



U.S. Assistance to Ukraine in the Information Space: Intelligence, Cyber, and Signaling

Impact Assessment

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ABOUT THE PROJECT

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Executive Summary

- The U.S. early public sharing of intelligence about an impending Russian invasion was seen as a broad success, though its effects were dampened by the politicized use of intelligence in Iraq and Afghanistan.
- This early warning tactic neither sought nor achieved preemption, but it did facilitate ally consensus building and successfully averted Russian false flag campaigns.
- The unprecedented level of U.S. battlefield intelligence support to an ally at war is seen as one of the key force multipliers and is making a significant difference.
- Ukraine's limited sharing of intelligence could dampen the effectiveness of the military assistance it is being provided.
- U.S. public and private sector assistance were instrumental in Ukraine's ability to counter Russia's extensive cyber offensive efforts.
- Underestimating Ukraine's will to resist, while seen as one of the key intelligence failures, is well explained by a solid body of academic research on defense in asymmetric warfare and national identity.
- Other key intelligence failures commonly identified by experts interviewed for this effort include unanticipated second-order effects on the global conflict environment, as well as limited preparedness for the developments in Ukraine.

Introduction

This study assesses several key aspects of U.S. assistance to Ukraine in the information domain over the course of 2022. The public sharing of intelligence in anticipation of Russia's incursion and subsequent exchange of intelligence with Ukrainian partners during the war constitute the bulk of the analysis. Indeed, in Ukraine the United States has gone particularly far in bilateral intelligence sharing—a level of exchanges associated more closely with the Five Eyes countries or Israel—while Ukraine remained somewhat guarded in its disclosures. Nevertheless, the course of war during 2022 has revealed other information domain aspects where U.S. —and international—assistance has proved significant. Namely, these aspects extend to joint defenses of the cyber space, notably showing how Russia's efforts have already turned directly against NATO states assisting Ukraine, as well as the impact of information campaigns by Ukrainian leadership. The public resilience aspect is also analyzed, as this turned out to be a significant factor in this war, sustained in no small part by the information campaigns, and was also largely missed by the external intelligence assessments.

Of the four types of military assistance provided to Ukraine, intelligence sharing is the least transparent—and thus the most challenging—aspect to analyze relying exclusively on open sources. For that reason, this study relies more heavily than others in this series on the insights shared by American, Polish, and Lithuanian experts, as well as other background conversations by the author throughout 2022. The ten experts interviewed specifically for this effort included high level officials, who have recently left the intelligence and military service, some of whom had first-hand experience in Ukraine in 2022, as well as diplomats, and heads of prominent security-focused think-tanks.

Unlike other papers in this series, it is not explicitly tied to the conflict timeline, as the information available does not allow making temporal trend distinctions – except for intelligence cooperation associated with prominent individual events. The study starts by assessing the U.S. early warning information (sharing) campaign concerning the impending Russian invasion. It subsequently discusses U.S. and Ukrainian intelligence sharing during the 2022 war, as well as the joint efforts to counter extensive Russian cyber offensives. It proceeds to look at the factors that explain the largely underestimated Ukrainian willingness and capacity to resist in the face of Russia's invasion, and some of the second order effects of this war seemingly not anticipated by the U.S. intelligence community.

This study focuses on U.S. assistance to Ukraine in the information domain, but it is important to recognize the significance of the concerted effort that includes other types of U.S. military and non-military assistance, as well as intelligence sharing and cyber capacity building provided by other NATO states (particularly Estonia and the United Kingdom), and Ukraine's own ingenuity in this regard.

This paper is part of the broader research effort to assess several tools short of war that the United States has used to help Ukraine: the first paper in this series has focused on arms transfers¹ while forthcoming publications will analyze U.S. assistance in the form of troop training, and the use of the U.S. naval assets in this conflict over the course of 2022. This effort bridges the coverage gap between classified tactical-

¹ Murauskaite, E. E. (Jan 2023). *U.S. Arms Transfers to Ukraine: Impact Assessment*. START, University of Maryland. <https://www.start.umd.edu/publication/us-arms-transfers-ukraine-impact-assessment>.

level military briefs and media commentary and draws on top-level regional expertise. These practical reflections offer a systematic integrated perspective and capture timely perspectives to be built upon as more insights become available over time.

Early Warnings: Goals and Effects

The U.S. intelligence community has taken a highly unusual approach to publicly share their assessment of the impending expansion of the Russian war effort within diplomatic circles and to the general public. Since the fall of 2021, U.S. policy makers and intelligence figures have started briefing their Ukrainian and European counterparts, and since January 2022, President Biden became increasingly blunt about the threat in his public statements and comments as well.²

In terms of partner reactions, at the time, most European leaders and diplomats were allegedly dismissing these briefings, as they did not include specific attack details or dates.³ Several European diplomats,⁴ as well as most experts interviewed for this effort, have noted a shadow of the Iraq war and the disastrous withdrawal from Afghanistan hanging over the credibility of U.S. intelligence shared in international circles. Many—including Ukrainians—reported considering the politicized use of intelligence, rather than doubting U.S. agency capabilities, dismissing the Russian build up as “just another *Zapad*” exercise. Another factor widely seen as contributing to the limited willingness to take the U.S. warnings seriously was the widely perceived success of Russia’s gray zone efforts, combined with incredulity of another conventional war breaking out in the 21st century, particularly in Europe.

The United Kingdom and the Baltic states were an exception. The Baltic states, historically advocating for a more hawkish Western policy vis-à-vis Russia, were only too pleased with the United States for joining the sounding of alarm bells. Yet, it is worth noting that these same allies were the first to join the efforts of the war in Iraq, without much criticism to the arguments about Saddam Hussein’s possession of WMD at the time. On the other hand, while acknowledging the intelligence-tainting effect of the shadow of Iraq and Afghanistan, it is worth recalling the frequently reported motivation for soldiers (active duty and retired) from the United States and other Western countries to support the Ukrainian efforts as a way to take part in the “just war” after years of service in those dubious campaigns.⁵

² See, e.g., Liptak, K. (Jan 19, 2022). *Biden predicts Russia ‘will move in’ to Ukraine, but says ‘minor incursion’ may prompt discussion over consequences*. CNN. <https://edition.cnn.com/2022/01/19/politics/russia-ukraine-joe-biden-news-conference/index.html>; Holland, S. (Feb 18, 2022). *Biden says Putin has decided to invade Ukraine*. Reuters. <https://www.reuters.com/world/us-steps-up-diplomacy-ukraine-amid-increased-alarm-2022-02-18/>.

³ Harris, S., DeYoung, K., and Khurshudyan, I. (Aug 16, 2022). *Ukraine: Road to War*. Washington Post. <https://www.washingtonpost.com/national-security/interactive/2022/ukraine-road-to-war/>; Löfven, S. (Nov 14, 2022). *Ukraine, climate, cyber, food—A world of challenges: What next?* SIPRI. https://www.youtube.com/watch?v=m_Tn2SopHtE.

⁴ Harris, S., DeYoung, K., and Khurshudyan, I. (Aug 16, 2022). *Ukraine: Road to War*. Washington Post. <https://www.washingtonpost.com/national-security/interactive/2022/ukraine-road-to-war/>.

⁵ See, e.g., Gettleman, J. (Oct 9, 2022). *An American in Ukraine Finds the War He’s Been Searching For*. New York Times. <https://www.nytimes.com/2022/10/09/world/europe/ukraine-war-americans.html>; Gongadze, M. (June 2, 2022).

Meanwhile, Ukrainian leaders and intelligence agencies were consistently expressing high confidence in their ability to counter the Russian maneuvers they thought the West was warning them about. Experts,⁶ including the several interviewed for this effort, considered these self-assessments overly optimistic – pointing to Ukrainian incredulity about Russia crossing the threshold of a conventional invasion. Part of the reason for the Ukrainian surprise was that Russian efforts were not consistent with what the Russian armed forces had been training for,⁷ or with the Russian communications they were intercepting at the time⁸—with many Russian units also not realizing they were in an actual war rather than an exercise.⁹ While Ukrainian intelligence agencies started to take some preparatory measures in late January/early February (e.g., moving their archives), the Ukrainian leadership seemed to consistently minimize these American warnings, all the way through mid-February 2022.¹⁰ Retrospectively, they reasoned with attempts to stave off the panic effects on the economy.¹¹

The consensus among American, Polish, and Lithuanian experts interviewed for this effort emerged that in sharing the information about an impending Russian invasion, the United States had no hopes of preventing it. This is consistent with the subsequently publicized intelligence that during the meeting between U.S. and Russian intelligence chiefs in early November 2021, Russia conveyed that the invasion

American War Veteran Joins Fight for Peace in Ukraine. Voice of America. <https://www.voanews.com/a/american-war-veteran-joins-fight-for-peace-in-ukraine/6600556.html>; Hammond, A. (March 9, 2022). *Russia-Ukraine war: The West sees its chance for redemption over Iraq.* Middle East Eye. <https://www.middleeasteye.net/opinion/russia-ukraine-war-west-redemption-iraq>.

