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Cover image: A CH-47 Chinook hovers over the water off Townsville, Queensland, as Australian Army soldiers from the 2nd Battalion, The Royal Australian Regiment and the 5th Aviation Regiment conduct helo-casting activities during Exercise Black Cutlass 2023. Source: Defence Image Gallery.

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/ FOREWORD

James (Billy) Kidd

The pace of change has never been this fast, yet it will never be this slow again.

Justin Trudeau, Davos address, World Economic Forum 2018

The interaction between the enduring nature of war—a fundamentally violent clash of human wills—and the changing character of warfare has rarely been more pronounced. The convergence of pervasive sensor networks, autonomous systems and long-range strike capabilities (including the use of hypersonic, ballistic and cruise missiles) has transformed the contemporary battlefield. The time between detection and action shortens every day and, as a consequence, dispersal and protection have become essential tactical actions once again. Strategic depth has also taken on new meaning, as has the security of both internal and external lines of supply. Persistent contestation of the electromagnetic spectrum means that operating in denied, degraded, intermittent and limited communications environments is becoming the norm. Surviving and succeeding on this battlefield requires military organisations to pivot, and to pivot quickly.

Rigorous academic debate is an essential element of any military pivot. Far from being a detached intellectual exercise, academic debate can—and must—influence and inform military learning and adaptation. It guards against doctrinal complacency, challenges bureaucratic processes and anchors the theoretical scaffolding necessary for new military concepts. The Australian Army Research Centre is responsible for fostering this debate within the Australian Army. This journal, the *Australian Army Journal*, is one of many important contributions that it produces.

Command, Decision-Making and Decision Advantage

The papers collected in this issue of the *Australian Army Journal* reflect an Army that is actively grappling with the interaction between the enduring nature of war and the changing character of warfare. One key theme that emerges from many of the papers is the ongoing examination of command, decision-making and decision advantage on the contemporary battlefield. Charles Miller's analysis of mission command in the littoral environment challenges the trend towards decentralisation, arguing instead for a more contextual and adaptive approach to command, control and decision-making. This opens avenues for

further inquiry as to how decision advantage might be achieved through more resilient command-and-control systems that are capable of operating under conditions of disruption. Similarly, a number of contributors engage with the military use (or lack thereof) of AI-enabled decision support tools. For example, Ned Dobos et al. posit that militaries might be under-utilising these tools and suggest that humans might be less influenced by AI-enabled inputs than is often suggested. Together, these contributions underscore one of the key challenges arising from the interaction between the enduring nature of war and the changing character of warfare: how militaries reconcile the relationships between AI-enabled decision-making and trust, ethics and human judgement.

Adaptation and Asymmetry

A second key theme that emerges in this issue is the imperative to adapt quickly—and often—in response to the accelerating pace of change in the character of warfare. Adaptability across all military echelons is not a passive development but a deliberate action that requires emphasis and investment, particularly in the context of robotic and autonomous systems and other emerging technologies. This proposition draws on observations from the Russo-Ukraine War and other contemporaneous conflicts that battlefield and strategic advantage arises from rapid learning, tactical innovation and the integration of emerging technologies with defence industries, at scale. At the conceptual level, Robert Bruce's critique of 'asymmetry' proposes a corrective to prevailing thinking in many militaries. While many aspire to so-called asymmetric approaches, Bruce cautions against the use of such terms and concepts as a rhetorical shorthand or shortcut. Instead, he reminds us of the need for disciplined, problem-oriented thinking.

The Human Dimension

Underscoring the enduring nature of war, a number of contributors argue that the human remains the decisive actor on the battlefield. Contributions on military virtue, ethical decision-making and command judgement collectively posit that character, professional identity and moral responsibility remain central to combat effectiveness and the profession of arms. The 2025 Keogh Visiting Chair, Professor Risa Brooks, makes a particularly important contribution on this theme. She provides a comprehensive examination of civil–military relations as a foundational element of democratic military effectiveness. She frames this as a set of mutual obligations between the public, civil leaders and the military and highlights how robust civilian–military dialogue, candid military advice, informed public engagement and a professional ethic grounded in humility, strategic literacy and self-accountability can safeguard strong civil–military relations. It is an important contribution to the discussion in Australia.

Three Contributions from the British Army

Finally, the Australian Army Research Centre is pleased to publish three outstanding papers from Major Charlie Kenzie, Major Charles Bevan and Major Georgina Edwards, all students at the UK Intermediate Command and Staff Course (Land). These papers reflect on the British Army's readiness for large-scale combat operations, provide a framework for developing confidence in command, and question the utility (or not) of the operational level of war. Each paper reinforces the utility of armies in war. In the spirit of healthy debate and the contest of ideas, an Australian response has been paired with each paper. We thank the British Army and each of the contributors for their permission to publish these papers in the *Australian Army Journal*.

Acknowledgements

This edition of the *Australian Army Journal* is a testament to the state of the profession of arms in Australia at present. I extend my thanks and gratitude to all contributing authors for their scholarship, intellectual courage, and willingness to engage in rigorous debate. This edition—like all those before it—is underwritten by the stewardship of our Editorial Advisory Board. Through its careful oversight, rigorous review processes and high editorial standards, the Board ensures that the *Australian Army Journal* remains a trusted and credible military publication. I thank the Board and its members for their continued service and commitment to military scholarship within the Australian Army.

'A Call to Arms'

I trust that you enjoy each of the contributions in this issue of the *Australian Army Journal*. I encourage you to engage with the arguments presented. None represents the 'last word' on its subject. Instead, they are waypoints. The strength of our profession lies not in consensus but in our willingness to reflect, question, learn and adapt. The value of the *Australian Army Journal* will always depend on the contributions of military professionals (of all ranks), scholars and other partners. Should that inspire you to share your own ideas, insights or experiences, please [contact the AARC team](#) to discuss how you might become a contributor.

Brigadier James (Billy) Kidd

Director General Future Land Warfare

/ DO AI-ENABLED DECISION-SUPPORT SYSTEMS IMPROVE ETHICAL CHOICES ON THE BATTLEFIELD?

Ned Dobos, Christine Boshuijzen-van Burken,
Deane-Peter Baker, Milad Ghasrihouzani,
Erandi Hene Kankanamge, Twan Huybers,
Oleksandra Molloy, Jo Plested, Abhi Veda

Introduction

Artificial intelligence (AI) software systems can process and interpret large and often complex data through previously learned (or sometimes live-learning) pattern-finding, inferencing and prediction algorithms. If AI-enabled decision-support tools were to be integrated into military operations—for example, if an AI-based object detection and classification tool were integrated with a camera feed and could quickly bring weapons, camouflage or military vehicles to a soldier's attention—would this have positive ethical consequences or negative ones? Military ethicists are divided on the answer to this question.

According to more optimistic narratives, AI-enabled technologies such as object classification and detection tools will not only make our armed forces more effective in battle; they will also reduce unintended civilian casualties and could mitigate the various other mistakes that regularly occur in the fog of war, where there is limited information and even more limited time available to reach decisions.¹ According to more pessimistic narratives, on the other hand, the introduction of these technologies is liable to open up a 'responsibility gap' that undermines the average soldier's exercise of moral self-restraint. The pessimists are concerned that the more armed forces personnel can 'blame' their technological aides when things go awry, the less incentive they will have, and the less care they will take, to make sure that things do not go awry.² There is also longer-term

disquiet about so-called ‘moral deskilling’, as pointed out by Shannon Vallor.³ The worry here is that, to the extent that AI-enabled decision-support systems relieve armed forces personnel of the burdens of ethical decision-making under pressure, the *capacity* of these personnel for such decision-making will become atrophied over time.⁴ Once the human in a human–machine environment does become morally deskilled in some such way, what will become of them outside this narrow setting, in contexts where they do not have the luxury of being paired up with a machine that helps them reason and act morally?

Notice that both the optimists and the pessimists share a common assumption: that once AI-enabled decision-support tools are made available to armed forces personnel, those personnel will actually pay attention to, and give consideration to, the inputs of those tools. For the pessimists, the adverse consequences of this will exceed the benefits, while for the optimists, the pros outweigh the cons. Neither side entertains the possibility that these technologies will have little or no discernible effect in either direction; both assume potentially significant consequences. Our research suggests that that this starting assumption warrants closer scrutiny.

The experiments described in this article yielded an interesting—and somewhat surprising—result, one that supports neither the optimistic nor the pessimistic narratives recounted above. What our research suggests is that, at least under certain circumstances, the integration of AI-enabled decision-support tools might have neither positive nor negative effects, simply because the human decision-makers using these systems will not give their inputs any significant weight in their deliberations. In our experiments, the human decision-makers seemed to be confident enough in their own direct sense perception that the introduction of AI-generated inputs made no detectable difference to their decision-making, for the better or for the worse.

This of course does not mean that these technologies will not have any observable effect—positive or negative—when actually integrated into real-world battlefield decision-making. That would be too hasty a conclusion to reach. Rather, it suggests that more research is needed to determine *when* a human who works closely with an AI-based decision-support system will actually give credence to the data generated by that tool, and when they will not. The default assumption among most researchers in this space is that this data will always be given some consideration by the human agents exposed to it, but our findings suggest that this may not necessarily be the case. Unlike previous research, which attempted to measure the effects of AI on moral decision-making through surveys alone, our project exposed participants to realistic simulations in which moral decisions were required, and monitored the actual choices and behaviours of these participants.⁵ Modern military personnel are faced with a plethora of ethical choices in the course of their duties but, for the sake of simplicity, our experiments focused exclusively on the application of lethal force, presenting participants with a simplified ‘shoot / no-shoot’ predicament.

Section 1: The Optimistic Story

In a description of the emerging combat environment, David Kilcullen contends:

[It] is likely to include a wider range of actors with access to a more capable array of high-end lethal technologies. These may be ‘onboard’ capabilities embedded within combat elements or carried at unit or formation level within a force, or distributed capabilities that combat actors can access through collaborative engagement techniques, dispersed operations or access to artificial intelligence capabilities, allowing them to reach back for remotely held support. In the case of state actors, this is likely to translate into increased levels of precision, lethality and manoeuvrability down to the small-team level (sections, combat pairs or even enhanced individuals). In the case of non-state actors, it will be manifested in individuals and small teams deploying levels of lethality that were previously restricted to large groups or government organisations.⁶

Kilcullen clearly depicts the impact of AI and related technologies as a double-edged sword in the sense that it has the potential to enhance the capabilities of both sides in any conflict. The above passage is nonetheless an example of what we call the ‘optimistic story’ about the military employment of AI—that is to say, those who take this view see AI as a means to making military capabilities more effective. Advantage over adversaries in AI capability is seen as equating to military advantage in a number of critical areas. The Australian Defence Force (ADF) Concept for Robotic and Autonomous Systems makes a similar point.⁷ Vladimir Putin stated about AI in the context of geopolitical strategy in 2017 that ‘whoever becomes the leader in this sphere will become the ruler of the world’.⁸ Friend and foe alike have high expectations of military AI and agree that the strategic potential of AI is immense.

On a tactical and technical level relevant to our project, it is often argued that AI in military systems will significantly enhance decision-making processes. For example, Ian Langford writes that ‘AI now enables ... militaries ... to make more accurate decisions via predictions, classifications and clustering’.⁹ Through the narrower scope of military targeting, this improved decision-making is seen as resulting in further improvements in precision. And while precision is not distinction in the sense required by the laws of armed conflict and international humanitarian law (IHL), it is an obvious enabler for those seeking to abide by this fundamental norm of the *jus in bello*. Distinguishing between combatants and non-combatants in the conduct of war is morally expected and legally obliged.

In addition to enhancing the quality of military decision-making processes, the optimistic story also emphasises the potential for AI to vastly increase the speed with which those decisions are made. Ian Reynolds notes, ‘AI-enabled technologies are promoted as the path towards attaining the required speed to compete and win on modern battlefields’,

following the mantra that ‘faster war is better war’.¹⁰ Being able to effectively handle the increased pace of war increases the likelihood that combatants will maintain the ability to conduct strikes, operations and campaigns within the bounds of IHL and the ethics of war.

Beyond better and faster decision-making, optimists expect AI to lead to increased effectiveness across the military enterprise. By augmenting the capabilities of human soldiers and optimising the use of resources, AI will work as a force multiplier.¹¹ While the link here to ethics is not immediately obvious, it becomes clear when we take seriously the fact that soldiers are far more likely to conduct themselves appropriately when they are deployed with the appropriate support and capabilities. (Consider, by contrast, what happened when under-resourced and poorly equipped Dutch soldiers faced the responsibility to protect vulnerable civilians at Srebrenica.)¹² Also worth mentioning, though not of direct relevance to our project, is an optimistic story around the use of AI-enabled autonomous robotic systems to relieve human soldiers of the most ‘dirty, dull and dangerous’ battlefield tasks.¹³

Section 2: The Pessimistic Story

The use of AI-powered decision-support systems in warfare raises significant ethical concerns, particularly the risk of over-reliance.¹⁴ This occurs when human operators place unfettered trust in these systems, accepting their outputs and following their recommendations without sufficient scrutiny—even when these conflict with the operator’s own judgement, critical thinking or situational awareness. For instance, a commander might follow an AI-generated targeting suggestion without confirming its consistency with the rules of engagement or mission objectives. This is especially troubling because errors in data, sensor inaccuracies or algorithmic biases can lead these systems to make errors, such as misidentifying illegitimate targets as legitimate ones.

There are several reasons why humans might place undue trust in AI systems, but one of the most prominent is *automation bias*.¹⁵ Coined in social psychology, this term captures our tendency to overvalue the judgements of computerised systems simply because they appear objective, precise and technologically advanced. We often assume these tools are smarter or more reliable than they really are. But at its core, automation bias may stem from a deeper cognitive shortcut. The human brain is frequently described as a *cognitive miser*—wired to conserve energy by simplifying complex decisions whenever possible.¹⁶ AI decision-support tools play right into this instinct, offering ready-made answers and relieving us of the burden of deliberation. In light of this, some would say that over-reliance on AI decision-support tools is not just predictable but practically inevitable.

In its most severe form, automation bias can reduce human operators to passive spectators—mere extensions of the technology they are supposed to supervise. Rather than critically engaging with AI outputs, they may become reluctant to question them, defaulting to a stance of deference. This dynamic gives rise to two distinct types of errors. *Commission errors* occur when individuals blindly follow system recommendations and disregard conflicting evidence, even that which comes from their own observations. *Omission errors*, on the other hand, arise when a system fails to prompt an action and the human, having become too dependent on automated cues, fails to respond at all. Both error types reveal how over-trust in automation can quietly erode human judgement.¹⁷

Another factor fuelling over-reliance on AI systems is what some refer to as *moral buffering*—a psychological strategy, often unconscious, that helps individuals sidestep feelings of guilt or shame when making difficult decisions.¹⁸ When a human operator acts on personal judgement, they may feel confident in their choice at the time. But if the outcome is disastrous, the emotional consequences—regret, remorse or even moral distress—can be hard to escape. By contrast, when the decision is outsourced to a machine, accountability feels more dispersed. The burden of responsibility can be shared with the system itself or with the wider chain of command that authorised its use. In this way, deferring to automation offers a kind of emotional insulation—a way to avoid the sting of personal blame or the deeper psychological toll that moral failure can inflict. Unfortunately, this can lead users to prioritise self-protection over sound judgement, choosing the path of least moral resistance even when it undermines mission effectiveness and inflates the danger of blind reliance on AI.

Over-reliance on technology can lead military practitioners to make flawed decisions and to produce harmful—or at least sub-optimal—outcomes, but that is not all. If these individuals *repeatedly* outsource their decision-making to AI-enabled systems, there is also a danger that they will lose the very capacity for moral reflection, agency and complex decision-making over time. From this point forward, the individuals will have no choice but to rely on the technology, since their capacity for independent ethical judgement will have become severely compromised. This is the danger of so-called ‘moral deskilling’.¹⁹

In line with an Aristotelian view on ethics, many scholars agree that ethical decision-making is a skill that requires practice. One must be able to recognise all the ethically salient features of a situation, weigh them up and deliberate on them carefully, integrate them into a well-justified all-things-considered judgement on the right thing to do, and conform one’s actions to that judgement. Just as muscles atrophy if they are not used, there is reason to believe that this skill will be gradually eroded in those deprived of the opportunity to exercise it regularly. Habits of reliance on systems that allow an individual to bypass, expedite or oversimplify these processes can dull a person’s sensitivity to

ethical complexities. If a military practitioner does not have the opportunity to use their intellectual and affective capacities for nuanced and sophisticated moral reasoning, the danger is that these capabilities will most likely be lost over time.

Moral deskilling is a serious concern because no matter how advanced AI systems become, they will never be capable of resolving every ethical dilemma faced in military life. Sooner or later, service members, whether in command positions or on the ground, will encounter situations where automated tools offer no guidance—or worse, provide direction that is at odds with prevailing ethical standards. These challenges will not be confined to the battlefield either. After leaving the military, veterans will continue to face morally complex decisions in civilian roles, in leadership, or simply in navigating their everyday lives. If we condition personnel to rely too heavily on automated systems, we risk deadening their ethical reflexes—the internal compass that enables them to think critically, wrestle with uncertainty and make hard decisions under pressure.

This erosion of moral capacity is not just a theoretical problem; it has real-world consequences. A force that loses its moral confidence becomes more brittle, less adaptable and more prone to failure when faced with the unpredictable. Equally troubling, individuals who have not developed or maintained their moral reasoning skills may find themselves more vulnerable to ethical disengagement, both during service and in their civilian transitions. If we want members of the ADF to emerge from their military careers with their moral capacities intact—and ready to act with integrity in whatever comes next—we must take seriously the long-term risks posed by moral deskilling. Ethical preparedness must be cultivated rather than automated.

These are just some of the dangers fuelling pessimistic narratives regarding the integration of AI-enabled decision-support systems in battle. To be fair, these narratives do not necessarily deny the potential advantages of these systems, but they do tend to regard the risks and costs associated with these systems as being greater than those advantages.

Section 3: Experiment Design²⁰

Both optimists and pessimists, despite their opposing views, start from the same basic premise: that military personnel will actively engage with and seriously consider the guidance provided by AI-powered decision-support systems when making moral decisions. Pessimists argue that this reliance will lead to more harm than good, whereas optimists believe it will enhance outcomes. But notably, neither camp considers the possibility that these tools might have minimal or negligible or even no impact at all. They each presume that the consequences—whether positive or negative—will be substantial. Our experimental research indicates that this foundational belief deserves more careful examination.

In order to understand the potential of vision AI to influence decisions, our experimental design followed the structure of a behavioural choice modelling experiment. Using volunteer role players, we filmed a set of realistic military threat scenarios that participants would later observe on a computer screen while controlling a crosshair with a mouse, representing a remote weapons system. We systematically manipulated several independent variables in the video clip series. The participants were instructed to decide whether and when to 'shoot' at the perceived originator of a threat, which was done simply by moving the crosshair and left-clicking. The mouse click was recorded by us, so we captured what was in the crosshair on the screen when participants clicked the mouse.

In some of the conditions, the footage being viewed was unaltered (see Figure 1), while in other conditions, labels mimicking vision-AI software were overlayed on the screen (see Figure 2). These labels annotated the objects that were 'recognised' by the AI software. Further, some of the labels were correct—that is, they contained accurate information—while other labels were incorrect. Vision AI takes the form of an object detection and classification tool. Put simply: the software puts a box around an item that it detects on the screen and—provided that the item exists in the AI system's library—classifies it into a category—for example, 'building' or 'vehicle'. It then adds a corresponding label adjacent to the object on the screen. Athena AI is a leading example, and our altered clips were intended to mimic those that Athena AI might generate.²¹

We created two distinct sets of video clips (Clip Series 1 and Clip Series 2). Each series included 12 different variations, or scenarios, resulting in a total of 24 scenarios. Clip Series 1 featured a person of unknown affiliation or intention emerging from a cabin and approaching an insider—that is, a dismounted member of a military reconnaissance mission. The three variable features of this person were outfit (civilian or military), item held (a rifle or a camera), and AI overlay (correct labels, incorrect labels or no labels). These combinations produced 12 unique scenarios. Clip Series 2 followed the same general theme: a person of unknown affiliation or intention enters the frame and walks past an insider or 'friendly'. Here, the three varying features were gender (male or female), item held (phone or gun), and AI overlay (correct labels, incorrect labels, or no labels).



Figure 1: Screenshot of unaltered video clip (without labels)



Figure 2: Screenshot of video clip with labels

In each scenario, there was presumed to be an ethically 'correct' decision. For the purposes of our experiment, the ethically correct decision was always equated with the decision that IHL would require in the circumstances and that conformed to the provided rules of engagement (participants were explicitly informed of the key requirement in this regard, which was 'positive identification for hostile intent'). In some cases, shooting was the 'correct' decision (e.g., the unknown person posed a genuine threat), while in others the correct decision was to refrain from shooting (i.e., there was no genuine threat). Our aim was to measure what influence, if any, the labels mimicking those generated by vision AI software such as Athena AI would have on participants' decision-making. Would these labels increase or decrease the likelihood of the 'correct' decision being made, where the scenarios presented were otherwise identical and all confounding variables were controlled?

Study participants (n=81) were military cadets / trainee officers at the Australian Defence Force Academy from all services. First-year students were excluded from participating. Most students were in their third year. Most of the participants identified as male, reflecting the gender distribution of the broader cohort from which they were recruited. Almost half of the participants had completed an undergraduate University of New South Wales course in military ethics. The participants were familiar with shooting scenarios from their training and exercises. The Departments of Defence and Veterans' Affairs Human Research Ethics Committee approved the research (# 474-22).

Each participant was shown 12 different video clips based on an orthogonal design (some clips featured labels; others did not).²² At the start of the experiment, participants were briefed about the scenarios and their role in them:

- You are a *gunner at a remote weapon system*, and you are protecting dismounted personnel who are on a reconnaissance mission. Your colleagues appear on the screen near the *tank in the foreground on the right*.
- Your role is to *provide cover fire for your colleagues*. You are seated in a protected shelter 500 metres from the checkpoint. You have a camera, screen, and a *remote control (mouse)* with fire buttons to control the gun.
- The area of the reconnaissance mission is known to be *hostile*, with civilians carrying weapons. This does not identify an enemy threat force. *Civilians and armed warriors* from opposing forces operate in the area simultaneously.
- Your order for opening fire is a *positive identification of hostile intent*. The *Red Card* is shown during the experiment.²³
- There are two different *settings* in the clips; each setting has 6 different '*scenarios*' that are *independent* and (slightly) *different* in terms of:
 - The presence/absence of AI *labels* (which can be *correct or incorrect*);
 - The *words* in the AI labels;
 - The actions and/or appearance of the *other* person emerging in the clips.

- Your *decision* in each of the 12 clips (of around 20 seconds):
 - You *shoot* the person emerging (and the clip finishes at that point); OR
 - You *do not shoot* the person (and the clip finishes by itself).
- After each of the 12 clips:
 - Please answer *two short questions* presented, then
 - Move to the *next* scenario.

Section 4: Results

In some of the scenarios, the condition of ‘positive identification for hostile intent’ was satisfied; for example, an unidentified person approaches with a rifle and takes aim at friendly forces. In other scenarios, this condition was not satisfied: an unidentified person approaches but they are holding a phone or a camera rather than a weapon. In the former set of scenarios, ‘shoot’ is classified as the correct decision (consistent with IHL and the rules of engagement), while in the latter set of scenarios, ‘no shoot’ is the correct decision (shooting would violate the rules of engagement and/or IHL).

The clips differed in a number of important respects. We varied the clarity and resolution of the video footage, the genders and ages of the role players, the attire that they wore, etc. Several of these variables had some bearing on whether the correct decision was made.

