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CSAG INFORMATION PAPER:

Drone combat in the RUS/UKR war and potential applications for the CENTCOM Area of Responsibility (AOR).

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The opinions and conclusions expressed herein are those of a number of international officers within the Combined Strategic Analysis Group (CSAG) and do not necessarily reflect the views of United States Central Command, nor of the nations represented within the CSAG or any other governmental agency.

1. **Subject**: **Drone combat in the RUS/UKR war and potential applications for the CENTCOM Area of Responsibility (AOR).**

2. **Purpose**: This paper presents the CSAG's analysis regarding drone combat in the Russian-Ukrainian war and the possible consequences and effects for the CENTCOM AOR.

3. **Introduction:** The Russian-Ukrainian war has highlighted rapid, multiple technological developments and strategies that should be closer analyzed and might be useful for operations in the CENTCOM AOR. The deployment of unmanned aerial systems (UAS), coupled with rapid technological advancements and the establishment of sensor-shooter networks, is becoming increasingly crucial for enhancing military capabilities. These elements play a significant role in maintaining and elevating our military superiority.

4. **Facts:**
   - **a.** The drone dynamics in Ukraine have showcased class I and class III drones, where, using NATO classification, class I drones are less than 150kg, and class III drones are greater than 600k.[1]
   - **b.** Ukraine's drone deployment and employment has evolved. During earlier stages of the war—when Russia's air defense and electronic-warfare capabilities were less sophisticated—Ukraine relied on larger drones such as the Turkish TB2 Bayraktar to great effect. The TB2's ability to carry multiple air-to-ground munitions and loiter for long periods allowed Ukrainian forces to penetrate Russian air defenses and strike heavy targets. However, as Russia achieved greater air domain dominance, it was able to detect and shoot down these larger models more easily. The TB2 may maintain some relevance—its sensor suite and considerable range still enable Ukrainian operators to collect intelligence—but Ukraine has nonetheless shifted to using smaller drone technology to adapt to Russian advances.[2]

[1] NATO. "STANAG 4671" https://standards.globalspec.com/std/13430067/stanag-4671 (Accessed September 2024)
[2] Kristen D Thompson https://www.cfr.org/article/how-drone-war-ukraine-transforming-conflictAccessed October 24)

c. In the war in Ukraine, small military drones – both fixed-wing and rotary, integrated with the ground units – have been commonly used for surveillance, target acquisition, battle damage assessment, and information warfare.[3]

d. Every day, drone units from both armies publish videos on social media demonstrating how drones as inexpensive as $500 can effectively destroy critical infrastructure, disrupt lines of communications (LOCs), and disable costly artillery or tanks. This has showcased their transformative role in modern warfare. Examples include the employment of "dragon drones" equipped with incendiary molten thermite, which burns at extremely high temperatures, and when released destroys obfuscating vegetation, renders equipment inoperable, and kills or severely injures troops.

e. Both sides developed specialized drone units capable of integrating drones into broader military operations. This included the establishment of dedicated drone companies within infantry brigades, enabling enhanced coordination and operational effectiveness on the battlefield.[4]

So What: Drones are the starting point of a rapid innovation cycle, with new iterations and types propagated across front lines and beyond.

5. <u>Assessment:</u>

a. In the ongoing conflict, both Russia and Ukraine have employed UASs extensively for a variety of missions, demonstrating their versatility in modern warfare. Ukraine, for example, has integrated drones into its military structure, with specialized units for surveillance, precision bombing, and artillery sighting, thus reshaping battlefield tactics and with a transformative effect akin to air-land integration which saw the birth of the blitzkrieg in World War Two.

b. This conflict has demonstrated the obvious battlefield advantages of drones, which have become smaller, faster, more lethal, easier to operate, long range, and available to almost anyone. They compress the kill chain, shortening the time from when a target is detected to when it is destroyed, and they can significantly bolster a military's ability to reconnoiter the battlefield.[5]

c. In addition, frontline Ukrainian soldiers are cycling through new drone technology every six weeks. Every brigade has master maintainers, fabricators, and software writers who are empowered to reprogram the drones, 3D print parts, and directly reach out to Ukrainian drone manufacturers to request changes, paying them directly for their services. In some circumstances, they can manufacture completely in-house, circumventing wasteful and lengthy acquisition cycles.[6]

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[3] Stacie Pettyjohn Evolution not Revolution https://www.cnas.org/publications/reports/evolution-not-revolution (Accessed October 2024)

[4] Reuters https://www.reuters.com/graphics/UKRAINE-CRISIS/DRONES/dwpkeyjwkpm/ (Accessed October 24)

[5] Kristen Thomson, https://www.cfr.org/article/how-drone-war-ukraine-transforming-conflict (Accessed January 2024)

[6] Stew Magnuson https://www.nationaldefensemagazine.org/articles/2024/10/3/army-wrestling-with-rapidly-changing-world-of-drones (Accessed October 24)

d. Sensor-shooter networks significantly improve communication between drones and ground forces by integrating advanced communication technologies, enabling real-time data sharing and coordination. These networks streamline operations, improve targeting accuracy, and facilitate timely responses to emerging threats in practical scenarios.