⁶ Weiss, M. (April 19, 2022). *The Lessons of Ukraine So Far.* Deep State Radio. <https://thedsrnetwork.com/lessons-of-ukraine/>.

⁷ Lee, R. (Sep 28, 2022). FY22 Q4 Future of SOF Forum/Future Security Forum:Panel 6 What are the Lessons of the War in Ukraine? https://www.youtube.com/watch?v=oLNQ215A_nc.

⁸ Zabrotskyi, M., Watling, J., Danylyuk, O. V., and Reynolds, N. (Nov 30, 2022). *Preliminary Lessons in Conventional Warfighting from Russia's Invasion of Ukraine: February–July 2022.* <https://rusi.org/explore-our-research/publications/special-resources/preliminary-lessons-conventional-warfighting-russias-invasion-ukraine-february-july-2022>.

⁹ Schwartz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin's War.* New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cfd83b40607771a3.

¹⁰ See, e.g., (Jan 28, 2022). *White House Warnings Over Russia Strain Ukraine-U.S. Partnership.* New York Times. <https://www.nytimes.com/2022/01/28/world/europe/biden-ukraine-russia-diplomacy.html>; Knickmeyer, E., Heintz, J., and Madhani (Feb 13, 2022). *Ukraine president plays down U.S. warnings of imminent Russian invasion.* Associated Press. <https://globalnews.ca/news/8616687/ukraine-russia-invasion-warning-evidence/>; Schwartz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin's War.* New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cfd83b40607771a3.

¹¹ Harris, S., DeYoung, K., and Khurshudyan, I. (Aug 16, 2022). *Ukraine: Road to War.* Washington Post. <https://www.washingtonpost.com/national-security/interactive/2022/ukraine-road-to-war/>.

had already been decided upon.¹² Instead, the goal of this extensive U.S. information operation was seen as calling the Russian bluff and making them carry out the inevitable offensive at their inconvenience. Indeed, spoiling the element of surprise is understood to have at least partially blunted the effectiveness of the invasion.¹³ In addition, several of the interviewed experts suggested that even if the chance of the campaign averting the Russian incursion was perceived as slim, it was worth taking, to make sure all the Ts were crossed.

One of the notable impacts of such public sharing of U.S. insights about impending Russian aggression has been the prevention of false flag operations in the early stages of the war. Namely, in early February the United States had exposed a series of Russian plans to stage and/or film attacks against their own people and/or troops, insinuating they had been perpetrated by Ukraine, thus giving Russia a pretext to send its armed forces into Ukraine.¹⁴ This aspect of the U.S. campaign was widely recognized as a successful counter effort, shaping the narrative and the ensuing information environment, as well as denying some of the terrain to Russian information operations.

The other likely goal of the U.S. information campaign was building consensus among the European allies and increasing their preparedness to the subsequent events. As noted above, their considerable skepticism has significantly dampened this effort. Overall, the extent and consistency of U.S. messaging,¹⁵ rather than the content of intelligence, was seen as the most helpful aspect in increasing ally preparedness.

Notably, many of the interviewed experts have pointed to the lack of movement of U.S. strategic assets in Europe as the key indicator of the perceived inevitability of a Russian conventional attack – as well as the clear U.S. reluctance to get directly involved in countering it. The absence of U.S. reservist mobilization or any significant changes in aircraft carrier positions, among others, were taken as clear signs – including to Russia – about the limits the United States was willing to go to. On the other hand, it is

¹² Schwirtz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin's War*. New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cfd83b40607771a3; Mackinnon, A. and Gramee, A. (Jan 11, 2023). *Former U.S. Ambassador to Moscow on the Moment He Realized Russia Would Launch a Full-Scale Invasion*. Foreign Policy. https://foreignpolicy.com/2023/01/11/us-ambassador-russia-john-sullivan-ukraine-invasion/?utm_source=PostUp&utm_medium=email&utm_campaign=Editors%20Picks%20OC&utm_term=64726&tpcc=Editors%20Picks%20OC.

¹³ See, e.g., Braw, E. (Winter 2023). *Lessons for the Next War: Ukraine's Victory in the Information Space Is No Reason for Complacency*. Foreign Policy.

¹⁴ Nakashima, E., Haris, S., Parker, A., Hudson, J., and Sonne, P. (Feb 3, 2022). *U.S. accuses Russia of planning to film a false attack as a pretext for Ukraine invasion*. Washington Post. <https://www.washingtonpost.com/national-security/2022/02/03/russia-ukraine-staged-attack/>; Crawford, S.K. (April 14, 2022). *Preemptive, public US strikes winning intelligence war with Russia*. <https://abcnews.go.com/Politics/preemptive-public-us-strikes-winning-intelligence-war-russia/story?id=84015518>.

¹⁵ See, e.g., Braw, E. (Winter 2023). *Lessons for the Next War: Ukraine's Victory in the Information Space Is No Reason for Complacency*. Foreign Policy.

likely that the lack of any force posture changes may have undercut the perceived credibility of the publicly shared intelligence at the time.

U.S. Sharing of Targeting Information

Several experts interviewed for this effort have noted that the U.S. sharing of intelligence with Ukraine – among other forms of military support – was a particularly efficient manner of increasing the costs of war to Russia, exhausting it for years to come, as well as minimizing Russia’s capacity to challenge other European states.

Since the Russian incursion in February 2022, the United States has deployed a number of manned (*Boeing RC-135 Rivet Joints* and *Boeing E-3 Sentry AWACS*) and unmanned (*MQ-9 Reaper*) surveillance aircraft to NATO member states neighboring Ukraine, flying reconnaissance missions and passing the finished signal intelligence products on to Ukraine.¹⁶ The level of U.S. intelligence sharing has deepened considerably since the start of the war in February, despite repeated American misgivings about potentially considerable Russian penetration of the Ukrainian intelligence apparatus.¹⁷ In addition to support provided from outside Ukraine, JSOC and SOCOM elements were stationed inside Ukraine, working closely with the Ukrainians to manage their incoming requests for the information, and sift through the sharable U.S. data.¹⁸

From the start, the United States has strictly limited its intelligence sharing with Ukraine to finished products (no raw data), refused to share information about high-value targets, and has been careful to keep its reconnaissance assets out of Ukrainian airspace and/or territory.¹⁹ Aside from concerns about conflict escalation, United States was also carefully balancing the assistance to prevent Ukraine (or Russia) from piecing together the precise capabilities of the U.S. intelligence apparatus.

¹⁶ Klippenstein, K. and Sirota, S. (March 18, 2022). *U.S. Quietly Assists Ukraine with Intelligence, Avoiding Direct Confrontation with Russia*. The Intercept. <https://theintercept.com/2022/03/17/us-intelligence-ukraine-russia/>.

¹⁷ Harris, S., DeYoung, K. and Khurshudyan, I. (Aug 16, 2022). *Ukraine: Road to War*. Washington Post. <https://www.washingtonpost.com/national-security/interactive/2022/ukraine-road-to-war/>.

¹⁸ Leigh, N. (July 13, 2022). *Are Western Special Operations Forces in Ukraine?* Overt Defense. <https://www.overtdefense.com/2022/07/13/are-western-special-operations-forces-in-ukraine/>; Schmitt, E., Barnes, J. E. and Cooper, H. (June 25, 2022). *Commando Network Coordinates Flow of Weapons in Ukraine, Officials Say*. New York Times. <https://archive.ph/X6JQb#selection-393.0-393.70>.

¹⁹ Klippenstein, K. and Sirota, S. (March 18, 2022). *U.S. Quietly Assists Ukraine with Intelligence, Avoiding Direct Confrontation with Russia*. The Intercept. <https://theintercept.com/2022/03/17/us-intelligence-ukraine-russia/>; Yaffa, J. (Oct 17, 2022). *Inside the U.S. Effort to Arm Ukraine*. New Yorker. <https://www.newyorker.com/magazine/2022/10/24/inside-the-us-effort-to-arm-ukraine>.

Nevertheless, the U.S. Air Force (operating outside Ukraine) have reportedly been sharing real-time data about incoming Russian missiles.²⁰ This suggests potentially minimal processing of the intelligence provided for purely defensive purposes.

