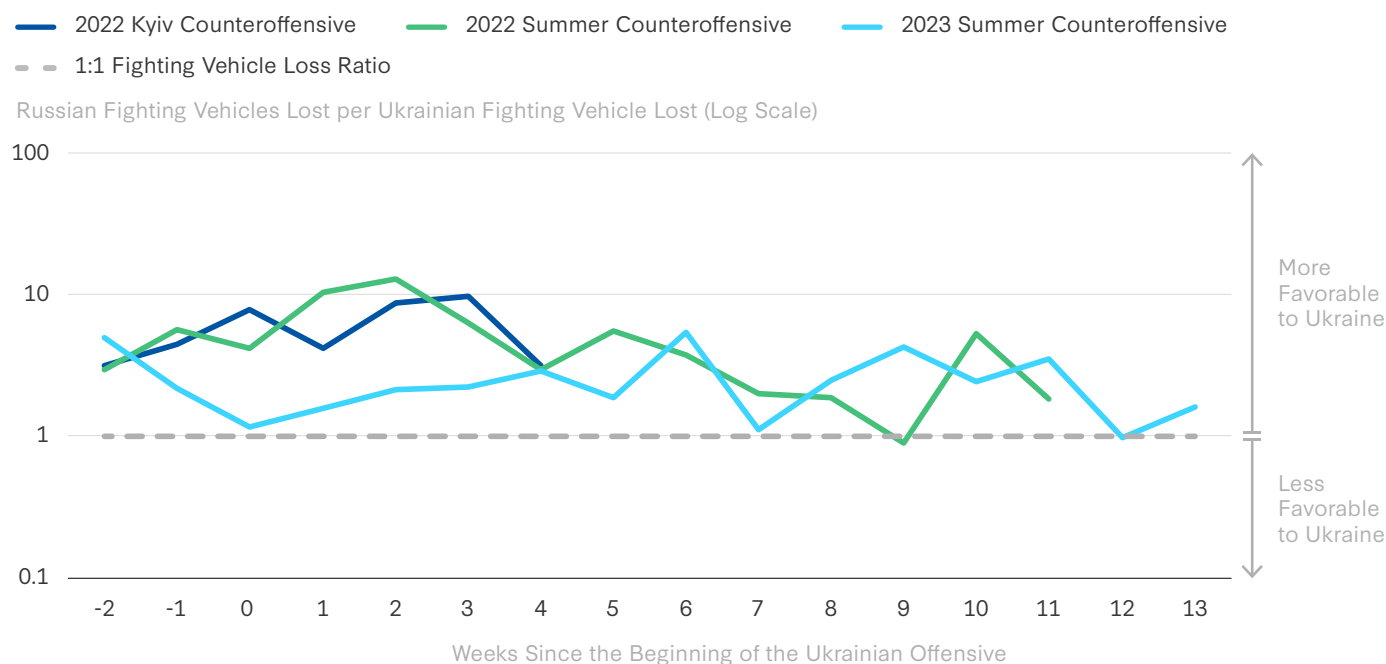
in which General Omar Bradley's First Army suffered more than 40,000 casualties to advance 11 kilometers, an advance rate of approximately 650 meters per day.¹² It succeeded despite the exhaustion of several of the infantry divisions tasked with the initial penetration, eventually breaking through German lines and advancing another 11 kilometers in the three days following the initial assault. The success was achieved due to German defensive failings and Allied airpower and demonstrates that slow advances are not incapable of becoming rapid breakthroughs.¹³ While Ukraine lacks the offensive advantages the Allies enjoyed in Normandy, the Russian military has also not demonstrated the operational competence of the German Wehrmacht in World War II. The example suggests that an accelerated advance remains possible, if unlikely.

Despite the slow progress, Ukraine advanced past the first of three lines of Russian fortifications in some areas along the southern front, as shown in Figure 3. It is possible that a Ukrainian breakthrough of the second line could

accelerate the rate of advance, but Russia can probably still limit the strategic impact of a second breakthrough. Russia maintains a third defensive system consisting of a constellation of disconnected fortifications surrounding key in the region, as shown in Figure 2.

Attrition ratios also suggest that the cost of seizing terrain has increased. As shown in Figure 4, Ukraine suffered greater attrition in its summer 2023 counteroffensive than in its previous offensives. According to open-source data, Russia lost only 2.0 fighting vehicles (defined as a tank, armored fighting vehicle, or infantry fighting vehicle) for each Ukrainian fighting vehicle destroyed, captured, abandoned, or seriously damaged in its current offensive. This ratio is less favorable to Ukraine than the 3.9 Russian vehicles lost per Ukrainian vehicle during its summer 2022 counteroffensive and 6.7 Russian vehicles lost per Ukrainian vehicle during the counteroffensive that drove Russia back from Kyiv in early 2022.¹⁴ While loss ratios and rates of advance are crude metrics for

Figure 4: Loss Ratio of Russian to Ukrainian Fighting Vehicles



Source: Data compiled by Daniel Scarnecchia from Oryx, "Attack On Europe: Documenting Russian Equipment Losses During The Russian Invasion Of Ukraine," Oryx, <https://www.oryxspioenkop.com/2022/02/attack-on-europe-documenting-equipment.html>; and "Attack On Europe: Documenting Ukrainian Equipment Losses During The Russian Invasion Of Ukraine," Oryx, <https://www.oryxspioenkop.com/2022/02/attack-on-europe-documenting-ukrainian.html>. Oryx data is not geolocated, and therefore the ratios are calculated from the total number of fighting vehicles confirmed to be lost across the entire country. The data are biased by the mode of collection, but the bias is assumed to be constant across the three Ukrainian offensives depicted. The 2022 Kyiv counteroffensive was coded as beginning March 16, 2022, the 2022 summer offensive as beginning August 29, 2022, and the 2023 summer counteroffensive as beginning June 4, 2023.

measuring Ukrainian progress, they together suggest that taking territory has been more difficult in the 2023 offensive than in Ukraine's previous operations.

