

DRONE WARFARE: AN EVOLUTION IN MILITARY AFFAIRS AND ITS IMPACT ON THE MALAYSIAN ARMED FORCES

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In an era where technological advancements are fundamentally transforming multiple facets of human life, it is hardly surprising that the military domain is undergoing equally significant metamorphoses. At the heart of this shift lies the increasing automation and digitization of warfare, a phenomenon that has opened new horizons for military strategy, tactical execution, and operational efficiency. Among the technologies at the forefront of this revolution is drone warfare—unmanned aerial systems that have rapidly ascended from a niche application to a central element in contemporary armed conflicts. As technology evolves, military forces worldwide face the challenge of either adapting to these changes or risking obsolescence. This dilemma holds true for the Malaysian Armed Forces, a crucial player in Southeast Asia's geopolitics, tasked with the multifaceted responsibilities of safeguarding territorial integrity, enhancing national security, and maintaining regional stability.

The purpose of this essay is twofold. Firstly, it aims to critically assess the evolution of drone warfare, encapsulating both its advantages and challenges, from increased situational awareness to ethical complexities. Secondly, this paper endeavours to scrutinize the specific impact of this technological evolution on the Malaysian Armed Forces. This investigation is pertinent for policy-makers, military strategists, and scholars interested in defence studies, especially those focused on the Southeast Asian context.

In the course of this discourse, we will delve into the historical background of drone technology, dissect its manifold applications, and expose the inherent challenges and criticisms associated with its use. Comparative studies of other nations that have successfully or

problematically integrated drones into their military arsenals will offer invaluable perspectives. These insights will, in turn, inform an in-depth exploration of the current state and future prospects of drone technology within the Malaysian Armed Forces. By weaving these intricate threads, this essay aims to offer a nuanced analysis of drone warfare's transformative influence on modern military affairs and provide a series of tailored policy recommendations that could guide the Malaysian Armed Forces in navigating this complex landscape.

In the annals of military history, few innovations have captured as much attention, elicited as much debate, or provoked as much strategic rethinking as drones, formally known as Unmanned Aerial Vehicles (UAVs) or Unmanned Aerial Systems (UAS). While the concept of unmanned flight predates modern drone technology, the origins of drones as we understand them today can be traced back to World War II. In those nascent stages, remotely piloted aircraft were primarily used for training anti-aircraft gunners which however, their potential for broader applications was not lost on military strategists.

In the 1950s and 1960s, drone technology saw incremental but significant advancements, notably in the United States, where they were utilized for high-risk reconnaissance missions over enemy territory during the Vietnam War. In these early forms, drones were little more than expendable platforms with rudimentary controls and limited data-gathering capabilities. Yet, their utility in reducing risks to human pilots was increasingly apparent. A major turning point came with the advent of satellite communications and Global Positioning System (GPS) technology in the late 20th century. These technologies facilitated real-time control and data transmission over long distances, exponentially widening the range and effectiveness of drones. The late 1990s and early 2000s saw an explosive growth in drone capabilities, as enhanced

sensors, high-definition cameras, and advanced navigation systems were integrated into these platforms.

Post-9/11, drones assumed a particularly prominent role in the United States' military strategy, used extensively in Afghanistan, Iraq, and later in counter-terrorism operations in places like Pakistan and Yemen. Their roles had expanded beyond reconnaissance and into targeted strikes, thereby significantly altering the calculus of modern warfare. Since then, drones have become a staple of armed forces around the world. Israel, with its emphasis on technology-driven warfare, China, aiming for rapid military modernization, and numerous European nations have all integrated drones into their military doctrines to varying extents. What began as a tool for surveillance and reconnaissance has evolved into a multi-faceted asset capable of performing a wide array of functions, including but not limited to logistics supply, electronic warfare, and even as swarm drones functioning in coordinated groups.

