



How to Train a Drone Warrior, with Lessons from Ukraine

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By Michael Raska

SYNOPSIS

The rapidly changing drone warfare in Ukraine shows that military innovation spreads not by top-down directives but through networks of creative practitioners adapting in real time. Diffusion of tactical creativity with iterative learning, experimentation, and rapid adoption amplifies military effectiveness. For advanced militaries, including the Singapore Armed Forces, the challenge is institutionalising these (un)military innovation pathways and sustaining strategic and operational innovation across all services.

COMMENTARY

Singapore's Defence Minister Chan Chun Sing recently announced that from July 2025, every recruit entering Basic Military Training (BMT) will learn to operate drones and counter drone threats.

It seems that lessons drawn from the ongoing war in Ukraine are being taken on board, as it has shown how drones are redefining the direction and character of modern warfare.

But the same war has also revealed a deeper, more fundamental strategic challenge for advanced militaries, including the Singapore Armed Forces (SAF): the critical need to cultivate creativity. Ukraine's drone units have their own "league table". Russia has learnt to hit back on an industrial scale. What can Singapore learn from this?

While training every SAF soldier to fly or counter drones is undeniably valuable, that alone will not be the game-changer. Instead, SAF will need to nurture drone units that are capable of sustained tactical and operational innovation.

The Ukraine war is showing that it's not just the technology, but how creatively it is used, that shapes outcomes on the battlefield. Initially, drones were viewed merely as tactical support tools, enhancing traditional reconnaissance and artillery functions. Yet Ukrainian soldiers gradually discovered drones' immense potential to offset Russia's superiority in manpower, armour, and artillery through precision, agility, and innovation.

Small, agile drone units like the renowned Nemesis Regiment and Magyar's Birds, officially known as the 412th and 414th Separate Regiment of Strike Unmanned Aerial Systems, have fundamentally reshaped tactical engagements, transforming frontline operations into iterations of constant experimentation and adaptation.

These units deliberately recruit younger personnel, tech-savvy individuals, gamers, civilian technologists, and software developers, who naturally challenge conventional thinking and rapidly design, adapt, and repurpose commercial technologies for combat scenarios.

They do not simply operate drones as instructed; they continually reconfigure drone payloads, modify software systems in real-time, and adjust tactics daily based on frontline realities.

Over the course of more than 11,000 sorties, for example, the Nemesis Regiment has reportedly destroyed over 1,000 targets and damaged 5,500 more, including over 2,000 artillery systems and approximately 105 tanks.

Meanwhile, Magyar's Birds have evolved from a small recon team to a brigade focused on attack drones, signals intelligence, and electronic warfare under commander Robert "Magyar" Brovdi. They have implemented low-cost, high-impact tactics, using fibre-optic FPV (first-person view) drones to both strike and intercept enemy systems.

Brovdi, once a grain trader, now commands less than two per cent of Ukraine's forces but accounts for over one-third of confirmed Russian casualties in recent months. His units employ diverse modular drones, fibre-optic links, AI-based targeting, and even a military logistics platform jokingly nicknamed "Amazon for the Front", delivering spare parts and batteries within hours.

For these innovative drone units, every mission becomes a tactical experiment generating immediate insights and operational adjustments. Success is tracked via a performance-based "drone league table", with the best teams getting priority access to supplies. The culture is competitive, data-driven, and ruthlessly effective.

Russia, by contrast, initially struggled to counter Ukraine's agile, creative drone tactics. Over time, however, Moscow adapted, though differently.

Under programmes like the Ushkuynik, a volunteer-run technology accelerator that produced "KVN", Russia's first fibre-optic drone, Russia began to deploy drones at industrial scales, saturating battlefields and logistical hubs far behind Ukrainian lines.

Immune to conventional electronic countermeasures, these fibre-optic drones transformed rear areas into lethal zones. Yet Russia's adaptation relies primarily on mass production and scale rather than frontline creativity.

Units Behaving Like Startups

This stark contrast between Ukraine's operational creativity and Russia's reliance on industrial scale underscores a critical strategic insight for small states such as Singapore. Singapore will not fight future wars by mimicking either approach wholesale. It lacks Ukraine's wartime improvisational character, and it cannot match Russia's industrial scale.

However, Singapore's strategic edge must be built on developing a flexible and responsive force structure and, more importantly, a strategic culture that allows for the continuous generation and application of creative operational concepts, while encouraging adaptive thinking at all levels of the SAF.

What does creative strategic culture look like in practice for the SAF?

It means going beyond teaching recruits how to fly drones. It requires developing specialised drone units structured more like high-performance startups than traditional line infantry. These units must be empowered to iterate quickly, on hardware, software, and tactics. Think of them as "innovation battalions" with engineers, software developers, and ISR specialists working side-by-side with combat operators.