Elsewhere along the southern front, Ukraine made limited advances south of the city of Velyka Novosilka in the direction of Berdiansk. Ukrainian forces liberated several towns in their advance south of Velyka Novosilka, engaging in significant fighting. However, Ukraine's gains in the area represented only approximately 10 kilometers of advance from early June to late August 2023.

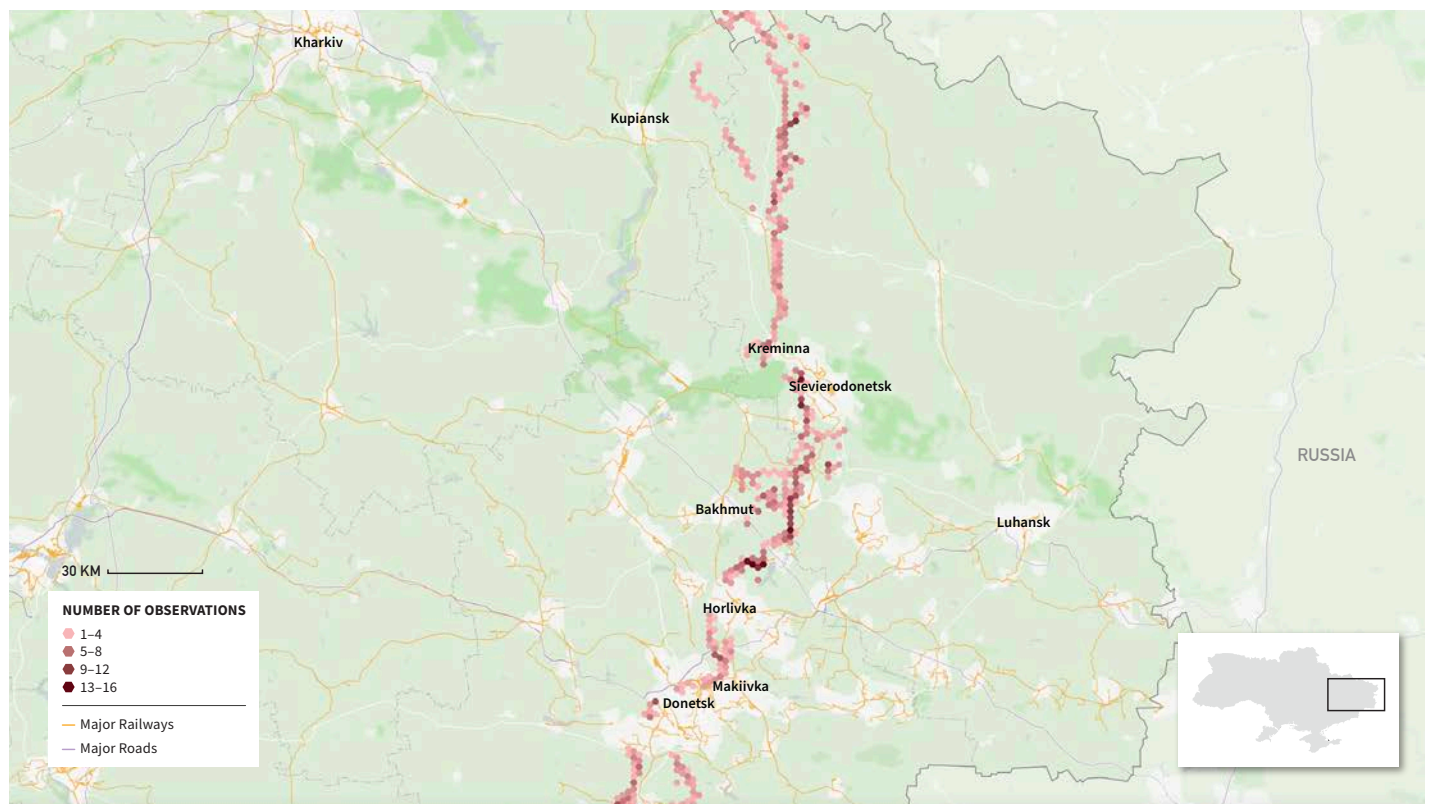
Eastern Front: Unlike on the southern front, where Ukrainian offensive operations over the summer represented a new phase in the war, fighting on the eastern front has been continuous in some areas for over a year. Ukraine made marginal gains over the summer in a handful of pockets along the eastern front, particularly in the Donetsk Oblast. One example is around Bakhmut, where Russia has pressed since August 2022 for small territorial gains at high costs to personnel.¹⁵ Beginning in May 2023, however, Ukraine conducted a series of

flanking counterattacks, retaking pieces of territory southwest and northwest of the city.

