

INSIGHTS

The Robotic Frontier: Reconfiguring Global Power and the Geopolitics of Unmanned Systems

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Introduction

Research on drones now requires broader methods to understand how these systems are used in both military and civilian contexts (Jackman, 2023). In Asia, the rapid development of Unmanned Aircraft Systems (UAS) has transformed drones into important technological tools that support modernization and community resilience (Gohari et al., 2024; Vergouw et al., 2016). As drone technology spreads globally and increasingly influences global security and politics, researchers must also recognize that these unmanned systems still rely heavily on human operators and should be developed in ways that support regional development and follow international laws (Jackman, 2023; Shaw, 2017). This article therefore examines drones from both technological and political perspectives. It explores how drone technology is reshaping geopolitics and influencing global security dynamics. The discussion also considers the broader implications of drones for the world, with particular attention to Asia and Cambodia.

Drone from Technology to Politics

The shift from drones as simple machines to political tools happened because they made airpower available to almost everyone (Shaw, 2017). In the past, only the wealthiest nations could afford a powerful air force, but today, over 95 countries use drones (Jackman, 2023; Shaw, 2017). This has changed how military work is done. Even though drones are called "unmanned," they actually require a lot of human effort, a concept scholars call "manning the unmanned" (Jackman, 2023). These operators are often physically far away from the battle, but they face high levels of stress because they go from combat work during the day to their normal family life in the evening, which can be very difficult for their mental health (Jackman, 2023).

How Drones are Changing Geopolitics

Drones are alternating the rules of global power by making it easier and cheaper for countries to use force (Shaw, 2017). Because there is no risk of a pilot being captured or killed, governments may feel more comfortable starting or continuing military actions (Coeckelbergh, 2016). This has led to a change in how the world is policed, moving from a system of huge, permanent military bases to a system of small, flexible runways called lily pads (Roboworld) (Shaw, 2017). This allows powerful nations to have a virtual permanent presence over large areas of the planet with fewer people on the ground (Shaw, 2017).

At the same time, drones act as one of the decisive actors in geopolitics (Demiryol & Soyaltin-Colella, 2024). Countries like Turkey and Iran have built their own effective, low-cost drones, such as the Bayraktar TB2 and the Shahed-136, allowing them project power in their regions without relying on traditional Western suppliers (Akbarzadeh & Naeni, 2025; Demiryol & Soyaltin-Colella, 2024). This means that airpower is no longer just for a few nations, and the gap between world powers and other states is closing (Demiryol & Soyaltin-Colella, 2024).

Implications for the World, Asia, and Cambodia

The global rise of drones has created a divide of big data (Finn & Donovan, 2016). This means that the valuable information drones collect is often controlled by large corporations or wealthy international groups, which can leave local communities in developing nations at a disadvantage (Martini et al., 2016).

In Asia, the drone market is growing very fast, with regional production expected to reach thousands of units (Wong, 2010). In Southeast Asia, countries like Indonesia and Malaysia use drones heavily for agriculture and tracking environmental changes (Gohari et al., 2024). With this, Cambodia could develop a clear policy vision that recognizes drones as important technological tools for supporting sustainable development (Gohari et al., 2024; Vergouw et al., 2016). This is particularly relevant for managing challenges related to the country's tropical monsoon climate and improving productivity in the agricultural sector (Gohari et al., 2024).

From a security perspective, Cambodia operates in a regional environment where neighboring countries are increasingly adopting drones for coastal and maritime surveillance (Gohari et al., 2024). To strengthen its own defense capabilities, Cambodia could consider integrating Intelligence, Surveillance, and Reconnaissance (ISR) functions using drone technologies (Rey Arroyo, 2025). AI-enabled drones can support military decision-making by providing real-time data, detecting irregular activities, and improving overall situational awareness (Prakash et al., 2023). More broadly, adopting drone technology could help Cambodia address the big data divide by improving its ability to monitor and manage its territory (Finn & Donovan, 2016; Martini et al., 2016). By promoting local research and practical applications, such as monitoring rice fields or managing river flooding, Cambodia can leverage drones to advance technological modernization and support long-term economic development but also security sectors (Gohari et al., 2024).