When discussing the paradigm shift that drone warfare has induced in military affairs, one must first examine the manifold advantages it offers. Unquestionably, one of the most compelling benefits is the enhanced situational awareness drones bring to the battle arena. Through the integration of high-resolution cameras, thermal imaging, and advanced sensing technologies, drones have elevated reconnaissance and intelligence gathering to unprecedented levels. This not only offers commanders a near-real-time assessment of the battlefield but also facilitates the making of more informed, data-driven decisions. The precision that drones afford is another advantage that is indispensable in modern conflict scenarios. Gone are the days where bombings necessitated significant collateral damage. Today, drones equipped with precision-guided munitions can execute surgical strikes, allowing for the neutralization of threats with minimal harm to civilians and infrastructure. This capability has proven to be

invaluable, especially in urban settings where conventional military tactics can result in high civilian casualties.

However, perhaps the most morally compelling advantage is the reduced risk to human life, at least for the operating forces. Unlike traditional manned aircraft, drones are piloted remotely, often from thousands of miles away. This physical detachment drastically diminishes the direct risks to military personnel, a factor of incalculable value. This is not merely about minimizing casualty figures but also about the broader psychological impact on soldiers and the ethical considerations that influence public opinion on military engagement.

Moreover, drones bring forth significant economic considerations. Traditionally, conducting aerial surveillance or executing air-to-ground attacks would require costly aircraft that are expensive to maintain and require highly trained pilots. In contrast, drones, especially when produced at scale, represent a cost-effective alternative. Their lower operational costs and reduced maintenance requirements make them a more economically sustainable option for military activities, thereby freeing resources for other critical defence needs.

While drone warfare has undeniably revolutionized military operations, it is not without its share of controversies and challenges that warrant critical scrutiny. One of the most heated debates revolves around ethical considerations, particularly concerning targeted killings and the so-called 'video game mentality' of drone pilots operating remotely. The impersonal nature of remote-controlled violence has led some critics to argue that drones may desensitize operators to the consequences of their actions, thus lowering the threshold for the use of force. This argument gains traction when one considers that drone strikes have, on occasions, led to civilian casualties, raising pressing questions on the moral dimensions of such warfare.

Technological dependence is another significant challenge that military organizations face. Given the intricate network of technologies that drones rely on from satellite links to ground control stations. A minor malfunction or a cybersecurity breach can render these systems vulnerable or entirely dysfunctional. The fear of drones being hacked, jammed, or intercepted poses a critical security risk that military strategists must mitigate.

Adding to the complexity is the subject of international law and sovereignty. The use of drones across borders, especially for targeted strikes in non-combat zones, raises significant legal questions. International law is still grappling with the concept of how unmanned warfare fits within existing frameworks governing the use of force and state sovereignty. This creates a potential grey area that could be exploited, intentionally or unintentionally, leading to diplomatic crises or even escalating conflicts.

Economic considerations, while generally favourable towards drone usage, have their limitations as well. High-quality, state-of-the-art drones with advanced surveillance and strike capabilities come with steep price tags. Furthermore, the rapid pace of technological advancements means that drone systems may require frequent updates or even replacements, posing potential budgetary strains over the long term. We must also address the evolving countermeasures against drone technology. As drones become more ubiquitous, so do techniques and technologies aimed at countering them. From radio frequency jammers to specialized anti-drone munitions, adversaries are continually working to level the playing field. This escalation not only negates some of the advantages that drones offer but also necessitates an ongoing investment in research and development to stay ahead of countermeasures.

While drone warfare has reshaped the military landscape by offering new levels of flexibility, precision, and safety, these benefits are counterbalanced by ethical dilemmas, technological vulnerabilities, legal ambiguities, and the constant arms race to counter these unmanned systems. These challenges and criticisms add layers of complexity that military planners, policymakers, and ethical scholars must carefully consider in the deployment and further development of drone technology.