However, our results indicate that the AI-mimicking labels appearing on the screen made *no statistically significant difference by themselves* (see Table 1). The results in Table 1 are presented in the standard modelling format commonly used in discrete choice analyses. The values shown are parameter estimates for each of the variables, with standard errors reported in parentheses. Levels of statistical significance (i.e., $p < .05$, $p < .01$, $p < .001$) are indicated by asterisks. The results show a significant effect of the device carried by the emergent figure in Clip Series 1, in both the lower and higher resolution settings. The highly significant parameter of -1.72 for the variable ‘Device’ shows that switching from the rifle to the camera reduces the likelihood of a correct decision. In Clip Series 2, the device was significant in the lower resolution setting, while gender was significant in both settings. By contrast, AI labelling was not significant in any of the models. When other variables were controlled for, the presence (or lack thereof) and accuracy of labels did not affect the likelihood of a correct decision being reached by the participant.

Table 1: Model estimation results

Clip series	Variable	Higher resolution	Lower resolution
Clip Series 1	Intercept	0.84 (0.17)***	-0.14 (0.21)
	Device (-1: Rifle, 1: Camera)	-1.72 (0.18)***	-1.67 (0.22)***
	Clothing (-1: Military clothing, 1: Civilian clothing)	-0.27* (0.15)	0.02 (0.21)
	AI labelling (-1: Incorrect, 1: Correct)	0.00 (0.21)	0.14 (0.3)
	AI labelling (-1: Incorrect, 1: No label)	0.14 (0.21)	-0.55 (0.31)
	R2	0.36	0.37
Clip Series 2	Intercept	2.98 (0.28)***	2.94 (0.44)***
	Device (-1: Gun, 1: Phone)	-0.29 (0.25)	-1.06 (0.39)**
	Gender (-1: Female, 1: Male)	0.55 (0.27)*	0.82 (0.34)**
	AI labelling (-1: Incorrect, 1: Correct)	0.44 (0.39)	-0.27 (0.4)
	AI labelling (-1: Incorrect, 1: No label)	-0.15 (0.34)	0.29 (0.43)
	R2	0.05	0.17

***, ** and * represent significance at .001, .01 and .05 levels, respectively

Section 5: Discussion and Future Directions

Our results indicate that, at least in the kinds of simplified battlefield scenarios presented to our participants, AI-generated labels intended to mitigate the ‘fog of war’ and support decision-making may not have the kinds of effects—either positive or negative—that have often been anticipated in discussions surrounding the military application of vision AI.

Contrary to both optimistic expectations and pessimistic warnings, the inclusion of these labels had no real impact on participants’ decision-making in our controlled settings.

Whether participants were shown raw video footage or video enhanced with labels mimicking those that an AI system might generate (e.g., identifying individuals as armed or unarmed), their decisions on whether or not to ‘shoot’ remained largely unchanged. Across all conditions, participants appeared to rely primarily on their own direct sense perception when assessing the visual information, suggesting that the presence of AI-generated overlays had negligible influence on their ethical and tactical judgements.

Why might this be the case? One potential explanation lies in the instructions provided to participants at the start of the experiment. Participants were informed that the AI-generated labels could be inaccurate or misleading. This disclosure may have fostered a level of scepticism or distrust that led participants to discount the information contained in the labels entirely, choosing instead to rely solely on their own visual perceptions of the scenario. Since participants were led to believe that the AI assistance would not be 100 per cent reliable, it is reasonable to suppose that some of them chose to err on the side of caution and ignore the labels entirely.

However, the distrust induced by our mention of AI fallibility at the beginning of the experiment may not be the whole explanation. There may be deeper psychological or cognitive reasons for the non-effect of the AI labels.

For instance, humans often privilege direct sense perception—what they see and interpret for themselves—over mediated or second-hand information, especially in high-stakes or ethically charged situations. *Familiarity bias* is the tendency for people to prefer processes and tools that they know well over those that are new and foreign, even if the unfamiliar option is consciously acknowledged to be equally or more effective and accurate.²⁴ Thus, when a person is given information seemingly generated by a cutting-edge technology whose design and programming are opaque, that person may choose to ignore the technology and to continue relying on their own senses simply because they have relied on their senses every day throughout their lives and built up a strong, often unconscious and unexamined trust in them. This suggestion is congruent with existing literature regarding humans trusting their own judgements and having confidence in them.²⁵ In our experiments, it is possible that even though the participants trusted that the AI labels were probably accurate, they simply felt comparatively *more* comfortable relying on their own judgement when visual cues were available.

This insight has important implications for the integration of AI systems into military decision-making environments. While much has been written about the dangers of over-reliance on AI—such as blind trust in automated systems leading to potentially unethical or dangerous outcomes—our findings suggest that under-reliance on or even active disregard of AI input may also be a real and persistent phenomenon. This points to a more nuanced reality: human decision-makers may not always be as easily swayed by AI input as some proponents or critics assume.

Of course, none of this is intended to suggest that vision AI and similar technologies will *never* influence decisions, or that they are without value in combat or high-pressure environments. Rather, our findings challenge the assumption that such tools will always shape ethical decisions, for better or for worse. Instead, the impact of vision AI may depend heavily on context, user trust, training, and the perceived reliability of both of the technology and of the sensory environment in which decisions are being made. Future research should explore these dynamics in greater detail, particularly in more complex and stressful combat simulations where the correct ethical decision is not as obvious as it was in the scenarios that we presented.

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We acknowledge that the Red Cross is a protected symbol, and a flag bearing this symbol may only be formally handed out by the ICRC. We did not have access to a formal Red Cross flag, and hence we created our own version for the sole purpose of experimentation with military AI software.

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/ MILITARY VIRTUE IN PRACTICE: EMBEDDING VIRTUE ETHICS INTO THE ARMY PROFESSION

Benjamin Gray

The margin between success and failure in future conflict will not be found in platforms or tactics alone; character and intellect will be an important part of preparing soldiers for war. In September 2024, the Chief of Army (CA), Lieutenant General Simon Stuart, responded directly to this imperative, directing a comprehensive review of the Army profession across the institutional pillars of jurisdiction, expertise and self-regulation.¹ This guidance directs that the Army must reoccupy its intellectual space, renew its professional body of knowledge, and inculcate a virtue ethic fit for the rigours of contemporary war. It requires recalibrating the Army's professional identity, renewing its ethical foundations and cultivating the ability to thrive in uncertainty, while also emphasising command accountability and institutional trust. In many ways, this requires a reimagining of the Army profession itself—one that places virtue, judgement, and moral courage at the centre of warfighting capability.

The CA's guidance calls for an institutional, not operational, review of the Army profession, focusing on identity, knowledge and ethical culture. Immediate priorities include command accountability, renewal of professional knowledge, and embedding a virtue ethic suited to contemporary war. This paper demonstrates how virtue ethics strengthens the Army across its three pillars: jurisdiction, expertise and self-regulation. Jurisdiction is reinforced by cultivating civic virtue and moral responsibility; by ensuring soldiers see themselves as national servants, not just warfighters; and by deepening legitimacy and public trust. Expertise is enhanced by embedding practical wisdom into planning and decision-making, fostering adaptive thinking and ethical acuity so professional knowledge is applied with discernment. Most critically, self-regulation is fortified through habituation of character via example, repetition and mentorship, safeguarding against moral drift and institutional failure. Virtue ethics empowers soldiers to act rightly under pressure and hold themselves accountable. It does not merely support the profession; it animates it, providing the ethical architecture to endure the rigours of modern war and flourish as a trusted institution in an era of complexity and competition.

Virtue Ethics

Virtue ethics is a character-based ethical framework that offers a coherent and practical approach to navigating the moral and intellectual friction of battle. Rooted in the philosophy of Aristotle, virtue ethics does not prescribe rules or outcomes but instead focuses on cultivating excellence of character through deliberate practice, repetition and reflection.² As a theory, it recommends that individuals pursue a meaningful life by developing virtuous habits, enabling them to act rightly in complex and uncertain situations. In contrast to rule-based or consequence-based models, virtue ethics emphasises the development of moral and intellectual attributes that guide behaviour instinctively and contextually.

Virtue ethics is the oldest ethical theory in Western philosophy and was prominent in various forms in the ancient period (500 BCE to 500 CE).³ While there are several variants of virtue ethics, the dominant strand is primarily based on Aristotle's *Nicomachean Ethics*. This approach focuses on character, believing that an individual can only flourish by cultivating virtues.⁴ Three foundational concepts underpin this framework: excellence of character (arete—pursuit of excellence in thought, word and deed), practical wisdom (phronesis—good judgement and discernment, balancing competing demands and adapting to friction) and flourishing (eudaimonia—professional and personal fulfilment attained when one lives in accordance with virtue over the course of a life). Together, these concepts can form an ethical and character architecture that enables soldiers to thrive in the chaos of combat and to endure the moral burdens of war.

Virtue ethics, as an approach, focuses on living a life of moral character through the cultivation of virtuous habits. Individuals acquire virtue through deliberate practice and habituation, enabling sound judgement in complex situations. Once established, these habits become integral to character, guiding choices intuitively.⁵ Virtue ethics stresses repetition, reflection, and traits such as courage, temperance and patience. Unlike rule-based theories, it prioritises practical wisdom and moral growth, requiring examples, coaching and experience to apply virtues effectively. Its goal is fulfilment grounded in wisdom and the pursuit of character excellence.⁶ The importance of virtues can be emphasised in two ways. First, character attributes are crucial for an individual to appreciate the ethical demands of a given situation. Second, having identified the ethical aspects, these character traits might deliver the stimulus for action. By this process, virtues enable a more discerning and prudent function than by the mechanisms of deontology⁷ or consequentialist⁸ calculation. Virtue ethics permits individuals to consider consequences and obligations via a method that resolves the intrinsic tension between them.⁹ Virtues are intended to provide a practical, contextual solution (not through slavish application or mechanical drills). Some individuals will be more courageous than others, some more patient or generous. Virtue ethics is dynamic and based on understanding

circumstances, not just obeying principles or an effect calculus; it is the possession and application of practical wisdom.¹⁰ In the military context, virtue ethics provides a foundation for ethical decision-making that is both resilient and adaptive. It aligns with the doctrinal concept of *fighting power*,¹¹ synthesising physical, moral and intellectual components at both the individual and institutional levels. Soldiers can cultivate character attributes that equip them to confront the dilemmas of battle, exercise restraint, and act with courage and integrity. Significantly, virtue ethics does not merely guide action; it shapes identity. It can enable soldiers to flourish as professionals, to pursue mastery and to serve as exemplars within their teams and communities. In this way, virtue ethics animates, offering a pathway to excellence in the Army profession.

The Army Profession—Framework and Foundations

The Army profession in Australia has, since pre-Federation, evolved through conflict, reform and restructuring. The establishment of the Royal Military College in 1911 marked the shift into professionalisation, providing the initial framework for a standing Army. However, it was upon the formation of the Australian Regular Army in 1947 that the Army profession was formalised as a modern construct. This profession is defined by three pillars: jurisdiction, expertise and self-regulation. *Jurisdiction* articulates the Army's unique role in society, the provision of a service that civilian institutions cannot replicate. *Expertise* reflects the cultivation and maintenance of a distinctive and continuously refined body of professional knowledge. *Self-regulation* is the Army's capacity to uphold its own standards and hold itself accountable through ethical and professional principles.¹² The pillars form the architecture of institutional trust and operational legitimacy and are the keys to professional mastery. This is not simply a technical issue; it is also ethical, cognitive and cultural, demanding continuous discourse and agility of thought.¹³ These pillars are interdependent; together they safeguard integrity, animate professional identity and ensure the Army thrives amid uncertainty and complexity.

Character and ethics form the cornerstone of a professional military identity, fortifying professional character and guarding against a drift into moral deviancy. War's harsh realities leave lasting moral burdens. Cultivating virtue is essential, not only to guide conduct but to protect soldiers from emotions that erode judgement and integrity. Through deliberate practice, ethical habits foster resilience and informed decision-making, enabling soldiers to balance risk, apply appropriate force, and thrive in challenging environments. Habituated practical judgement fosters equilibrium between recklessness and excessive caution, embedding intellectual and moral reasoning into professional identity.¹⁴ This foundation ensures soldiers act decisively under pressure while upholding the values that sustain trust in the Army profession. However, this process is not incidental; it requires institutional commitment. From the outset, individuals

must be incentivised to develop suitable character attributes, a toolkit for judgement and behaviour, and then mentored on how to navigate friction and pursue excellence.¹⁵ The objective is to create an environment where character development is inseparable from tactical proficiency. This will ensure that soldiers are not only technically competent but ethically grounded—capable of acting decisively under pressure while upholding the values that sustain trust in the profession of arms.

Virtue ethics promotes high personal standards and ethical decision-making by cultivating virtues until they become instinctive. Future battles will present complex moral and cognitive challenges that will render rigid frameworks like consequentialism or deontology ineffective in chaotic environments.¹⁶ Soldiers must develop attributes that enable them to make intuitive judgements and avoid paralysis in fast-moving, ambiguous environments. Virtue ethics offers flexibility by focusing on character rather than prescriptive rules, binding individual and institutional identity through leadership, mentoring and culture. Habituation, reinforced by example and coaching, ensures that virtues such as courage, temperance and integrity guide action under pressure. Immersion in virtuous practice can create resilience and sound judgement, improving outcomes for individuals and units and increasing the likelihood of mission success.¹⁷ This approach transforms ethics from compliance into lived identity, equipping soldiers with the skills and attributes to act decisively and ethically in battle.¹⁸ It is essential to understand that there is no single school of virtue ethics theory. Instead, it is a family of theories that comprises multiple perspectives, including those of Aristotle, medieval interpretations such as those of Thomas Aquinas, and more recent ones such as those of Alasdair MacIntyre and Nancy Sherman, among many others.¹⁹ Today, there is significant debate concerning which virtues should be considered morally praiseworthy. However, most theorists agree that fundamental virtues serve as a unifying link that connects various interpretations to the domain of virtue ethics. In *The Republic*, Plato described his four cardinal virtues: wisdom, justice, fortitude and temperance.²⁰ *Nicomachean Ethics* defines Aristotle's virtues in detail, with much of this permeating into modern thought on the application of virtue.²¹ Virtue theory has been embedded in historical works. It heavily influenced Roman philosophy²² and was later incorporated into Christian theological concepts by religious scholars.²³ The tradition of virtue was prevalent in intellectual and scientific life throughout the 16th, 17th and 18th centuries, with elements reflected in works and objectives ranging from those of Machiavelli to those of the founding fathers of the United States. However, the tradition of virtue diminished as consequentialism and deontology expanded in the modern era.

The modern revival of virtue theory can loosely be traced to the 1958 essay 'Modern Moral Philosophy' by Elizabeth Anscombe, which re-energised virtue ethics in Western academia.²⁴ Subsequently, Michael Stocker detailed various criticisms of deontological and consequentialist approaches in 'The Schizophrenia of Modern Ethical Theories',

published in 1976,²⁵ as did Philippa Foot in her 1978 essay collection *Virtues and Vices*.²⁶ Significant momentum was generated by Alasdair MacIntyre in 1981 with the publication of *After Virtue*,²⁷ which sought to contextualise and apply virtue to modern problems. Equally, Rosalind Hursthouse continued the revival in 1999 with *On Virtue Ethics*,²⁸ where she provided an explanation of and argument for contemporary virtue ethics. However, in its raw form, virtue ethics has early origins with Socrates and was later developed by Plato and refined/codified by Aristotle. The central vein is that in virtue ethics, morality is generated by an individual's character instead of being an echo of their actions (or the consequences thereof). Virtue ethics cultivates character through habituation, enabling intuitive ethical judgement in the friction of battle where rules fail. Importantly, it can bind individual and institutional identity, ensuring soldiers act rightly under pressure.

Jurisdiction and the Army in Society

Virtue ethics places ethical responsibility at the core of identity, providing a practical framework for soldiers to reconcile their role as warfighters with obligations to society. The Army's legitimacy is earned through disciplined conduct, ethical restraint, and a shared sense of purpose. When virtue ethics is embedded in the Army profession, character development aligns both military doctrine and community values, reinforcing trust and accountability. Aristotle emphasised that virtue is shaped within a community and requires deliberate practice. Soldiers must routinely demonstrate ethical conduct, guided by habits that cultivate integrity, courage and judgement. This approach can transform ethics from abstract theory into permanent behaviours, ensuring the Army remains a trusted institution capable of operating ethically under pressure. This strongly complements almost all military cultures, and in the Army context, it aligns exceptionally well with the values of accountability and excellence.²⁹ A great strength of virtue ethics lies in its ability to link individual character to institutional character. This connection is reinforced through coaching, mentoring, and daily opportunities for practical application.³⁰ Soldiers are not merely trained to follow rules but are habituated to act with integrity, courage and restraint. These virtues are not only tactical assets but also ensure that the Army remains a trusted institution, capable of operating ethically in battle and accountable to the Australian people.

Crucially, virtue ethics also implies that by living according to ethical standards, individuals experience greater satisfaction or nourishment.³¹ Virtue ethics reinforces the Army's societal role by shaping soldiers as ethical agents, not just combatants. It cultivates virtue and responsibility, sustaining professional identity and public trust. Through habituation and mentorship, soldiers develop character traits that enable them to make ethical decisions intuitively. Maintaining high standards ensures actions reflect integrity and judgement, allowing the soldiers to act decisively under pressure while

upholding the values that define the Army profession.³² To pivot back to the Army's connection and accountability to society, virtue and moral responsibility within the military profession are best cultivated through a dual approach: institutionally guided frameworks; and practitioner-led examples, coaching and mentorship. Commanders, senior leaders and battalions/regiments provide the ethical scaffolding that expresses shared values, responsibilities and expectations. These frameworks can be used to promote character traits such as integrity, courage, humility and accountability as essential to soldiering. However, character attributes are not instilled by doctrine. They are built by emulating and learning from practitioners, commanders, mentors and peers who model ethical behaviour in daily practice. This practitioner-led approach ensures that virtue is not abstract but lived, shaped by example, coaching and reflection in the context of military service. Within a battalion, regiment, battery, company or squadron, virtue involves acting with the common good in mind, exercising judgement under pressure, and maintaining discipline and honour in complex operational environments. When individuals internalise virtues through habit and community engagement, they become resilient and thoughtful contributors to the profession of arms. This approach strengthens unit cohesion, fosters trust, and guards against moral drift and ethical failure. By linking personal character to collective responsibility, it makes virtue a foundation for ethical soldiering and enduring operational effectiveness.

Military service entails more than tactical skill; it requires ethical clarity, virtue, and moral responsibility. The Army should aspire to reflect national values not only in strategy but in conduct. Virtue ethics provides the framework for achieving this by cultivating character through habituation, mentorship and example rather than imposing external codes. This alignment strengthens legitimacy and trust and facilitates the integration of ethical reasoning and responsibility into a professional identity. Soldiers become ethical agents accountable to each other, the Army profession and the nation they serve. Authority is earned through behaviour, not rhetoric, and virtue ethics harmonises institutional conduct with societal expectations, making it indispensable to the preservation of the Army profession.

Virtue ethics also offers a coherent and culturally resonant framework through which the Army can shape public perception and reinforce trust. In the era of growing strategic competition and scrutiny, the Army's legitimacy is no longer derived solely from its operational effectiveness; it must be earned through ethical conduct, virtue, and moral responsibility. The Army profession lives within the outcomes of civil–military relations, and its jurisdiction must be defined not by internal assertion but through a shared understanding. By cultivating excellence of character and embedding practical wisdom into everyday conduct, soldiers aspire to become exemplars of the profession. This is foundational, not just performative. When soldiers act with restraint, humility, and moral clarity, they reinforce the Army's identity as a trusted institution. Public trust is not

sustained by rhetoric; it is sustained by behaviour. This additionally enables the Army to communicate its purpose in human terms. It reframes soldiering not as a vocation of violence but as a profession of disciplined service with expertise in war. In doing so, it bridges the gap between military identity and societal expectation. It allows the Army to speak with moral authority, not just tactical credibility. In an age of resurgent competition, this is a necessity.

Virtue ethics can also serve as a critical bridge between the identity of the soldier and the society they serve. In the context of the Army profession, this is more than symbolic. Soldiers are not isolated actors; they are members of a national institution entrusted with the ethical application of force. Their conduct, character and judgement must reflect both the internal standards of the profession and the moral expectations of the broader community. Virtue ethics enables this alignment by cultivating excellence of character, shaped by military doctrine and the realities of the battlespace, and informed by Australian values and cultural norms. Broader social and cultural perspectives significantly influence individual character development, and linking community norms and the Army is crucial for sustaining legitimacy and trust. By embedding virtue ethics into training, education, and leadership development, the Army can develop soldiers who are not only tactically proficient but ethically attuned. This includes integrating virtue into ab initio training, scenario design, and instructional practice, ensuring that soldiers internalise the virtues expected of them as both professionals and citizens. As a result, virtue ethics can become a mechanism for harmonising the Army's moral landscape with that of the society it defends. This approach reinforces the Army's jurisdiction by clarifying its role as a disciplined, ethical institution and strengthens public trust by demonstrating that soldiers are guided by good character.

Expertise and Intellectual Foundations

The CA has made it clear that the Army's professional body of knowledge and its adaptive systems are critical components that require immediate attention, aimed at reoccupying its intellectual space and reasserting expertise in land warfare. This is not an academic indulgence; as the war in Ukraine has demonstrated, conflict is a contest of adaptation, and the Army must assess whether its current systems (doctrine, education and innovation) are fit for purpose. Intellectual renewal is central to the Army's strengthening of its professional knowledge foundations, not only through doctrinal refinement but also through the cultivation of intellectual agility and ethical reasoning.³³ The CA's vision is clear: the Army must become more, not less, professionalised. Soldiers must be prepared to think critically, adapt quickly, and lead effectively in complex situations. This is not simply about knowledge; it is about wisdom, judgement, and the ethical application of expertise in war.

The functions of virtue ethics provide a robust framework for intellectual and ethical development by embedding reasoning into the character of the soldier through deliberate practice, reflection, and experience. Unlike rule-based or consequence-driven models, virtue ethics does not rely on external prescriptions; it cultivates internal dispositions that guide behaviour instinctively and contextually.³⁴ Intellectual virtues are acquired through instruction, learning and coached experience, while ethical virtues are developed through habituation and repetition. Together, these form a unified architecture that can enable soldiers to act with integrity and stamina under pressure. This character-based approach is particularly suited to the tactical realities of the future battlefield, where decisions must be made in ambiguity, time scarcity, and emotional intensity. Virtue ethics equips individuals with practical wisdom, enabling them to apply judgement in context, balance competing demands, and adapt ethically to friction. Virtue ethics is an ultimately practical ethical theory that considers perspectives and viewpoints on approaching the world, absorbing experience, and executing a whole-of-life learning journey.³⁵ It also fosters excellence of character and professional nourishment through purposeful action, reinforcing the Army's intellectual and moral components of fighting power. The CA's guidance on the Army profession reinforces this need for intellectual renewal and ethical resilience, calling specifically for the inculcation of a virtue ethic to prepare soldiers for the moral rigours of contemporary war.

Practical wisdom serves as a critical tool for adaptive thinking and tactical judgement in the contemporary battlespace. In combat, decisions are rarely made in ideal conditions, and soldiers and commanders must respond to unforeseen complexities. Decisions cannot rely solely on rules or procedures; they must be informed by intuitive, contextual judgement. Soldiers must be equipped to assess situations dynamically, balancing risk, mission objectives, and ethical considerations.³⁶ This cultivated disposition can enable soldiers to act with clarity and restraint under pressure. When paired with experience and technical knowledge, wisdom supports tactical mastery by guiding decisions that are both effective and ethically sound.³⁷ The tempo of battle, particularly when it occurs as a sequence of close engagements, does not permit commanders extensive time to ruminate on problems or to cycle through a full appreciation and orders process. In these situations, many ethical and intellectual decisions must be informed by intuitive, practical judgement.