Furthermore, Army Secretary Wormuth has noted that the U.S. special operations cell, operating in Germany following the Russian invasion, has been providing intelligence concerning potential threats to convoys transporting Western weapons to Ukraine.²¹ Notably, this coordination and intelligence sharing might help explain, in part, the absence of Russian strikes on these convoys.²² Nevertheless, Russian hackers have used ransomware to target Polish organizations involved in the transfers of Western military assistance. In addition, Poland also reported an uptick in other Russian intelligence activities when Western arms transfers were underway via Polish territory.²³

One of the reportedly typical forms of intelligence sharing has been confirming target coordinates – per Ukrainian requests and sometimes without solicitation.²⁴ The impact of this type of information sharing has become particularly noteworthy with the arrival of HIMARS into the battlefield in the summer of 2022. Moreover, as ammunition shortages became increasingly dire with the war dragging on, U.S. intelligence sharing has reportedly been helpful in maximizing its effectiveness through improved targeting accuracy.²⁵

Moreover, as ammunition shortages became increasingly dire with the war dragging on, U.S. intelligence sharing has reportedly been helpful in maximizing its effectiveness through improved targeting accuracy.

However, in case of targeting the Russian Black Sea flagship Moskva, the United States has reportedly gone beyond simple confirmation. Namely, the U.S. naval surveillance aircraft Poseidon P-8 had

²⁰ Erlanger, S., Schmitt, E., Schwirtz, M., and Nagourney, E. (Oct. 11, 2022). *Pressure Grows on the West to Speed Air-Defense Systems to Ukraine*. New York Times. <https://www.nytimes.com/2022/10/11/world/europe/ukraine-g7-air-defense.html>.

²¹ Schmitt, E., Barnes, J. E. and Cooper, H. (June 25, 2022). *Commando Network Coordinates Flow of Weapons in Ukraine, Officials Say*. New York Times. <https://archive.ph/X6JQb#selection-393.0-393.70>.

²² For detailed discussion, see the Murauskaite, E. E. (Jan 2023). *U.S. Arms Transfers to Ukraine: Impact Assessment*. START, University of Maryland. <https://www.start.umd.edu/publication/us-arms-transfers-ukraine-impact-assessment>.

²³ Miller, M. (Dec 15, 2022). *Russian hackers targeting military aid to Ukraine*. Politico. <https://subscriber.politicopro.com/article/2022/12/russian-hackers-targeting-military-aid-to-ukraine-00074131>.

²⁴ Khurshudyan, I., Sonne, P., Morgunov, S., and Hrabchuk, K. (Dec 29, 2022). *Inside the Ukrainian counteroffensive that shocked Putin and reshaped the war*. Washington Post. https://www.washingtonpost.com/world/2022/12/29/ukraine-offensive-kharkiv-kherson-donetsk/?=undefined&utm_campaign=wp_for_you&utm_medium=email&utm_source=newsletter&wpisrc=nl_personalizedforyou&utm_content=contentpacks_CP-4__position1; Yaffa, J. (Oct 17, 2022). *Inside the U.S. Effort to Arm Ukraine*. New Yorker. <https://www.newyorker.com/magazine/2022/10/24/inside-the-us-effort-to-arm-ukraine>.

²⁵ Khurshudyan, I., Sonne, P., Morgunov, S., and Hrabchuk, K. (Dec 29, 2022). *Inside the Ukrainian counteroffensive that shocked Putin and reshaped the war*. Washington Post. https://www.washingtonpost.com/world/2022/12/29/ukraine-offensive-kharkiv-kherson-donetsk/?=undefined&utm_campaign=wp_for_you&utm_medium=email&utm_source=newsletter&wpisrc=nl_personalizedforyou&utm_content=contentpacks_CP-4__position1.

reportedly been tracking Moskva for several hours before the attack,²⁶ supplying Ukraine with highly accurate intelligence, which was subsequently considered instrumental for the attack's success.²⁷

In addition, the United States was sharing satellite imagery of the battlefield with Ukrainian units—including providing the tablets for viewing it—which, according to Ukrainian commanders, was making a tangible difference in their offensives against the Russian positions,²⁸ toeing a fine line, in terms of the level of processing of the shared intelligence.

Overall, Admiral Stavridis, former NATO Supreme Allied Commander Europe, has considered intelligence sharing and training to be the most important element of Western support to Ukraine. According to him, this included information on “Russian positions, vulnerable logistic nodes, troop and armor movements, maritime dispositions of the Black Sea Fleet, and a sense of general Russian intentions.”²⁹ All the experts interviewed for this effort considered the extent and speed of U.S. intelligence sharing with Ukraine unprecedented.

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In addition, several of the interviewed experts directly familiar with the battlefield dynamics have lauded emerging Ukrainian capabilities to manage and integrate the enormous flow of information, in addition to their excellent intelligence access in the occupied territories. A notable role in this regard was played by the *Delta* network for information sharing and target prioritization, developed by Ukraine in collaboration with NATO in 2017.³⁰ Similarly to the new weapons' systems being put to test in, and tailored to, the battlefields of Ukraine, *Delta* has previously been used in joint exercises, and successfully debuted in this war. In contrast to Russians, still largely relying on radios, this has given Ukraine a big advantage in both speed and communication security.

²⁶ Leone, D. (April 22, 2022). US Navy P-8 Poseidon maritime patrol aircraft reportedly assisted Ukrainians in hitting Russian Navy's Black Sea flagship RTS Moskva (121). Aviation Geek. <https://theaviationgeekclub.com/us-navy-p-8-poseidon-maritime-patrol-aircraft-reportedly-assisted-ukrainians-in-hitting-russian-navys-black-sea-flagship-rtm-moskva-121/>; Boyle, D. (April 20, 2022). REVEALED: US maritime surveillance plane was over Black Sea minutes before Russian flagship Moskva was 'hit by Ukrainian missiles'. Daily Mail. <https://www.dailymail.co.uk/news/article-10733677/Moskva-sinking-Did-supply-Kyiv-location-Black-Sea-flag-ship.html>.

²⁷ Borger, J. (May 7, 2022). *US intelligence told to keep quiet over role in Ukraine military triumphs*. The Guardian. <https://www.theguardian.com/us-news/2022/may/07/us-spies-ukraine-russia-military-intelligence>; Yaffa, J. (Oct 17, 2022). *Inside the U.S. Effort to Arm Ukraine*. New Yorker. <https://www.newyorker.com/magazine/2022/10/24/inside-the-us-effort-to-arm-ukraine>.

²⁸ Schmitt, E., Barnes, J. E. and Cooper, H. (June 25, 2022). *Commando Network Coordinates Flow of Weapons in Ukraine, Officials Say*. New York Times. <https://archive.ph/X6JQb#selection-393.0-393.70>.

²⁹ Stavridis, J. (Sep 14, 2022). *How Ukraine Turned the Tide Against Russia*. Time. <https://time.com/6213007/ukraine-offensive-against-russia/>.

³⁰ Jakes, L. (Nov 15, 2022). *For Western Weapons, the Ukraine War Is a Beta Test*. New York Times. <https://www.nytimes.com/2022/11/15/world/europe/ukraine-weapons.html?searchResultPosition=94>.

Proxy Coordination and Ukrainian Intelligence Sharing

In assessing the intelligence aspect in terms of collaboration in the information domain, it is also worth looking at the Ukrainian side of the equation of intelligence sharing. Receiving accurate and sufficient information on issues like the battlefield performance of equipment provided, or the forthcoming tactical planning and its implementation outcomes, among other aspects, is important in subsequent U.S. decisions about providing military assistance in various domains.

Several experts interviewed for this effort have noted persistent Ukrainian reluctance to share their operational plans with the United States. On the other hand, others such as Gen. Hodges have suggested a more limited “the need to know” for the United States and lauded Ukrainian information security.³¹

Congressman Himes has noted the U.S. struggle in this intelligence-sharing partnership to maintain awareness of Ukrainian planned offensives, some of which the United States may consider “unnecessary or overly provocative,” ensuring that “a tactical victory doesn’t lead to some strategic catastrophe.”³² For instance, the United States had reportedly withheld the intelligence concerning the whereabouts of Russia’s Gen. Gerasimov, and, upon discovering that the Ukrainians managed to identify the general’s location anyway, urged against targeting him as a too-provocative move—but to no avail.³³ Similarly, the killing of the daughter of a prominent Russian nationalist Alexander Dugin by Ukrainian forces seemed to come as a surprise to the U.S. intelligence community and was broadly condemned.³⁴

Here it is worth noting a significant and consistent insight yielded by several high-level online crisis simulations conducted by the University of Maryland’s ICONS Project since 2014. Namely, in exercises stipulating various hypothetical Eastern European security crises, the regional interlocutors consistently under-represented the extent of an unfolding regional crisis, treating the outreach to the U.S. as a kind of trump card to be used if and when the situation got extremely dire – rather than as an early off-ramp to help de-escalate. In its nature, Ukraine’s consistent under-representation of its human and equipment losses in the

The consistent public lobbying by Ukrainian leadership for more and more advanced Western weaponry have been an excellent and effective information campaign. However, these requests do not necessarily coincide with the most pressing specific needs and capabilities on the battlefield frontlines.