Despite these successes, Ukraine has yet to approach key Russian positions beyond the current frontlines. These include the cities of Donetsk, Makiivka, and Horlivka, as well as the network of Russian fortifications that stretch between them. As CSIS assessed in June 2023, a Ukrainian attempt to push through these cities is unlikely because of the difficulties and likelihood of high casualties in urban warfare.¹⁶ For now, sustained Ukrainian operations on the eastern front have fixed large numbers of Russian forces that otherwise would have been available to reinforce Russian defensive efforts to the south.¹⁷

Unlike most other locations in Ukraine, Russian forces were involved in limited offensive operations in multiple areas along the eastern front over the summer. In addition to pushing back against Ukrainian gains in the Donetsk Oblast, Russia increased its presence near and attacks against the northern city of Kupiansk, which Ukraine liberated in September 2022.¹⁸

Figure 5: Russian Fortifications on the Eastern Front



Note: Fortifications constructed before 2022 are not pictured.

Source: Africk, "Russian Field Fortifications in Ukraine."

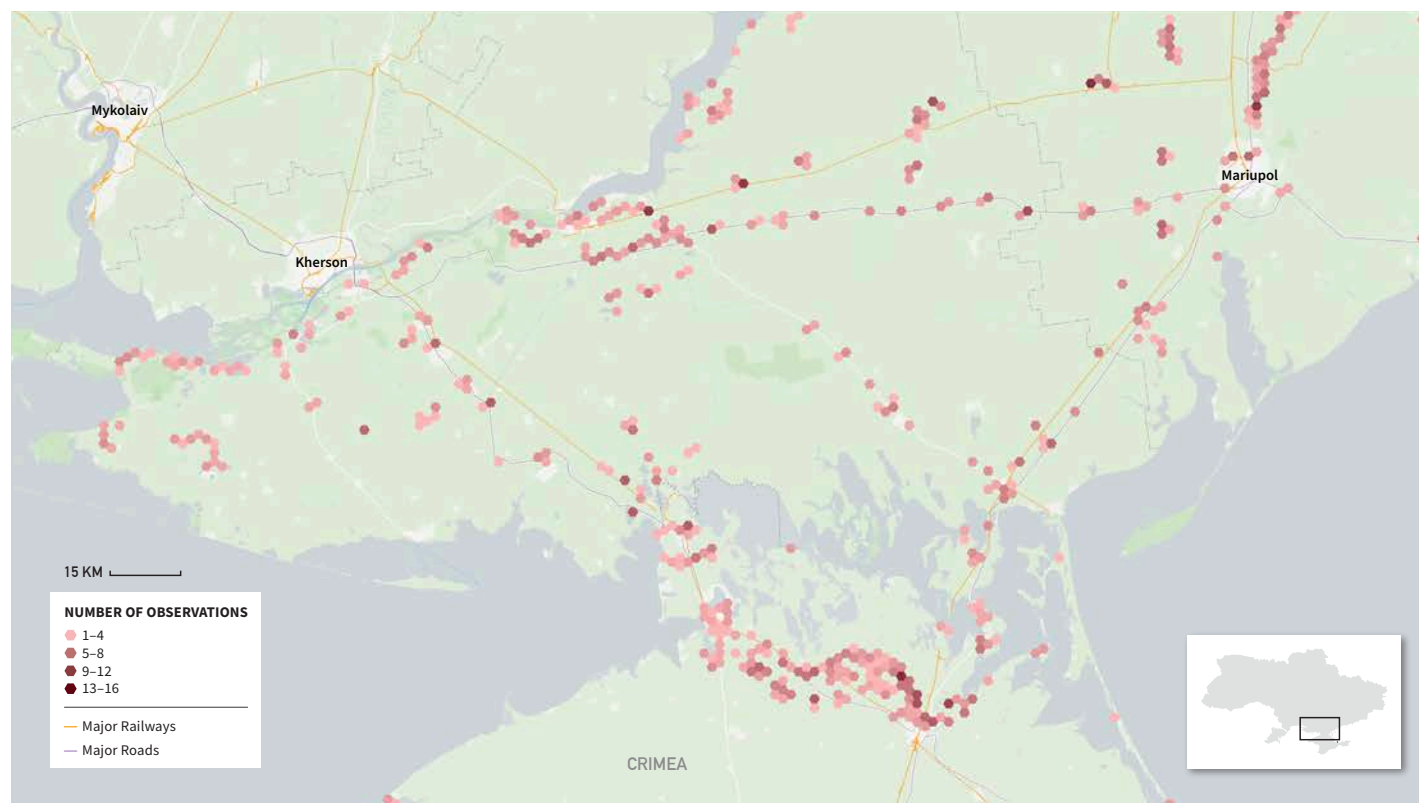
Dnipro Front: Throughout the summer, Ukraine conducted limited crossings of the Dnipro River in the Kherson Oblast to perform reconnaissance and raid Russian positions.¹⁹ These crossings varied in size, but they typically involved small groups of Ukrainian soldiers using speedboats to discretely cross the river and execute their missions quickly before returning across to Ukrainian-controlled territory.

