Red Diamond

7 DECEMBER 2023

"Know The Enemy"

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Remedies for the Missing Links in Russia's Kill Chain

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In Ukraine, Russia has struggled to deliver dynamic, precision fires with the efficiency and scale that their modernized artillery principles would imply. Massed indiscriminate fire is now being constrained by production and logistics. ***This article examines some of the missing links in Russia's kill chain, including: Integration of sensors and shooters, the limited range of precise one-way attack drones, cost and availability of complex munitions and counter measures—that ultimately cancel each other out—and finally, a lack of human analysis that renders Russian forces vulnerable to deception.*** Recent observations provide insight into Russia's short-, medium-, and long-term remedies, providing the U.S Army with the opportunity to prepare for an optimized adversary during today's training events.

Despite modernization efforts, Russia's reconnaissance fire complex has not achieved complete automation of linked sensors and shooters in Ukraine. Modernization efforts that began in 2008 updated Russian artillery principles to include dynamic prosecution of high pay off targets, engaged by tactical to strategic level weapons. Targeting is enabled by Strelets, a network of ruggedized computers that automate the transfer of data between all sensors and shooters. [1] However, complete automation is still very challenging in terms of physical connectivity and data compatibility. An operator would have to manually relay data into and out of the system. Platforms not in proximity to Strelets can neither contribute to nor rapidly benefit from the common operating picture it provides. Although Strelets is available in Ukraine, Russian units rarely use it due to a lack of trained personnel. [2]

To improve sensor to shooter links, Russia is using new technology, leveraging the success of Ukrainian techniques. To co-ordinate artillery, Ukrainian forces use internet facing Android tablets and Kropiva software. The application uses live atmospheric data to provide solutions for numerous munitions and automatically assigns the nearest capable weapon to newly identified targets, earning it the nickname 'Uber for Artillery'. [3]. Recent reporting details Russia's addition of commercial wireless technology to systems like Strelets, allowing terminals to interface with multiple devices running user-friendly mobile applications. [4] This may fill a crucial gap in Russia's kill chain, improving multi-echelon, cross domain fires. Taking this a step further, the addition of low cost, mass produced, system-on-a-chip type apparatus to Russia's full array of sensors could even fully automate the output of analog equipment.

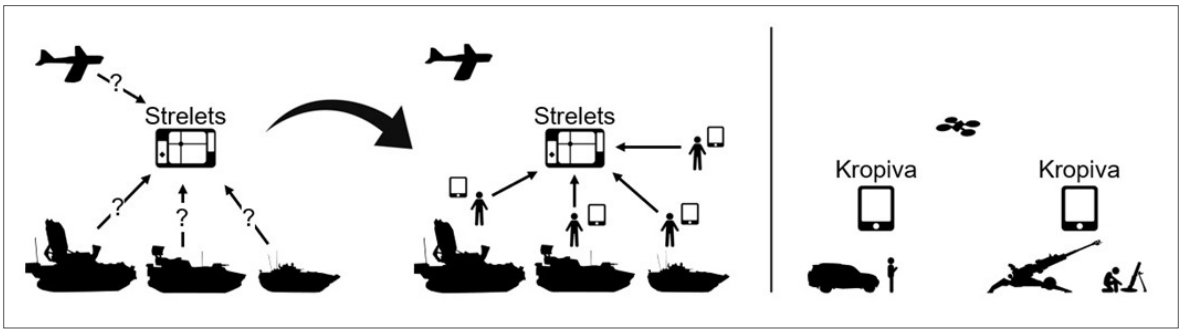

Figure 1: How Strelets appears to be evolving, and Ukraine's Kropiva system.

Russia is also addressing kill-chain issues by focusing on research and development (R&D) efforts to improve limited ranges of their precise one-way attack drones. Russian is developing a new system, the Lancet 'Italmas.' This system is visually similar to the Iranian Shahed-136, and like the Shahed it now has an internal combustion engine, increasing the range from 40km to 200km. [5] Technical details are unclear, but like previous Lancets, the 'Italmas' is likely to include both coordinates based and electro-optical targeting. Going forward, Russia could begin to amend production and stockpiles of previously dumb munitions. The addition of sensors like photodiodes, and a means to translate target position signals into control surface movement would significantly increasing the accuracy of less precise systems.