³¹ (April 26, 2022). Jacek Bartosiak talks to Gen. (ret.) Ben Hodges on war in Ukraine as of 26 April 2022. <https://www.youtube.com/watch?v=lUyRclxae0M>.

³² Ward, A., Berg, M., and Ukenye, L. (Oct 24, 2022). *House Intel’s Turner ‘disappointed’ Israel not aiding Ukraine*. Politico. <https://www.politico.com/newsletters/national-security-daily/2022/10/24/house-intels-turner-disappointed-israel-not-aiding-ukraine-00063109>.

³³ Schwirtz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin’s War*. New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cfd83b40607771a3.

³⁴ (Oct 6, 2022). *U.S. Intelligence Agencies Said To Believe Ukrainians Were Behind Killing Of Russian Nationalist’s Daughter*. Radio Free Europe. <https://www.rferl.org/a/russia-us-intelligence-dugina-ukraine/32067696.html>.

battlefield, among other aspects of intelligence sharing, seems to be reflective of this cultural approach. The consistent public lobbying by Ukrainian leadership for more and more advanced Western weaponry have been an excellent and effective information campaign. However, these requests do not necessarily coincide with the most pressing specific needs and capabilities on the battlefield frontlines. Namely, President Zelensky has been consistently pushing the West to provide Ukraine with e.g., fighter jets and longer-range artillery – with the accompanying policy debates taking up considerable public attention. Meanwhile, the shortages of ammunition remained a consistent problem on the frontlines, and the lack of advance winter-time preparations has made simple items like heaters and warm clothing of crucial importance. Appreciating these divergences, frequently lost in the highlights of public discourse, and maintaining acute awareness of the basic needs through accurate information sharing, adds an important perspective to assessing the capabilities and tactical short-to-medium term planning assistance to the Ukrainian armed forces.

Nevertheless, a somewhat greater openness was seen once the preparations for the Kharkov offensive have started and Ukraine requested assistance in wargaming efforts. As the war progressed, over the summer of 2022, U.S. military personnel engaged in extensive table-top exercising (TTX) with their Ukrainian counterparts, gaming out the potential counter-offensive scenarios.³⁵ The United States has reportedly shared the more sophisticated TTX algorithms, allowing for multi-iteration assessments of Ukrainian tactics.³⁶ Reportedly, the Ukrainian planners had originally wanted to engage in a broader southern offensive, but with consistent U.S. feedback on military and political level that this would be biting off more than Ukraine could chew, Ukrainian forces have settled on a more limited campaign that focused on Kherson.³⁷ Many have subsequently credited the U.S. training and intelligence sharing for the success of the Ukrainian counter-offensive.³⁸

³⁵ Lillis, K. B. and Bertrand, N. (Sep 1, 2022). *U.S. War Gamed with Ukraine Ahead of Counteroffensive and Encouraged More Limited Mission*. CNN. <https://edition.cnn.com/2022/08/31/politics/ukraine-us-wargames-counteroffensive/index.html>; Barnes, J.E. and Cooper, H. (Sep 10, 2022). *Ukrainian Officials Drew on U.S. Intelligence to Plan Counteroffensive*. New York Times. <https://www.nytimes.com/2022/09/10/us/politics/ukraine-military-intelligence.html>.

³⁶ Yaffa, J. (Oct 17, 2022). *Inside the U.S. Effort to Arm Ukraine*. New Yorker. <https://www.newyorker.com/magazine/2022/10/24/inside-the-us-effort-to-arm-ukraine>.

³⁷ Khurshudyan, I., Sonne, P., Morgunov, S., and Hrabchuk, K. (Dec 29, 2022). *Inside the Ukrainian counteroffensive that shocked Putin and reshaped the war*. Washington Post. https://www.washingtonpost.com/world/2022/12/29/ukraine-offensive-kharkiv-kherson-donetsk/?=undefined&utm_campaign=wp_for_you&utm_medium=email&utm_source=newsletter&wpisrc=nl_personalizedforyou&utm_content=contentpacks_CP-4__position1.

³⁸ Lillis, K. B. and Bertrand, N. (Sep 1, 2022). *U.S. War Gamed with Ukraine Ahead of Counteroffensive and Encouraged More Limited Mission*. CNN. <https://edition.cnn.com/2022/08/31/politics/ukraine-us-wargames-counteroffensive/index.html>; Barnes, J.E. and Cooper, H. (Sep 10, 2022). *Ukrainian Officials Drew on U.S. Intelligence to Plan Counteroffensive*. New York Times. <https://www.nytimes.com/2022/09/10/us/politics/ukraine-military-intelligence.html>; Yaffa, J. (Oct 17, 2022). *Inside the U.S. Effort to Arm Ukraine*. New Yorker. <https://www.newyorker.com/magazine/2022/10/24/inside-the-us-effort-to-arm-ukraine>.

Cyber Defense and Resilience

Offensive and defensive operations in cyberspace are another key aspect in international assistance to Ukraine in the information domain. Over much of 2022 a narrative has taken root that Russia has failed to deploy a full scale cyber offensive campaign,³⁹ and/or to integrate it with the physical invasion, potentially due to the overall poor preparedness of the Russian forces. For instance, Mikk Marran, former head of Estonia's Foreign Intelligence Service, assessed the Russian cyber campaign as "nothing really extraordinary," although he did recognize it as "intense" during the first days of the 2022 war.⁴⁰ However, emerging reports have revealed that Russia has, in fact, mounted a massive cyber offensive effort in the early phases of the 2022 war,⁴¹ but Ukraine was able to defend against it quite effectively—with considerable public and private international assistance.

Assisting Ukraine in identifying prospective cyber threats, and countering executed cyberattacks have been an important aspect of U.S. information operations' support and intelligence sharing prior to and during the 2022 war. For instance, since 2017, the United States have provided \$40 million in cyber capacity development.⁴² Subsequently, successful collaborative efforts at building network resilience (in terms of hardware and software), and detection capabilities were one of the key factors limiting Russia's cyber advances in 2022⁴³—in contrast to their previous punitive campaigns.⁴⁴ Indeed, Russia seems to have underestimated the Ukrainian cyber capabilities and infrastructure resilience.⁴⁵

The pre-invasion phase (late January into early February 2022) seems to have been marked by the most intense Russian offensive cyber efforts.⁴⁶ These included DDoS attacks targeting Ukrainian defense and

³⁹ See, e.g., (March 1, 2022). *Cyber-attacks on Ukraine are conspicuous by their absence*. Economist. <https://www.economist.com/europe/2022/03/01/cyber-attacks-on-ukraine-are-conspicuous-by-their-absence>.

⁴⁰ Mackinnon, A. (Nov 21, 2022). *Estonia's Former Spy Chief: Too Soon to Count Russia Out*. Foreign Policy. <https://foreignpolicy.com/2022/11/21/estonia-spy-chief-mikk-marran-russia/>.

⁴¹ For a detailed list of identified attacks, see the Appendix of Lewis, J. A. (June 16, 2022). *Cyber War and Ukraine*. CSIS. https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/220616_Lewis_Cyber_War.pdf?S.iEKeom79InugnYWlcZL4r3Ljuq.ash.

⁴² U.S. Department of State (May 10, 2022). *U.S. Support for Connectivity and Cybersecurity in Ukraine*. <https://www.state.gov/u-s-support-for-connectivity-and-cybersecurity-in-ukraine/>.

⁴³ See, e.g., Hodges, B., Horrell, S., and Kuz, I. (Sep 22, 2022). *Russia's Militarization of the Black Sea: Implications for the United States and NATO*. CEPA. <https://cepa.org/comprehensive-reports/russias-militarization-of-the-black-sea-implications-for-the-united-states-and-nato/>; Lewis, J. A. (June 16, 2022). *Cyber War and Ukraine*. CSIS. https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/220616_Lewis_Cyber_War.pdf?S.iEKeom79InugnYWlcZL4r3Ljuq.ash.

⁴⁴ Krebs, C. (Winter 2023). *Lessons for the Next War: Real War Trumps Cyberwar*. Foreign Policy; U.S. Department of State (May 10, 2022). *U.S. Support for Connectivity and Cybersecurity in Ukraine*. <https://www.state.gov/u-s-support-for-connectivity-and-cybersecurity-in-ukraine/>.

⁴⁵ Jones, R. (Dec 13, 2022). *What Ukraine Is Teaching Us About Threat Intelligence*. Cyber Initiative Group Winter Summit 2022.