It is possible that Ukraine plans to establish and sustain bridgeheads across the river from which to launch larger military operations in the near future. Ukrainian military leaders stated their intent to set the conditions for future larger crossings, including by destroying Russian artillery that could target large river-crossing forces and clearing mines that could slow landing forces.²⁰ However, even with proper preparation, amphibious assaults are one of the most complex and demanding operations a military can attempt. Any attempt to cross the Dnipro with a large number of forces would likely be discovered and contested by Russian forces in the first line of fortifications that spans from the Dnipro Delta across from the city of Kherson and up the Dnipro

River northward. Moreover, even a successful crossing would require complicated logistical support and need to overcome a large number of fieldworks Russia has constructed along the major roads in the region, as shown in Figure 6. Ukraine more likely intends these attacks to fix Russian forces in Kherson, preventing them from redeploying to the southern or eastern fronts.

Beyond the Frontlines: In addition to the fighting on the three fronts, the war has been marked in recent months by intensified missile barrages and escalating naval engagements. Since May, Russia has renewed its long-range UAS and missile attacks in Ukraine. Targets include a mix of critical infrastructure, command and control installations, and other military and civilian targets throughout Ukraine.²¹ For its part, Ukraine continues to conduct missile and UAS strikes against Russian military assets, headquarters, and strategic infrastructure in occupied territory.²² Ukraine has also conducted UAS attacks inside Russia. These attacks have been concentrated in the Bryansk and Belgorod regions near the western border with Ukraine, in Crimea, and in Moscow.²³ On July 30, Ukrainian president Volodymyr

Figure 6: Russian Fortifications on the Dnipro Front



Source: Africk, "Pre-2022 Field Fortifications in Russian-Occupied Ukraine."

Zelensky acknowledged that Russian territory was fair game: “Gradually, the war is returning to the territory of Russia—to its symbolic centers and military bases, and this is an inevitable, natural, and absolutely fair process.”²⁴

With the termination of a grain export deal in mid-July, tensions escalated in the Black Sea region. Ukraine struck Russian targets—including diesel-electric submarines, air defense systems, amphibious landing ships, radar installations, and infrastructure, such as dry docks—in and around Crimea using UK-supplied Storm Shadow cruise missiles, UASs, special operations forces, and other weapons systems and forces.²⁵ On July 17, Ukrainian UASs damaged the Kerch Strait Bridge used by Russia to move supplies and troops into Crimea.²⁶ On August 24, Ukrainian special operation forces also reportedly conducted a nighttime raid against Russian positions in Crimea.²⁷ In response to Ukrainian attacks, Russia withdrew the bulk of its Black Sea Fleet, such as attack submarines and frigates, from Sevastopol to other ports in Russia and Crimea.²⁸

Over the summer, Russia also conducted a series of attacks against Ukrainian Danube ports that serve as hubs for the export of grain and other food commodities.²⁹ According to Romanian officials, Russian UASs were flown near and occasionally inside Romanian air space to strike Ukrainian ports, such as Izmail and Reni, just a few hundred yards from Romanian territory. On several occasions, Romanian officials collected fragments from Russian UASs inside of Romanian territory.³⁰

DEBATING BATTLEFIELD PERFORMANCE

Battlefield success hinges on a complex interaction of several factors, including force employment, strategy, technology, leadership, weather, and combat motivation.³¹ While Ukraine retains the initiative in the war, Ukraine’s military advance has been relatively slow. Why? This section examines four possible hypotheses: Ukrainian strategy, Russian defenses, Ukrainian technology, and Ukrainian force employment.

Ukrainian Strategy: Some policymakers and analysts contend that poor Ukrainian strategy contributed to the slow pace of Ukrainian operations, though there is little evidence to support this argument.³² According to proponents, the Ukrainian military focused too much on

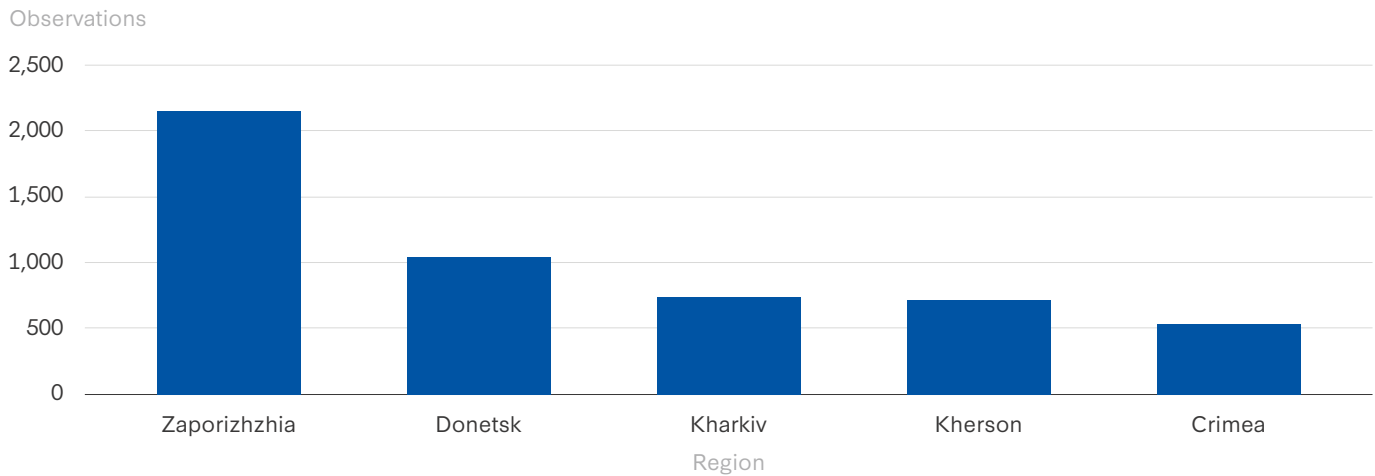
conducting operations along multiple fronts, rather than concentrating forces on a single front in Zaporizhzhia Oblast. The military objective in the south—and indeed a major objective of Ukrainian military operations more broadly—appeared to be pushing south to the Sea of Azov, cutting Russian occupation forces in two, severing the land corridor between Russia and occupied Crimea, and retaking such cities as Melitopol.