However, in some ways, the Army's current approach to ethics and character education is insufficient to meet the demands of future war. Repetitive modules, compliance-driven briefings, and generic inclusions have diluted the ethical development of soldiers. Virtue ethics offers a more coherent and personally relevant alternative, prioritising character-based learning, mentorship, and situational reinforcement over procedural compliance. To cultivate ethical resilience, the Army must shift from static instruction to self-motivated, lived experience. Generic ethics modules embedded across courses should

be consolidated into a single learning experience early in a soldier's career. This should be reinforced through leadership, not revisited through redundant PowerPoint slides or directed inclusions delivered by specialists. Ethics and character must be embedded into the profession, not appended to it. The emphasis must move from classroom theory to coaching and mentorship. Junior leaders must be empowered to guide soldiers through real-world dilemmas during exercises, operations and planning cycles. Ethical reasoning should be part of after-action reviews, mission rehearsals, and decision-making discussions, not isolated lectures. Practitioner-led scenario-based learning and discussions must replace static briefings. Soldiers should engage with dilemmas drawn from combat, humanitarian operations, and coalition environments. Live, virtual and constructive simulation should be used to explore consequences, ambiguity and ethical friction. Ethics must be reinforced continuously, not episodically. Commanders should lead values-based conversations during training and operations, linking ethical conduct to mission success and effectiveness. Micro-learning could support this model, delivering short, interactive updates on emerging ethical challenges without disrupting unit tempo. Coupled with this should be an aggressive shift from module completion to observed behaviour, with ethical competence and character development tracked through coaching reports and performance reviews, not attendance sheets or lessons delivered.

Critically, military character and ethics must be defined as professional, rather than being influenced by religion, spirituality or cultural relativism. It must be grounded in law, rules of engagement, and Army values, not spiritual doctrine. Chaplain-led ethics sessions should be transitioned to sessions led by trained instructors and leadership mentors, with priority given to junior leaders providing coaching and mentoring. A secular ethics curriculum, rooted in Defence policy, doctrine and international humanitarian law, must become the standard. A secular ethics curriculum enables consistency, clarity and inclusivity. It ensures that all members of the profession, regardless of belief, are trained to the same standard of ethical competence. It removes ambiguity, avoids conflation with personal faith, and reinforces the Army's identity as a disciplined, accountable institution. In doing so, it strengthens the moral component of fighting power and prepares soldiers to act with integrity in the complexity of future conflict. Ethics must be taught as a professional skill, not a spiritual belief. The battlefield demands it. This approach removes duplication, builds ethical resilience through lived experience, and reinforces the Army profession through leadership influence and coaching. It prepares soldiers not just to know what is right but to act rightly, under pressure, in war.

Virtue ethics enhances fighting power and battle readiness by embedding character-based learning into the intellectual and moral foundations of the Army profession. Fighting power, as defined in Army doctrine, integrates physical, moral and intellectual components to generate warfighting capability.³⁸ Virtue ethics can provide a coherent framework for developing these components in tandem. In the *Nicomachean Ethics*,³⁹

Aristotle, the progenitor of virtue ethics, provides concepts that complement fighting power, particularly the moral and intellectual components. Fighting power is the ‘way in which the Army generates its capacity, through the integration of the physical, moral and intellectual components at both the individual and organisational level’.⁴⁰ The intellectual component addresses knowledge of warfare and cognition; the moral component supports culture, values and legitimacy; and the physical component specifies the Army’s capabilities and functions. This is intended to be a unifying concept to harmonise intellect, ethics, will and means. The physical component is simple, focusing on the functions and means of fighting, and is broken down into the elements of combat, combat support, combat service support, and command support. The intellectual and moral components are more complex as they involve the integration of individuals and groups, fighting culture, will and morale. The framework of virtue ethics, already divided into intellectual and moral virtues, nests exceptionally well into the intellect and moral components.⁴¹ The Army’s concept of mission command and its approaches to the moral/ethical problems of modern combat have not changed significantly since adopting residual ‘AirLand Battle’ concepts from the United States in the 1980s.⁴² This envisioned fast-paced combat across a linear battlefield and simultaneously over the full dimensions of the area of operations. However, the AirLand Battle was designed for a fighting organisation of the scale and depth of the US Army in combination with the US Air Force, which is inappropriate for the small, less mechanised, and relatively shallow Australian Army. It took several decades to mature the warfighting philosophy and embed the concepts of manoeuvre theory, mission command, and combined arms teams in a way suitable to the Army’s scale and culture; during this time, the character of the conflict the Army was committed to changed several times. Unbridled application of Boyd’s OODA loop⁴³ is the aim and the necessity for the future. Still, the force must be empowered to do so to achieve decision superiority as an offset to the adversary’s attritionist mass (which has historically been the aim of Australian manoeuvre theory). The fleeting opportunities, culminating points, gaps in adversary formations, and momentary breaks in courage or morale are the locations in time and space where battles are won and lost. This being the case, slavish adherence to doctrine and linear procedures are likely to result in cognitive overload, culmination, and constrained thinking/adaptation.⁴⁴ When people face sequential, cumulative or simultaneous intellectual dilemmas, there is a high probability of decision paralysis—fracturing the decision cycle and losing fleeting opportunities to exploit adversary vulnerabilities.

All concepts of warfighting are intended to overcome the unknown and ambiguous factors of battle friction.⁴⁵ In *Organic Design for Command and Control*, John Boyd stated that ‘friction is generated and magnified by menace, ambiguity, deception, rapidity, uncertainty, mistrust’.⁴⁶ Conceptually, manoeuvre theory is a ‘habit of thinking about the purpose of engagements, battles, campaigns’ and how to understand, adapt to and exploit ‘all those little things that go wrong when an army tries to move or fight’.⁴⁷

Manoeuvre theory, like virtue ethics, approaches the pursuit of success by seeking balance, accepting friction and ambiguity, and framing success in terms of time and understanding rather than by position and method alone.⁴⁸ Additionally, manoeuvre theory avoids rigid, slavish patterns, recipes and formulas. Unfortunately, while the Army wants to fight in a manoeuvrist style, it has consistently veered towards attritionist methods.⁴⁹ As William Lind stated in his *Manoeuvre Warfare Handbook*, a 'slugging match against someone much stronger than yourself is never very promising. Even if you win, the cost is usually high'.⁵⁰ Also, current trends are edging towards progressively more violent engagements that are more devastating. The combination of costly battles, exhausted forces, and increased tempo and firepower results in a corresponding increase in demoralisation and combat fatigue.⁵¹ This in turn increases the likelihood of mistakes, ethical transgressions, and errors in planning, command and judgement.

At the tactical level, where battles and engagements are executed, the environment is defined in *ADF-P-0 Military Ethics* as 'volatile, uncertain, chaotic and ambiguous', where 'fear, fatigue, stress, injuries or grief are added' and heightened.⁵² Ethical and intellectual habits can be cultivated, calibrated and employed to balance risk (individual, team and mission), determine the appropriate level of violence to respond to adversary action, and understand and thrive in battle.⁵³ Cultivating and habituating practical judgement will undoubtedly generate the 'mean' between imprudent risk and excessive caution, a mental process that hard-wires intellectual and moral reasoning into a soldier's professional identity.⁵⁴ From the outset, the collective and the individual must be equipped with appropriate character attributes and a toolkit for judgement and conduct, and then coached throughout their service life on how to navigate friction and pursue excellence sequentially. The practical reality is that deeply embedded individual and institutional attributes are often more critical than legal restrictions; legalities are repeatedly observed only as long as others respect them or if they are enforced by the collective and valued by the institution.⁵⁵ The primary aim, regardless of function (commander, planner or individual combatant), is to embed character traits and skills within the Army profession that prioritise recognising and executing the appropriate course of action. This is particularly important when practical judgement is required in circumstances where specific rules do not provide clear guidance. In this moment of friction or ambiguity, individuals must leverage their professional character, cultivated dispositions, and the attributes the Army profession has fostered and habituated within them.⁵⁶ In *Beyond Compliance*, the 2011 report on ADF personal conduct, Craig Orme described this type of behaviour as the 'extreme levels of strength of individual character required to generate and sustain extra-ethical virtuous behaviour under conditions of high moral intensity'.⁵⁷ Character-based learning, grounded in the Army profession, equips soldiers to make rapid, ethically sound decisions under pressure. Rather than relying on rigid procedures, this fosters intuitive judgement through habituation. Soldiers learn to act rightly not by memorising rules but by emulating virtuous behaviour, practising ethical decision-

making, and internalising the standards of the profession. This process enhances tactical agility, supports initiative and reinforces disciplined restraint, qualities central to mission command and manoeuvre theory.

Self-Regulation and Ethical Conduct

The review of the Army profession identifies command accountability, the inculcation of a virtue ethic, and the renewal of risk culture as critical components of institutional reform. These elements form the backbone of the Army's capacity for self-regulation—potentially the most challenging and consequential pillar of the profession. Command accountability is not simply a policy; rather, it is an obligation and a professional duty. Additionally, the CA's review highlighted the need for assessing systems, professional practice, and institutional culture to ensure they are fit for purpose in an era of expanding risk. Risk is the currency of battle, and the Army must instil a mindset that embraces risk as a necessary component of combat decision-making. Virtue ethics is highly compatible with aggressive initiative, the exploitation of opportunities, judgement, and rapid decision-making. It places a significant emphasis on individual judgements, assessments and actions. During combat, there is a need to reduce disruption as much as possible to pursue 'spur-of-the-moment choice'.⁵⁸ Reducing deliberative preparation and instead, stressing that actions flow spontaneously from character and judgement can assist this.⁵⁹ It is critical that, in the quest for ethical compliance, this is not disrupted by a process that requires individuals to navigate a complex ethical analysis framework; the point is to expedite individual and collective decision-making cycles and aid in achieving temporal dominance.⁶⁰ As identified by the soldier, journalist and historian SLA Marshall in his work *Men Against Fire*, it is 'plasticity of mind' that is the desirable cognitive disposition in a commander;⁶¹ a tactical commander must be able to creatively and flexibly emplace and manoeuvre forces to accomplish tasks and to make prudent judgements and rapid decisions under pressure. Rapid planning, rapid adaptation, and aggressive execution are essential, and command in this environment is not an exact science with blueprints or formulas that can be applied to each situation. Ultimately, commanders will apply virtues relevant to the tactical circumstances that instinctively guide their actions and deeds, without going through multiple steps of a decision-making process.

Command is defined as 'the authority which a commander in the military service lawfully exercises over subordinates by virtue of rank or assignment'.⁶² This also includes authority and responsibility for planning the employment of, organising, directing, coordinating and controlling forces elements, as well as responsibility for individual soldiers.⁶³ Commanders bear responsibility for assigning soldiers to missions that may or will result in their death, as an accepted fact. An example of this is a deception operation that results in casualties but no tangible benefit beyond misdirection or

cognitive manipulation of the enemy.⁶⁴ There are multiple uncertainties and operational risks inherent in battle,⁶⁵ and the weight of carrying the deaths of soldiers resulting from directions and judgements made is part of the ongoing burden of command. Commanders carry this across all elements of preparation for and execution of battle, as well as in their responsibility for training and discipline, orders and conduct, and the methods and means of combat execution.⁶⁶ Critically, because of command decisions, judgements and orders, soldiers willingly risk life and limb to perform their duties. This is a 'grave moral responsibility', and while it has been a long time since officers were expected to lead their soldiers towards the enemy boldly, there is still the need to impose restraint, sacrifice, and clarity of purpose so that lives are not expended or taken needlessly or immorally.⁶⁷ Command is the fusion point of procedural science and tactical execution; the balancing of risk and pre-battle decisions for which the consequences cannot be seen and are only assumed. At this point, the fusion of ethics and intellect occurs. It enables a commander to make a balanced and wise decision about the employment of forces, informed by the environment, aggression, and judgement of human potential.⁶⁸

The Army's ethical resilience depends on lived leadership, not policy alone. Command accountability, character development, and mentorship are essential in an era of complexity and moral risk. Accountability is more than oversight; it is ethical leadership, requiring commanders to take ownership of their decisions and the climate they create. Failures such as misconduct or atrocity stem from leadership lapses, not anomalies. Embedding character development reinforces this imperative. Soldiers guided by virtue ethics pursue excellence as an intrinsic goal, shaped by mentorship and example. Observing and emulating leaders of integrity, courage and wisdom transforms ethics from mere compliance into an active professional identity. In the Army, where teamwork and mastery are incentivised, the institution is well suited to on-board character-based learning. This is the primary means by which ethical standards are transferred, reinforced and sustained. It is not a passive exchange; it is an active, lived relationship. Leaders must coach juniors through real-world dilemmas, guide them in ethical reasoning, and demonstrate the Army profession through their own actions. This is how character is built—not in lectures but in moments of decision and human connection.

Virtue ethics safeguards against moral drift and ethical blindness by cultivating a deeply embedded framework of character, judgement and ethical awareness that persists even under the pressures of combat. Soldiers are vulnerable to ethical erosion not because they lack training but because repeated exposure to violence, emotional fatigue, and institutional processes can suppress ethical considerations until they fall below the threshold of detection.⁶⁹ In such environments, individuals may act in ways that violate moral standards without being aware of it, a form of ethical blindness. A future risk is that as battle is gradually conducted more by technology, we might fall prey to disconnecting moral considerations from tactical employment.⁷⁰ Furthermore, individuals can suffer from ethical blindness in the battlespace; otherwise good people can find themselves

transgressing without even realising it.⁷¹ Clinical research on selective attention suggests that people tend to perceive what they expect to see and often fall prey to target fixation or immediate objectives, failing to acknowledge ethical issues even when they are glaringly apparent.⁷² However, when soldiers are ethically attuned to complexity and ethical friction, this can assist them in approaching dilemmas, killing and battle, and prevent them from becoming ethically anaesthetised by their situation. Nancy Sherman identifies that for soldiers 'guilt is often a testament to a sense of moral accountability in the use of lethal force'.⁷³ The sense of responsibility can also keep morality at the forefront and ensure that it remains in consideration despite the corrosive nature of war. She observes that this feeling of personal accountability and responsibility can often be sanitised or 'squeezed out' in large military forces.⁷⁴ Virtue ethics counters this by habituating excellence of character through deliberate practice and reflection. It equips soldiers to discern ethical dimensions even in chaotic or ambiguous situations. This ethical acuity is not procedural; it is instinctive, and soldiers of good character are more likely to resist emotional calcification, moral disengagement and the corrosive effects of prolonged exposure to combat stress. By embedding this into the profession, the Army can reinforce ethical acuity and ensure that moral reasoning remains active and visible. In doing so, it can transform ethical conduct from a compliance requirement into an organisational characteristic, safeguarding the profession against the slow erosion of standards that history has shown to be both real and consequential.

Critically, it is highly probable that in the future, tactical force elements and command and control (C2) nodes will be physically distributed across the battlespace by choice and necessity, with terrain and threat dictating this distribution. The Russia–Ukraine War has revealed that electromagnetic signature management is vital and that command post constructs of past decades cannot survive in modern battles.⁷⁵ Linked to this is that teams of various sizes will be tasked and employed with significant independence, freedom and distance. Rapid decision-making (ethical and intellectual) in complexity and danger will be required, necessitating the empowerment of lower levels of command with less experience and skills. The distributed force elements will crew platforms and command systems at the tactical level that may have a strategic impact. While they will not necessarily hold the authority for engagement, they will be required to be responsive to release effects. Authorities, delegations and responsibilities will form an evolving mosaic rather than a simple vertical chain of command.⁷⁶ Commanders, junior leaders, and teams must make independent, rapid assessments of tactical and moral problems without assistance from higher HQs or command elements. They will need to accept substantially more responsibility and accountability due to the physical and intellectual demands of an extended battlefield.⁷⁷ Geographic and cultural factors, such as terrain, national boundaries, ethnic tensions, cultural optimisation, and revolution, as well as globalism, will all congest and complicate how the Army is expected to fight. The interpretation of customary battlespace norms is likely to evolve more quickly than legal statutes and other laws.

Existing and Alternative Approaches

The ADF's doctrinal approach to ethical decisionmaking, as distilled in *ADFP0 Military Ethics*, seeks to blend elements of natural law theory, the 'just war' tradition, deontology, consequentialism, Defence values, and virtue ethics into a single, universal framework. Yet this fusion produces an approach that is conceptually diluted, internally inconsistent, and poorly suited to the realities of tactical decisionmaking.⁷⁸ *ADFP0 Military Ethics* presents ethical analysis as a linear, procedural sequence (checking legality, intention, values alignment, and reflection), but this imitates staff planning rather than the immediacy of combat, where time is scarce, information is incomplete, and decisions require intuitive rather than formulaic reasoning. Its conceptual base is also unstable: natural law theory is minimally explained and inappropriately conflated with the just war tradition, while consequentialist elements appear implicitly in processes the doctrine shuns. The result is an awkward merger that is at dissonance with existing doctrinal procedures and requires steps already completed elsewhere in the planning process, creating unnecessary duplication. Most critically, the framework fails to provide practical means for soldiers to apply ethical judgement in environments defined by chaos and friction. It is heavy on theory, light on practicality, and lacking any mechanism for habituation, coaching, or practitioner-led development—the very elements required to prepare soldiers for ethical action under pressure.

The most common alternatives to virtue ethics are consequentialism and deontology. Both offer distinct strengths and vulnerabilities when applied to military decisionmaking. Consequentialism initially appears sensible because it centres on achieving the best outcome and mirrors aspects of military planning—assessing effects, estimating outcomes and weighing benefit. However, its weakness lies in the impracticality of accurately predicting consequences in chaotic environments. As a result, consequentialist reasoning is vulnerable to overextension, fixation, and the justification of harmful actions for a perceived greater good. Deontology, by contrast, offers simplicity through duty, rules and obligations. Its simplicity transfers neatly into hierarchical military structures and externally imposed constraints such as the law of armed combat and the rules of engagement. Yet this strength is also its liability. In combat, rigid adherence can lead to obstinacy and decision paralysis, or enable individuals to abandon responsibility under the justification of 'just following orders'. Both frameworks struggle when applied in tempo, friction and distributed C2: consequentialism collapses under the weight of unknowable outcomes, while deontology fails to adapt to rapidly shifting conditions where rules cannot account for context or nuance.⁷⁹ Importantly, both consequentialism and deontology remain appropriate and necessary frameworks for consideration within the Army's ethical landscape. Both are embedded in ADF doctrine, planning processes, and professional military education, and both align closely with core elements of the just war tradition by emphasising outcomes, proportionality, duty and restraint. Nevertheless, while both are

indispensable as regulatory, planning and decision-support frameworks, neither provides a sufficient foundation for the Army profession itself, as neither sufficiently cultivates the character, judgement and agency the CA has identified as essential for soldiers operating under conditions of uncertainty, decentralised authority, and ethical risk.

Implementation Pathways

Embedding virtue ethics into courses, training programs and instructional practice enabled through the 'Analyse' and 'Design' phases of the Systems Approach to Defence Learning (SADL) could further expand character development, a foundational element of the Army profession. Additionally, instructional staff model virtuous behaviour, reinforcing ethical standards through example and, in doing so, transform professional character and ethics from doctrinal concepts into capability, preparing soldiers not only to fight but to lead, endure and flourish in the moral complexity of future war.

There is an opportunity to map virtue ethics into the SADL, as it can provide a scalable and coherent method for embedding ethical resilience across the Army profession. The SADL's structured phases (Analyse, Design, Develop, Implement, Evaluate) provide a practical framework for deliberately cultivating, assessing and reinforcing character development. In the Analyse phase, virtue ethics informs the identification of ethical and intellectual friction points relevant to rank, role and battle context. This includes charting the ethical demands of tactical decision-making, command accountability and planning complexity. In the Design phase, learning outcomes are shaped around the cultivation of excellence, wisdom and professional nourishment, ensuring that ethical reasoning is embedded within doctrinal, tactical and leadership content. During Development, training materials and scenarios can be constructed to reflect the ethical realities of contemporary warfighting. This includes the deliberate use of dilemmas, ambiguity and ethical risk to habituate judgement and restraint. Implementation should require instructors not only to deliver content but also to model virtuous behaviour, reinforcing ethical standards through example and mentorship. Finally, the Evaluate phase assesses not only knowledge retention but also ethical conduct, decision-making under pressure, and alignment with Army values. This application transforms virtue ethics from a conceptual proposal into a practical framework, embedded across the continuum of professional development. It ensures that soldiers are taught not merely what to think but how to act—ethically, adaptively and with integrity. In doing so, it operationalises the vision for institutional renewal.

Designing collective training scenarios with ethical friction requires a deliberate fusion of doctrinal training design principles and the philosophical underpinnings. The goal is to create realistic, immersive environments where soldiers must navigate complex tactical problems while exercising ethical judgement under pressure. Training must go past technical proficiency; it must also contest character, judgement and decision-making.

Training designers begin by analysing the unit's operational role and identifying tasks where ethical dilemmas are likely to emerge, such as rules of engagement, treatment of non-combatants, or decisions under uncertainty. From this, the scenario objective can be crafted to include ethical decision points. These scenarios can be designed to test not only tactical execution but also the application of courage, temperance and judgement. Critically, this must be blended craftily throughout the training rather than being confined to standalone ethics scenarios, which feel disembodied from the rest of the training. For example, it feels awkward and forced when soldiers go through weeks of exercise without a single ethical dilemma, only to face a single scenario during a culminating action. Simulation and live training can be blended to increase realism, with friction introduced through unpredictable events, moral ambiguity, and time pressure.

Institutionally guided and practitioner-led ethics and character development represent a dual approach to cultivating excellence within the Australian Army. Institutionally, the Army provides the philosophical framework, rooted in the Army profession, through doctrine, endorsed expectations, and command guidance. This establishes a shared understanding of ethical expectations and professional standards across the force. However, character development cannot be achieved solely through policy. It must be led by practitioners (commanders, mentors and peers) who model virtuous behaviour in daily practice. This practitioner-led approach ensures that ethics are not abstract ideals but experiences that are shaped by example, coaching and reflection within the context of war. An Army virtue ethic can be inculcated through vicarious learning, mentoring, and crucible experiences, rather than through rigid instruction. By linking individual character to institutional culture, the Army fosters a profession where ethical conduct is intuitive, resilient and contextually grounded. This approach not only strengthens battlefield performance but can safeguard against moral drift and ethical failure, ensuring soldiers are equipped to act with integrity, courage and judgement in complex operational environments.

Conclusion—Preparing the Soldier for the Road

The Army profession must be renewed across its pillars (jurisdiction, expertise and self-regulation) to meet the demands of future war. Success will not hinge on platforms or procedures but on the character, intellect and ethical resilience of soldiers. Virtue ethics offers a practical framework to reinforce these pillars, embedding ethical responsibility and judgement into the profession.

Jurisdiction is strengthened by cultivating virtue, ensuring soldiers see themselves not only as warfighters but as ethical agents serving Australia. This alignment earns legitimacy through disciplined conduct and ethical restraint. Expertise is enhanced

by integrating practical wisdom into planning and decision-making, fostering adaptive thinking and ethical acuity. Soldiers trained in virtue ethics can navigate complexity, act decisively, and apply professional knowledge with discernment. Finally, self-regulation is fortified through habituation of character via example, repetition and mentorship, safeguarding against moral drift and institutional failure.