⁴⁶ Starks, T. (Dec 2, 2022). *Ukraine gets by in cyberspace with a little help from its friends*. Washington Post. <https://www.washingtonpost.com/politics/2022/12/02/ukraine-gets-by-cyberspace-with-little-help-its-friends/>,

financial institutions, the media and communications sector, as well as energy infrastructure. For instance, on the eve of the invasion, on February 23, 2022, a Russian hacking unit *Sandworm* managed to infect a few hundred Ukrainian government computers with malware (although they were restored within a few hours) and, significantly, take down Ukrainian military satellite communications system.⁴⁷ It was due to testing and preparation efforts undertaken in early 2022 that Ukraine had a back-up system to switch to⁴⁸—otherwise the blow would've been crippling.

In addition, in the antecedent and early phases of the war (December 2021-March 2022), the hunting forward operations by the U.S. Cyber Command were seen as a major boost in detecting Russian penetration of Ukrainian networks, as well as assisting live efforts to counter cyber offensives.⁴⁹ The 40 officers deployed to Ukraine were one of the largest missions abroad, and, according to Gen. Nakasone, it combined both, defensive and offensive activities.⁵⁰

As an aside, Ukrainian preparations in shoring up against cyber offensives revealed a notable vector of intersection between information operations and cyber campaigns. Reportedly, tracking the Russian discourse and narratives on public media helped Ukrainians identify the objects most likely to be targeted by cyber offensives – subsequently, these were stress-tested for weaknesses and reinforced, with some of the energy infrastructure thus avoiding cyber damage.⁵¹

During much of the 2022 war, various U.S. government agencies continued to share threat intelligence with their Ukrainian counterparts. For instance, in late February, the Cybersecurity and Infrastructure Security Agency (CISA) shared mitigation guidance concerning malware targeting Ukrainian organizations.⁵² Similarly, in July, the Cyber National Mission Force shared a new set of threat indicators.⁵³ The FBI has been consistently briefing Ukrainian counterparts, including sharing of best

⁴⁷ Schwirtz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin's War*. New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cf83b40607771a3.

⁴⁸ Schwirtz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin's War*. New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cf83b40607771a3.

⁴⁹ Cyber National Mission Force Public Affairs (Nov 28, 2022). *Before the Invasion: Hunt Forward Operations in Ukraine*. <https://www.cybercom.mil/Media/News/Article/3229136/before-the-invasion-hunt-forward-operations-in-ukraine/>; Krebs, C. (Winter 2023). *Lessons for the Next War: Real War Trumps Cyberwar*. Foreign Policy; Corera, G. (Oct 30, 2022). *Inside a US military cyber team's defence of Ukraine*. BBC. <https://www.bbc.com/news/uk-63328398>.

⁵⁰ Corera, G. (Oct 30, 2022). *Inside a US military cyber team's defence of Ukraine*. BBC. <https://www.bbc.com/news/uk-63328398>.

⁵¹ Starks, T. (Dec 2, 2022). *Ukraine gets by in cyberspace with a little help from its friends*. Washington Post. <https://www.washingtonpost.com/politics/2022/12/02/ukraine-gets-by-cyberspace-with-little-help-its-friends/>.

⁵² <https://www.cisa.gov/uscert/ncas/alerts/aa22-057a>.

⁵³ Cyber National Mission Force Public Affairs (Nov 28, 2022). *Before the Invasion: Hunt Forward Operations in Ukraine*. <https://www.cybercom.mil/Media/News/Article/3229136/before-the-invasion-hunt-forward-operations-in-ukraine/>.

practices in threat detection.⁵⁴ In addition to other resilience and capacity building efforts, the U.S. Agency for International Development (USAID) has also assisted in providing the necessary hardware to Ukraine.⁵⁵

Overall, J. Fleming, the head of British GCHQ has called these joint efforts “the most effective defensive cyber activity in history.”⁵⁶ Similarly, several European experts interviewed for this effort have remarked upon the unprecedented scale and success of the cyber defense coordination among Ukraine and its partners.

Another key factor in Ukraine’s cyber resilience was the unprecedented and successful collaboration with the private sector. The U.S. IT sector (e.g., Amazon, Google, Microsoft, and others) played a lead role in enabling and scaling many of the preemptive measures, providing these services free of charge. Many experts have identified the migration of government data to cloud servers outside Ukraine in early February as one of the significant steps ensuring continuity.⁵⁷ As the war wore on, analysis of the intercepted malware, continuous updates on threat intelligence, automated network protection, and additional protection of high-risk users and targets were some of the key private sector contributions enabling Ukraine’s resilience.⁵⁸ Overall, the Deputy U.S. National Security Advisor Neuberger has called this unprecedented level of public-private cooperation “remarkable.”⁵⁹

The efforts of Ukrainian volunteer IT Army have received some coverage for their counter-offensive efforts.⁶⁰ Individual cyber efforts, like defacing and breaking Moscow’s electric car charging stations⁶¹ or

⁵⁴ U.S. Department of State (May 10, 2022). *U.S. Support for Connectivity and Cybersecurity in Ukraine*. <https://www.state.gov/u-s-support-for-connectivity-and-cybersecurity-in-ukraine/>.

⁵⁵ U.S. Department of State (May 10, 2022). *U.S. Support for Connectivity and Cybersecurity in Ukraine*. <https://www.state.gov/u-s-support-for-connectivity-and-cybersecurity-in-ukraine/>.

⁵⁶ Fleming, J. (Aug 18, 2022). *The head of GCHQ says Vladimir Putin is losing the information war in Ukraine*. Economist. <https://www.economist.com/by-invitation/2022/08/18/the-head-of-gchq-says-vladimir-putin-is-losing-the-information-war-in-ukraine>.

⁵⁷ Starks, T. (Dec 2, 2022). *Ukraine gets by in cyberspace with a little help from its friends*. Washington Post. <https://www.washingtonpost.com/politics/2022/12/02/ukraine-gets-by-cyberspace-with-little-help-its-friends/>; Beecroft, N. (Nov 3, 2022). *Evaluating the International Support to Ukrainian Cyber Defense*. Carnegie Endowment. <https://carnegieendowment.org/2022/11/03/evaluating-international-support-to-ukrainian-cyber-defense-pub-88322>.

⁵⁸ For a more detailed list of private sector assistance efforts, see Table 1 at Beecroft, N. (Nov 3, 2022). *Evaluating the International Support to Ukrainian Cyber Defense*. Carnegie Endowment. <https://carnegieendowment.org/2022/11/03/evaluating-international-support-to-ukrainian-cyber-defense-pub-88322>.

⁵⁹ Mackinnon, A. and Iyengar, R. (Dec 16, 2022). *Whatever Happened to Russia’s Vaunted Cyberoffensive?* Foreign Policy. <https://foreignpolicy.com/2022/12/16/russia-cyber-offensive-cyberattack-war-ukraine-putin/>.

⁶⁰ Starks, T. (Dec 2, 2022). *Ukraine gets by in cyberspace with a little help from its friends*. Washington Post. <https://www.washingtonpost.com/politics/2022/12/02/ukraine-gets-by-cyberspace-with-little-help-its-friends/>

⁶¹ Singer, P. W. (April 19, 2022). *The Lessons of Ukraine So Far*. Deep State Radio. <https://thedsrnetwork.com/lessons-of-ukraine/>.

hacking the *RuTube* platform and disrupting it for a week⁶² have likely helped with Ukraine's information campaign and possibly morale. However, experts have assessed these volunteer contributions as less significant in scale, seeing their ability to impact Russia's military advances or sway Russia's public opinion (which is among the group's set goals) as limited, while pointing to the immense challenge of effort coordination.⁶³ In addition, several related public initiatives, like the North Atlantic Fellas Organization (NAFO) and Saint-Javelin, have emerged since May 2022: a growing number of Twitter users, led by U.S. veterans, have started self-organizing to counter Russia's information campaigns with Shiba Inu memes, and to fundraise for fighters in Ukraine with this merchandise.⁶⁴ These were broadly lauded as successful information campaigns, notable for several high-profile online take downs of Russian officials and collecting sizeable donations, but being mainly active on Western online platforms has ultimately limited their reach to a broader audience susceptible to pro-Russian narratives.⁶⁵

Still, it is difficult to accurately assess the extent of Russia's success or failure in cyber operations against Ukraine – and the success of defenses, since outside experts seems to disagree about the priorities and relative scale of these Russian campaigns. Those, who emphasize Russia's attempts to cause kinetic damage via cyberattacks, as being prioritized over access to networks and information, see the efforts in Ukraine as a failure.⁶⁶ In contrast, those who assess Russia as prioritizing the infiltration of Ukraine's military networks rather than destroying civilian targets, including several European experts interviewed for this effort, ascribe lesser significance to the averted wiper attacks and suggest that detecting such network penetration remains a long-term concern.⁶⁷

⁶² Krasnolutska, D. and Verbyany, V. (Dec 21, 2022). *Ukrainian Hackers Gather Data on Russian Soldiers, Minister Says*. Bloomberg. <https://www.bloomberg.com/news/articles/2022-12-21/ukrainian-hackers-gather-data-on-russian-soldiers-minister-says>.