Arguably, a "creative" operational mindset is already embedded in the SAF's elite formations, such as the 7th Singapore Infantry Brigade (7 SIB) and the 3rd Battalion, Singapore Guards (3 GDS). These units are trained to operate in uncertain and fluid environments, exercise decentralised decision-making, and adapt effectively in ambiguous, high-risk situations.

They already embody the key traits the SAF must now scale across all services: initiative, autonomy, adaptability, and tolerance for calculated risk – precisely the traits demanded in an era of dynamic, drone-saturated battlefields.

But to stay ahead, this creative mindset must now be embedded throughout the SAF, not just confined to elite units and the Special Forces.

In the Singapore Army, for example, operational creativity means empowering regular infantry and armoured units to innovate at the tactical edge. Platoons should be equipped not only with off-the-shelf drones, but also modular sensor kits, jamming tools, and on-the-fly mission planning software. A forward-thinking Army could create "tactical innovation units", tasked with rapidly testing, modifying, and deploying drone-enabled tactics in real time.

The recently established Drone Acceleration and Rapid Equipping (DARE) group within the SAF may reflect a step in this direction, serving as a catalyst for fast-tracking commercial drone technologies from concepts to operational use.

In the Republic of Singapore Navy (RSN), creativity translates into reimagining sea

control – deploying autonomous surface vessels (ASVs) and unmanned underwater vehicles (UUVs) not merely as reconnaissance tools, but as active participants in potentially contested zones. The key is to view drones not as tools to augment existing naval doctrine, but as drivers of entirely new operational concepts.

Similarly, for the Republic of Singapore Air Force (RSAF), operational creativity must push the boundaries of traditional air superiority. Beyond using drones for intelligence, surveillance, and reconnaissance, and strike support, the RSAF could explore using swarms of drones for active electronic warfare, spoofing targeting systems, or masking strike aircraft. In this vision, drones are not an adjunct to fighter jets, but force multipliers in their own terms.

Even more critically, the SAF's newest service, the Digital and Intelligence Service (DIS), must become a strategic driver of military creativity.

SAF and Transformation

DIS operates at the intersection of cyberspace, signals intelligence, and cognitive warfare. It is uniquely positioned to fuse real-time drone feeds, cyber operations, AI analytics, and countering hostile disinformation campaigns.

But doing so creatively demands more than technical expertise. DIS must evolve into a fusion hub that brings together not just coders and engineers, but diverse expertise from psychologists, sociologists, anthropologists, red-teamers, and behavioural strategists, individuals capable of understanding and shaping how adversaries perceive, react, and make decisions under stress.

Operational creativity here means designing deception operations, cognitive overload attacks, and AI-driven simulations to anticipate enemy moves and disrupt their decision cycles before conflict even erupts.

Across all SAF branches, therefore, fostering operational creativity requires new mindsets and new mechanisms. This includes concepts such as cross-functional experimentation teams, tactical innovation labs, open competitions between units, rotations between military and civilian tech sectors, and a leadership culture that encourages bottom-up feedback and experimentation.

Such an SAF won't emerge from existing pathways. Instead, it will require a culture of shared experimentation, rapid iteration, and intellectual diversity.

To enable such a culture, three pillars must underpin the SAF's transformation. First, its leadership must be willing to absorb risk, empowering subordinates to innovate, experiment with AI, and explore unconventional options. This requires changing professional military education, creating incentive structures for bottom-up innovation, and normalising "safe-to-fail" experimentation.

Second, Singapore must build stronger bridges between the SAF, local start-ups, research universities, and global tech firms. The goal is not to outsource innovation but to foster co-creation, where military users shape requirements dynamically and developers adapt in real-time.

Third, Singapore's defence ecosystem must be willing to invest in high-risk, high-reward technologies and explore their full range of operational pathways. In particular, the SAF and the Defence Science and Technology Agency (DSTA) should expand "sandbox" innovation environments where frontline units can prototype and field-test solutions at speed, while streamlining and revising existing "Ops-Tech" integration processes to shorten the path from concept to capability.

Successful models elsewhere, such as the Cyber Defence Unit of the Estonian Defence League, reflect how fast innovation loops can be implemented.

Critically, these changes are not just about preparing and fighting future wars; they are about shaping the character of the SAF as an organisation. In a world where adversaries can deploy thousands of autonomous drones or manipulate public perception through information warfare, military power will no longer rest solely on firepower or platforms. It will rest on how fast a force can think, adapt, and act.

Minister Chan's announcement on drone training is a timely and necessary step. But it must serve as a catalyst for deeper reforms that enable a sustained innovation culture both at operational and strategic levels. Otherwise, the SAF risks preparing for the wars of the past while assuming it is ready for the battles of the future.

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