Virtue ethics prepares soldiers for the road ahead by transforming ethics from a compliance-based approach into a professional identity. It operationalises the CA's vision, equipping soldiers with both conscience and capability. In battlespaces defined by velocity, ambiguity and risk, virtue ethics can cultivate integrity under pressure, embed ethical reasoning into rapid decision-making, and foster mastery in the face of adversity.

About the Author

Colonel Benjamin Gray is a senior Australian Army officer and artillery specialist with extensive experience in operational planning, joint effects integration, military education, and force development. Since January 2025, he has served as Director of Training Futures at Headquarters Forces Command. After enlisting in the Army and graduating from ADFA and the Royal Military College in 2003, he held a range of command, instructional, and staff appointments across the Royal Australian Artillery, ADFA, the School of Armour, Joint Operations Command, and the School of Artillery. His career includes operational deployments to the Solomon Islands, Afghanistan, and South Sudan, as well as significant contributions to raising the Army's 10th Brigade and serving as the Chief of Army's Scholar. Colonel Gray holds multiple postgraduate qualifications in strategy, security, military ethics, and defence studies, has been recognised with commendations for his service in both the Solomon Islands and South Sudan, and is supported by his wife Sally and their two children, Maxwell and Olivia.

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/ TACTICALLY ADAPTABLE ROBOTIC AUTONOMOUS SYSTEMS AND ARTIFICIAL INTELLIGENCE (RASAI) AS A CAPABILITY: IMPLEMENTATION CONSIDERATIONS

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Introduction

In war, operational advantage favours the side that adapts more quickly;¹ this principle has held across conflicts, from early 20th century campaigns to modern multi-domain operations. In an environment of agile adversaries and rapid technological change, adaptability is not just desirable; it is essential. The Australian Army recognises the importance of adaptability. Land Warfare Doctrine (LWD) 1 describes a credible land force as 'adaptive and relevant'.² The 'Adaptive Campaigning' framework reinforces it, embedding continuous learning and adjustment as core principles,³ but adaptability is no longer just a human trait. As **robotic and autonomous systems and artificial intelligence (RASAI)** become embedded in Army formations,⁴ their capacity to be rapidly modified in response to recent operational experience must be treated as a core requirement. Tactical adaptability must be designed into RAS from the outset, creating **tactically adaptable RASAI (TAR)**.

The faster the adaptation, the greater the tactical advantage and, while dynamic adaptation during contact may be an ambition, it is unrealistic with current technology. A more immediate and practical opportunity lies in enabling adaptation of RASAI *between* engagements by integrating new observations, reconfiguring payloads, or updating control parameters based on lessons from previous missions.⁵

Traditionally, adaptability—the ability to improvise under fire and adapt to new situations—has been seen as a critical leadership trait. However, we argue that tactical adaptability now extends to machines and must become an institutional capability, enabled by doctrine, modular hardware, updatable software, and human–machine workflows. RASAI systems must support rapid adjustment in configuration, control logic, and tactical function between deployments. In a forthcoming Australian Army Research Centre Occasional Paper related to this study, we define TAR as ‘A RASAI capability that can be modified and adapted between engagements to address a changing environment⁶ or to exploit or counter a rapid advancement in technology’.⁷

This article considers tactical adaptability as it applies to RASAI and distinguishes it from related concepts such as flexibility, robustness and resilience. It explores key enablers, including mission command architecture, software modularity, model retraining, and human-in-the-loop structures, and provides examples from Australian and allied forces, including intelligence, surveillance and reconnaissance detachments, RAS teams, and logistics elements. It also identifies institutional barriers that currently inhibit this capability across Defence.

Two options exist to obtain TAR: one is to require each RASAI capability to be tactically adaptable on its own. The other is to raise tactical adaptability as a capability for RASAI systems, which could be achieved through a TAR support element—a specialist function responsible for enabling force-wide RASAI adaptation. This article considers the latter. Its goal is to provide a doctrinally grounded and operationally useful roadmap for engineering tactical adaptability into the emerging human–machine force structure of the Australian Defence Force (ADF).

RASAI do not yet dominate the battlespace; however, the prevailing view is almost unanimous that they will.^{8,9,10,11,12,13,14,15,16,17,18} The urgency of the recommendations made in this article is predicated on the assessment of when that will occur. This being the case, the ADF must act to integrate tactical adaptability as a core capability in the design, procurement and operation of RASAI systems. The recommendations presented here aim to ensure that the ADF prepares not only to meet the challenges posed by these emerging technologies but also to exploit the full potential of RASAI systems in future operations. By embedding adaptability into the force structure, the ADF will be equipped to remain competitive, agile and capable in the face of rapidly evolving technological and operational environments.

Artificial Intelligence

‘Artificial Intelligence (AI) is the study of agents that receive percepts from the environment and perform actions.’¹⁹ As such, it is a key component in RASAI capabilities. Notably, AI systems typically make decisions by learning from previous data to identify, and act on, important trends and patterns. One of the predominant AI training methods is supervised learning, which uses exemplar data consisting of labelled input–output pairs and applies an optimisation algorithm to minimise the prediction error. This approach assumes the training data is both comprehensive and representative of the deployment environment. In real-world Defence contexts, that assumption rarely holds. Operational data may be sparse, degraded or deliberately adversarial, making model performance fragile and transient. To remain effective, AI-enabled systems must support regular updates, including model retraining and parameter adjustments, based on recent mission data. Defence must assume that current models and methods will be periodically outperformed and design its systems with the expectation of continual algorithmic improvement. This requirement is amplified by the rapid pace of AI advancement. In 2024, over 7,000 new AI research contributions were accepted in just the two pre-eminent AI conferences,^{20, 21} and these are typically innovations considered the most profound.

In addition to the requirement for continuous model updates, there is also a real risk that new AI methods will emerge unexpectedly, causing abrupt and significant leaps in performance, rendering previous approaches obsolete. These advances can arise suddenly, often from what appear to be incremental or minor methodological changes, but they can be transformational in outcomes.

For example, while ChatGPT appeared to emerge suddenly, the core techniques—transformer architectures, reinforcement learning from human feedback, and large-scale pretraining—were already well-established methods.²² It was the careful integration and optimisation of these components, combined with unprecedented volumes of training data and compute resources, that delivered a language capability that surpassed expectations and redefined industry benchmarks. This example highlights the nonlinear nature of AI progress, where a modest change can lead to disproportionate gains in performance. Importantly, such advancements may originate from a single researcher or small team and are often software-only improvements that can be deployed almost immediately. This underscores the importance not only of ensuring continuous and rapid model update cycles but also of building and retaining the technical capability and infrastructure to discover, adopt and exploit major breakthroughs before adversaries do—or shortly after. It also points to the need to standardise and modularise onboard compute across platforms. This allows AI developers to work within known resource constraints when designing or replacing models, supports modular scaling where additional compute is justified, and reduces uncertainty during field deployment of new methods.

These characteristics of AI mean that adaptability is no longer solely a human trait: it must now be treated as a design requirement for AI-enabled systems operating in the tactical environment. For RASAI platforms, this includes system-level changes like updating machine learning (ML) models, reconfiguring modular payloads, adjusting autonomy parameters, and modifying control logic between missions. Such adaptations must occur on tactical timelines and reflect direct lessons from recent operational experience; therefore **TAR is a requirement for any system dependent on AI models.**

Defining Tactical Adaptability

Tactical adaptability is the ability of a military unit to modify its tactics, techniques or procedures (TTPs) quickly in response to changing battlefield conditions.²³ Tactical adaptability operates on timescales relevant to the tactical battle, typically short—either between missions or in phases of a single operation.²⁴ At its core, it shortens the feedback loop from observation to action—recognising what has changed and implementing adjustments in the next engagement, identifying what is not working or what the enemy is doing differently, and rapidly adjusting to retain the advantage in the next encounter.

Tactical adaptability differs from several related concepts:^{25,26}

- **Flexibility**—the ability to perform multiple predefined roles. A multi-role aircraft or a cross-trained soldier is flexible, capable of selecting from established options. Flexibility is static: it draws from a fixed menu. Adaptability involves creating or modifying new approaches, not just choosing among existing ones.
- **Robustness**—the ability to function despite a range of disturbances or unexpected stresses. An armoured vehicle that withstands repeated impacts is robust. While robustness supports adaptability by providing survivability, it does not entail tactical change.
- **Resilience**—the ability to recover after disruption, damage or failure. A resilient unit can regroup and return to the fight. But resilience alone may simply restore the status quo; unless combined with adaptation, it risks repeating failure.

Adaptability requires changes in response to the environment—not merely selecting from existing options. While tactical adaptability can be achieved through flexible systems, this is only the case when the change is driven by observed environmental or adversarial changes.

Traditionally, adaptability might involve fitting field-expedient armour, rerouting convoys based on fresh intelligence, or reorganising teams to address an unexpected gap. In the context of RASAI, this could mean updating a drone's image recognition model overnight to identify a new enemy uniform by morning. This is not pre-planned flexibility; it is tactical adaptation.

Crucially, tactical adaptability is based on observations in timeframes meaningful to the tactical element. It allows forces, and the systems they employ, to evolve during a campaign, incorporating new information to improve their next encounter. Tactical overmatch is guaranteed not by static capability but instead by frequent and fast improvement between contacts. It is this ability to evolve under pressure that distinguishes a reactive force from an adaptive one.^{27, 28}

From Mindset to Capability

Adaptability has often been discussed as a human quality: the ingenuity of soldiers and commanders to make decisions under pressure. The Australian Army prides itself on a culture of improvisation and initiative, embodied in the doctrine of mission command. Mission command decentralises decision-making, giving subordinates the freedom to execute the commander's intent in the way they see as best, given unfolding reality. This approach enables on-the-spot tactical adjustments. However, while mission command encourages adaptive behaviour, it does not authorise units to adapt their capabilities, such as modifying hardware or software, within the same timeframe. In other words, soldiers are empowered to be adaptive, but not to adapt their equipment.

To fully harness tactical adaptability, it must be considered a **capability**, not just a trait of individuals. In military terms, a capability can be developed through the Fundamental Inputs to Capability (FIC) as outlined in the One Defence Capability System:²⁹ organisation, command and management, personnel, collective training, major systems, facilities and training areas, supplies, support, industry, and data. While some FIC support adaptability:

- mission command within organisation and command and management promotes decentralised decision-making, and Army's Adaptive Warfare Branch institutionalises a human adaptation cycle
- collective training deliberately stresses forces under uncertainty
- facilities and training areas provide the environments for adaptation, though they are not themselves adaptive
- Defence's growing emphasis on data as a strategic asset underpins adaptability in AI-enabled systems.

Other FIC elements, however, are less aligned:

- Major systems remain rigid rather than modular.
- Supplies and support are geared to efficiency rather than agility.
- Industry engagement often favours long-cycle acquisition rather than rapid adaptation.

Recognising these gaps is essential if tactical adaptability is to be treated as a fully developed capability.

Australian doctrine already points to the importance of adaptation. *LWD 1: The Fundamentals of Land Power* identifies adaptability as essential for land forces operating in dynamic, complex environments. The Defence Strategic Review 2023³⁰ and Army's Future Land Operating Concept³¹ similarly describe forces that can 'adjust rapidly' to change. Current doctrine articulates the need for adaptive action but offers no specific framework for tactical adaptation, particularly when it comes to adapting **technology and materiel** during operations.³²

Bridging this current gap will require tactical units having the ability and authority to implement deliberate system changes between engagements. This would elevate capability adaptation from ad hoc practices, which are born of necessity, to institutionalised procedures that are repeatable, supportable and scalable. A soldier adding body-armour plates to a vehicle to account for increased enemy heavy weapons is showing initiative, while a unit with access to modular kits and embedded technical specialists to harden vehicles in theatre based on observed enemy threat has formal adaptability. The latter reflects a repeatable and scalable force function, not just individual ingenuity.

A relevant example is software modification in combat systems. An adaptive approach treats software, particularly AI models in surveillance drones, targeting systems or navigation, as dynamic and updatable in the field. If an algorithm fails to detect a new threat signature, an adaptable force can refine or retrain it between missions via reach-back to a lab or through forward-deployed tech teams. The Army Robotic and Autonomous Systems (RAS) Strategy recognises this, noting that future autonomous capabilities must be 'intelligent and adaptable' and that modernisation must enable 'rapid updates to enhance or replace capabilities in service'.³³ The advantages offered by RASAI systems are not enduring; their continued utility increasingly depends on how quickly and precisely they can be modified to recognise changes. Electronic warfare air platforms already operate this way, with mission data and threat libraries updated in or near theatre to account for new radar signatures.^{34, 35} This precedent reinforces the feasibility of capability adaptation and provides a baseline methodology for extending similar practices to RASAI.

Case Studies in Tactical Adaptation

Below we briefly outline three tactical adaptability scenarios. These examples are drawn from allied experience and show how local changes delivered operational benefits in compressed timeframes.

AI Evasion Tactics:^{36, 37} US Marines successfully bypassed an AI-enabled surveillance system during a training exercise by performing unexpected movements such as somersaulting, hiding under cardboard boxes and walking in single file. The soldiers'

behaviour was not within the initial AI training dataset; therefore the computer vision system did not recognise their behaviour as human. While these actions are extreme, enemies' adaptations could be much more subtle as they explore their own counter-AI adaptations. If this occurred during operations, the data related to these missed detections would need to be captured and subsequently used to retrain the model before the next engagement. While the Marines defeated the system on day one, they would not have had the same success on subsequent days if the system had been TAR, as the model would have been retrained using the new data. RASAI systems must not only be able to detect threats but also be capable of adaptation in response to changes in the environment or adversary behaviour.

Countering New Camouflage Tactics:^{38, 39} In mid-2022, Ukrainian reconnaissance units deployed small drones which were able to identify Russian forces on the ground. In response to this, Russian forces deployed new camouflage and decoy techniques that confused the drones' object recognition systems. Ukrainian soldiers collaborated with remote volunteer tech teams to retrain the AI model using fresh imagery of the camouflage patterns. Within days, a software patch was issued to fielded drones, which restored their ability to detect enemy positions. This case demonstrates real-world tactical AI adaptation, where soldiers equipped with the right tools became ad hoc systems integrators, modifying fielded capabilities in near real time. While demonstrating the need for TAR, ad hoc adaptation in this manner introduces a number of risks. The lack of a technical regulatory control or a TAR equivalent to electrical and mechanical engineering instructions (EMEIs) could mean that unit-sourced modifications occur without the necessary quality assurance mechanisms. Additionally soldiers independently engaging local tech teams could result in inconsistent configurations between systems, undermining interoperability. A capability approach to TAR is needed to ensure modification of systems does not weaken the force, much as the Army's Technical Regulatory Framework and EMEIs assure the safety and effectiveness of materiel modifications.

Rapid Reconfiguration to Defeat Jamming:^{40,41} During a NATO electronic warfare exercise, a robotic vehicle unit encountered jamming that disabled its primary radio control links. Prior to the mission planned for the next day, technicians reconfigured the vehicles overnight by installing alternative communications modules operating on different frequencies and including an optical data link currently immune to jamming. These platforms were modular and could be rapidly swapped out to adapt to the adversary's changing behaviour. This case illustrates how modular hardware, supported by technically capable personnel and empowered operational authority, enables tactical adaptability at the system level.

These cases illustrate the practical need for tactical adaptability. The adaptations applied in all of these examples, however, are local, without an organisational framework in place.

Local changes without clear organisational guidelines introduce unmanaged technical regulatory framework risks. This suggests that a more controlled and deliberate process for TAR is required.

The next sections examine what enables such adaptations (enablers), what currently hinders them (gaps) and how tactical adaptability can be embedded as a formal warfighting capability.

Enablers of TAR

TAR depends on deliberate design choices, support structures and operational permissions that allow systems to be modified between engagements. This section identifies the key enablers that turn RASAI platforms from fixed-function assets into adaptive tactical systems.

Flexibility—Modular, Reconfigurable Hardware

Hardware modularity enables physical reconfiguration of RAS platforms in response to new mission requirements or operational insights. Platforms that support standardised payload interfaces, hot-swappable sensors, and plug-and-play effectors can be adapted in the field without depot-level intervention. For example, an unmanned ground vehicle (UGV) designed with open payload architecture can rapidly switch from a signals intercept role to a logistics mule role by replacing sensor and power modules. This capacity depends not just on mechanical compatibility but on software abstraction layers that allow new payloads to be recognised and integrated with minimal downtime. While this example is more aligned with flexibility as opposed to adaptability, advances in sensor and payload technology mean that a flexible, modular design provides the foundation for RASAI hardware adaptation between tactical encounters.

Defence RAS strategies^{42,43,44} highlight a shift towards open digital backbones and common standards, critical if future platforms are to support modular TAR. Without this design philosophy, tactical elements are locked into static configurations, limiting their ability to respond to newly observed threats. This places a responsibility on the industry FIC to deliver open architectures and modular standards, rather than proprietary or closed designs, if TAR is to be realised in practice.

Field-Updatable Software and Machine Learning Models

RASAI systems increasingly depend on software-defined functions, especially those involving computer vision, navigation, sensor fusion, and autonomous control. To be adaptable, these systems must support rapid update cycles, ideally within 24 to 48 hours of new observations to be tactically relevant. This includes both rule-based logic (e.g. updating mission parameters or control routines) and ML-based models (e.g. retraining a detection network to account for a new enemy uniform or drone signature).^{45, 46}

Effective TAR requires mechanisms to inject updated models onto deployed devices, ideally through secure, low-bandwidth digital delivery. In-theatre retraining or re-parameterisation is feasible if forward-deployed units include technical specialists or if systems support modular inference pipelines where new models can be uploaded without full redeployment. Critical to achieving confidence in this process are the acquisition and certification frameworks, falling under the FIC of **organisation** and **command and management**, which allow authorised units to make bounded software changes without breaching compliance regimes. Additionally the collective training FIC must prepare units to work with systems that change between missions, and command and management must enable authorisation to apply these changes.

Intent-Driven Control and Mission Logic

Mission command for humans is well understood; however, for RASAI it translates to systems that accept intent-level commands rather than rigid scripts. Systems that support configurable task graphs, goal reweighting, or bounded autonomy parameters allow for tactical adaptation without requiring complete redesign. For example, a robot tasked with route clearance might be instructed to prioritise speed over stealth based on new threat assessments. Likewise, the sensitivity of detecting adversaries might increase during higher risk periods. If the system architecture supports the injection of these intent changes between missions, whether via a control interface, mission script or application programming interface (API), it becomes tactically adaptable.^{47, 48}

This requires that TAR platforms be designed with an expectation of operator parameter selectability. Systems that only accept pre-certified mission templates or require developer-side modification are inherently fragile. Consider a counter uncrewed aerial system (UAS) jammer that cannot have its jamming band or power settings changed by the operator in theatre. If the adversary shifts their drone to an off-band frequency or reduces radar cross-section (RCS) and the jammer is fixed to pre-certified settings, the jammer is rendered ineffective, and hostile UAS will penetrate defended airspace.

Tactical Data Feedback and Model Update Infrastructure

Data collected by RASAI systems during operations—video, sensor logs, mission outcomes—must be extractable, processable and usable to inform adaptation across the battlespace. This requires onboard data logging architectures, compression and transmission standards, and back-end tools or personnel that allow for rapid triage and incorporation into retraining cycles.⁴⁹

Equally important is the ability to push model updates or software patches back to the system rapidly. This cycle—data extraction, insight generation, model refinement, redeployment—must be shortened to days, not months. Systems that lack bandwidth-efficient update paths or store model parameters in ways that prevent local modification are not TAR compliant in practice, regardless of their stated autonomy.

Embedded Technical Personnel and RASAI Support Roles

Embedding roles with the technical competence to modify systems in theatre is critical to maintaining the quality of and trust in AI systems.

At a minimum, force elements employing RASAI systems should include:

- operators trained to recognise when system adaptation is required
- technicians able to replace or integrate modular hardware
- digital specialists capable of deploying new models or software builds
- liaison roles to coordinate with reach-back support elements.

This distribution of roles aligns closely with Scholtz's (2003)⁵⁰ framework for human–robot interaction, which highlights supervision, intervention, adjustment, repair and coordination as essential human functions in robotic operations. The current Army structure does not routinely embed this blend of roles at the tactical level. For TAR to be viable, these support capabilities must be normalised, whether as attached specialists or organically trained within combat teams.

Authorisation and Institutional Leeway

Tactical adaptability requires authority to modify systems at the point of need. Current governance models, based on centralised control of system modifications, are incompatible with TAR. A revised framework must enable bounded, auditable changes by authorised users in theatre. This may include pre-approved model update parameters, sandboxed execution modes for isolated testing, or the establishment of tactical adaptability detachments with modification authority. Without such mechanisms, RASAI platforms remain static, constrained by approval delays while adversaries continue to adapt.

Gaps in the ADF's TAR Today

While the ADF recognises the need for agility, its current structures and processes remain misaligned with the requirements of TAR. RASAI systems are not static platforms; they are software driven and data dependent, and should be modular by design. However, five critical gaps prevent them from being adaptable in practice:

- **No Formal TAR Teams or Structures:** The ADF lacks any dedicated force element tasked with in-theatre modification of RAS. Existing trades are not structured or trained to perform daily software changes, reconfigure AI pipelines, or implement hardware substitutions on deployed autonomous systems. Updates must typically route through original equipment manufacturers (OEMs) or acquisition channels, delaying responsiveness. Without a defined unit or role empowered to adapt RASAI systems between missions, TAR remains conceptual rather than executable. The ability to change a system must be delivered with it. A useful precedent exists in the Joint Electronic Warfare Operational Support Unit, which routinely generates and distributes new mission data files to update deployed air platforms in response to emerging threats. This demonstrates the feasibility of embedding adaptation as an institutional function. By abstracting this model, the ADF could establish a Joint RASAI Operational Support Unit to deliver equivalent responsiveness for autonomous systems, providing modular payload integration, bounded software changes, and rapid model updates in theatre.
- **Absence of Uniformed Technical Specialists in RASAI:** There is no organic technical capability to support and create updates for fielded RASAI systems. Roles such as AI model handlers, ML engineers, digital integrators or data engineers do not exist in the ADF's force structure. While Defence Science and Technology Group (DSTG) involvement in supporting ADF operations is well established, DSTG does not doctrinally provide real-time effects or operational support directly within the combat elements. Even where informal talent exists within units, there is no mechanism to authorise or support its use for TAR tasks. This creates a vacuum of personnel and skills around deployed RASAI systems, particularly as to who is creating the new AI models and methodologies. This gap is mirrored in the civilian sector, where no established trade or profession exists for deployed RASAI model handling, further limiting Defence's ability to draw on external expertise and generate role-ready AI technical specialists.
- **Inaccessible and Disconnected Data Streams:** RASAI systems generate and rely on enormous volumes of data from sources such as onboard cameras, sensors, mission logs and system health monitors. But in most cases, this data is neither stored in accessible formats nor connected to a centralised analysis or retraining pipeline. Classification issues, bandwidth constraints, and stovepiped architectures

mean tactical units cannot extract useful insights or enable AI retraining cycles. Without tactical-to-strategic data federation, TAR cannot occur: the system cannot learn what the fight teaches it.

