Emerging and critical technologies, including dual-use technologies, are transforming the scope and nature of security. The utilization of artificial intelligence (AI) and unmanned systems is poised to exert significant influence not only on geopolitical rivalries among major powers but also on the future of warfare and law enforcement activities.

♦ More extensive casualties and human rights violations due to the proliferation and misuse of emerging technologies

The effectiveness of unmanned systems has been demonstrated in conflicts such as the war in Ukraine and in use by non-state actors such as the Houthis in Yemen. During the ongoing conflict in Ukraine, the integration of AI-powered military support systems and the adaptation of commercial drones for reconnaissance and attack purposes have yielded impressive outcomes at relatively low costs. This success has attracted considerable interest from countries within the Global South (GS), including Southeast Asia and Africa. Moving forward, the extent to which GS countries adopt and employ AI and unmanned systems could lead to substantial shifts in both international and internal security. These developments would pose pressing challenges in areas such as national defense strategies, adherence to the rule of law, and international cooperation.

In the Gaza conflict, Israel has reportedly employed AI-driven automated attack systems, effectively operationalizing autonomous target recognition and attack execution. This approach has raised significant ethical and trust-related concerns, particularly regarding the level of human involvement (human in the loop). Should similar systems become widespread among other nations, the risks of target misidentification and harm to civilians could escalate. Additionally, the potential for the misuse of technology and increased human rights violations, particularly by authoritarian regimes, cannot be overlooked.

From the perspective of law enforcement, the use of AI and unmanned systems for tasks such as border and domestic surveillance holds the promise of enhancing security measures. The proliferation of advanced dual-use technologies may spur innovations in domestic law enforcement and border management within GS countries. Integrated systems that combine AI and unmanned technologies could be deployed for purposes such as border management, counterterrorism, and crime prevention. By enabling cost-effective mission execution even in resource-limited nations, these technologies are likely to be considered for adoption by a growing number of states.

However, in nations where military forces also assume roles in law enforcement, the blurring of institutional boundaries between the military and police poses significant risks. In particular, authoritarian regimes may leverage these technologies to strengthen state control and exacerbate human rights abuses. To mitigate these risks, the establishment of robust international norms and regulatory frameworks governing the use of AI and unmanned systems is imperative.

♦ Intensifying drone development race and deepening integration of alliances and partnerships

The competition between the US and China has escalated into a fierce race to develop unmanned aerial vehicle (UAV) technologies. Both nations are accelerating their UAV development efforts with an eye toward a potential Taiwan contingency. Unlike the small, low-cost UAVs used in the Ukraine war, the US is prioritizing the development of highly advanced UAVs designed for long-range missions. Given its

geographic remoteness, the US faces a critical need for UAVs capable of withstanding challenging environments to counter China's anti-access/area denial (A2/AD) capabilities. This imperative necessitates not only cutting-edge technological innovations but also the enhancement of robust production systems.

In contrast, China seeks to leverage its geographic proximity by deploying large numbers of affordable short- and medium-range UAVs, aiming to secure a strategic advantage over the US. One of the most prominently discussed technologies in this domain is swarm technology, which enables multiple UAVs to autonomously coordinate and execute operations. While China has a competitive edge in hardware development, it has shifted its focus toward software innovation to compete with the US, which is known for its expertise in this area. Consequently, the focus of the competition has shifted toward advancing autonomy and upgrading cooperative operational capabilities. These advancements have the potential to significantly improve operational efficiency in reconnaissance and attack missions, further intensifying the US-China rivalry.

Drone unit of the Ukrainian Armed Forces (Photo: Reuters/Aflo)

Historically, the primary roles of UAVs on the battlefield have been intelligence, surveillance, reconnaissance, and targeting (ISRT). Moving forward, the US intends to establish an AI-driven Joint All-Domain Command and Control (JADC2) system. This system aims to integrate geographically dispersed sensors and shooters into a seamlessly functional network in collaboration with allied and partner nations. A key objective for the US will be achieving superiority in the "Observe, Orient, Decide, Act" (OODA) loop to ensure the effective execution of long-range precision strikes.

In preparation for a potential Taiwan conflict, the US is striving to strengthen its collaboration with Taiwan and its allies. The pre-deployment of short- and medium-range UAVs in Taiwan is viewed as essential to bolstering its defense capabilities. However, Taiwan faces distinctive challenges, including the necessity of not relying on inexpensive Chinese-made drones, as Ukraine has. This highlights the urgent need for Taiwan to prioritize domestic drone development and manufacturing efforts, either independently or in collaboration with allied nations.

♦ Recommendations

- Support for AI infrastructure development in Global South (GS) countries: When providing assistance to GS countries in establishing and expanding AI infrastructure, active engagement with the international community in the development of comprehensive norms and regulatory frameworks is imperative to ensure the responsible and appropriate application of AI technologies. It is essential to utilize initiatives such as the Hiroshima AI Process to promote the ethical use of AI through mechanisms designed to safeguard individual privacy and ensure accountability. Moreover, measures must be taken to prevent the misuse of AI by authoritarian governments for the sake of regime survival or systemic oppression.

- Formulation of doctrines and operational concepts for effective drone technology utilization on the battlefield: To ensure the efficient and lawful deployment of unmanned systems on the battlefield, including counter-drone measures, it is necessary to develop comprehensive doctrines and detailed operational concepts. These frameworks should encompass not only Japan's specific needs for the defense of remote islands and critical infrastructure but also potential contingencies involving Taiwan. Operational planning must consider joint initiatives and coordinated strategies with the US and Taiwan. Future efforts should be extended to maritime and underwater drone technologies, ensuring alignment with the strategic and operational objectives of the US, China, and Taiwan. Additionally, it is vital to review rules of engagement (ROE) for unmanned systems while simultaneously reinforcing the legal foundation governing their use. Under the current provisions of Japan's Radio Act, drone performance and counter-drone system output are constrained, creating significant barriers to their development and deployment. Repeated UAV incursions into Japan Maritime Self-Defense Force (JMSDF) bases have also provoked concerns from the US, highlighting the urgency of addressing these issues, including through the reevaluation of existing legal frameworks.

- Strengthening defense industry cooperation with allied and partner nations: Japan should actively encourage collaborative initiatives in the defense industry with allied and partner countries to enhance the exchange, sharing, and joint development of unmanned system technologies. In particular, Japan's recognized strengths in hardware technology such as the development of high-performance sensors and durable materials should be leveraged to bolster maritime security capabilities. Moreover, resilient supply chains must be established through cooperative efforts with allied and partner nations. This should encompass not only manufacturing capacity but also the integration of component supply networks and technical support mechanisms.

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Research Fellow, The Japan Institute of International Affairs)