⁶³ Lewis, J. A. (June 16, 2022). *Cyber War and Ukraine*. CSIS. https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/220616_Lewis_Cyber_War.pdf?S.iEKeom79InugnYWlcZL4r3Ljuq.ash.

⁶⁴ See, e.g., (Oct 18, 2022). *Who are the NAFO Fellas? The army of cartoon dogs fighting Russian propaganda*. Ukrainer. <https://ukrainer.net/nafo-fellas/>; Taylor, A. (Sep 1, 2022). *With NAFO, Ukraine turns the trolls on Russia*. Washington Post. <https://www.washingtonpost.com/world/2022/09/01/nafo-ukraine-russia/>; <https://www.saintjavelin.com/pages/about-us/>.

⁶⁵ Humiski, J. C. (Dec 20, 2022). *Can the West create a NAFO that's built to last beyond Ukraine?* The Hill. <https://thehill.com/opinion/national-security/3782298-can-the-west-create-a-nafo-thats-built-to-last-beyond-ukraine/>; Braun, S. (Sep 17, 2022). *Ukraine's info warriors battling Russian trolls*. Deutsche Welle. <https://www.dw.com/en/nafo-ukraines-info-warriors-battling-russian-trolls/a-63124443>; Kirichenko, D. (Jan 5, 2023). *NAFO's Fellas Must Evolve*. CEPA. <https://cepa.org/article/nafos-fellas-must-evolve/>.

⁶⁶ See, e.g., Singer, P. W. (April 19, 2022). *The Lessons of Ukraine So Far*. Deep State Radio. <https://thedsrnetwork.com/lessons-of-ukraine/>.

⁶⁷ See, e.g., Beecroft, N. (Nov 3, 2022). *Evaluating the International Support to Ukrainian Cyber Defense*. Carnegie Endowment. <https://carnegieendowment.org/2022/11/03/evaluating-international-support-to-ukrainian-cyber-defense-pub-88322>; Hodges, B., Horrell, S., and Kuz, I. (Sep 22, 2022). *Russia's Militarization of the Black Sea: Implications for the United States and NATO*. CEPA. <https://cepa.org/comprehensive-reports/russias-militarization-of-the-black-sea-implications-for-the-united-states-and-nato/>.

It is important to note that the U.S., as well as other Western partners actively supporting Ukraine, were also targeted by prominent Russian cyber offensives. In early February, a Russian cyberattack against the U.S. Viasat satellite company was seen by many as one the most historically significant cyber offensives, disrupting communications beyond Ukraine.⁶⁸ Over the period of August to September, pro-Russian hackers have targeted U.S. Brookhaven (BNL), Argonne (ANL) and Lawrence Livermore National Laboratories (LLNL).⁶⁹ This coincided with Russia's intensified nuclear threats as Ukraine's

counter-offensive was gaining traction and UN inspectors were conducting risk assessments at the contested Zaporizhzhia nuclear power plant. As noted above, Polish organizations involved in distributing Western military and humanitarian assistance in Ukraine have also been targeted by pro-Russian hackers. Thus, while the U.S. and NATO have been clear and explicit about avoiding a direct conventional military stand-off with the Russian forces, in the cyber domain the conflict did extend beyond Ukrainian borders from the start.

Finally, the Russia-Ukraine confrontation in the cyber domain, and the role of international assistance in it, have raised several broader issues – including the overestimated impact of cyber offensives in modern conventional warfare.⁷⁰ For instance, drones have turned out to be a cheaper and more effective mode of attacking, whereas a cyber offensive tool was used up after a single launch and detection.⁷¹ In another example, a cyberattack on a Ukrainian power plant was estimated to have taken over 1.5 years for a Russian hacking group *Sandworm* to prepare, and yet the power outage it caused only lasted six hours.⁷² In light of this cost-benefit analysis, suggestions that the U.S. and/or other Western allies ought to consider providing Ukraine with offensive cyber capabilities as a way to slow down Russia's battlefield

Thus, while the U.S. and NATO have been clear and explicit about avoiding a direct conventional military stand-off with the Russian forces, in the cyber domain the conflict did extend beyond Ukrainian borders from the start.

⁶⁸ Starks, T. (July 29, 2022). *Cyberattacks on satellites may only be getting more worrisome*. Washington Post. <https://www.washingtonpost.com/politics/2022/07/29/cyberattacks-satellites-may-only-be-getting-more-worrisome/>; Lewis, J. A. (June 16, 2022). *Cyber War and Ukraine*. CSIS. https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/220616_Lewis_Cyber_War.pdf?S.iEKeom79InugnYWlcZL4r3Ljuq.ash.

⁶⁹ Pearson, J. and Bing, C. (Jan 7, 2023). *Exclusive: Russian hackers targeted U.S. nuclear scientists*. Reuters. <https://www.reuters.com/world/europe/russian-hackers-targeted-us-nuclear-scientists-2023-01-06/>.

⁷⁰ Jones, R. (Dec 13, 2022). *What Ukraine Is Teaching Us About Threat Intelligence*. Cyber Initiative Group Winter Summit 2022; Lewis, J. A. (June 16, 2022). *Cyber War and Ukraine*. CSIS. https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/220616_Lewis_Cyber_War.pdf?S.iEKeom79InugnYWlcZL4r3Ljuq.ash; Mackinnon, A. and Iyengar, R. (Dec 16, 2022). *Whatever Happened to Russia's Vaunted Cyberoffensive?* Foreign Policy. <https://foreignpolicy.com/2022/12/16/russia-cyber-offensive-cyberattack-war-ukraine-putin/>.

⁷¹ Jones, R. (Dec 13, 2022). *What Ukraine Is Teaching Us About Threat Intelligence*. Cyber Initiative Group Winter Summit 2022.

⁷² Schwirtz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin's War*. New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cfd83b40607771a3.

advancements⁷³ should be taken with a grain of salt. Nevertheless, it is also worth mentioning Ukrainian information campaign efforts to get cyber offensives against civilian infrastructure to be considered a war crime.⁷⁴ It remains to be seen how much international support this concept will gain as the war continues.

Insights and Implications

Ukrainian Will to Fight

Underestimating the Ukrainian will (and ability) to resist the advancing Russian forces has been near-universally assessed as a key oversight on the part of both U.S. and Russian intelligence.⁷⁵ Yet, it proved to be a significant component in sustaining the war effort, with Ukrainian and international information campaigns helping sustain this will, and the continuing resistance, in turn, boosting these information campaigns.

The initial U.S. assessment that Ukraine would be swiftly overrun was the among the primary reasons to withdraw clandestine assets from the country and significantly delay in sending advanced weaponry to Ukraine. Reportedly, the number of U.S. intelligence assets in Ukraine has subsequently increased well above pre-2022-war levels.⁷⁶

As a lessons-learned effort to inform future intelligence assessments, it is thus worth identifying the factors that are understood to have contributed to the strong Ukrainian will to fight. The first set of factors relates to the extremely high stakes involved for Ukraine.⁷⁷ A large body of academic literature suggests that when an actor perceives its survival as being at stake, its willingness to take risks and use force (or in Ukraine's case – resist) increases considerably. The research consistent with this concept

⁷³ See, e.g., Weber, V. (Dec 2, 2022). *The Benefits and Risks of Extending Weapons Deliveries to the Cyber Domain*. Lawfare. <https://www.lawfareblog.com/benefits-and-risks-extending-weapons-deliveries-cyber-domain>.

⁷⁴ Van Sant, S. (Jan 9, 2023). *Kyiv argues Russian cyberattacks could be war crimes*. Politico. <https://www.politico.eu/article/victor-zhora-ukraine-russia-cyberattack-infrastructure-war-crime/>.

⁷⁵ See, e.g., Bowen, A. S. (Sep 14, 2022). *Russia's War in Ukraine: Military and Intelligence Aspects*. Congressional Research Service, Report R47068. <https://crsreports.congress.gov/product/pdf/R/R47068>; Freedman, L. (Oct 19, 2022). *Russia-Ukraine Dialogues: battlefield updates*. LSE. <https://www.youtube.com/watch?v=Qow33e-IQFM>; Risen, J. and Klippenstein, K. (Oct 5, 2022). *The CIA Thought Putin Would Quickly Conquer Ukraine*. The Intercept. <https://theintercept.com/2022/10/05/russia-ukraine-putin-cia/>; Atran, S. (July 11, 2022). *The will to fight*. Aeon. <https://aeon.co/essays/wars-are-won-by-people-willing-to-fight-for-comrade-and-cause>.

⁷⁶ Risen, J. and Klippenstein, K. (Oct 5, 2022). *The CIA Thought Putin Would Quickly Conquer Ukraine*. The Intercept. <https://theintercept.com/2022/10/05/russia-ukraine-putin-cia/>.