- **No Pathway for Rapid Field-Level Software Changes:** Defence acquisition and compliance frameworks remain aligned to centrally tested, version-controlled software updates. Tactical teams that identify a model or logic issue cannot, typically, modify systems without triggering multi-stage certification. Emergency procurement pathways exist, but no standing process supports continuous integration or bounded in-theatre updates for RASAI systems. This has the potential to freeze needed adaptations behind bureaucratic processes which are disconnected from operational tempo. It is unclear if recommendations relating to improving capability timelines from the Defence Strategic Review and the National Defence Strategy have been meaningfully implemented; however, TAR could provide a mechanism to operationalise those reforms by institutionalising bounded, rapid update processes.
- **Doctrinal Silence on RASAI Adaptation:** Doctrine does not yet account for the adaptation of autonomous systems between engagements. A review of current ADF doctrine reveals no defined framework for tactical system modification or autonomy adaptation in theatre—only ambitions. Concepts like mission command, while enabling human initiative, have not been extended to RAS platforms. There is no doctrinal authority, process or expectation for tactical-level changes to autonomy settings, mission parameters or control logic. As a result, even units inclined to adapt their systems must navigate ambiguous policy terrain. There is also limited guidance on how AI-enabled systems should be managed, retrained, or tuned in the field, an absence that inhibits initiative.

While the requirements of TAR are more prevalent in high-intensity peer conflicts, some operational environments may impose limits on adaptation tempo, support availability or legal frameworks, particularly in coalition or grey zone operations. Therefore, TAR must be scalable and selectively applied based on mission type, risk tolerance and operational constraints. However, if TAR is permitted only in high-intensity conflicts, the ADF risks entering the conflict without a mature understanding how to effectively adapt its systems, thereby exposing a greater vulnerability when the stakes are highest.

Current gaps mean TAR is not yet viable at scale. Where adaptation occurs, it is typically improvised and driven by individual initiative rather than institutional support. Without formal structures, processes and authorities, the quality of the changes cannot be guaranteed. RASAI systems will only continue to deliver tactical advantage if they can evolve as quickly as the threat. Achieving this requires more than good design; it demands a force structure, workforce and doctrine that make machine adaptation a routine element of operations.

Recommendations

The following recommendations define the structural, technical and doctrinal changes needed to achieve TAR as a capability.

System and Procurement Foundations

Recommendation 1. Adopt a Formal RASAI Interface Framework

For TAR to be viable, RASAI systems must be modularly designed to support safe, field-level modification through open, standardised interfaces. This requires changes to both system architecture expectations and commercial arrangements:

- Develop and adopt a Defence-wide RASAI Interface Framework based on allied or NATO open mission system standards, to define mandatory interface layers for mobility systems, payload systems and decision/compute systems.
- Standardise RASAI compute hardware, allowing software and model updates to be deployed across different RAS platforms without unique dependencies.
- Retain control of standard development kits, interface definition and update tools within Defence, enabling secure in-house and third-party modification without OEM reliance.
- Prohibit closed, proprietary architectures that prevent field-level adaptation.

Recommendation 2. Embed Adaptability into RASAI Acquisition and Certification

All future RASAI procurements must include explicit TAR enablers. Systems must:

- mandate compliance with the modular framework in all RASAI acquisition contracts, ensuring vendors deliver systems with modularity, documented APIs, and containerised components that can be swapped or updated without proprietary engineering
- support modular payloads, open architectures and exposed control interfaces
- include abstraction layers that allow software and model updates without full re-certification
- contractually obligate vendors to provide tools for in-field configuration and patching, not just depot-level support.

Platforms that require OEM intervention or weeks-long validation cycles to change mission behaviour are unfit for TAR. Adaptability must become an acquisition gate for RASAI, not a retrofit.

Tactical Execution and Adaptation Infrastructure

Recommendation 3. Operationalise Tactical Data Feedback and Learning

For RASAI systems to adapt between missions, data must be captured, analysed and fed back rapidly. This demands:

- standardised logging architectures on all RASAI platforms, capturing sensor data, mission outcomes, and system anomalies
- on-site or forward-deployable analysts and triage tools to extract model-relevant data
- a live feedback loop that pushes refined models or logic updates back to deployed systems within days.

TAR requires more than raw data; it requires structured feedback infrastructure that turns recent operational experience into executable system improvements.

Recommendation 4. Establish a Model Update Pipeline

TAR requires a capability to generate, validate and deploy system updates within 24 to 72 hours. This must include:

- a field-ready pipeline for distributing software patches and ML model updates to deployed RASAI assets
- pre-approved adaptation boundaries, such as allowed model types, input limits and mission parameter envelopes, to expedite field-level approval
- local test harnesses or digital twin sandboxes for validating updates in theatre before deployment to live systems.

This pipeline should be treated as a standard support mechanism for RASAI operations, not an experimental workaround.

Recommendation 5. Raise a Deployable TAR Support Element

Create a dedicated force element responsible for the adaptation of fielded RASAI systems. This element, similar to electronic warfare or other specialised capability, would be embedded at the appropriate level and:

- include AI technicians, robotics engineers, software integrators and digital support specialists
- be capable of reconfiguring modular payloads, deploying newly updated AI models, and share new data across tactical forces. Updates could be applied daily, following a cadence similar to cryptographic key rotations

- maintain a pipeline to centralised analysis, model repositories, simulation environments and allied research facilities.

The proposed TAR support element will have appropriate technical expertise to conduct hardware and software changes within authorised parameters.⁵¹ Without it, modularity and AI-enabled platforms will remain static assets, regardless of threat evolution.

Workforce and Innovation Ecosystem

Recommendation 6. Develop a Uniformed RASAI Technical Workforce

RASAI adaptability depends on having technical expertise at the point of need and AI competent operators who understand the importance of correct labelling and the characteristics of AI. The ADF should therefore develop deeper expertise in artificial intelligence, robotics and software integration within its force structure. To make informed decisions during operations, combat leaders will require sufficient understanding of autonomy parameters, AI behaviour and the operational risk envelope associated with system updates. Crucially, these skills must be embedded within tactical units rather than concentrated in headquarters or specialist support organisations. Without uniformed digital specialists co-located with RASAI platforms, field-level adaptation will remain largely theoretical.

Recommendation 7: Integrate Academic and Industry Research Nodes for Rapid Method Adaptation and Innovation

In addition to regular model updates, new AI methodological innovation needs to be maintained. Maintaining this capability requires deliberate integration of Defence-approved academic and research partners into the RASAI adaptation cycle. TAR support elements should therefore be formally linked with accredited university research teams, DSTG, and national AI and robotics laboratories that can be mobilised to provide technical reach-back when required.

Operational RASAI systems should also be designed to support controlled method-level substitution. This includes the ability to replace object detection algorithms, autonomy control strategies, or data processing approaches using pre-authorised templates or sandbox validation environments. Rapid research and development pathways should exist to allow new approaches to be prototyped and evaluated within days or weeks when adversary tactics change.

To enable this interaction between operational units and external research partners, technical liaison officers should be embedded within TAR teams to translate operational problems into research tasks and integrate validated solutions back into deployed systems. A supporting 'validated method repository' should also be established, providing

deployed units with access to modular models and technical approaches that have already been tested and approved for operational use.

While these recommendations provide specific mechanisms to support TAR, the development of tactically adaptable RASAI will ultimately require coordinated consideration across all FIC.

Conclusion

As intelligent systems become more prevalent in the battlespace, they must be delivered with adaptability in mind. Deployed AI-enabled platforms must be capable of having their behaviour modified between engagements, not over weeks or months but within the tempo of tactical operations.

RASAI systems will not deliver sustained warfighting advantage if they remain static and locked into their deployment configuration while adversaries evolve. TAR is the next capability step: the ability to update autonomy parameters, reconfigure platforms, adjust models, and redeploy systems in response to changing conditions.

The case studies in this paper from the US and NATO forces demonstrate how quickly tactical AI systems can be comprised and how quickly systems can be trained in response. The speed of adaptation necessitates a change in how we design, employ and evolve RASAI.

This paper proposes a pre-emptive framework for future RASAI integration. While RASAI platforms have not yet reached full saturation in the battlespace, the sentiment is clear that RASAI systems will become prolific. Defence needs to act now and consider the recommendations in this paper to avoid reliance on improvised adaptation once conflict begins.

Tactically adaptable robotic autonomous systems and artificial intelligence as a capability requires alignment across all FIC elements, which will deliver systems designed for field-level modification, embedded technical specialists, and streamlined update pipelines. Until this is achieved, even the most intelligent battlefield systems will be vulnerable to the simplest changes in a complex operational environment.

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/ QUANTUM RAS PLANNING

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Introduction

The Australian Army is forecasting an increased use and reliance on robotics and autonomous systems (RAS) in the future battlespace.¹ When this outcome is realised, the system will be characterised by many platforms operating autonomously or semi-independently. Two near-term opportunities of RAS are logistics resupply and persistent intelligence, surveillance and response (ISR). Consider a scenario where hundreds of autonomous systems are performing both logistics resupply and ISR. Some platforms may be delivering ammunition, fuel and medical supplies to the forward forces, while others provide persistent surveillance over the areas of interest. As operational conditions change, supply priorities may shift, routes may become unavailable and new threats may appear in previously low-risk areas. Planners must continuously decide the allocation of the units to the tasks and how they should respond to changing circumstances. Existing planning methods within the Army rely on the Joint Military Appreciation Process (JMAP).²

³ The JMAP operates on the assumption that military capability bricks are grouped into manageable sizes—for example, a combat brigade is divided into battalions, which are in turn divided into companies and again divided into platoons. This hierarchical structure simplifies planning, requiring coordination only at the interfaces between sub-units. However, in a future battlespace dominated by RAS, the assumptions on which this structure is based break down.

Companies like Amazon Prime Air are exploring the use of aerial RAS platforms to distribute packages to customers with minimal human involvement.⁴ These systems dynamically allocate tasks, reroute in real time and scale to thousands of concurrent independent ‘missions’. While this industrial use case has clear parallels to logistic resupply in the field, the scale is well beyond the ability of current military planning processes. The scale of planning is likely to be beyond human capabilities. To fully realise the adaptability, persistence and distributed mass that RAS promises, automated planning tools are needed to support decision-making. An optimal plan can be considered as an optimisation problem. In other words, such a plan would allocate resources,

sequence tasks and coordinate movement within given constraints to achieve a mission objective that could be described by an 'objective function'. An objective function could be based on fuel consumption, operational risk, expected casualties or probability of mission success. As the number of assets or constraints or the complexity of the objective function increases, the optimisation problem becomes exponentially more difficult to resolve. Classical planning tools do not scale efficiently at such large scales, particularly under real-time military pressures.

Quantum computing offers a potential breakthrough for solving large problems with exponentially large solution spaces. Unlike classical computers, quantum systems can explore large solution spaces simultaneously by using fundamental principles of quantum mechanics, namely superposition and entanglement. In quantum computing, information is stored in quantum bits, or qubits. Superposition allows a qubit to exist in multiple states at the same time. Entanglement links qubits in such a way that the state of one cannot be fully described without reference to the other, even when they are separated.

Several algorithms, such as the quantum approximate optimisation algorithm (QAOA),⁵ quantum annealing,⁶ variational quantum eigensolver (VQE)⁷ and quantum walk⁸ have been developed with applications that enable combinatorial optimisation. In addition to these native algorithms, there have been developments in the quantum-inspired classical algorithms. These include quantum-inspired evolutionary algorithms (QIEA),⁹ which mimic quantum algorithms to improve the performance of classical optimisation routines. These algorithms have shown promise in hardware-constrained environments.

This article examines these quantum algorithmic approaches, assessing their theoretical foundations, practical strengths and implementation constraints within the RAS context. While providing a comparative overview, it focuses on QAOA due to its broad applicability and compatibility with near-term quantum devices. This article includes translating a RAS planning problem into a quadratic unconstrained binary optimisation (QUBO) formulation, followed by an Ising Hamiltonian and a detailed quantum circuit construction and analysis.

In addition, the article assesses the contemporary quantum computing landscape, highlighting the existing capabilities in quantum hardware, coherence times, error rates and mitigation strategies. It also provides a trend path, employing the quantum computing equivalent of 'Moore's law' to illustrate the growth strategies. This analysis provides a realistic timeline and feasibility assessment for practical efforts to plan and implement RAS within the Australian Army.

Background and Fundamentals

Classical Methods and Limitations

Classical methods for RAS planning can include heuristic algorithms like A*¹⁰ and Dijkstra's¹¹ algorithm. Also, such methods regularly make use of techniques such as genetic algorithms¹² and particle swarm optimisation.¹³ Linear and integer programming approaches with meta-heuristic methods such as simulated annealing¹⁴ and tabu search¹⁵ have also proven to be useful applications. While useful for small-scale problems, these algorithms begin to face performance bottlenecks as the problem size grows. Indeed, they are impractical for dealing with the exponential rise in computational effort needed to explore vast solution spaces. Further, as variables such as the number of agents, tasks or waypoints increase, these classical methods become increasingly expensive to compute. And they are unable to deliver near-optimal solutions within designated timeframes. These scalability issues arise from the NP-hard nature of the RAS planning problems. These limitations have motivated the search for alternative paradigms that can handle such scenarios more efficiently.

Quantum Computing Fundamentals

Quantum computing is one such alternative, rooted in the principles of quantum mechanics and different from the standard classical computing models.¹⁶ Unlike classical bits, which process information using either 0 or 1, quantum computers use qubits. Qubits exhibit the property of superposition, which enables them to represent multiple values simultaneously and to explore many solution spaces in parallel.

In addition to superposition, quantum computers exhibit entanglement—a phenomenon where the state of one qubit becomes correlated with another, regardless of the distance. This allows the representation of complex, interdependent variables, and this characteristic is particularly advantageous in tackling multi-agent RAS problems. Another foundational concept is quantum interference, which enables the construction of desirable solutions while suppressing those that are suboptimal. This mechanism allows quantum algorithms to guide computations towards optimal answers in a more efficient manner than can be achieved through random exploration.

Despite all these advantages, quantum computing is not without its challenges. One of the primary issues is decoherence. This term refers to the loss of information that occurs when a quantum system, such as a qubit, interacts with its surrounding environment. Quantum states are short lived, which can lead to the collapse of superposition and loss of entanglement before errors set in. Because modern technology has not advanced beyond the noisy intermediate-scale quantum (NISQ) era,¹⁷ the hardware is prone to noise and

operational errors. Therefore, quantum computing solutions must be accompanied by error correction and error mitigation strategies. Such limitations constrain the practical scalability of quantum algorithms but are the focus of ongoing research.

Quantum Algorithms for RAS Planning

This section presents a deep dive into the key quantum algorithms relevant to RAS planning.

Quantum Approximate Optimisation Algorithm

QAOA is a hybrid quantum-classical algorithm designed to tackle combinatorial optimisation problems by preparing quantum states that can approximate optimal solutions. It operates by alternating between two types of unitary operations applied to an initial superposition state. One is the cost circuit that encodes the objective function. The cost circuit encodes the ‘cost’ Hamiltonian. Hamiltonian in quantum mechanics is defined as an operator that corresponds to the total energy of the system, including both kinetic and potential energy. Another component is the mixer circuit that encodes the ‘mixing’ Hamiltonian. The mixer component enables exploration of the solution space, while the cost component guides the system towards better solutions by encoding the optimisation objective. In combination, these functions balance the exploration of a solution space with guidance towards lower-cost solutions.¹⁸

For a given depth parameter p , the QAOA state is constructed by the equation:

$$|\psi(\gamma, \beta)\rangle = \prod_{k=1}^p e^{-i\beta_k H_M} e^{-i\gamma_k H_C} |+\rangle^{\otimes n}$$

Here, $\gamma = (\gamma_1, \dots, \gamma_p)$ and $\beta = (\beta_1, \dots, \beta_p)$ are tunable parameters and $|+\rangle \otimes n$ denotes an equal superposition of all the basis states across n qubits. The algorithm aims to find the parameters (γ, β) which can minimise the expected value of the cost Hamiltonian with respect to the prepared state. The expectation value of the cost Hamiltonian is:

$$E[\gamma, \beta] = \langle \psi(\gamma, \beta) | H_C | \psi(\gamma, \beta) \rangle$$

The expectation value is evaluated on a quantum processor, while a classical optimiser iteratively updates the parameters to converge towards an optimal solution. The algorithm is also compatible with the current NISQ devices, and its hybrid architecture allows for immediate applicability in practical workflows.

Quantum Annealing

Quantum annealing is based on the adiabatic theorem, which states that a quantum system will tend to be in its ground state if the corresponding Hamiltonian evolves slowly. Quantum annealing starts off with an initial Hamiltonian whose ground state is easy to prepare and slowly evolves to a problem Hamiltonian, which represents the objective function.¹⁹ The time-dependent Hamiltonian is expressed as:

$$H(t) = (1 - s(t))H_0 + s(t)H_C, \quad s(t) \in [0, 1]$$

Under ideal adiabatic conditions, as $t \rightarrow T$, the system evolves to the ground state of H_C , which is the optimal solution. Quantum annealers like D-Wave's, for example, implement this process for QUBO-based problems.

In the RAS domain, annealing is applicable to route optimisation, resource allocation and scheduling problems. The main strength of quantum annealing is that the associated hardware technology is relatively mature. Nevertheless, practical limitations remain, including noise sensitivity and the reliance of quantum annealers on predetermined optimisation scenarios.

Variational Quantum Eigensolver

VQE is another hybrid quantum-classical algorithm that was initially designed for quantum chemistry experiments. This algorithm estimates the ground state energy of a given Hamiltonian H by preparing a parametrised quantum state $|\psi(\theta)\rangle$ and by minimising the expectation value given by the equation:

$$E(\theta) = \langle \psi(\theta) | H | \psi(\theta) \rangle$$

In the context of RAS, the Hamiltonian can be constructed from a QUBO model or any other cost representation to support scheduling, mission planning or resource usage. The optimisation over is handled by a classical optimiser.

The algorithm is adaptable to near-term quantum hardware and is able to handle complex cost structures. However, the utility of the algorithm heavily depends on the choice of the ansatz and the quality of the optimiser. Additionally, repeated circuit evaluations during parameter tuning can introduce computational overhead.

Quantum Walk Based Algorithms

Quantum walks are the quantum versions of the classical mathematical process of random walks, characterised by superposition and interference. A discrete time coined quantum walk on a graph $G(V,E)$ is described by the evolution operator equation:

$$U = S \cdot (C \otimes I)$$

In this equation, C is a coin operator acting on the internal state of the walker, and S is the shift operator that updates the walker's position.²⁰ In comparison with random walks, quantum walks enable faster diffusion through the state space and can be used for spatial search, path planning and information propagation.

In the context of RAS, quantum walks can explore large graphs such as navigation maps or coordination graphs among the agents. Their speed-up offers high-dimensional planning.²¹ However, the algorithmic implementation remains complex and sensitive to decoherence.

Grover's Search Based Algorithms

Grover's algorithm provides a quadratic speed-up for unstructured search problems by amplifying the amplitudes of the marked states. For optimisation, Grover's method is adapted by embedding the optimisation criterion in a quantum oracle O that flags optimal solutions. The Grover iteration is given by the equation:

$$G = (2|\psi\rangle\langle\psi| - I) \cdot O$$

Here, $|\psi\rangle$ is a uniform superposition of all the states. For a search space of size N containing one marked solution, the required number of iterations is approximately $\frac{\pi}{4}\sqrt{N}$ iterations.

QAOA Problem Formulation for RAS Planning

RAS task planning problems could range from path optimisation for autonomous vehicles (or drones) all the way to multi-agent scheduling and coordination. In this context, it is useful to model a path optimisation problem as an optimisation task. For example, such a planning problem would be the structural equivalent of a travelling salesman problem (TSP), wherein a vehicle must visit a series of nodes exactly once and return to the origin point. In this scenario, the aim is to minimise the travel cost. There are benefits of conceptualising problems such as this as optimisation tasks via QAOA. QAOA leverages the QUBO formulation,²² which is further mapped into an Ising Hamiltonian for encoding the problem into quantum hardware.²³ Below, we detail the QUBO and the Ising Hamiltonian formulation by considering an example.

QUBO Formulation

Given a cost matrix C where C_{ij} represents the travel cost from node i to node j , the goal is to visit every node exactly once while minimising the total travel cost. Let $x_{i,t} \in \{0, 1\}$ be a binary variable indicating whether node i is visited at time t in the tour. The total number of binary variables is n^2 , resulting in n^2 qubits for the quantum computer. These variables are arranged in a matrix fashion where the rows represent nodes, and the columns represent time steps.

The objective function to be minimised is the total cost equation:

$$\min \sum_{i=0}^{n-1} \sum_{j=0}^{n-1} \sum_{t=0}^{n-1} C_{ij} \cdot x_{i,t} \cdot x_{j,(t+1) \bmod n}$$

To ensure a valid tour, some constraints are also added as penalty terms:

- Each node must appear only once:

$$\sum_{t=0}^{n-1} x_{i,t} = 1 \forall i$$

- Each position in the sequence must be occupied by exactly one node:

$$\sum_{i=0}^{n-1} x_{i,t} = 1 \forall t$$

Both constraints are added to the QUBO objective by adding large penalties A and B . The resultant penalty equation is:

$$Q_{\text{penalty}} = A \sum_{i=0}^{n-1} (1 - \sum_{t=0}^{n-1} x_{i,t})^2 + B \sum_{t=0}^{n-1} (1 - \sum_{i=0}^{n-1} x_{i,t})^2$$

The final QUBO formulation would be:

$$Q = Q_{\text{objective}} + Q_{\text{penalty}}$$

Conversion to Ising Hamiltonian

To run the QUBO matrix on quantum hardware, it is transformed into an Ising Hamiltonian. Here, binary variables are mapped into spin variables taking values in $\{-1, +1\}$ value, using the relation:

$$x = \frac{1-z}{2}$$

Substituting this back into the QUBO expression yields a Hamiltonian in the Ising form:

$$H = \sum_i h_i z_i + \sum_{i < j} J_{ij} z_i z_j$$

In this equation, h_i is a linear coefficient, and J_{ij} is a quadratic coupling term between the spin variables. The resulting Ising Hamiltonian would represent the energy landscape of the problem. In this example, the minimum energy state would correspond to the optimal or near-optimal solution.

