The War in Ukraine:

How Multi-Domain Formations Are Combatting Russia

Bradley Thrasher

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Over the last 249 years, the operational environment (OE) in which the U.S. Army operates has significantly evolved. Today, emerging technologies like artificial intelligence (AI), hypersonics, machine learning, nanotechnology, and robotics are driving a fundamental change in the character of war.[1] Simultaneously, strategic competitors like Russia and China are synthesizing emerging technologies with their analysis of military doctrine and operations.[2] Peer threats seek "to exploit...overmatch opportunities"[3] and "fight...through multiple layers of stand-off in all domains – space, cyber, air, sea, and land."[4] The U.S. Army in Multi-Domain Operations (MDO) 2028 concept[5] counters layers of stand-off through three (3) tenets: calibrated force posture, multi-domain formations, and convergence.[6] While the MDO strategy prepares the U.S. Army for operations within contested OEs, recent engagements, such as the Russian invasion of Ukraine on February 24, 2022,[7] underscore the relevance of this concept in combatting dynamic peer threats.

Multi-Domain Formations

At the outset of the invasion, President of Russia, Vladimir Putin, aimed to seize the Ukrainian capital of Kyiv and establish a presence throughout the country.[8] Despite Russia's projections of a "swift victory,"[9] and pervasive doubt in Ukraine's capacity to withstand an invasion,[10] Kyiv remains unseized,[11] with Ukrainian forces having "recaptured 54% of occupied territory"[12] to date. Ukraine's ability to leverage the tenet of 'multi-domain formations' through independent maneuver, employment of cross-domain fires, and maximization of human potential has largely enabled its forces to resist Russia's offensive since the initial invasion in 2022.

Independent Maneuver

Ukraine's capacity to independently maneuver and rapidly adapt tactics within a degraded OE largely denied early Russian advances on Kyiv. Doctrinally, "multi-domain formations conduct independent maneuver by continuing operations in a contested environment."[13] Critical to this end are subordinates who leverage disciplined initiative to react to changes in the OE.[14] Reinforced by troop density[15] and jamming technology,[16] Russia's initial advances necessitated decisive tactical action from Ukrainian units. To the northeast of Kyiv, Ukrainian units met and halted the Russian advance near Chernihiv[17] by strategically directing "the mass of Russian troops into narrow stretches of terrain – dirt roads that were impassable, thawing fields or swamps that would ensnare vehicles and force greater fuel consumption."[18] To the west, the Russians attempted to cross the Irpin River to reach Moshchun: a gateway to Kyiv.[19] In response, Ukrainian units employed "hit-and-run attacks…and punishing artillery strikes on…pontoon bridges."[20] When "Russian jamming cut off communications and made Ukrainian drones inoperable,"[21] Ukrainian units placed artillery rounds on the Dnieper River dam, effectively flooding the Irpin and Russia's pathway to Moshchun.[22] To further counter jamming, Ukrainian air defense units would "violate all doctrine,"[23] operating in close proximity to the Russian front line to rapidly acquire targets.[24] Thus, Ukraine's ability to maneuver, utilize rapid decision-making, and employ "guerrilla tactics"[25] in the absence of strict orders ultimately forced Russia to retreat by late March from Kyiv.[26]

Cross-Domain Fires

Supplementing maneuver tactics, Ukraine's acquisition of modern technologies has enabled the successful employment of cross-domain fires, allowing for the rapid targeting of

Russian forces. In combat, "cross-domain fires integrates and delivers lethal and nonlethal fires across all domains, the electromagnetic spectrum, and the information environment."[27] Throughout the war in Ukraine, it is clear that "Russia continues to prefer massed fires against targets that cannot be seen rather than precision strikes against identified targets."[28] Ukraine, however, "has focused on analyzing sensor data, prioritizing targets, applying economy of effort, automating the assignment of targets to the nearest capable munition, and conducting precision strikes."[29] Ukraine's ability to employ "man-portable air-defense systems, antitank guided missiles, and first-person view unmanned aerial systems"[30] in conjunction with traditional fires[31] has rendered nearly 3,197 Russian tanks and 6,160 armored vehicles ineffective as of July 2024.[32] The use of cross-domain fires has also proven effective in "targeting supply lines, depots, and command centers,"[33] imparting a "psychological impact on Russian soldiers."[34] Ukraine's leveraging of technology in conjunction with traditional fires has, therefore, been pivotal in degrading Russian resources and morale.

Human Potential Maximization

Critical to the employment of advanced weaponry, Ukraine's human potential has been bolstered by modern technology and leveraged to combat Russian hybrid threats. Today, "man-machine interfaces, enabled by AI and highspeed data processing, improve human decision-making in both speed and accuracy."[35] One tool Ukraine employs is the "Geographic Information System for Artillery (GIS Arta)."[36] Commonly referred as "the Uber for artillery,"[37] GIS Arta "optimizes across variables like target type, position, and range to assign 'fire missions' to available artillery units."[38] AI-enabled data analysis has also bolstered Ukrainian success.[39] For instance, "by ingesting reams of images and text...AI models can find potential clues, stitch them

together, and then surmise the…location of a weapons system or a troop formation."[40] These

capabilities enable "Molfar, an intelligence firm with offices in Dnipro and Kyiv, to typically find

two to five valuable targets every day."[41] Lastly, Ukraine's "decentralized IT army, consisting of

over 250,000 IT volunteers at its peak, has been formed to counter Russian digital threats."[42]

Overall, the prevalence of modern technology and cyber defense capabilities

has enhanced Ukraine's potential to impart lethality in both physical and digital realms.

Conclusion

Despite the influence of multi-domain formations in Ukraine, one may argue that

'calibrated force posture' is more critical to garner success during large-scale combat operations

(LSCO). By definition, "calibrated force posture is the combination of capacity, capability,

position, and the ability to maneuver across strategic distances."[43] The ability to rapidly

maneuver is essential to closing with and engaging lethal enemies. However, the prevalence of

technologically adept adversaries within the OE demands not just a capacity to maneuver, but

the ability to harness modern weaponry more efficiently than the enemy. Ukraine's ability to

persist for over two years against Russia, a preeminent competitor, highlights the importance of

units that not only independently maneuver but leverage cross-domain fires and human
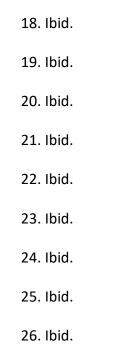
potential to achieve overmatch.

At the start of Russia's 2022 invasion, "the prevailing view in Russia…and even among

many Ukrainians, was that a Russian blitzkrieg would seize Kyiv, oust Ukrainian President

Volodymyr Zelenskyy, and install a loyal puppet."[44] Despite these beliefs, Ukrainian units have

persisted for over two (2) years by utilizing "tactical agility…and international material support

to inflict shocking numbers of casualties and persistent battlefield disappointment on…Russian

adversaries."[45] Ukraine's ability to seize the initiative under maneuver within a degraded OE and employ technology in conjunction with conventional weaponry successfully disrupted Russian advances on Kyiv. Through the optimization of technology, Ukraine's human potential has enabled the rapid acquisition of targets and the deterrence of Russian cyber threats. With all factors considered, the current war in Ukraine highlights the indispensable role of multi-domain formations in LSCO, providing real-time insight into the changing character of warfare.
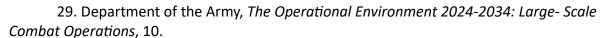
Footnotes

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