⁷⁷ See, e.g., Davidson, C. (Apr 5, 2022). *The Surprisingly Unsurprising Russo-Ukraine War: Learning and Teaching the Right Lessons for Integrated Deterrence*. NSI <https://nsiteam.com/the-surprisingly-unsurprising-russo-ukraine-war-learning-and-teaching-the-right-lessons-for-integrated-deterrence/>; Lee, R. (Sep 28, 2022). *FY22 Q4 Future of SOF Forum/Future Security Forum: Panel 6 What are the Lessons of the War in Ukraine?* https://www.youtube.com/watch?v=oLNQ215A_nc; Freedman, L. (Oct 19, 2022). *Russia-Ukraine Dialogues: battlefield updates*. LSE. <https://www.youtube.com/watch?v=Qow33e-IQFM>.

ranges from classic prospect theory,⁷⁸ to studies on proxy (vs. sponsor) behavior,⁷⁹ to weaker-party success case studies in asymmetric warfare.⁸⁰

A related, second, set of contributing factors concerns being the victim and the defender, along with the prevalent perception of fighting for a just cause.⁸¹ Indeed, a number of generalized (i.e., non-Ukraine specific) academic studies that involve laboratory experiments have found that when an entity comes under attack, the common defender response is to fight back and even escalate the crises⁸² rather than acquiescing in the face of a deterrent failure.

Furthermore, recent study on gray zone warfare found that defender states marked by weak institutional capacity are particularly prone to respond with overwhelming force when attacked.

Furthermore, a recent study on gray zone warfare found that defender states marked by weak institutional capacity are particularly prone to respond with overwhelming force when attacked.⁸³ Indeed, Ukraine's rating on a Polity Scale,⁸⁴ which measures the level of democratization, is +4 (out of 10), making it an open anocracy (i.e., a democracy in transition), and numerous authors have found anocracies to be particularly prone to violence.⁸⁵ Thus, a solid academic research base paints Ukrainian determination to use of force and resist the Russian invasion as hardly surprising.

⁷⁸ I.e., a party facing losses is more inclined to take risks. Kahneman, D. and Tversky, A. (1979). *Prospect theory: An analysis of decision under risk*. *Econometrica* 47(2): 263-291.

⁷⁹ I.e., the survival of a proxy, especially if it is a non-state actor, is usually at stake, which makes them more likely to escalate to violence, compared to their state sponsors. Pfaff, A. C. and Granfield, P. (March 27, 2018). *How (Not) to Fight Proxy Wars*. National Interest. <https://nationalinterest.org/feature/how-not-fight-proxy-wars-25102>.

⁸⁰ I.e., the weaker party has no latent military capacity to use as a future threat, and thus must go all-in if it is to have a chance at success. De Nevers, R. (2007). *Imposing international norms: great powers and norm enforcement*. *International Studies Review* 9: 53-80; Caprioli, M. and Trumbore, P. F. (2006). *First use of violent force in militarized interstate disputes, 1980-2001*. *Journal of Peace Research* 43(6): 741-749.

⁸¹ (Nov 3, 2022). Jacek Bartosiak, John R. Deni (US Army War College) on the observation from the battlefield in Ukraine. <https://www.youtube.com/watch?v=BmnwMjlUEzQ>; Atran, S. (Oct 12, 2022). *Transcultural Predictors of Will to Fight*. SMA General Speaker Session. <https://nsiteam.com/transcultural-predictors-of-will-to-fight/>.

⁸² Deck, C. and Sheremeta, R. M. (2012). *Fight or flight? Defending against sequential attacks in the game of siege*. *The Journal of Conflict Resolution* 56(6): 1069-1088; Clark, D. J and Konrad, K. A. (2007). *Asymmetric conflict: weakest link against best shot*. *The Journal of Conflict Resolution* 51(3): 457-469.

⁸³ Murauskaite, E. E., Quinn, D., Wilkenfeld, J., Astorino-Courtois, A., and DeFrancisci, C. S. (2023). *Regime, power, state capacity, and the use of violence in gray zone international crises*. In Wilkenfeld, J. and Murauskaite, E. E. (eds.). *Escalation Management in International Crises*. Edward Elgar Publishing.

⁸⁴ <https://www.systemicpeace.org/csprandd.html>.

⁸⁵ See, e.g., Hegre, H. (2014). *Democracy and armed conflict*. *Journal of Peace Research* 51(2): 159-172; Mansfield, E. D. and Snyder, J. (Winter 2005/6). *Prone to violence: The paradox of the democratic peace*. *National Interest* 82: 39-45.

The high level of motivation and morale quickly gave Ukrainians a significant point of advantage against the Russian forces.⁸⁶ Indeed, the low Russian morale and the extent of corruption among the armed forces' ranks has also been significantly underestimated by both, U.S. and Russian intelligence.⁸⁷ Furthermore, the high level of centralization and rigidity of the Russian military has impeded its ability to act on the intelligence on the ground to such an extent that some U.S. officials have even suggested it was such Russian failures that ultimately allowed Ukraine to gain the advantage in fighters morale⁸⁸—rather than inherent Ukrainian qualities.

On a tactical level, fighting in on well-known terrain, which also held symbolic meaning, was said to put Ukrainians in a significant advantage over the Russian conscripts.⁸⁹

The third set of significant factors relates to Ukraine's successful information and communication campaigns.⁹⁰ The morale boosting effect of President Zelensky's decision to stay and leadership has been broadly discussed.⁹¹ Furthermore, the broad and swift mobilization of the whole elite sector (business, political, as well as military), governmental cohesion, and good civil-military relations should also be recognized.⁹² In addition, seeing their cause being followed so closely on international news reportedly

⁸⁶ McConville, J. C. (Nov 16, 2022). *Politico Defense Summit*. <https://www.politico.com/live-events/1997/07/21/at-a-crossroads-americas-defense-strategy-00001398>; (Nov 3, 2022). *Jacek Bartosiak, John R. Deni (US Army War College) on the observation from the battlefield in Ukraine*. <https://www.youtube.com/watch?v=BmnwMjUEzQ>; (April 26, 2022). *Jacek Bartosiak talks to Gen. (ret.) Ben Hodges on war in Ukraine as of 26 April 2022*. <https://www.youtube.com/watch?v=IUyRclxae0M>.

⁸⁷ Bowen, A. S. (Sep 14, 2022). *Russia's War in Ukraine: Military and Intelligence Aspects*. Congressional Research Service, Report R47068. <https://crsreports.congress.gov/product/pdf/R/R47068>; Risen, J. and Klippenstein, K. (Oct 5, 2022). *The CIA Thought Putin Would Quickly Conquer Ukraine*. The Intercept. <https://theintercept.com/2022/10/05/russia-ukraine-putin-cia/>.

⁸⁸ Schwirtz, M., Troianovski, A., Al-Hlou, Y., Froliak, M., Entous, A., and Gibbons-Nef, T. (Dec 16, 2022). *Putin's War*. New York Times. https://www.nytimes.com/interactive/2022/12/16/world/europe/russia-putin-war-failures-ukraine.html?campaign_id=51&emc=edit_mbe_20221219&instance_id=80572&nl=morning-briefing%3A-europe-edition®i_id=203988385&segment_id=120256&te=1&user_id=2a0f7034f929ec26cfd83b40607771a3.

⁸⁹ Lee, R. FY22 Q4 Future of SOF Forum/Future Security Forum:Panel 6 What are the Lessons of the War in Ukraine? https://www.youtube.com/watch?v=oLNQ215A_nc; Freedman, L. (Oct 19, 2022). *Russia-Ukraine Dialogues: battlefield updates*. LSE. <https://www.youtube.com/watch?v=Qow33e-IQFM>.

⁹⁰ See, e.g., McNerney, M., Sharpe, A., and Demus, A. (Sep 13, 2022). *National Will to Fight Amid 2020s/30s Technologies*. NSI. <https://nsiteam.com/national-will-to-fight-amid-2020s-30s-technologies/>.

⁹¹ Prasad, A. (March 2, 2022). *Volodymyr Zelensky's appeal lies in his service to Ukrainians above all else*. The Conversation. <https://theconversation.com/volodymyr-zelenskys-appeal-lies-in-his-service-to-ukrainians-above-all-else-178012>; Pisano, J. (July 2022). *How Zelensky Has Changed Ukraine*. Journal of Democracy. <https://www.journalofdemocracy.org/articles/how-zelensky-has-changed-ukraine/>.