Qubit Projection for a Pure Quantum Solution

The number of qubits required to solve the problem scales non-linearly as the problem dimensions are encoded in the quantum space. Considering the most basic TSP, the formulation would use binary variables to represent whether a specific location is visited within a specific timeframe. This leads to quadratic scaling: n cities would require n^2 qubits to represent all the city-to-position assignments. The same TSP can be extended to a vehicle routing problem (VRP) scenario²⁴ where there may be multiple vehicles operating simultaneously. To capture vehicle-to-city assignments, we would require $v \cdot n^2$ qubits, where n is the city count, and v is the vehicle count. A vehicle-to-depot assignment would introduce an extra $v \cdot d$ qubits, where d is the number of depots. Furthermore, if there is a vehicle selection from a fleet of vehicles, then we would need an extra v qubits for encoding the active vehicles. Similarly, if depot activation is also part of the problem, then we would need another d qubits. Summing all the components, the total qubit count would be:

$$\text{Total Qubits} = v \cdot n^2 + v \cdot d + d + v$$

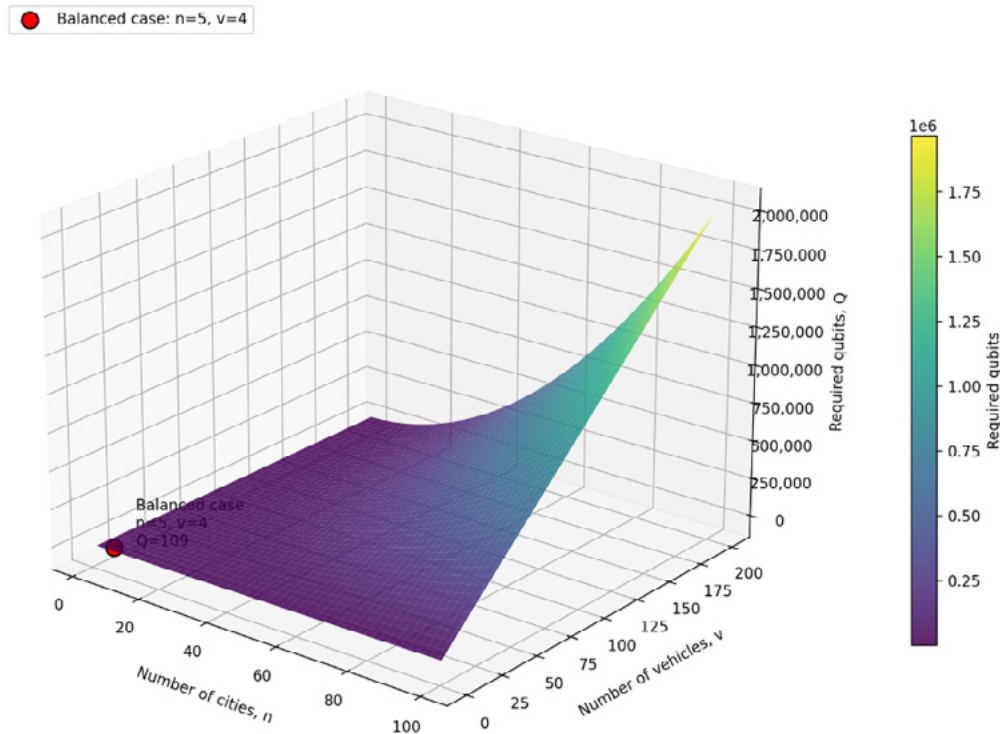


Figure 1: Qubit projection with respect to cities, vehicles and depots

The surface plot in Figure 1 illustrates how the qubits grow with the problem size. For this simulation, the number of cities ranges from one to 100 and the number of vehicles ranges from one to 200. The number of depots is kept fixed at one. The qubit count grows steeply for larger values of n and v . The scaling for cities is quadratic in nature. For the highest configuration (100 cities and 200 vehicles), the total projected qubit is approximately 2,000,401. Even under moderate scenarios, such as 50 cities and 50 vehicles, the qubit demand is approximately 125,101, which is beyond the capability of current hardware. The red dot in the plot shows the scale of problems that can be tackled as a pure quantum formulation. For the current capability of 127 qubits, a pure quantum solution could theoretically solve a balanced scenario of five cities, four vehicles and one depot.

Current Landscape and Future Projections

The commercial quantum sector has witnessed notable advances. Companies are pursuing a wide range of technological approaches that include superconducting qubits, trapped ions, photonics and quantum annealing. All these developments demonstrate

the ongoing efforts to improve qubit quality, increase system size and move towards a fault-tolerant quantum computer. There are some impressive recent advances in quantum technology within the commercial sector. Some notable examples are listed below.

- IBM's 433-qubit Osprey processor is already online.²⁵ The company plans to introduce its first modular processor, Kookaburra, around 2026. This will be followed by the Cockatoo system in 2027, designed to interconnect multiple Kookaburra modules using L-couplers. These developments form part of IBM's broader roadmap towards large-scale, fault-tolerant quantum computing, culminating in the Starling system, targeted for 2029.²⁶ At the time of writing, there were reports of the company integrating multiple dies into a 4,158-qubit Kookaburra module scheduled for late-2026 release.²⁷
- Google's 105-qubit Willow chip has demonstrated the capacity to cross the break-even line for error correction, showing that a larger surface code patch can surpass the error rate of an individual superconducting transmon.²⁸
- Rigetti's 84-qubit Ankaa-3 has the capacity to halve two-qubit errors, which is an improvement from its prior generation.²⁹ This improvement also validates a multi-chip tiling strategy for the 336-qubit Lyra design.
- IonQ's Forte registers 29 algorithmic qubits, which is defined as the largest circuit size, outperforming any classical surrogate.³⁰ Its 64-qubit Tempo, introduced around 2025, is now being progressively deployed to customers and research partners.³¹ Quantinuum's H-series has achieved the first logical qubit that outlives the best physical ion and posts a world record on a 20-qubit device.³²
- Photonic systems reached quantum advantage in 2022 when Xanadu's 216-mode Borealis Gaussian boson sampler produced a distribution in microseconds, an achievement that would have taken classical hardware millennia to emulate.³³
- While still in a pre-deployment phase, PsiQuantum has fabricated photonic chips on 300 mm GlobalFoundries wafers, targeting one million physical photonic qubits and roughly 1,000 logical ones around 2027.³⁴
- D-Wave's annealer employs more than 5,000 flux qubits arranged in a Pegasus lattice. Testing began on a 7,000 qubit and a 20-way connectivity Advantage 2 prototype in 2023. D-Wave has recently shown a measurable scaling speed-up on a hard spin glass benchmark.³⁵
- Companies QuEra³⁶ and Pasqal employing the neutral atom quantum computing approach have demonstrated controlling 256- and 324-atom arrays, respectively.³⁷
- Microsoft's Majorana 1 nanostructure offers the first evidence of braiding ready zero modes, which hint at topological qubits with gate errors below 10^{-6} .³⁸

The Road Ahead

Moore's law in classical computing states that the number of transistors on a chip doubles every two years. While there is no formal qubit Moore's law, based on the relevant literature, we make an assumption that the qubit count doubles every two years and the average two-qubit error falls by half for every hardware generation. We refer to this phenomenon as 'qubit Moore's law'. At the 50- to 100-qubit level, error-mitigated circuits tackle non-trivial chemistry and optimisation tasks. Once these numbers surpass approximately 1,000 high-fidelity physical qubits (or around 10 surface code logical qubits), opportunities will exist for early fault-tolerant circuits such as deep-phase estimation and error-corrected QAOA on 256-variable instances.³⁹

Achieving this standard is already within reach of several technology companies. IBM plans to extend its exponential trajectory from 127 qubits to beyond 10,000 qubits by 2027. Google has provided a six-milestone path to the first at-scale quantum computer by 2027. Willow is part of Milestone 2, which has already broken the logical error barrier.⁴⁰ IonQ expects 1,024 algorithmic qubits by 2028 via photonic networking of modular traps.⁴¹ Quantinuum projects approximately 100 logical qubits by 2027 and hundreds by 2029.⁴² Rigetti's Lyra would deliver 336 physical transmons with less than a 0.5 per cent two-qubit error rate by 2026.⁴³ PsiQuantum aims to reach 1,000 logical qubits before the end of this decade. The success of its efforts will depend on factors such as the achievement of efficient fusion gates and ultra-low loss waveguides.⁴⁴ D-Wave remains on the annealing track by increasing qubit connectivity and integrating a gate-based spin qubit prototype.⁴⁵ Neutral atom research aims to cross the 1,000 qubit threshold and demonstrate 128 logical Rydberg qubits by 2028.⁴⁶

Error Correction Trajectory

Superconducting qubit-based researchers are addressing known defects in the two-level system and moving towards a 3D chiplet packaging. The target is to reach coherence times above the 200-microsecond mark and the two-qubit error below 0.1 per cent by 2027.⁴⁷ Trapped-ion researchers have crossed the 99.9 per cent qubit fidelity threshold on the next-generation barium and ytterbium chain. This has been achieved by combining ultra-narrow lasers and sympathetic cooling to support minute-scale coherence and sub 10^{-3} logical error per surface code cycle. Photonic qubit researchers are driving silicon nitride to below the 0.1 dB m⁻¹ mark.⁴⁸ This is a key step for generating fusion-based million-qubit architectures. Neutral atom researchers are extending the optical-tweezer trap lifetimes by refining the stability of the Rydberg blockade towards 99 per cent fidelity.⁴⁹ Topological qubit researchers are seeking to achieve at-hour scale coherence and two-qubit errors below the 10^{-6} mark. In summary, the milestone for all domains remains that physical qubits operate collectively as logical qubits.

Application Outlook

Quantum computers are expected to move beyond just a headline demonstration into multiple domains. Optimisation is the first domain that can be revolutionised using quantum algorithms. Hybrid gate-based QAOA⁵⁰ (or the next generation of D-Wave annealers) should be able to solve 100- to 256-variable routing problems.⁵¹ These problems would either be faster to solve or achieve results closer to optimal than has been achievable using elite classical heuristics. In the cryptography domain, million-qubit fully error-corrected machines remain a 2030s goal. This aspiration should not lead one to ignore the fact that future generations of hardware could set even more impressive records. Factoring 100-plus bit RSA keys⁵² or cracking smaller elliptic-curve keys are examples of possible achievements in the days to come.⁵³ Once these things are achieved, scientific fields such as chemistry and material science will inevitably benefit from error-mitigated VQE on a dozen high-fidelity qubits, enabling the achievement of chemical accuracy for medium molecules. In industries like agriculture and material science, such technology will accelerate battery and fertiliser design processes.⁵⁴

Beyond cryptography, in the domain of machine learning, 500 to 1,000 qubits may embed quantum kernels into classical machine learning pipelines—fast linear algebra subroutines inside the classical pipelines that can yield speed-ups in classification problems.⁵⁵ Once the hardware exceeds the 1,000-qubit threshold (with suitable error correction), city-scale traffic management will be within reach.⁵⁶

Cost Perspective

Owning a quantum computer is an expensive affair. Estimates exist that it cost around 40 million euros over the period 2021–24 for Fraunhofer to install an IBM Q System One with ancillary infrastructure cost.⁵⁷ The cost of D-Wave's 2,000-qubit annealer is at US\$15 million. A standalone dilution refrigerator can cost around US\$1 million to US\$3 million.⁵⁸

Compared with owning a quantum computer, cloud access is far cheaper and has become an affordable option for many users. On Amazon Braket, a single shot on IonQ Forte costs US\$0.08 with a US\$0.3 task fee. The complete machine can be reserved for US\$7,000 per hour. Rigetti's 84-qubit Ankaa costs US\$0.0009 per shot or US\$5,750 per reserved hour.⁵⁹

Looking at future perspectives, a 10,000-qubit machine would fall within the US\$1 billion to US\$2 billion range. This estimate considers the costs of infrastructure, hardware, installation, integration and servicing.^{60 61} But this cost is likely to reduce over the years as quantum hardware matures and quantum systems become more publicly available. Since the ADF may not need to use quantum algorithms frequently, it could access the

technology with a cloud-based access set-up and eventually shift towards owning a complete quantum computer once the technology has further matured and in response to its evolving needs. As the load and dependency increase towards a quantum solution, owning a computer becomes more cost-efficient.

Conclusion

The scale of planning required to effectively employ RAS platforms in the future battlespace is likely to be intractable without new computational methods. The usage of quantum computing with RAS represents a paradigm shift in the way complex mission planning and multi-agent systems are coordinated. Classical computational methods, while good for small-scale problems, become exponentially more complex as the task size and agent count increase. Quantum algorithms—which leverage the principles of superposition, entanglement and interference—offer a new approach. In short, quantum computers hold the potential to overcome classical computational bottlenecks.

This article has explored multiple algorithmic approaches suitable for RAS planning such as QAOA, quantum annealing, VQE, quantum walk and Grover-based methods. Every algorithm has a unique strength and suitability for specific types of RAS problems. For example, QAOA has hybrid adaptability and compatibility with NISQ devices. Annealing has hardware maturity and is fit for QUBO-structured problems. VQE allows for flexible parametrisation of cost functions. All these algorithms together enable a diverse toolbox for tackling a range of RAS applications.

The detailed explanation of QAOA (starting from the issue of problem encoding via QUBO to the Ising Hamiltonian and the circuit design) has demonstrated its utility in solving complex optimisation tasks such as TSP and VRP. The qubit projection analysis has further highlighted the scaling challenges for pure quantum solutions. As has been shown, even a moderate-sized RAS problem can demand qubits that are beyond the capabilities of currently available hardware. The projections for advances in quantum technology show the importance of hybrid quantum integration to achieving feasible use of quantum technology in the near term.

The landscape of quantum computer hardware is evolving rapidly. Examples include IBM's 400-plus qubit processors, Google's Willow processor and the emergence of photonic, ion trap, neutral atom and topological qubit technologies. The trajectory of qubit growth and error correction has also been presented in detail. With the anticipated arrival of 10,000-plus qubit systems by 2027, quantum hardware is on a path towards commercial and military deployment. Continuous research and innovation is required, however, to address challenges such as decoherence, gate fidelity and errors.

There are promising developments in the application of quantum technology. In the near term, quantum algorithms may offer speed-ups in solution quality for mid-sized routing and scheduling problems. In the longer term, fault-tolerant computers may emerge, and solutions to problems such as city-wide autonomous traffic management or large-scale RAS operations may become feasible. Cost dynamics suggest that cloud access is the most economically viable option for accessing quantum technology, especially for the military or other government sectors that are still exploring its potential uses. Over time, as hardware and use cases mature, government agencies may choose to acquire quantum computers for their own exclusive use.

In summary, quantum computing holds immense transformative potential for solving RAS planning problems. The practical realisation of this potential, however, requires a phased approach. For the ADF, this is likely to involve leveraging hybrid quantum-classical algorithms before gradually transitioning towards a more comprehensive approach. This article lays the foundation for integration efforts and offers a roadmap for future exploration and adoption.

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/ MISSION COMMAND IN A MULTI-DOMAIN LITTORAL ENVIRONMENT: KEY INGREDIENT OR HOLDOVER?

Charles Miller

Mission command is the Australian Army's reigning command doctrine.¹ In this regard, Australian philosophy and practice are consistent with those of the United States and of NATO.² Underpinning the widespread belief in mission command among developed world militaries is a scholarly consensus that, until recently, held that armies which practise mission command or mission command-like philosophies should be more effective on the battlefield. Many scholars have attributed the fighting ability of forces such as the German Wehrmacht in World War II, the Israel Defense Forces (IDF) in the Six-Day War and Yom Kippur War, and the United States Marine Corps in the Gulf War at least in part to their practice of mission command.³ At the same time, however, many military analysts and professionals have argued that in a modern battlespace, especially in a complex environment such as the littoral, mission command should no longer be seen as the only appropriate form of command. In this article, I explore both sides of this debate and apply them to the modern littoral environment. I conclude that the mission command sceptics are broadly correct: while mission command is still appropriate in many circumstances, there are also a large set of occasions in the modern littoral environment in which a more centralised command style would be more fitting. Consequently, the recent shift in the ADF's philosophical doctrine with respect to command—that command exists on a spectrum from more to less centralised and that the right point on the spectrum depends on context⁴—is well advised. The Army should further ensure that personnel are trained to fight both under mission command and under a more centralised command style (what ADF doctrine terms 'prescriptive command'⁵) and to switch between the two command styles as appropriate.

Decentralisation implies granting subordinates a high degree of autonomy in deciding on the details of mission implementation—in some readings, it even implies the right to disobey a superior's orders if these are judged inappropriate in light of the subordinate's understanding of the situation. Mission command is characterised by many—including

by ADF doctrine—as a decentralised command philosophy, though it is important to stress that subordinates under mission command must still act in accordance with their superior’s intent. Mission command is thus not pure decentralisation, but decentralisation only relative to other types of command style. It is nonetheless the element of decentralisation in mission command which some theorists argue makes mission command so potent. Their argument is that the modern battlefield is so fast moving, and the local knowledge of superior officers often so restricted, that decentralised command and control is essential to military effectiveness.⁶ This theory, however, depends on these assumptions about the modern battlefield. Believers in decentralisation argue, for example, that in past historical eras (for instance, in the Napoleonic Wars), battlefield observability was greater and hence centralised command and control was more appropriate.⁷

The dominance of mission command, however, has increasingly been questioned. In the modern environment, many security scholars argue that conditions have again changed, such that decentralisation, which was appropriate for the 20th century, may no longer be so to the same extent today. Two factors specifically are held to have changed. First, modern communications allow for much closer observation of the battlespace by superior officers than was possible in, say, the 1940s or 1960s. Thus, the information gap between superior and subordinate—which was a key argument in favour of decentralisation—no longer holds to the same degree. Second, the growing number of capabilities which must be synchronised across different domains—multi-domain operations—makes it increasingly risky for subordinate commanders to ‘do their own thing’. These factors may be especially important in the littoral environment, which has been identified as the Australian Defence Force’s principal area of concern in the future.⁸ In the littoral environment, the Army’s combat arms must not only cooperate with each other but also work closely with the RAAF and RAN, with the ADF’s space and cyber capabilities, and most likely with one or more allies. They must do so in a contested environment, most likely with a peer competitor which will contest the electromagnetic spectrum (EMS) and in which resupply will prove especially challenging. In light of this, then, some authors argue that in a modern littoral environment, mission command should no longer be assumed to be the only or optimal command philosophy.⁹

In this paper, I begin by recapping the arguments in favour of decentralisation. I then contrast these arguments with the growing literature which qualifies the view that decentralisation is optimal for military effectiveness, especially in a 21st-century littoral environment characterised by increasing observability, interdependence among elements of the joint force, and importance of high-level assets whose control cannot be usefully decentralised. I conclude in favour of the position that mission command still has a place as one of the possible command styles the Army might choose to employ, but not as the only one.

Decentralisation and Military Effectiveness: the Argument in Favour

Decentralisation has been seen as the key to success on the battlefield. The Ukrainian army's effective resistance to the Russian invasion, for instance, surprised many observers who sought explanations. Crucial, for many, was the Ukrainian army's greater ability to adopt mission command;¹⁰ in making this argument, Joe Junguzza and Kelly Lelito are expressing the consensus in the literature on military effectiveness. Stephen Biddle's influential 'modern system', a type of force employment which he argues is crucial to success in modern war, is crucially dependent on the ability of armies to decentralise command.¹¹ Similarly, David Barno and Nora Bensahel write that '[mission command] is rightly seen among military leaders as the most important precept of US military leadership. Mission command will remain extremely important in future wars'.¹²

Many other security scholars treat decentralisation as an intervening variable between broader social or political variables and military effectiveness. Decentralisation itself is assumed to promote military effectiveness—the question is rather why, in light of this, some armies do not choose to decentralise. For example, Daniel Reiter and Allen C Stam argue that autocratic political systems promote centralised command in order to protect their domestic political power.¹³ Caitlin Talmadge promotes more nuanced distinctions between different types of autocratic regimes, arguing that autocracies facing greater external threats will decentralise command (and hence fight more effectively) while autocracies facing greater internal threats, such as coups, will centralise command (and hence fight less effectively).¹⁴ Stephen Rosen argues that ethnically heterogeneous societies will tend to produce more centralised military command styles.¹⁵ In a similar vein, Jason Lyall argues that armies from states characterised by widespread repression of excluded ethnic groups will promote centralisation even though this reduces their fighting effectiveness against external foes.¹⁶ Kenneth Pollack argues that ingrained cultural values—such as entrenched belief in social hierarchy in the Arab world—make it harder for some armies to fight in a decentralised manner.¹⁷ In each of these cases, however, decentralisation equals effectiveness.

It is worth examining in detail why these strands of the literature hold that decentralisation is good for military effectiveness. The primary reason relates to the nature of the modern battlefield.

Stephen Biddle outlines this argument in the greatest detail in *Military Power*. Biddle notes that the increasing range, accuracy and volume of firepower (resulting from technological innovations such as rifling, breech loading mechanisms and automatic fire) from the early 19th to the early 20th century required radical decreases in troop concentration in order to ensure survivability.¹⁸ These developments led in turn to a radical reduction in the ability of superiors to observe and communicate with their subordinates. In the early 19th century, for instance, armies fought in densely packed

formations. This, Biddle argues, allowed for direct observation of most—if not all—of the battlefield by high command echelons.¹⁹ By the end of the First World War, however, troops fought in such a dispersed manner that even junior officers would have found it difficult to observe the actions of most of their subordinates.²⁰ Dispersion not only reduced the ability of commanders to observe their subordinates; it also reduced their ability to communicate with them, since with the majority of subordinates voice communication would no longer be audible.²¹

These two developments resulting from greater dispersion—reduced observability and reduced communication—made decentralisation more imperative in Biddle's view. If a superior cannot see what the situation looks like from the perspective of his subordinates, he or she cannot give them effective orders, at least not in a timely manner. This is especially important if the situation on the ground changes rapidly in a manner unanticipated by the commander, necessitating adaptation. Consequently, if those subordinates instead are trained and motivated to make decisions for themselves, decisions will be made more quickly and also more appropriately for the circumstances. Similarly, if communication between superiors and subordinates is harder and slower, timely and appropriate decisions will be more likely under a decentralised command and control system than a centralised one.

The pro-decentralisation argument rests on a number of cases from modern military history. The German army's traditional command system of *Auftragstaktik*, from which the modern concept of mission command derives, arguably stressed a more decentralised command and control system than that of comparable armies in the First World War and Second World War.²² Many historians have consequently argued that the tactical achievements of the German army in the world wars—the Germans' ability to hold off superior numbers and materiel in both wars, the rapid conquests of the Blitzkrieg in the second—are directly related to this decentralised philosophy.²³ Indeed, Biddle and others argue that the 'modern system' around which modern war is still based today was created by the Germans in the later stages of World War I. The belief that Germany's tactical achievements in the world wars were attributable to *Auftragstaktik* led to the adoption of decentralised command and control by their former enemies, the British and Americans, after World War II. The fact that Germany lost both world wars was not considered to detract from the potency of decentralised command and control, since German defeats were ascribed to defects in areas of warfare besides tactical combat on land (for example, air and naval warfare, industrial production and alliance diplomacy).²⁴ Instead, decentralised command and control was seen as providing an explanation for why Germany had held out for so long and achieved so much despite their deficiencies in other areas. Similarly, the crushing tactical victories of the IDF against Arab armies, especially in the Six-Day War of 1967 and to a lesser extent in the 1948 Arab–Israeli War, the Suez Crisis and the Yom Kippur War, were ascribed to the IDF's adoption of

decentralisation.²⁵ By contrast, the IDF's decreased effectiveness from the 1970s onwards has been attributed to creeping command centralisation.²⁶ Decentralised command and control has also been seen as key to the fighting effectiveness of the United States Marine Corps in conflicts such as the Gulf War of 1991.²⁷

This view of the positive effects of decentralisation on effectiveness may be convincing on both a theoretical and an empirical level for warfare in the 20th century. It does, however, depend on the interaction between a number of assumptions about the contemporary battlefield. For instance, the argument that greater dispersal implies a greater need for decentralisation rests on the assumption that there will not be countervailing technological advancements which restore observability and communication even in the presence of radical dispersal. Satellites and helmet-mounted cameras, for instance, can allow a commander, should she so choose, to close the gap in information about the battlespace between her and her subordinates. The question of the desirability of centralisation therefore relies in part on the extent to which advances in C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) technology can compensate for the increasing troop dispersal imposed by precision fires. This reasoning, along with several other considerations, has led security scholars to temper the view that decentralisation is necessarily always optimal, as I will now explore.