Instead of focusing on a southeast axis, however, Ukrainian commanders divided troops and firepower between the east and the south. Some U.S. military officials advised Ukraine to concentrate its forces in the south and drive toward Melitopol to punch through Russian defenses. Likewise, some criticized the Ukrainian military for moving forward on multiple axes within Zaporizhzhia Oblast itself rather than focusing on one main axis.³³ The argument about how and where Ukraine should concentrate its offensive efforts is, in part, a debate about force ratios.³⁴ Proponents of focusing solely on the south argue that massing Ukrainian forces along a single axis in Zaporizhzhia would have allowed Ukraine to achieve the favorable force ratio necessary to generate a significant breakthrough.

But this argument is unpersuasive for at least two reasons. First, Russian military leaders came to the same conclusion and prepared accordingly. They anticipated that Ukrainian forces would likely focus on the southern front and sent forces to fortify Melitopol and Tokmak, as well as other areas in Zaporizhzhia. Second, well-designed mechanized campaigns almost always progress on multiple axes, not just one. Advancing along a single axis allows the defender to fully concentrate on stopping that advance. In this case, the Russians would almost certainly have moved forces from other parts of the theater as rapidly as possible to stop the Ukrainian drive toward Melitopol. Instead, Ukrainian advances in Bakhmut and other eastern areas pinned down Russian forces since Russia was not prepared to lose Bakhmut.

Actual force ratios across the long front lines in Ukraine are impossible to determine using open sources, but there is little reason to believe that Ukraine’s multifront approach was a mistake. To achieve favorable force ratios despite its smaller military, Ukraine would have had to move forces to the decisive point before the Russian defenders could react and surge their own forces

Figure 7: Construction of Russian Fortifications between February 2022 and August 2023



Source: Africk, "Russian Field Fortifications in Ukraine."

to that area.³⁵ But Russia anticipated that Ukraine would attack in Zaporizhzhia, prepared its most extensive networks of fortifications in the region, and almost certainly planned to redeploy forces to reinforce against a Ukrainian advance there.³⁶

As a result, Ukraine likely could not have achieved more favorable force ratios even by massing its forces along one or two axes in Zaporizhzhia Oblast. While a more

favorable force ratio is always desirable, evidence suggests that a higher concentration of Ukraine's efforts along the southern front likely would have been met by a higher concentration of Russian forces in heavily fortified terrain.

Russian Defenses: Another possible explanation for Ukraine's limited progress is that Russian forces constructed and used defensive fortifications effectively. There is some evidence to support this argument. In

Figure 8: Multilayered Defenses North of Mykhailivka, Ukraine



advance of Ukraine's offensive, Russia built the most extensive defensive works in Europe since World War II, with expansive fortifications in eastern and southern Ukraine.³⁷ These defenses consist of a network of trenches, anti-personnel and anti-vehicle mines, razor wire, earthen berms, and dragon's teeth, as shown in Figure 8.

Ukraine's slow advance can be attributed, in part, to Russia's successes using fortifications to defend against Ukrainian assaults. Across the entire front, Russian troops primarily fought from infantry trench systems. Russian forces in some areas, such as the 7th Guards Air Assault Division, were so thoroughly dug in that Ukrainian forces discovered carpets and pictures on the walls of captured Russian positions.³⁸

Russia employed a variety of fortifications to slow the advance of Ukrainian vehicles. However, not all fortifications are created equal. One former Ukrainian commander belittled the effectiveness of Russian dragon's teeth defenses in September 2023.³⁹ Based on satellite imagery and other information, CSIS analysis in June 2023 similarly questioned the potential effectiveness of Russia's dragon's teeth given the varied quality in their installation and make.⁴⁰

But Russia's extensive use of mines effectively slowed Ukrainian advances. Ukraine is now the most mined country in the world after Russia expanded the size of minefields from 120 meters to 500 meters.⁴¹ The increased size and frequency of minefields complicated

Ukrainian planning and limited the effectiveness of Ukraine's equipment. For example, when the Ukrainian 47th Assault Brigade and 33rd Mechanized Brigade attempted to cross a minefield north of Robotyne on June 8, 2023, mine-clearing efforts were insufficient. Slowed or disabled by mines, Ukrainian vehicles came under fire from Russian attack helicopters, and Ukrainian soldiers were forced to abandon their equipment and retreat.⁴² The incident reportedly resulted in the loss or abandonment of at least 25 tanks and fighting vehicles, although some were later recovered.⁴³ Drone footage and satellite imagery show a cluster of 11 vehicles damaged and abandoned in one location from the failed advance, as shown in Figure 9.