⁹² (Nov 3, 2022). *Jacek Bartosiak, John R. Deni (US Army War College) on the observation from the battlefield in Ukraine*. <https://www.youtube.com/watch?v=BmnwMjUEzQ>; See, e.g., McNerney, M., Sharpe, A., and Demus, A. (Sep 13, 2022). *National Will to Fight Amid 2020s/30s Technologies*. NSI. <https://nsiteam.com/national-will-to-fight-amid-2020s-30s-technologies/>.

strengthened the fighters' morale.⁹³ Moreover, the *Starlink* efforts to keep the communications open and accessible to civilians were significant in helping them keep the spirits up.⁹⁴ In contrast, in Russian-occupied territories where the phone and internet communications were entirely cut off, civilians found it difficult to comprehend the broader war developments and were surprised to see their towns liberated by Ukrainian counter-offensives.⁹⁵

The fourth, and perhaps the most elusive, factor was the strength of Ukrainian national identity. The Russian planners had miscalculated the extent to which Ukrainians may identify as Russians⁹⁶—despite the level of support for Putin and affinity to Russia that some had expressed. Indeed, in surveying over 1,000 Ukrainians before and after the 2022 Russian invasion, scholars have found that the relative level of personal identification with Ukraine was the strongest predictor of an individual's "willingness to sacrifice (suffer economic hardship, imprisonment, fighting, family loss, and dying)."⁹⁷ Moreover, the same survey found that identification with Ukraine—rather than Russia—has increased in the occupied territories.⁹⁸

Indeed, in surveying over 1,000 Ukrainians before and after the 2022 Russian invasion, scholars have found that the relative level of personal identification with Ukraine was the strongest predictor of an individual's "willingness to sacrifice (suffer economic hardship, imprisonment, fighting, family loss, and dying)."

Finally, it is worth noting that some experts have identified the positive second order effect of Ukraine's strong willingness to resist: successful thus far, this is understood to be enhancing the deterrent impact of the public will to fight in the neighboring countries as well.⁹⁹

Second Order Effects

Several experts interviewed for this effort have pointed to the failure of U.S. intelligence—and government—agencies to adequately appreciate and prepare for the global second order effects likely produced by an attack that was seen as inevitable in early 2022. In addition, the subsequent failure to

⁹³ Lee, R. (Sep 28, 2022). FY22 Q4 Future of SOF Forum/Future Security Forum:Panel 6 What are the Lessons of the War in Ukraine? https://www.youtube.com/watch?v=oLNQ215A_nc.

⁹⁴ Rondeaux, C. (Sep 28, 2022). FY22 Q4 Future of SOF Forum/Future Security Forum:Panel 6 What are the Lessons of the War in Ukraine? https://www.youtube.com/watch?v=oLNQ215A_nc.

⁹⁵ Avdeeva, M. (Oct 19, 2022). *Russia-Ukraine Dialogues: battlefield updates*. LSE. <https://www.youtube.com/watch?v=Qow33e-IQFM>.

⁹⁶ Eltsov, P. (Apr 5, 2022). *The Surprisingly Unsurprising Russo-Ukraine War: Learning and Teaching the Right Lessons for Integrated Deterrence*. NSI. <https://nsiteam.com/the-surprisingly-unsurprising-russo-ukraine-war-learning-and-teaching-the-right-lessons-for-integrated-deterrence/>.

⁹⁷ Atran, S. (July 11, 2022). *The will to fight*. Aeon. <https://aeon.co/essays/wars-are-won-by-people-willing-to-fight-for-comrade-and-cause>.

⁹⁸ Atran, S. (July 11, 2022). *The will to fight*. Aeon. <https://aeon.co/essays/wars-are-won-by-people-willing-to-fight-for-comrade-and-cause>.

⁹⁹ Stringer, K. (Oct 3, 2022). *ThinkJSOU Panel: Update on the Ukraine / Russia Conflict*. <https://www.youtube.com/watch?v=Sz3IC1vHNEI>.

manage the public information aspect of these effects has further impeded the international efforts to mitigate these crises.

For instance, given the inherently limited nature of naval traffic from the Black Sea ports and the prominent role of both Ukraine and Russia as global suppliers of grain, failure to make any allowances for the resulting food crisis was seen as unfortunate. Specifically, the International Rescue Committee has found that of the 10 countries at the highest risk of humanitarian emergencies, seven were importing an “average of 66% of their wheat from Russia and Ukraine—with this percentage rising to 90% in Somalia.”¹⁰⁰ These 10 countries account for 90 percent of all the world’s population in need of humanitarian assistance,¹⁰¹ and many have been on the emergency watchlist for years—and yet, no preparedness efforts have been taken by the United States that wielded the intelligence of the impending war, or other parties of the international community.

Similarly, the United States seems to not have engaged in any advance planning efforts to prepare for the impact that Russia’s focus on Ukraine would have on other international conflicts that Russia was involved in. Syria presents a prime example—but likely not the only one. From the start of the invasion, Russia had redeployed a significant number of Wagner Group’s personnel¹⁰² and eventually also its S-300 air defense system from Syria to Ukraine.¹⁰³ Subsequently, Iran and Turkey were soon emboldened by both Russia’s withdrawal from Syria and shrinking leverage over them to try and fill the power vacuum in this regional conflict (also changing Israel’s security calculus).¹⁰⁴

More directly concerning the battlefield in Ukraine, failures to assess the auxiliary needs of the fighters, as well as the Ukrainian population, in a timely manner were also seen as resulting in preventable suffering. For instance, Ukraine was supplied with hazmat suits very early in the war, anticipating potential Russian use of any of the WMD – a red line that has not been crossed. Meanwhile, no preparations were made for any auxiliary power supply or heating solutions, even though various pressures tactics against the energy grid and fuel supply lines have been a typical Russian political tool for decades, exercised in the extreme form of bombing the infrastructure in the case of Ukraine.

¹⁰⁰ International Rescue Committee (Dec 12, 2022). *2023 Emergency Watchlist at a Glance*. https://www.rescue.org/sites/default/files/2022-12/CS2301_Watchlist_at_a_Glance_Handout_Final.pdf.

¹⁰¹ International Rescue Committee (Dec 12, 2022). *2023 Emergency Watchlist at a Glance*. https://www.rescue.org/sites/default/files/2022-12/CS2301_Watchlist_at_a_Glance_Handout_Final.pdf.

¹⁰² Murauskaite, E. E. (Aug 18, 2022). *Foreign Fighters in Ukraine: What Concerns Should Really Be on the Agenda?* Belfer Center, Harvard University. <https://www.russiamatters.org/analysis/foreign-fighters-ukraine-what-concerns-should-really-be-agenda>.

¹⁰³ Kingsley, P. and Bergman, R. (Oct 19, 2022). *Russia Shrinks Forces in Syria, a Factor in Israeli Strategy There*. New York Times. <https://www.nytimes.com/2022/10/19/world/middleeast/russia-syria-israel-ukraine.html>.

¹⁰⁴ See, e.g., Yacoubian, M. (Jan 10, 2023). *Ukraine’s Consequences are Finally Spreading to Syria*. War on the Rocks. <https://warontherocks.com/2023/01/ukraines-consequences-are-finally-spreading-to-syria/>.

Conclusions

This study has traced the key aspects of U.S. assistance to Ukraine in the information domain during the 2022 war, ranging from the early-warning information campaign, to battlefield intelligence sharing, to countering Russia's cyber offensives. The perceived impact and implications of these efforts were assessed from multiple vantage points by European and American experts.

The unprecedented U.S. campaign of publicly sharing intelligence about an impending Russian invasion succeeded in priming the European partners for action, helped avert false flag campaigns, and seemingly dampened the early impact of the invasion. However, previous instances where the United States have used intelligence for political purposes in Iraq and Afghanistan had damaged some of the credibility of this messaging campaign, delaying and reducing its consensus building effects.

The extent of battlefield intelligence sharing with Ukraine was also seen as unprecedented in recent U.S. practices of proxy or ally support. It became a major force multiplier increasing the effectiveness of Ukraine's limited resources. However, the more limited nature of Ukraine's battlefield intelligence sharing, while backed by operational security reasons, could pose a future challenge in selecting the specific military systems for transfer and coordinating the overall flow of incoming Western assistance.

In the cyber domain, U.S. public and private sector assistance were seen as instrumental in countering Russia's extensive cyber campaign. Indeed, the defense effectiveness seen in Ukraine had initially led some to discount Russia's campaign as a failure. Nevertheless, one of the lessons of this war was the limited impact of cyber efforts to the overall conventional military campaign.

The U.S intelligence community (along with the rest of the world) seems to have succumbed to two key failures concerning this war. The first one was gross underestimation of Ukraine's capacity to stand up to Russia – explained by its strong (and growing) sense of national identity and the commonly strong will to fight of desperate weaker party defenders, as discussed in extensive academic literature analyzed in this report. The second one was the failure to identify and adequately prepare for the second-order effects of this war—ranging from shifting dynamics in regional conflicts that Russia was previously involved in, to the worsening in humanitarian crises in countries deprived of Ukrainian and/or Russian grain, as well as of international donor's attention.



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