The United States stands as a seminal case in the adoption of drone technology, particularly in the realms of surveillance and targeted killings. In the aftermath of the September 11 attacks, drone usage escalated dramatically as part of counter-terrorism efforts. However, this has also brought ethical and legal challenges to the forefront, especially with regards to civilian casualties and the issues of extrajudicial killings. The American experience demonstrates that while drones offer strategic advantages, they also require stringent oversight and ethical guidelines to mitigate against abuses and errors.

Israel provides another noteworthy example. Given the nation's geographical constraints and its focus on technology-driven warfare, Israel has become a pioneer in the development and deployment of military drones. The Israel Defence Forces have employed drones not just for intelligence gathering, but also for real-time coordination with ground troops, thereby enhancing the overall efficacy of their military operations. Yet, like the U.S., Israel has faced international scrutiny for its use of drones in conflict zones, particularly concerning issues of proportionality and discrimination in attacks.

China's approach to drone warfare underscores the technology's pivotal role in modernizing armed forces. The Chinese military has invested heavily in developing indigenous

drone technology, aiming to reduce its reliance on foreign systems. These drones are designed for a myriad of roles, from reconnaissance to payload delivery, and there's growing evidence that China is exporting this technology to other countries, thereby altering the global landscape of drone warfare. However, questions arise around the robustness and reliability of these systems, as well as the geopolitical implications of their export to nations with questionable human rights records.

European nations, particularly the United Kingdom and France, have also integrated drones into their military doctrines but tend to operate under a more constrained legal framework that places significant emphasis on compliance with international laws of armed conflict. Their usage showcases how drone warfare can be conducted within existing legal paradigms, albeit not without its share of challenges and debates, particularly around issues of accountability and transparency.

The confluence of these case studies reveals a recurring theme which is the integration of drones into military operations is fraught with complexities that extend beyond mere technological considerations. Whether it's grappling with ethical dilemmas, ensuring technological reliability, navigating the maze of international law, or dealing with economic costs, the experiences of these nations collectively serve as both a guide and a cautionary tale. Their examples underline the necessity for a nuanced, multi-dimensional approach to adopting drone technology, tailored to the unique operational, ethical, and legal landscapes that each military organization operates within.

The impact of drone warfare on the Malaysian Armed Forces cannot be overstated because it signifies a transformative shift in both strategic planning and tactical execution. At

the heart of this transformation is the amplified capability for real-time surveillance and reconnaissance, especially critical given Malaysia's complex geographical landscape of dense forests, expansive coastlines, and intricate waterways. Drones can be deployed for swift and efficient maritime surveillance to guard against illegal fishing, smuggling, and potential seaborne attacks, all of which are concerns for Malaysia's naval defence.

Likewise, in terms of land operations, drones offer an innovative solution to longstanding challenges. Border security, for instance, is a high-priority issue for Malaysia, given its shared boundaries with multiple nations. The deployment of drones for constant monitoring not only enhances the situational awareness of ground forces but also allows for quicker response times to security breaches. In a similar vein, the utility of drones in counter-insurgency operations and internal security missions cannot be overlooked. Their capacity to conduct discreet surveillance and gather actionable intelligence provides a distinct advantage in asymmetric warfare situations that the Malaysian Armed Forces might encounter.

Moreover, economic efficiency is an aspect where the Malaysian military stands to gain significantly. While Malaysia doesn't possess the extensive defence budgets of nations like the United States or China, drones offer a cost-effective means to augment capabilities. By integrating drones into their operational framework, the Malaysian Armed Forces can achieve a substantial force multiplier effect without the associated costs of large-scale human deployments or expensive manned aircraft. This economization of resources allows for a reallocation of funds towards other aspects of defence, perhaps in advanced training or infrastructure development.

However, it's essential to acknowledge the challenges that accompany these advantages, many of which are similar to the ethical and technological concerns faced globally. There are questions about rules of engagement, data security, and interoperability with existing systems, all of which require rigorous deliberation and policy-making. The Malaysian military will need to invest not just in the technology itself but also in the education and training that go hand-in-hand with ethical and effective drone use.