Minefields disrupted Ukraine's offensive momentum and imposed constraints on Ukraine's rate of advance. Russian minelaying increased the demand on Ukrainian reconnaissance and engineers and complicates military planning.⁴⁴

As a result, Ukrainian operations in mined areas had to be slow and

Figure 9: Damaged and Abandoned Vehicles from an Attempted Ukrainian Advance North of Robotyne, June 2023



Source: Screenshot of video release by the Russian Ministry of Defense.

deliberate or risk trapping equipment and personnel on exposed ground.

The terrain in Ukraine increased the effectiveness of Russian defenses. Rows of flat, open farm fields separated by tree lines characterize the southern front. Without air superiority, Ukrainian ground forces had to advance by crossing these fields with little natural cover to conceal their movement. In addition to laying mines, Russia targeted advancing Ukrainian troops and vehicles with artillery fire, attack helicopters, and fixed-wing aircraft. Using thick summer foliage to their advantage, Russia concealed tanks, anti-tank units, and infantry units in the tree lines that border the fields to ambush Ukrainian forces.⁴⁵

In urban areas, Russia used infrastructure to its advantage. Buildings and other structures provide cover to defending forces and enable ambushes. Russia also methodically destroyed roads and created obstacles in urban areas to disrupt the advance of Ukrainian vehicles and channel them into dangerous areas. For example, a Ukrainian assault in late July on the town of Staromaiorske along the southern front was reportedly slowed by a combination of such defenses.⁴⁶

Ukraine's advance was further complicated by the proliferation of sensors and rapid precision strike capabilities on the battlefield, especially long-range precision fires and UASs. Russia deployed significant numbers of small UASs in contested areas, and some Ukrainian sources reported losing 10,000 UASs every month, demonstrating the sheer number of these systems being employed on the battlefield.⁴⁷ The ubiquity of these systems makes it impossible to establish that sensor saturation and advanced strike capabilities provide a distinct defensive advantage, but there are good reasons to believe this is the case. Sensor saturation creates a "transparent battlefield" in which forces can be found and targeted more easily than in past decades.⁴⁸

The advancement of precision fires and the proliferation of lethal UASs shorten the time it takes to strike enemy forces once they are located. In many cases, a UAS may act as both the sensor and the strike capability. Loitering munitions, for example, can circle battlefields until a target is acquired and approved for an immediate strike. On a transparent battlefield onto which an adversary can rapidly

strike detected forces, attackers must distribute further, move more deliberately, make greater use of cover, and more tightly coordinate movement with suppressive fire in order to survive their advance. In contrast, defenders can take advantage of prepared fighting positions that are less exposed both to enemy detection and enemy fire.

Ukrainian Technology: A third possibility is that offense was weakened by insufficient technology, especially weapons systems that would facilitate a breakthrough. There is some evidence to support this argument. Ukraine received significant military assistance from the West, which aided combat operations. Examples include artillery, main battle tanks, armored carriers, ground support vehicles, air defense systems, air-to-ground missiles, manned aircraft, UASs, coastal defense systems, and radar and communications. U.S.-supplied cluster munitions, which can cause devastation over a broader area than ordinary shells, were also helpful for Ukrainian forces. Ukraine used cluster munitions to target Russian troops running across open ground, either to flee or to provide reinforcements. However, Ukraine's lack of fighter aircraft, disadvantage in fires, and limited enablers made it more difficult to break through Russian lines.⁴⁹

Ukrainian Force Employment: Some have argued that the speed of Ukrainian advances was impacted by its military doctrine and tactical implementation, a combination known as "force employment."⁵⁰ There is some evidence to support this argument.

Choices in how militaries use the soldiers and equipment at their disposal can permit attackers to advance despite the extreme lethality of defenders' firepower or permit defenders to limit the gains of numerically overwhelming attackers.⁵¹ Effective force employment requires tight coordination between infantry, armor, artillery, and airpower at several organizational levels, as well as high levels of autonomy, initiative, and tactical prowess at lower echelons.

Ukraine changed how it used its forces to reduce its losses while accepting an advance rate much slower than its leaders may have initially desired. There is little doubt that Ukraine's initial force employment resulted in high rates of attrition. But it remains unclear why Ukraine's initial force employment resulted in such high losses

without generating in sizable advances. Training, force structure, organizational culture, or lack of airpower all may have played roles, and the interaction between Russian defenses and Zaporizhzhia's terrain may have forestalled a mechanized breakthrough independent of those factors.