A Roadmap for Strategic Modernization and Aerial Stewardship

Navigating the complex geopolitical and local implications of Unmanned Aircraft Systems (UAS) requires a structured approach to technical and legal sovereignty. To ensure that modernization serves national interests, policymakers and military leaders should focus on the following three pillars.

The first one being is smart spending and resilience. To avoid the attrition trap, where a nation runs out of equipment or funds during a conflict, it is vital to prioritize the economic efficiency of UAS (Rey Arroyo, 2025). Drones are significantly more cost-effective and reusable than traditional manned aircraft, making them a "budget-friendly" alternative for high-risk tasks where the loss of a human pilot would be politically or financially devastating (Ariante & Del Core, 2025; Ibrahim & Baballe, 2024; Reddy & Venkatesh, 2023). Because drones are relatively inexpensive to manufacture, they allow a nation to maintain a strong, persistent presence in the sky without the massive logistical burden of manned fleets (Ibrahim & Baballe, 2024; Wong, 2010). By tracking "cost-per-day" and integrating commercial technology into procurement, a strategy used to reduce acquisition timelines from years to months, a military can ensure its inventory remains resilient under pressure (Rey Arroyo, 2025).

The second pillar is Tech-Stack dependency. Modernization requires reducing long-term reliance on foreign tech and external experts (Coetzee & Putter, 2026; Hammadi, 2024). Many nations currently depend on external technical support for maintenance, which creates a strategic vulnerability if those links are cut off during a crisis (Coetzee & Putter, 2026). To survive such cutoffs, countries should invest in open-source hardware and software frameworks (Mohanty et al., 2023; Sciancalepore et al., 2024). This allows local engineers to build, fix, and customize their own systems without requiring constant permission or proprietary data from foreign companies (Mohanty et al., 2023). Furthermore, building local technical capacity is the only way to bridge the big data divide, ensuring that the valuable information collected by drones remains a national asset used for domestic development rather than being controlled by international entities (Finn & Donovan, 2016; Martini et al., 2016).

Finally, the emphasis should also be given to safety and fair play. To fly drones effectively without being blocked by adversaries, a nation must maintain control over its own rules and radio spectrum (Custers, 2016; Vergouw et al., 2016). Because radio signals do not stop at physical borders, international coordination is necessary to prevent interference and loss of

control in crowded airspaces (Vergouw et al., 2016). Governments should implement clear registration and licensing frameworks to ensure all operators are qualified and accountable (Custers, 2016; Ravich, 2016). A key tool for safety is geofencing, software that acts as a virtual no-go zone to automatically stop drones from entering restricted areas like airports or government buildings (Ariante & Del Core, 2025; Custers, 2016; McKenna, 2016). By creating a risk-based regulatory system, the government can protect the public while allowing the domestic drone industry to flourish (Ariante & Del Core, 2025; Custers, 2016).

Conclusion and Policy Recommendations

Drones are now much more than toys; they are powerful tools that are changing how the world is managed and how wars are fought (Vergouw et al., 2016). While they can help with farming and medicine, they also bring big risks to privacy and safety (Custers, 2016). As drones start using Artificial Intelligence (AI) to make their own decisions or fly in swarms, it is even more important for humans to stay in control of life-and-death choices (Coeckelbergh, 2016; Shaw, 2017).

To manage this technology well, nations, including Cambodia, should:

1. **Create Clear Laws:** Write simple rules about where drones can fly and how they must be registered (Custers, 2016; Gohari et al., 2024).
2. **Protect Privacy:** Mandate Privacy Impact Assessments (PIA) to ensure drones do not spy on people or violate their rights (Wright & Finn, 2016).
3. **Ensure Fair Access to Data:** Help local farmers and agencies own and use the data drones collect (Finn & Donovan, 2016).
4. **Train Local Pilots:** Build programs to teach people how to fly drones safely and how to understand the data they collect (Martini et al., 2016; Phade et al., 2023).
5. **Work Together Regionally:** Share information with neighboring countries to make sure drone use is safe and fair for everyone (Akbarzadeh & Naeni, 2025).

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**Edited with ChatGPT and QuillBot for clarity; all views expressed are solely those of the author.*

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