e. While there has been significant innovation, the intensive use of drones in the conflict has raised humanitarian concerns. Drones equipped with Artificial Intelligence (AI) for target acquisition, identification, and strikes raises significant concerns regarding collateral damage because the machine learning algorithms in these drones may not adequately evaluate the complexity of real-world scenarios, potentially leading to misidentification of targets or failure to account for the presence of civilians. The ethical implications of drone warfare, in combination with increasingly enhanced AI technology, as well as the potential for misinformation and propaganda related to drone use, require a careful balance between military objectives and humanitarian considerations.

f. Given the asymmetric advantages demonstrated by the employment of drones on the battlefield, it is likely terrorist groups will take note. The ongoing conflict has highlighted the nascent risk of increasingly sophisticated drone tactics employed by these groups and the need for continuous adaptation and the development of countermeasures in response.

So What: The experiences of Ukrainian and Russian forces highlight the critical need to adapt tactics, techniques, and procedures while keeping at the leading edge of technology, to fully exploit the potential of UAS while mitigating evolving threats. Understanding and implementing lessons learned from the Ukraine war will be critical for maintaining operational effectiveness in countering drone threats elsewhere, including in the Middle East.

6. Conclusion:

a. The most interesting lesson that comes from drones concerns how Ukraine and Russia have acquired and developed UAS. Ukraine has been able to successfully leverage the global "big tech" ecosystem, its civilian commercial technology sector, domestic start-ups and even bringing technical expertise in-house for its "drone warfare." This approach has shortened the cycle between prototyping, experimentation, testing, production, and fielding and has been tactically and at times operationally decisive. In sum, fail fast, forward.

b. The reorganization around UAS, with continuous technological iterations, and the creation of sensor-shooter networks are transforming the character of war, with implications for the CENTCOM AOR.

c. In the contemporary operating environment, small unmanned aerial systems (SUAS) have emerged as transformative battlefield assets, providing militaries an unprecedented blend of low-cost intelligence, surveillance, target acquisition, reconnaissance, and precision strike capabilities. These SUAS have proven their potential to disrupt mechanized formations' advances, neutralize fire support systems, and attack strategic assets with minimal expense.[7]

d. For CENTCOM, the key takeaway from the Ukraine conflict is the incredible rapidity with which drones have been adopted as sensors and shooters and adapted (in conjunction with AI/ML)

[7] May Padalino https://www.moore.army.mil/infantry/magazine/issues/2024/Summer/pdf/10-Padalino_txt.pdf (Accessed October 24)

to speed sensor-shooter links. This has had implications upon the defensive as well as offensive battle, highlighting the necessity of a layered defense strategy that can be effective against drones.

e. In the future, UAS with supporting AI will likely play a critical role in conflicts ranging from major combined arms combat operations between peer competitors, to insurgencies, given the low barrier to entry into drone warfare. Terrorists can readily adopt and adapt the technology to devastating effect. Multiple non-state actors have already deployed and employed drones in combat, including Hamas, Hezbollah, Houthi rebels, and ISIL.

f. Kamikaze drones have demonstrated extraordinary effectiveness in destroying enemy armored vehicles. These drones, often relatively inexpensive, can be equipped with explosives and directed at specific targets, such as tanks, without endangering pilots or ground troops. The use of drones for reconnaissance and coordinated attacks has increased the vulnerability of traditional armored vehicles, neutralizing the protection for which they were procured.

g. The innovation in the use of UAS for combined arms operations will require the continued rapid modernization of critical components that go on platforms, such as sensors, communications, and payloads. It will be crucial to keep current and identify any future changes in trends.

7. Recommendations for US/CENTCOM:

a. The U.S. needs to prioritize the development of several advanced drone technologies to enhance their military capabilities and strategic positioning. Key areas of focus include AI and fully/partial autonomous operations, stealth capabilities, long-range, swarm technology, and advanced sensing systems. Bringing the manufacturing and capacity to innovate in-house should be considered in earnest if the U.S. military is to retain the battle winning edge.

b. CENTCOM should promote partnerships to share best practices and experiences, sharing intelligence and technology related to UAS operations and c-UAS TTPs. Collaborative efforts can lead to improved capabilities and enhanced regional security. In particular, the seamless exchange of experiences and lessons between EUCOM and CENTCOM regarding drone operations could lead to enhanced military capabilities and operational successes. By focusing on the transformative impact of drones and developing strategies that incorporate these insights, both commands can adapt to the evolving landscape of modern warfare effectively.

c. CENTCOM should continue to schedule joint and combined exercises that simulate the use of sensor-weapon networks in operational scenarios and ensure that these exercises involve and focus on the coordination of UASs, sensors, and weapon systems to improve responsiveness and effectiveness in real-world situations.

d. CENTCOM should encourage standardization of platforms for interoperability with allies and partners. A common UAS architecture can simplify training, maintenance, and logistics while facilitating collaborative missions among the services.