While granular data on Ukraine's force employment is scarce, open-source information suggests a shift in tactics after its unsuccessful first assaults. Accounts based on interviews with combatants suggest a change in how Ukraine coordinated its infantry, armor, and artillery.⁵² Ukrainian operations in June 2023 appear to have been organized around larger maneuver units than later Ukrainian operations in the summer, which employed smaller infantry units supported by artillery and small numbers of tanks. Analysis by the Royal United Services Institute demonstrates that Ukraine can effectively integrate multiple combat branches at lower echelons.⁵³

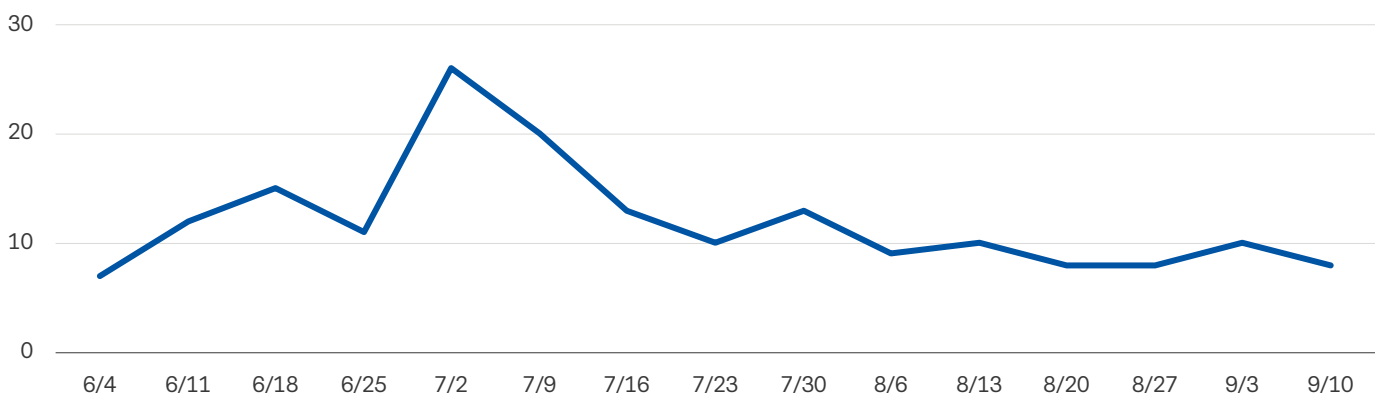
Ukraine also emphasized destroying Russian artillery as part of its changing offensive strategy. Open-source data shows that Ukraine greatly increased its destruction of Russian artillery systems in late June and early July following its initial failures to advance, as shown in Figure 10.⁵⁴ This is consistent with some reporting on Ukraine's changed operational approach.⁵⁵ This appears to mark a shift toward destroying enemy artillery before advancing and away from the combined arms approach of advancing while simultaneously suppressing the enemy using artillery fire.

These changes were associated with a significant decrease in Ukrainian losses. U.S. and European officials reported

that Ukraine lost as much as 20 percent of the weapons sent to the battlefield in the first two weeks of the offensive, a rate that prompted Ukrainian commanders to reevaluate their tactics.⁵⁶ After adopting an operational approach centered around small-unit probes and attrition by artillery and UAS strikes, Ukrainian equipment loss rates were cut in half, with approximately 10 percent of equipment lost in the next phase of operations.⁵⁷ In a war of attrition, such a decrease in loss rates was probably seen by Ukrainians as worth the slow pace of advance.

The key question of whether Ukraine's initial mechanized assaults would have succeeded if executed with greater skill is unanswerable, despite remarks made by some military officials, political figures, and security analysts.⁵⁸ Effective coordination between branches of arms might have allowed Ukraine to break through Russian lines. It is also plausible that Ukraine's lack of air superiority on a sensor-saturated battlefield would have limited the benefits of such coordination. Previous analysis of World War II breakthroughs suggests that skillful implementation of combined arms tactics have mattered for successful offensive operations, but that preponderance of firepower, operational maneuverability, speed, surprise, and air dominance have also influenced the likelihood of a breakthrough and exploitation.⁵⁹ There is little reason to believe that more effective combined arms tactics would have been sufficient to achieve the breakthrough that Ukraine and its backers initially hoped for in the summer of 2023 without the advantages of surprise and air superiority.

Figure 10: GeoConfirmed Data on Rates of Destroyed Russian Artillery (June 2023–September 2023)



Source: Data from "Ukraine," GeoConfirmed.org, September 15, 2023, <https://geoconfirmed.azurewebsites.net/ukraine>.

POLICY IMPLICATIONS

Opposition to providing further aid to Ukraine is building among some members of U.S. Congress, as highlighted in the September 2023 stopgap spending bill that did not include additional money for Ukraine. Some argue that the United States should concentrate exclusively on countering China in the Indo-Pacific and defending Taiwan. These officials contend that U.S. resources are finite, that weapons exports to Ukraine come at Taiwan's expense, and that sustained focus on war in Europe benefits China.⁶⁰ Some also argue that the United States should prioritize aid to Israel over Ukraine.⁶¹ Others maintain that every dollar spent on Ukraine is a waste of taxpayer money that could be better used on domestic priorities, such as improving healthcare, cracking down on illegal immigration, or combating the spread of fentanyl.⁶²

But these arguments are misguided. Continuing aid to Ukraine is essential to prevent authoritarian leaders, such as Vladimir Putin, from achieving their revanchist aims. In fact, Beijing, Moscow, and Tehran have deepened their military, economic, and diplomatic ties since Russia's invasion of Ukraine.