The Case for Greater Centralisation

Modern critics argue that mission command and decentralisation have come to be romanticised²⁸ and may even be favoured for reasons which are not, strictly speaking, related to military effectiveness, such as the idea that decentralisation is an appropriate command philosophy for the army of a free society.²⁹ Even if decentralisation is more normatively appropriate for a democracy, this does not mean that mission command is always the approach which will get results on the battlefield. Analysts such as Amos Fox, Andrew Hill and Heath Niemi have argued even further, in the context of the modern US military, that mission command has become something of a dogma. Fox writes:

Army mission command doctrine is, in effect, being applied in a prescriptive manner. The Army dictates the primacy of mission command instead of providing commanders and staffs with options for directing action within their commands.³⁰

Hill and Niemi concur:

Mission command is presented as a premise of effective command—‘Given that I am decentralizing control as much as possible (that is, exercising mission command), how should I command?’—when it is in fact just one of many possible answers to the question of control, and not always the right one.³¹

On the empirical level, David Stahel has questioned the degree to which the German army in World War II actually did practise mission command. He argues that in most cases centralisation was more common at the tactical level and that decentralisation at the operational level in fact represented senior officers' 'going their own way' rather than the exercise of disciplined initiative within the constraints of their commanders' intent, as the modern doctrine of mission command requires.³² This in turn challenges the idea that *Auftragstaktik* was the 'secret sauce' which made the Wehrmacht so effective in ground combat. There are of course many other empirical cases which appear to support the idea that decentralisation fosters combat effectiveness, but the German case is the original and the most influential. If decentralisation was not the reason for the Wehrmacht's proficiency, this seriously undermines the case for decentralisation in general.

When might centralisation be superior to decentralisation?

More senior-level commanders may not have as good a view of the local-level situation confronting their subordinates, but they most likely have a superior view of the overall operational picture and where each tactical fight fits in. Mission command attempts to reconcile this fact with decentralisation via the concept of the commander's intent, which must be communicated clearly to subordinates. At the same time, however, senior-level commanders are also likely to be in somewhat safer circumstances than their subordinates, further from the front line. This gives them the ability to make decisions without having to be concerned (at least to the same degree) with their own immediate physical survival. Senior-level commanders are generally supported by staffs and a suite of decision support tools unavailable to their subordinates. Senior-level commanders can also collate and transmit information from one lower-level unit to another—lower-level tactical innovations and adaptations, for instance. Recognising these advantages, many security scholars argue that under some circumstances, centralised command and control is likely to be preferable to decentralisation.

Ryan Grauer, for instance, argues that centralised command styles are more appropriate in armies facing a relatively slowly changing tactical environment.³³ Theo Farrell argues that the decision on whether to centralise can be seen in light of the 'explore/exploit' trade-off—decentralisation is advisable where armies need to explore new solutions and ways of doing things, while centralisation is preferable where the need is to exploit existing solutions.³⁴ Michael Huntzeker argues that an adaptive army is one which combines elements of both centralisation and decentralisation—some decentralisation to allow units to experiment with new innovations, some centralisation to spread good innovations across the army.³⁵ Huntzeker also notes that many armies have, historically, switched between centralisation and decentralisation as needed, even over the course of the same day (the example he gives is of fire control in World War I).³⁶

Organisational theorists have also produced a number of arguments—not confined to the military context—as to why one would opt for a more or less decentralised decision architecture. The social scientists Chanuwas Aswamenakul, Paul Smaldino and Tyler Marghetis, for example, argue that organisations face a fundamental trade-off between decision quality and decision speed.³⁷ Ideally, of course, an organisation should make good decisions quickly, but there is an inherent trade-off between speed and quality. Better decisions arise from extensive exploration of many possible options and rigorous evaluation of alternatives, but this takes time. Some organisations operate in a context where decisions must be made quickly, even if this implies sacrificing a certain degree of decision quality. Organisations on the other side of the spectrum, by contrast, are better advised to take their time to make quality decisions. The more an organisation is in an environment requiring quick decisions, Smaldino argues, the more that organisation’s decision architecture should be centralised. The more an organisation is in an environment requiring high-quality decisions, even at the cost of delay, the more decentralised should its decision architecture be.

Similarly, organisational economists Wouter Dessein and Tano Santos argue that organisations face a trade-off between coordination and adaptation. The more decentralised an organisation, the better its constituent units can adapt to unforeseen circumstances. But decentralised organisations come with a cost—they make it harder for an organisation’s constituent units to coordinate with one another. In the extreme case, if every constituent unit has the right to do what it wants, each one may end up acting at cross-purposes with the others. Consequently, Dessein and Santos argue that an organisation’s degree of centralisation/decentralisation depends on its relative need for adaptation versus coordination—the more an organisation needs to be adaptive, the more decentralised it will be; the more an organisation needs to coordinate, the more centralised it will be.³⁸ Again, ideally, an organisation would be both adaptive and well coordinated, but in practice it is difficult to increase an organisation’s ability to do one without reducing its ability to do the other.

The implications of this discussion for military command styles are clear: the more the contemporary battlespace requires coordination between disparate units and rapid decision-making at higher echelons, the more *centralised* decision-making should be. In the following section, I will apply these considerations to warfare in a modern littoral environment.

Command Style in the Modern Littoral

A modern conventional battlespace in any environment is more complex and interdependent than its 20th-century equivalent and hence requires greater coordination. In addition to coordinating infantry, armour, artillery and aircraft as their forebears did, modern commanders must reckon with unmanned and autonomous systems both in the air and on land; satellite and aerial reconnaissance; cyberspace; and the crucial battle for the EMS. It is for this reason that military professionals speak not only of combined arms warfare or joint operations but also of multi-domain operations. All of these developments imply an even greater need for coordination in the modern battlespace relative to the 20th-century environment described by Biddle and others.

By the same token, the need for rapid decisions is implied by the tight coupling between these systems and the resultant short windows of opportunity for concerted action. A window of opportunity might, for instance, be created by a cyber exploit which temporarily disables hostile satellite reconnaissance or integrated air missile defence systems. This window of opportunity would then require rapid, concerted action by the joint force—perhaps long-range artillery and air power working in concert with armour, infantry and drones, depending on the context.

Alternatively, many operations in the modern battlespace require carefully staged, sequential action. A subordinate commander acting out of turn would create a significant risk to his forces. In his description of modern warfare in Ukraine, for instance, Jack Watling describes a battlefield in which successful offensive operations require carefully choreographed movements from a number of units acting in sequence. A sector must be surveyed first— primarily by unmanned aerial vehicles (UAVs)—then isolated by UAVs and artillery, then degraded and fixed by a combination of capabilities including unmanned ground vehicles and more conventional artillery. Only after all of these missions have been achieved successfully can the attacker close in and destroy the enemy with a combination of tanks and armoured personnel carrier mounted infantry.³⁹ A subordinate commander who acted out of turn and attempted to complete the final stage before the survey, isolate, degrade and fix stages had been completed would simply see his forces wiped out by enemy firepower. Yet the capabilities necessary to achieve all of these stages in turn must be coordinated at a relatively high level.

If the modern battlespace is one which requires a greater degree of centralisation than before, this is even more true in the case of the littoral environment. Littoral warfare in the form of amphibious operations has always been recognised as necessitating careful coordination. Landings must be carefully scheduled to ensure optimal timing, assault waves must be carefully scheduled to allow for the most rapid build-up of combat power on the beachhead, fire support must be coordinated between army, navy and air force, and so on.⁴⁰ The littoral has always been recognised as an environment in which the three

services must operate jointly, which requires extensive coordination and hence a tighter degree of central control.

In the modern littoral, the army's long-range precision strike capabilities are used in part to deny the use of the sea to hostile foreign powers.⁴¹ In this task, long-range precision strike units should expect to be protected by shorter-range fires, infantry, drones and other ground units against hostile ground attack. Integrated air missile defence systems protect the core long-range strike units from hostile air and missile attacks. Friendly air assets carry out reconnaissance, protect the army's long-range strike units and pose a threat to hostile ground and sea units alike. Friendly naval assets present an additional threat vector to hostile naval assets, resupply or protect the sea lines of communication of friendly ground units, and can—through long-range strikes of their own—pose a threat to hostile ground forces too. Sitting alongside these capabilities, EMS units protect the electromagnetic spectrum to allow for friendly communications and targeting and to deny it to the enemy. Space assets assist friendly communications and reconnaissance; however, space assets are rare and expensive national-level capabilities—control over them cannot usefully be devolved to lower-level tactical commanders. Cyber units ensure the integrity of friendly communications and attempt to attack those of the enemy. Since cyber units protect friendly and attack hostile systems, their operations are generally harder to localise and subject to lower-level control. This is before one considers the complexity of cooperation with host country and allied units. In short, the situation is one of high complexity, requiring coordination and synchronisation among units from multiple domains to an even greater degree than might be necessary in other land power contexts.

The demands of synchronicity are pushing command and control in the littoral in the same direction. Analysis of the littoral environment suggests that the army may need to exploit fleeting windows of opportunity. Suppose, for instance, that friendly reconnaissance identifies a high-value naval target in range of land-based long-range precision fires. Hostile reconnaissance is temporarily disabled by a cyber exploit. In this situation, a variety of units will need to work in concert—quickly (while the opportunity remains) and in a manner which leaves less room for lower-level autonomy.

Similarly, in the littoral, the strategic and political consequences of command decisions are likely to be greater than in a purely land power context. Whereas in a land power context far from the sea (consider the Donbas, for instance), a command decision might lead to the destruction of an enemy tank or supply depot, in the littoral, a command decision could lead to the destruction of a billion-dollar destroyer, frigate or amphibious assault ship.

Logistics are another complicating factor. Given the geography of the Indo-Pacific littoral, supplies would have to cross large distances contested by the enemy. Depending on the positioning of friendly forces, host resupply may be limited in certain important respects.

Pre-positioning supplies may help in some respects but can only be effective for so long. Consequently, the need to coordinate complex resupply operations across long and possibly contested distances implies an additional level of complexity, which is likely to also imply greater centralisation. A commander unsure of the timing or extent of resupply cannot allow a subordinate to use too much existing stock.

At the same time, however, mission command would not be entirely out of place in a littoral environment. Advances in C4ISR technology have unquestionably increased the timeliness, granularity and fidelity of information. This would of course imply that the information asymmetry between subordinates and superiors has been reduced, and with it—seemingly, at least—the need for decentralisation. However, this overlooks the extent to which enemy action is likely to complicate the picture. Communications could be cut off, hacked or spoofed. At the least, the need for signature reduction implies that communications technology cannot be used to the fullest extent technologically possible against a peer competitor. In light of this, the information asymmetry between subordinates and superiors is likely to persist, even if in reduced form. Moreover, even if C4ISR technology were to be used to its fullest extent, there would remain inherent cognitive limits on the amount of information any one individual can take in. Consequently, for reasons of commander attention if nothing else, a fundamental degree of information asymmetry between superiors and subordinates will persist.

There are also likely to remain a number of tactical situations in a littoral environment in which decentralised command is likely to be optimal. For instance, one possible counter to the use of long-range precision fires against shipping is ground assault against the long-range precision fire units. This in turn could result in ‘old-fashioned’ ground combat between hostile ground assault forces and friendly forces protecting the long-range precision fire units. Given the geography of the Indo-Pacific, this would imply infantry jungle fighting. In such a scenario, independent small-unit decision-making would be key. This is especially so given the known negative effects of tree cover and foliage on the ability of reconnaissance assets to operate effectively.⁴²

Conclusion

In this paper I have examined the debate about command centralisation and decentralisation, with special relevance to the littoral environment. I outlined the one-time consensus view in many circles that decentralisation as exemplified by mission command is always the best way to exercise command in modern land warfare. I then examined the growing challenge to this consensus in academic and policy circles and explained why, and in what circumstances, a more centralised command style might be preferable—namely, where coordination among various arms is very important, rapid decision-making

at higher echelons is required and modern communications technology reduces the gap in situational awareness between superior and subordinate. Applying this to the modern littoral environment, I argued that precisely these circumstances are likely to occur frequently in the future. Tight coordination among capabilities across multiple domains, many of which cannot by nature be subjected to decentralised control, will necessitate greater command centralisation, as will the necessity of coordinating with allies and host nations and of operating in an environment in which resupply cannot be taken for granted. The requirement for rapid action at higher domains will likewise push in the direction of greater centralisation, while modern C4ISR technology will reduce the gap in situational awareness between seniors and subordinates which had previously been taken to necessitate greater decentralisation. At the same time, however, mission command may remain important in many circumstances. C4ISR technology is not perfect and can be spoofed, jammed, hacked or destroyed. The demands of signature reduction will also ensure that asymmetries in situational awareness will not disappear entirely. Ground jungle combat in the specific context of the Indo-Pacific littoral, with low observability, will also necessitate decentralisation at some times and in some places.

This means that mission command will still be important—there are likely to be many circumstances in a modern littoral environment in which decentralisation will be necessary— but that it will no longer be the only command style. Training for a littoral environment should focus on both centralised and decentralised command and control, and on the ability to switch between the two as circumstances change.

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/ CIVIL–MILITARY RELATIONS IN DEMOCRACY: THE MUTUAL OBLIGATIONS OF THE PUBLIC, CIVILIAN LEADERS AND THE MILITARY

Risa Brooks

In any democracy, the military’s relationship with the country’s civilian leaders and the public—its civil–military relations—is foundational to its capacity to safeguard its national sovereignty from external threats and challenges. Those relations shape the quality of interaction between military and civilian leaders in strategic assessment, ensuring that a state’s strategies in armed conflict are thoroughly tested, evaluated against resource and other constraints, and aligned with national objectives. Civil–military relations also affect accountability for how the military is used and how well it performs, and the capacity to address organisational problems or resource misalignments within it. And ultimately, they affect public trust and confidence in one of the most important institutions in the state: the military. Such trust is foundational to building the societal consensus necessary to adequately and appropriately fund the armed forces. These are just some of the ways in which civil–military relations are vital to the state’s ability to develop the strategies and capabilities essential to deterring foreign aggression and to fighting wars effectively if deterrence fails.

Despite its importance, the topic of civil–military relations is too often neglected by national security professionals, by civilian leaders, and within the professional development of military personnel. For the military, in particular, the issues associated with civil–military relations can seem abstract or remote from the more concrete and tangible tasks required to prepare for a potential war. Yet without due attention to civil–military relations, the armed forces’ ability to perform this essential work is undermined.

Civil–military relations describe a set of interactions and mutual obligations between three sets of actors: the public, civilian leaders and the military. In those relations, each group has divergent perspectives, equities and responsibilities.¹ This article explores the roles

of the public, civilian leaders and the military, describing essential responsibilities and outlining common challenges and obstacles that can work against each group fulfilling its respective obligations.² It conceptualises these obligations in general terms so that the core principles and issues can be assessed in the context of the unique and evolving experiences of different democracies, including Australia's distinctive national experience. The text draws on many examples from the United States, where there has long been lively scholarly debate about civil–military relations, as well as on examples from other democracies, including Australia's. The article aims to provide a descriptive survey of the variety and diversity of civil–military relations concerns so that readers have a sense of the full landscape of issues that can arise. The salient problems in a given political or strategic moment or national setting will inevitably vary; therefore, this article should be taken as a point of departure for future debate and research about civil–military relations tailored to different national contexts.

The Public's Obligations

Of the three core actors, the public's obligations in civil–military relations are probably the most straightforward, if also the least appreciated and reflected upon. At the most basic level, these obligations entail that the public thoughtfully and respectfully consider—and, when needed, scrutinise—the military organisation and its activities, as well as its performance in the missions and armed conflicts in which its forces and personnel are engaged on behalf of the country. The public should hold the military—and the civilians who oversee it—to a high standard, expecting accountability for problems and shortcomings, while understanding the vital role the military plays in protecting the country's security.

To be sure, that ideal is rarely achieved in any democracy. In part, this arises from the simple fact that citizens' time and attention are limited. Many democracies also maintain primarily professional militaries drawn from a narrow segment of society. In these contexts, citizens are less likely to have a baseline exposure to the military, and they lack significant incentives to devote time and attention to matters pertaining to it.

While these are challenges that are common across democracies, there are also specific cultural and societal dynamics that can further undermine the capacity of the public to meet its obligations in civil–military relations. One of these dynamics occurs when society evinces what author and journalist James Fallows characterises as a kind of blind reverence towards the military: a situation in which the military is highly revered symbolically and culturally, but the public knows very little about it. In his article 'The Tragedy of the American Military', Fallows describes how this dynamic is expressed in the United States.³ He observes that the public deeply admires the military—often

putting it on a pedestal—while noting that this regard is often superficial. Fallows frames this as a tragedy because what he believes the US military needs to remain healthy and protect the country’s security is the public’s attention, not simply its adulation.

There are several indications of this social esteem for the military in the US context. Since the 1990s, the military has been at or near the top in biannual polling by the Gallup organisation about Americans’ confidence in institutions, beating out the courts, police, and even religious institutions.⁴ There are also many signs of this reverence in popular culture. At sporting events, soldiers are sometimes brought onto the playing field or into the arena with an array of patriotic symbols. At the same time, service members and veterans enjoy a variety of perquisites in civilian society, such as discounts at retailers or early boarding on airlines, that are often not made available to other service professions. Members of the public may approach soldiers in uniform, greeting them with the phrase, ‘Thank you for your service’. That sentiment is well-meaning and sincere but nonetheless frequently indicates a lack of familiarity or knowledge about how else to interact with service members. For some on the receiving end of that message, the interaction can feel alienating and distancing. As Marine Corps veteran and author Phil Klay explains, it can be disorienting for ‘warriors at the mall’⁵ to interact with a society that knows little about the experience of military service.

Many Americans lack even basic knowledge about the military. In surveys by the US Army Recruiting Command in 2023, 50 per cent of respondents reported knowing little to nothing about military service.⁶ A survey by the Association of the United States Army in 2022 found:

[N]early one-third of Gen Z respondents believe that most Army jobs are combat roles, though the Army offers over 200 jobs across a variety of fields. Further, just 51% of Gen Z respondents think that soldiers are allowed time to pursue their hobbies or recreation.

To try to counter this knowledge deficit, the US Army has invested in a promotional program called ‘Know your Army’, in which it develops short videos that are shown on various media platforms.⁷

The reasons for this disengagement are complex. One factor is the family basis for military service; nearly 80 per cent of those who join the US military have had a family member who served.⁸ This makes it less likely that other citizens will get to know service members and naturally interact with them. The disproportionate location of military bases in the country’s sun belt, as well as the end of conscription in 1973, also contribute to this dynamic. Regardless of its causes, however, this ‘blind reverence’ can yield a superficiality in how the public views the military.

Equally unhelpful is a circumstance in which the public is simply uninterested in the military and shows little inclination to learn or engage with its affairs. In these cases, the military is not part of the national conversation in a meaningful sense. An atmosphere of complacency or even of scepticism about the importance of national defence in general—and the military in particular— may prevail. The public looks to the government to manage the affairs of the state and adopts a stance of indifference or what is assumed to be benign neglect.

A society's understanding of the military may also be coloured by historical metaphors that are out of sync with its contemporary character or with the nature of the threat environment in which it operates. A mythology or mystification of the military, its history and its accomplishments can obscure current challenges in both domains. To be sure, commemoration and national memory, as well as honouring the sacrifices of those who have served, are essential in democratic societies; they help provide a shared national identity and help maintain a commitment by society to care for its veterans.

Yet deeply rooted cultural metaphors can also complicate the contemporary societal–military relationship. In the United States, the cultural perception of those who fought in World War II as the 'greatest generation' has served as a powerful narrative of unity and victory and a foundation for veneration of those who served in the war. In her book *Looking for the Good War*, however, Elizabeth Samet describes how this romanticised view can also foster a distorted understanding of how wars occur, and cause confusion and disorientation when they depart from that simple narrative.⁹ Iconic films like *Saving Private Ryan* reinforce that theme, suggesting that wars worth fighting are defined by moral clarity and unfold in discrete failures and successes that ultimately build towards victory. Perhaps similarly, in Australia, the ANZAC spirit provides an important source of inspiration in its narrative about the grit and determination of young, inexperienced soldiers fighting heroically on behalf of their fledgling nation. That conception is foundational to Australians' national identity and to how they understand the role of the Army within it.¹⁰ Yet that image is in some ways at odds with the modern Army's character and the strategic challenges it faces today. That historical vantage point for viewing the military may make it harder for people to relate to and understand what is involved in military service and to support and honour service members in the concrete ways they may need in the present.¹¹

All of the above dynamics inhibit both the society's engagement with the military and the society's capacity to meet its obligations to civil–military relations, especially in ensuring the military's health and capacity to perform its ultimate job: fighting wars in defence of the country.

Why is such engagement important? The public plays an essential role in guaranteeing that elected leaders, who are ultimately in charge of the military, have the incentives to investigate problems and provide the military with adequate and appropriate resources, guidance and direction to protect the country's security.¹² Public pressure is also essential to ensuring that myriad organisational inefficiencies, from those associated with procurement and acquisitions to those involving personnel recruitment and training, are addressed; absent that public attention, politicians can sometimes neglect their responsibilities and fail to promote reform, especially when it is politically difficult to do so or when the problems are complex and difficult to solve.¹³ Demands from society for change create incentives for politicians to exercise oversight and address such issues.¹⁴

External pressure from society is especially important in addressing serious and systemic problems in the military organisation. Societal problems that afflict the military, such as sexual assault and harassment, can prove intractable without it. The record of how militaries deal with such problems on their own is not always encouraging. The US experience is once again instructive, showing how disruptive organisational changes needed to address endemic problems are less likely to occur without civilian direction.¹⁵ Other serious deficiencies, such as the failure to address abusive or ineffectual leadership in the military, can prove similarly challenging without external pressure by civilian leadership prompted by societal attention.¹⁶ Failure to address such problems can, in turn, have severe consequences for the health of the military. For example, one study found that mid-grade officers in the US Army are especially inclined to consider leaving service when they experience destructive leadership of this kind. In contrast, other studies have shown that concerns about sexual assault are a significant driver for women to leave the military.¹⁷

This accountability function is also especially important in wartime or when the military is engaged in domestic and foreign missions. Defects in how the military is prosecuting operations otherwise may be less likely to be addressed, and questions about when and whether such missions are a good use of the military's resources are less likely to be aired.

Civilian Leaders' Obligations

The country's elected civilian leadership—its political leaders—also maintain essential obligations to their country's civil–military relations. In liberal democracies, political leaders play a vital role as the political translation mechanisms through which the will of the people is channelled into how the military is resourced and organised, and when and how it is used for different missions and in armed conflict. Civil servants support elected leadership and provide expertise and bureaucratic capacity to help the military realise the objectives that elected leaders set for the armed forces; they help administer the military,

including in processes of civilian oversight.¹⁸ But the ultimate authority over the military in democratic settings, and the accountability for it, resides with political leaders.¹⁹ This is true even in democracies with a well-developed and highly capable public service.²⁰

Put otherwise, a key responsibility of elected leaders is to exercise civilian control over the military.²¹ While many are familiar with the broad concept of civilian control, however, its meaning is often poorly misunderstood as reducible to the exercise of command and to the authority of the civilian leadership. Civilian control is thought to be intact as long as civilians are in charge and the military follows their orders and complies with their directives.

In practice, civilian control entails much more than following orders; rarely is civilian authority challenged and overt disobedience an issue in democratic militaries. Rather, civilian control is better understood as a process of oversight and coordination within the military domain that varies across and within democracies. Ultimately, that process aims to promote military effectiveness in service of the state's overarching national security priorities: the integration of military activity, its responsiveness to internal and external constraints, the skill of its personnel and the quality of its weapons and equipment.²²

The process of civilian control is a function of the institutions, routines and informal conventions through which civilians interact with the military and oversee its activities.²³ Effective civilian control requires a robust process through which the activities of the military—whether in peacetime planning or in wartime operations—are carefully scrutinised by elected leaders, supported by their executive and/or legislative staffs and civil servants in the defence bureaucracy. Civilian control is operationalised through the multiplicity of regular and routine interactions between and among civilians and uniformed officials.²⁴ It is only through these interactions that one can ensure that what is done in the military domain will support and promote elected leaders' ultimate objectives.