Given the rapid advancements in drone technology and the varied applications we've seen worldwide, the integration of drones into Malaysia's military operations is not a matter of 'if,' but 'when' and 'how.' As the Armed Forces continue to evolve their capabilities in line with the changing facets of modern warfare, drones will invariably form an integral part of Malaysia's defence ecosystem. By learning from the global community's experiences, both positive and negative, the Malaysian Armed Forces can chart a course that maximizes the advantages of drone warfare while mitigating its inherent challenges.

However, this process should be approached with both ambition and caution. The first recommendation would be a calibrated investment in drone technology that balances both surveillance and strike capabilities. Rather than pursuing high-end models that may strain budgetary resources, a focus on medium-range, multi-purpose drones could provide a balanced mix of capabilities without excessive financial burden. Given the cyber vulnerabilities associated with drone operations, it is critical to invest concurrently in cybersecurity measures. This would involve not only technological solutions but also specialized training programs for drone operators and cybersecurity personnel. Military collaborations with academic institutions specializing in cybersecurity could be a fruitful avenue for capacity building.

Equally significant is the necessity for ethical and legal frameworks to govern drone usage. Drawing on international best practices and emerging norms, a set of guidelines should be developed to ensure that drone operations align with international law and ethical considerations. These guidelines should be continually reviewed and updated to keep pace with technological advancements and shifts in international consensus. Operational training must be accorded priority. Given the technological complexity and diverse functionalities of drones, rigorous training regimes should be instituted. This should extend beyond mere piloting skills to include scenario-based training that simulates real-world operational and ethical dilemmas. Such training will equip operators with the nuanced understanding required to make split-second decisions in complex environments.

Finally, it would be prudent for Malaysia to explore multilateral partnerships for the sharing of drone technologies and operational doctrines. Given that the country is situated in a geopolitically sensitive area, regional stability and collective defence are of paramount importance. Collaborative engagements with ASEAN nations or even broader alliances can yield mutual benefits, from cost-sharing to enhanced interoperability. The adoption and adaptation of drone warfare hold significant promise for enhancing the operational effectiveness of the Malaysian Armed Forces. However, this transition must be managed judiciously, balancing technological ambitions with ethical, legal, and fiscal responsibilities. A well-considered, multipronged approach can ensure that the Malaysian Armed Forces are well-positioned to harness the full potential of this transformative technology. In the realm of military operations, the introduction of drones represents a seminal shift, altering not just the mechanics of warfare but also its ethical, legal, and strategic dimensions. The advantages are capable to enhanced situational awareness, unparalleled precision, reduced risk to human life,

and economic efficiencies. Yet, these come with their own set of challenges, ranging from ethical dilemmas to technological vulnerabilities and complex legal frameworks.

The landscape of drone warfare is not a monolith and it varies considerably across nations. As exemplified by case studies from the United States, Israel, China, and the European Union, different military doctrines have assimilated drone technologies in ways that reflect their unique geopolitical, ethical, and strategic contexts. This diverse tapestry offers valuable lessons for the Malaysian Armed Forces as they consider the adoption and adaptation of this potent technology.

To navigate this intricate landscape successfully, the Malaysian Armed Forces would benefit from a comprehensive approach that melds technological acquisition with ethical governance, cybersecurity measures, specialized training, and multilateral partnerships. The fusion of these elements can form a robust policy framework that maximizes the advantages of drone warfare while mitigating its inherent risks and challenges.

In a world increasingly characterized by rapid technological advancements and shifting paradigms, the importance of adaptive and forward-thinking military strategies cannot be overstated. Drones, in this context, are not merely tools of war but they are harbingers of a new era of military affairs as one that demands critical engagement, thoughtful policy-making, and a balanced understanding of both its potential and its pitfalls. By adopting drone technology it will reverberate far into the future, shaping not just military capabilities but also the ethical and strategic contours of Malaysia's defence posture for years to come.

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