U.S. allies and enemies alike see Ukraine as a test of Western resolve. The Ukrainian military still has the

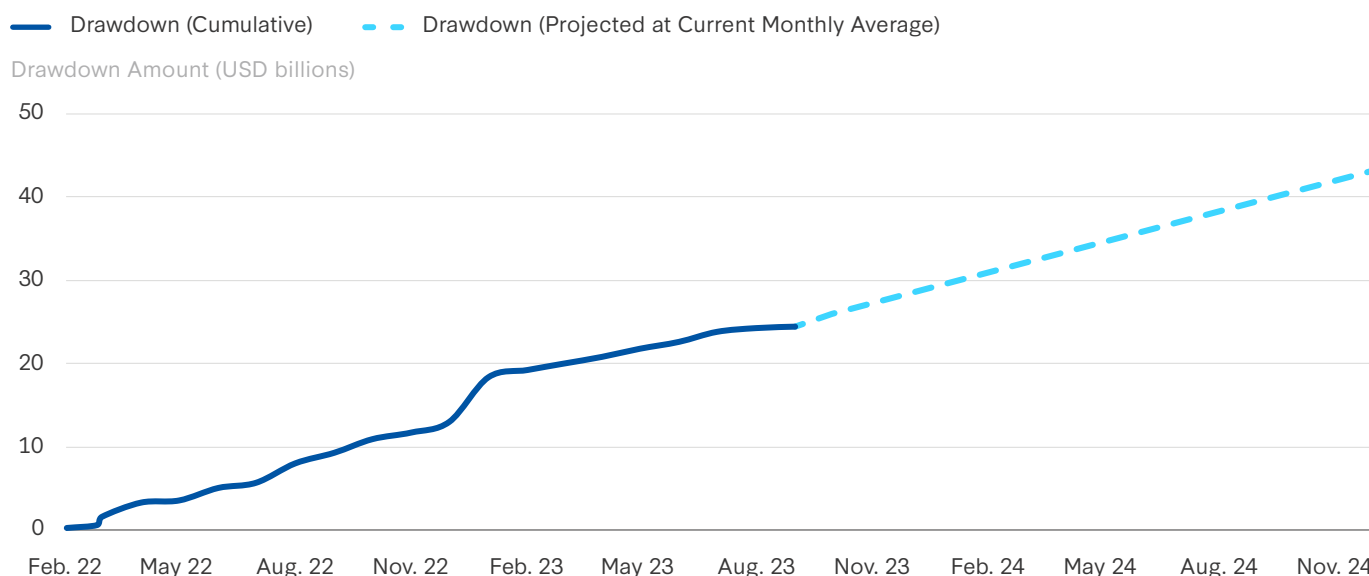
initiative in the war and continues to advance forward.⁶³ Ukraine's supporters can meaningfully impact two of the factors outlined in the previous section: Ukrainian force employment and technology. The fundamental challenge is that both take time. A war that continues to favor the defense is also likely to be protracted, since Ukrainian advances will likely continue to be slow.

The United States and its Western allies need to be prepared to support a long war and to develop a long-term aid plan. They have already provided extensive training and intelligence to improve Ukraine's force employment, including combined arms maneuver, air defense, special operations activities, intelligence, and the operation and maintenance of more than 20 military systems.⁶⁴ This support needs to continue and adapt as the war evolves.

In addition, Ukraine needs more and better technology in two respects. The first is long-term assistance that will help Ukraine strengthen its *defense* and prevent or deter a Russian counterattack in the future. Examples include mines, anti-tank guided missiles, air defense systems, stockpiles of munitions, counter-UAS systems, and area-effect weapons, such as artillery.

The second type of assistance is aid that helps Ukraine on *offense* in the current campaign and maximizes

Figure 11: U.S. Presidential Drawdowns for Ukraine (February 2022–September 2023) and Projected Drawdown Amounts (September 2023–December 2024)



Source: "Presidential Drawdown Authority (PDA) Announcements," Office of the Undersecretary of Defense (Comptroller)/CFO, Accessed September 21, 2023, https://comptroller.defense.gov/Budget-Execution/pda_announcements/.

the possibility that it can break through well-fortified areas and retake as much territory as possible from Russia. Examples include a steady supply of munitions; attack aircraft, such as F-16s; long-range missiles, such as MGM-140 Army Tactical Missile Systems (ATACMS); and UASs that can conduct intelligence, surveillance, reconnaissance, and strike missions.

Based on current trends, continuing aid to Ukraine may cost roughly \$14.5 billion per year. Figure 11 highlights what this might look like through the end of 2024. This aid has a highly favorable risk-reward ratio. One of the United States' most significant adversaries, Russia, is suffering extraordinary attrition. As many 120,000 Russian soldiers have died, and perhaps three times that number have been wounded, along with several dozen Russian general officers. Ukrainian soldiers have destroyed substantial numbers of Russian military equipment, such as main battle tanks, armored and infantry fighting vehicles, armored personnel carriers, artillery, surface-to-air missile systems, fighter aircraft, helicopters, UASs, submarines, landing ships, and a guided missile cruiser.⁶⁵ And the United States has lost zero soldiers in the war.

The war is now, in part, a contest between the defense industrial bases of the two sides: Russia and its partners, such as China and Iran; and Ukraine and its partners, including the United States and other Western countries. A decision by the United States to significantly reduce military aid would shift the military balance-of-power in favor of Russia and increase the possibility that Russia will ultimately win the war by seizing additional Ukrainian territory in a grinding war of attrition. Too much is at stake. As UK prime minister Margaret Thatcher said to President George H.W. Bush in the leadup to the First Gulf War, after Iraq had invaded Kuwait, "This is no time to go wobbly."⁶⁶ ■

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