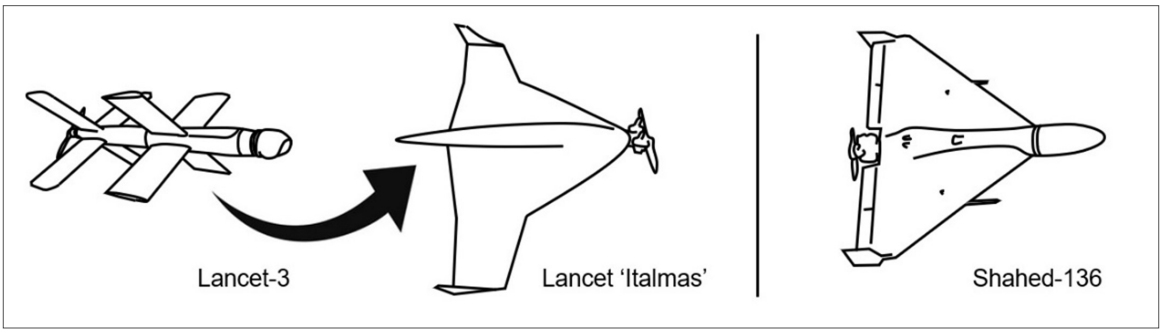

Figure 2: Russian Lancet and Shahed-136 drones.

Russia is also leveraging novel combinations of legacy equipment, a possible indication of low-tech solutions to neutralize expensive Ukrainian countermeasures. Images posted to social media show a Russian MT-LB chassis fitted with an RBU-6000 rocket system. The RBU-6000 is a Soviet-era anti-submarine system, normally fitted to maritime platforms. [6] Such a combination is unlikely to improve on the range or lethality of existing land systems like the TOS-1 multiple rocket launcher and attached to a land vehicle, the RBU-6000 will be difficult to aim and reload. However, at close ranges it might be effective against Ukrainian forces who breach Russian defenses. It could also be used to elicit enemy force reactions, like forcing targets to move position. Used at longer ranges, such a system provides low-cost mass to soak up expensive countermeasures. Rather than an improvement in capability, such a pairing likely indicates an effort to make the best use of what is at hand.

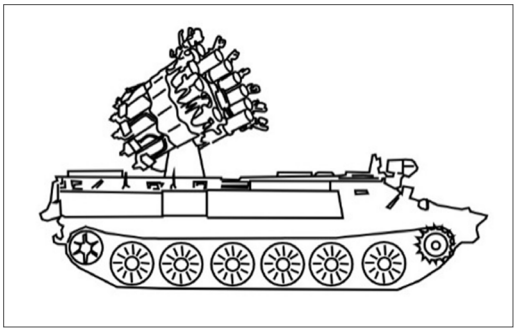

Figure 3: MTLB chassis fitted with RBU-6000 anti-submarine rocket launcher.

Sophisticated detailed Ukrainian decoys have highlighted Russia's lack of human target analysis and this deficiency has put their forces at risk to Ukrainian counterfire. Russian inflatable decoys are cheap, easy to transport, and rapid to deploy; but slight bulges and wind movement make them apparent to high resolution near-ground sensors. Ukrainian workshops produce detailed replicas of military equipment using wood, foam, and plastic pipe. [7] Ukrainian replicas of high value targets have successfully unmasked Russian artillery, which would be subject to counter fire. Russia has the ability to conduct reconnaissance, but analysis is rarely applied. [8] In the near term, this is unlikely to improve, making it difficult for Russia to defeat a deceptive and motivated adversary. Eventually, advances in automation and machine learning might fill this gap, but without data scientists at least sitting 'on the loop' such a system might be vulnerable to poisoning with false data.

IMPLICATIONS FOR U.S. ARMY TRAINING

- Representation of a challenging and accurate reconnaissance fire complex might take the form of rapid cross cuing of ground sensors to unmanned aerial systems. When a high pay off target is identified, fire is immediately requested. Whether or not sensor data is taken at face value is a variable that can be adjusted.
- During training events, some opposing forces already use applications like Android Team Awareness Kit (ATAK) that use smartphones and non-military carriers to share data and conduct precision targeting. The effects of security and counterintelligence risks associated with such devices and applications could be rendered by surrogates of military intelligence reporting channels and open-source platforms like the Information Operations Network (ION).
- During field exercises, kinetic effects are often virtual, and software defined, because they are constrained by scale, cost, and safety. New adversary weapons (and sensors), including novel remixes and improvements, as well as future technology, like directed energy, can be immediately rendered in the synthetic wrap.
- During exercises, detailed decoys could risk confusion between what is intended to be a decoy and what is intended to emulate the real thing. This might be intentional, to almost guarantee an element of confusion. Otherwise, pre-exercise threat briefs, explaining genuine enemy equipment and how it will be represented are vital.

- Russia is learning from the conflict in Ukraine, and making rapid improvements to its equipment and how it is employed. Other LSCO actors would likely do the same. It is not sufficient for training audiences to only consider how an adversary might employ what something does, they must also consider what it can be made to do.

RELATED READINGS

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