Despite the centrality of civilian control to democratic civil–military relations, very few democracies have fully developed processes for its practice.²⁵ Therefore, one responsibility of political leaders is to maintain sufficient capacity and investment in civilian oversight of the military. In addition, political leaders must prioritise defence matters themselves and routinely devote the scarce time and resources of their staff to such concerns. It is essential that elected civilian leaders understand their unique roles and identities as actors in the civil–military sphere and how they diverge from those of both civil servants and the uniformed military.²⁶ Elected leaders have obligations and perspectives that are distinct from those of public servants; similarly, the obligations and perspectives of public servants differ from those of their uniformed counterparts, even when the two groups work closely in the defence bureaucracy.²⁷ Ambiguity and poor role differentiation can be contrary to the exercise of civilian control.²⁸

In particular, elected leaders' distinctive expertise includes their exposure to and focus on domestic political concerns that include but are also beyond the military and defence sphere; this broad perspective is essential to ensuring that policy and strategy across the state's institutions are integrated. As part of their jobs, elected officials cultivate the political skills and acumen to help them play this role. Through civilian oversight they can ensure that developments within the military align with government priorities and that the institution is pressed to both report on and address any shortcomings.

This point underscores the importance of a related obligation, which is that politicians must ensure that adequate resources are devoted to cultivating civilian expertise in military affairs; this provides capacity for their staffs, political appointees and bureaucracy to support civilian oversight.²⁹ The acquisition of such expertise can be complicated for civilians who lack the structured educational opportunities that officers have access to at different career progression points in professional military education. The barriers to entry can be significant for civilians interested in military and defence matters, given the required technical knowledge, insight into and experience of military organisations, and knowledge of the fundamentals of armed conflict.³⁰ Even when civilians working in the political sphere or bureaucracy have prior military experience, that exposure is often a snapshot, at best, of the kinds of work or issues they must deal with when they become part of the defence establishment. Supporting investments in educational opportunities—such as building distinctive professional development programs or tracks primarily for civil servants in the defence space, freestanding technical programs for journalists or civil society groups, or curricula on defence issues in higher education—are ways that elected leaders can help build a pipeline of expertise. Indirectly, these actions promote a robust process of civilian control and oversight and thereby fulfil the obligation to promote healthy civil–military relations.

In addition to ensuring that there is sufficient human capital to provide for comprehensive civilian oversight, civilian officials need to ensure that the institutional infrastructure and routines are adequate. While the character of defence-related institutions will reflect and need to align with the particularities of a country's national institutions, there is often room for improvement in most democratic systems. To illustrate, the United States maintains Congressional committees in both the Senate and the House that are devoted to the armed forces, and each of these committees has designated subcommittees specialising in specific issues pertinent to the US military. These committees commonly call on the Pentagon's civilian leaders and its senior leaders to testify on concerns they have about the functioning of the defence bureaucracy or the uniformed military. While some hearings can become mired in partisan politics, considerable oversight work is undertaken on a routine basis in private. Even so, concerns persist that committee staffs are sometimes overburdened or lack the requisite expertise to help members of Congress in carrying out their oversight functions. A recent comprehensive study of oversight suggests that such problems in democracies are common and that, in some cases, those deficits are serious.³¹

However they are structured institutionally, oversight processes also need to enable interaction and feedback mechanisms across the military and civilian divide at different levels of the defence bureaucracy and military commands and staffs. Absent that institutional infrastructure, the civilian and military spheres can become siloed. In his study of civil–military relations in India, for example, Anit Mukherjee illustrates what can happen when civilian and military interaction is underdeveloped or truncated.³² Bureaucrats are solidly in charge of administering the military; in this respect, civilian control is well established. But the nature of civilian control processes as they are practised often inhibits full engagement at different levels across the military and civilian divide. This is magnified by dynamics in which some in the civil service are less than receptive to the expertise, experience and perspectives of their military counterparts. They may discount the advice of military personnel, attributing it to parochialism, or assume that these personnel lack broad exposure or even the sophistication to engage with complex defence problems. Mukherjee shows how in India, dynamics in which civil servants discount military expertise in this manner have hindered procurement, operations, jointness, military education, promotions and defence planning, thereby harming the country's national security.³³ To be sure, these biases can run both ways. Military personnel sometimes maintain negative stereotypes about public servants, viewing them as lacking essential technical expertise or experience, or as being overly caught up in bureaucratic routines. Bridging these culture divides is a challenge, but efforts to do so are vital to maintaining healthy civil–military relations.

Another key domain of civilian responsibility lies in the process of strategic assessment. Strategic assessment, broadly understood, refers to the interactions among military and civilian leaders at the apex of decision-making, where vital questions of military strategy are at stake. It encompasses examining the overall political goals of the country and what they imply for the military.³⁴ In support of the process of strategic assessment, core assumptions need to be probed and consideration needs to be given to how political objectives are translated into strategic concepts, operational plans and (at times) tactical engagements, and to how all of the above intersect in force development activities related to training, recruitment, procurement and the like.³⁵

In the event of armed conflict, political leaders at the highest levels solicit advice from their military counterparts, weighing the costs and risks of different military options and assessing how well they advance strategic and political goals. Those consultative processes ideally involve a healthy and forthright discussion in which elected leaders, because they are accountable to and represent the population, have the final say.³⁶ The significance of those processes, however, goes well beyond the exercise of civilian authority. Equally important is the quality of how civilians and the military interact within them. In that advisory domain, the military and civilian leaders naturally and appropriately bring to the table divergent expertise, perspectives and priorities. Some differences in

views and even some friction are therefore not unexpected and can be productive; they are necessary to ensure adequate investment in search and analysis and in constructive and thorough probing of the issues. Too much friction can prove dysfunctional, however, leading to competition, gamesmanship and rivalries between military and political leaders—as occurred in British civil–military relations under Prime Minister David Lloyd George during the First World War—or to a breakdown in communication, as occurred in the United States during the planning for the 2003 Iraq War under then Secretary of Defense Donald Rumsfeld.³⁷ President Abraham Lincoln’s interactions with the military in the American Civil War are sometimes cited as a more constructive example.³⁸

Specifically, there are several pitfalls for civilians to avoid in the domain of strategic assessment and in advisory processes and interactions. First, civilians should be wary of viewing the military and civilian interface in transactional terms. Such an approach is sometimes associated with the scholar Samuel Huntington’s objective control model of civil–military relations, which he develops in his classic work *The Soldier and the State*.³⁹ While military officers may not be familiar with Huntington’s name, his concepts have diffused throughout military organisations in many democracies and have strongly shaped military culture.

Specifically, Huntington posits that there are two discrete spheres: a political sphere, which is the realm of civilians and in which decisions about the objectives of armed conflict are made; and a military sphere, where those decisions are implemented by military leaders. According to this approach, civilians deliberate and decide among themselves the overall political goals for the use of force. They then hand off this guidance to the military to implement; the military approaches that process in a technical and apolitical fashion. This approach translates, more practically, into civilians offering guidance about preferred military outcomes, and military leaders devising and delivering options pursuant to those objectives. If civilians do not like these options, they ask the military to revise and revisit them. In other words, strategic assessment is practised in purely transactional terms.⁴⁰

A transactional approach carries with it four main dangers. First, it supports a static and top-down approach to strategy rather than a dynamic, iterative approach, or what Frank Hoffman describes as an “end to end” approach ... that encompasses policy formulation, strategy development, planning guidance, resource allocation and alignment, implementation oversight, and performance assessment based on feedback loops.⁴¹ Second, the siloing of the military and political spheres means that military expertise may not adequately inform discussion about overarching political objectives in an international crisis or armed conflict, and that these goals will not reflect constraints posed by the resources and capabilities of the military, or associated risks and costs. It can also inhibit the formulation of grand strategy or the integration of all instruments of statecraft—including diplomacy, financial tools and the like—with military resources.⁴²

Third, it supports a view among military professionals that war and military operations are ‘politics-free’ zones.⁴³ This approach fails to prime the military culturally to think through how military activity intersects with the political context in which even discrete tactical engagements or missions occur. Finally, and perhaps most importantly, it leaves—as Hew Strachan describes it—strategy by the wayside, an ‘orphan’ from war.⁴⁴ Strategy is the space between political objectives and military goals; it is the conceptualisation of how military actions generate strategic effects to advance political goals. With the military focused on implementation and devising alternative operational plans, and the political leadership devising preferred end-states in isolation, the conversation about strategy is truncated. Hence, the model of normatively appropriate civil–military relations embraced by military and political leaders can profoundly shape strategic assessment in ways both good and bad for the country’s security.

In this vein, civilians and military should be mindful of the cross-cultural differences that they must bridge in interacting with each other, especially with respect to strategy-making.⁴⁵ Military leaders, because of the functional demands of their jobs and the hierarchical style of their organisations, may favour a transactional style in which they seek guidance once civilian leaders have decided on their objectives and priorities, which the military leaders can then implement. Civilian leaders may favour the same style for political reasons—for example, if they anticipate that the military may have views that are at odds with civilians’ policy preferences.

Often, however, civilians will approach high-level assessment in a very different style from their military counterparts. Civilians may use a dialectical process to weigh their political goals in tandem with an exploration of possible military options; this style is out of sync with military leaders’ preferences for a clearly defined, discrete and efficiently delivered delineation of civilian goals that they can then act upon. Elected civilian leadership, in deciding how and when to use military force, may be looking for different things from the advisory process than military leaders are accustomed to offering. They may be looking for what amounts to a theory of how force might or might not be used in support of some coalescing political objectives.

A second pitfall relates to the dangers that arise when political leaders marginalise the military or fail to solicit military leaders’ views fully. Robust strategic assessment requires that political leaders seek forthright advice from the military, even when it is at odds with their preferences. In other words, it is incumbent upon elected leaders to encourage and seek out appropriate practices and routines (and ensure that they exist) to engage military leaders on strategic matters. In addition, political leaders need to signal clearly in actions and statements that they want to hear views that might weigh against their preferred policies or strategies. Unless civilian leaders convey that they are receptive to hearing unfavourable views, they are unlikely to receive them.

At the same time, civilians should be wary of the reverse dynamic in which they simply neglect their roles in strategic assessment, either through inattention or through undue deference, and delegate implementation to military leaders of inchoate or poorly conceived strategic objectives.⁴⁶ Elected leaders, supported by their personal staffs and defence bureaucracy, need to be actively involved in making decisions about strategic matters.

Among the risks of politicians devoting insufficient time to and investment in strategic assessment during periods of peace is that the country will lack developed strategic principles grounding the force development and planning activities essential to preparing for war. Capabilities—the acquisition of weapons systems, equipment, personnel and other resources—may then amount to de facto strategy without an adequate theory underpinning how those capabilities support strategic and political objectives.

In wartime, civilian disengagement can have other pernicious effects. It can leave military commanders on their own to improvise strategy, or lead to its wholesale neglect. This might manifest in commanders maintaining a mindset that success in war is achieved through campaign- or theatre-level objectives, or equating cumulative tactical accomplishments with strategic-level success. Civilians can help mitigate this dynamic by intervening to prompt commanders to scrutinise operational- and tactical-level connections to higher-order strategic effects and political goals. To be sure, ideally, high-level commanders are already inclined to do so; cultivating the capacity and inclination for strategic thinking and prioritisation among senior leaders and commanders is of paramount importance to ensuring strategic effectiveness in war. But practically, military commanders often become absorbed in the operational and tactical levels of war, as these can take on an immediacy and momentum of their own in the midst of armed conflict that may be prioritised over probing more expansive, strategic effects. As Alice Hunt Friend puts it:

Operational and tactical-level contexts can have incentive structures that are separate from national purposes, and political leaders can lose control of military campaigns if they aren't proactively evaluating the first-order diplomatic and political purposes of applying force.⁴⁷

In part for this reason, civilians play a vital role in ensuring that connections between and among levels of military activity and political goals are robust.

In the absence of that civilian–military interface in strategic assessment, there is a tendency for countries to succumb to what I term 'strategic backfilling'.⁴⁸ This occurs when operational and tactical developments cumulatively become a substitute for strategy. In other words, campaigns or battles are assumed to have strategic effects, whether or not they do.

Finally, one last set of obligations that civilian leaders have relates to the information they owe the public to which they are accountable. Political leaders need to speak to the public about how they see the country's threat environment and the strategic challenges it faces and to explain the decisions they are making about the military in light of those security challenges. They need to decide the military's jurisdiction, including how much and when it will be used in domestic roles related to civil functions (such as natural disasters or policing) and outline the trade-offs therein.

Elected leaders also need to speak openly about challenges facing the military, including when there is evidence of organisational deficiencies or breakdowns in the profession and its performance. They should, in turn, support military leaders speaking to the public (when appropriate) about such matters and how they are working to address them and otherwise holding themselves or their subordinates accountable. While there can be considerable disincentives for politicians to engage in this kind of forthright dialogue with the public, failing to provide it leaves the country's citizens less prepared to fulfil their own obligations.

The Military's Obligations

Finally, the military has various roles to play in promoting healthy civil–military relations. Paramount among these are its obligations to civilian oversight processes and in strategy and policy formulation. Most importantly, within advisory roles, military leaders owe civilians their forthright and candid advice. Even when it is uncomfortable, such as when political leaders are disinclined to hear views contrary to their preferences, military leaders must relay their assessments of the costs of risks of different policies and actions.

Here they must avoid what Carrie Lee calls the 'indirect politicisation' of military advice.⁴⁹ That phenomenon involves military leaders anticipating the preferences of political leaders and conforming their advice accordingly, even when doing so compromises their own true views and assessments. At the same time, military leaders must avoid the opposite tendency, which is to insist that their views prevail or contort their advice in ways that support their preferred outcomes.

A second set of obligations relates to the military's role in ensuring its members maintain a healthy relationship with the society they serve. While, as described above, society can become detached from the military and develop distorted perceptions of it, the same can happen for military members and how they regard civilian society. Preventing that from happening is a core obligation, especially for military leaders, who must role-model and promote positive attitudes among their service members.

Ensuring that military members maintain a healthy relationship with society is complicated by the inherent differences between civilian and military life. Scholars have long debated questions related to how much the military, in both values and demographic composition, should mirror society.⁵⁰ Regardless of how those questions are resolved, however, the civilian and military worlds differ in significant ways. Serving in the military requires meeting physical fitness and other standards and sacrificing privileges and rights enjoyed by those in civilian society. Military culture demands conformity and it values hierarchy and regimentation in ways starkly at odds with civilian society, especially that found in liberal democracies.

Moreover, as Sir John Hackett articulated in his seminal work *The Profession of Arms*, the military maintains a contract of ‘unlimited liability’ with society.⁵¹ Naomi Shephard captures its significance in the Australian context:

When committing to service within the Australian Army, individuals will experience personal sacrifice at all levels. They will be exposed to additional laws, surrender basic human rights and freedom and, at times, assume dangerous or deadly roles. They must be willing to apply lethal force against the enemy and be prepared to make the ultimate sacrifice of their own life.⁵²

While some occupations in civilian life also entail significant risk and sacrifice, the ‘unlimited liability’ contract is a stark reminder of the commitments that define military service and distinguish it from civilian society.

While these differences between civilian and military life are to be expected, they can morph into something more concerning: service members can at times develop negative views of their counterparts in civilian society because of the standards the service members are held to and the sacrifices they make. In the worst cases, they can sometimes evince a blanket sense of superiority towards those outside the military. Importantly, this sense of superiority is distinct from having pride in service. Indeed, it is essential that individuals derive meaning from and are proud of their role in defending the country; both are needed, not only for service members’ personal wellbeing but to support morale, cohesion, good order and discipline in the military organisation as a whole. Having pride in service, however, is different from assuming that being in the military makes one an inherently better person than those who do not serve.

In a classic article from the 1990s, journalist and author Thomas Ricks documented these attitudes in his experiences interacting with US Marines during their boot camp training. After they returned from leave following their training, many of the Marines shared with Ricks sentiments that spoke of their alienation from their former lives as civilians and the contempt they felt for civilian society. As he puts it:

At various times each of these new Marines seemed to experience a moment of private loathing for public America. They were repulsed by the physical unfitness of civilians, by the uncouth behaviour they witnessed, and by what they saw as pervasive selfishness and consumerism.⁵³

More recent surveys of officers support Ricks's anecdotal findings, showing that a sizable minority views military culture as superior to civilian society—more loyal, honest, hardworking and the like.⁵⁴

Attitudes of superiority of this kind are corrosive to military professionalism. One defining feature of a profession is the 'responsibility ethic', or the understanding that the profession exists to serve all of society and answers ultimately to it.⁵⁵ Fulfilling that ethic requires more than subordination to civilian decisions made on behalf of the electorate; it entails some degree of humility towards and regard for society, even when it is at its most fractious and difficult. This can be more difficult to sustain when the public itself has a skewed view of the military, such as when it puts the military on a pedestal and also considers it better than society. Even so, the military in a democratic society stands—in some measure—apart from society but not above it. Maintaining a keen awareness of that distinction is a vital obligation for the military professional.

The military has two other obligations related to its professionalism. The first involves its commitment to the cultivation of expertise, which is another defining feature of a profession.⁵⁶ There are many dimensions of this expertise, but one that merits particular attention is the requirement, particularly for those assuming high-level leadership and command positions, to develop the capacity for strategic thinking and especially the skill set to think about the intersection of politics, strategy and military activity. Herein lies another danger of Huntington's implied premise that there can exist a clean differentiation between the realm of politics and the domain of military activity. His model presumes that the latter is exclusively composed of technical and tactical endeavours and that acquiring expertise in those areas is sufficient for the military profession. Military leaders should, in this view, extinguish all considerations of politics from their roles as experts in the profession of arms; in Huntington's terms, they should strive to be 'politically sterile'.⁵⁷

The military's understanding of its relationship to politics can be poorly developed in democracies. Military personnel today are often taught to be 'apolitical', but that concept can be interpreted too broadly.⁵⁸ Military personnel should remain apolitical in the sense that they avoid engaging in partisan contestation and electoral politics.⁵⁹ This 'nonpartisan ethic' entails that military members forgo public advocacy of policies they favour and that they refrain from openly affiliating with causes or political leaders in campaigns and elections.⁶⁰ But 'politics' means myriad other things, and many of these fall within the domain of the military professional. For example, it encompasses the way that the political system or other features of an adversary's society or institutions affect

how it might respond to military actions in armed conflict, including battlefield outcomes; it encompasses how the domestic politics of one's own country may affect the availability of resources and the public support for the conflicts in which the military is engaged; and, on a smaller scale, it involves understanding the small-p politics of how one's unit, staff or office operates.⁶¹

The country's security ultimately depends on the capacity of military leaders and commanders to develop the ability to think agilely and comprehensively about politics in these ways. Understanding and engaging with them is essential to cultivating the expertise and commitment to learning that are defining features of the profession of arms and fundamental obligations of the military.

The final core obligation relates to the requirement that the profession commit to self-policing and self-regulation. Professions are delegated autonomy by society to practise their craft; that delegation, however, is contingent on the profession's maintaining the trust of society. With that grant of autonomy comes the responsibility to establish and enforce ethical and performance-related standards.

To this end, military leaders need to think carefully about their 'theory of accountability', or how they understand what is entailed in answering for, evaluating and remedying organisational or performance-related weaknesses and failings.⁶² They need to maintain a robust understanding of what accountability involves and how to pursue it.

Accountability means and requires more than one thing. It requires holding individuals to account for failures of judgement, incompetence or poor leadership and applying disciplinary measures as appropriate up and down the chain of command. This, indeed, is a familiar understanding of accountability in the military domain. Even so, militaries—even in well-established liberal democracies—can fall short in how well and thoroughly they assess culpability and address failings.⁶³ This is especially true at senior levels, in part because discerning a direct cause-and-effect connection between a leader's decisions or actions and poor organisational outcomes is often complicated. The institution must hold its senior officers accountable to meet its obligations to the public and its civilian overseers, but this alone is not sufficient.

A more complete approach moves beyond an individually oriented theory of accountability. It seeks to address the institutional and cultural forces that incentivise individual action and thereby predispose people towards adverse decisions and actions. Military leaders need to hold the organisation to account for institutional-level causes of poor outcomes and performance, while also disciplining individuals when appropriate. Thinking through and ensuring that a robust theory of accountability is operationalised and practised in the military domain is essential.

It is worth considering one final obligation—this one to society. The military needs to work to ensure that the society it serves has a sense of ownership over and engagement with it. In other words, the military plays a role in helping society develop a more complete and substantial understanding of the organisation and its members. Military leaders should think creatively about how they can engage with the public and play their role in bridging this civil–military gap. This might entail institutional outreach efforts or simply service members or veterans sharing their individual experiences with others in the community, even when it is uncomfortable or unfamiliar to do so.⁶⁴ As Brad West and Cate Carter put it, with reference to the Australian experience, bridging the societal–military divide requires overcoming ‘the disinclination of members of the ADF to represent their cultural ethnography’.⁶⁵ These efforts will help provide a foundation for the public to meet its own obligations to civil–military relations and, in turn, for politicians to do the same.

Conclusion and Recommendations

The public, the military and civilian leaders all play vital, intersecting and self-reinforcing roles in civil–military relations in democracies. Each maintains mutual obligations—roles and responsibilities—to ensure those relations are as healthy as possible. While no democratic country ever achieves the ideal, working towards it is essential. To this end, civilian officials, military leaders and members of the public can each help in their own way to advance that effort.

In particular, civilian leaders might begin by assessing the state’s architecture for civilian control and ensuring that the incentives and resources within governmental institutions and bureaucratic processes are appropriately aligned and effective. They can also invest in building stronger pipelines of expertise within the bureaucracy, educational institutions and civil society to provide sufficient downstream capacity for civilian oversight and, more broadly, foundational knowledge about the military in the public domain. Politicians can and should be transparent and forthright in speaking to the public about issues relevant to the military and defence, even when it is politically challenging to do so. In so doing, they can help convey to the public that it has a stake in such matters.

As part of these efforts, elected leaders might think carefully about how they are interacting with their military counterparts in advisory and consultative processes on strategic and policy matters. Here they might also invest in reviews of best practices and past shortcomings in this area. As the analysis above suggests, the aim here is to promote robust and rigorous debate and discussion, while avoiding succumbing to the pathologies sometimes observed in civil–military relations in which political leaders variously neglect, marginalise or unduly defer to the military. Rigorous engagement is a sound metric; as argued above, some friction and difference in perspective between the military and civilian sides is healthy and appropriate.

For their part, military leaders can also help improve civil–military relations by encouraging greater study and discussion of civil–military relations in senior service colleges and throughout the force, as well as informally in their staffs and units and within their personal social networks in order to socialise a normative commitment to the issues. More specifically, in advisory processes they should strive to offer advice and insights to civilian leaders candidly and forthrightly. Military leaders can also work to ensure that the military develops a robust theory of accountability internally and that it practises it throughout the organisation. There is no better way to build trust and promote cohesion than for subordinates to see that organisational faults or negative outcomes are being taken seriously and addressed. Senior leaders can also role-model healthy engagement with society, including expressing pride in service, while avoiding themes that (often unwittingly) reinforce attitudes of superiority. Military personnel at all levels can do the same, thereby helping to reinforce healthy norms and conventions of behaviour among their peers and subordinates. They can seek to engage members of the public they interact with in their communities, especially those who might not know much about the military and military life, thereby bridging the civil–military divide.

Finally, members of civil society, including journalists, public intellectuals, university professors and beyond, can seek to foster more curiosity and interest in the country's military. They can role-model respect and regard, not by mystifying the military and putting it on a pedestal but by conveying its purpose and functions while holding it to a high standard. Reverence for military service and its sacrifices—and public rituals to that end—is vital. Yet activities that allow the public to get to know the military and feel an organic connection to it are also important. Perhaps most importantly, the public should be encouraged to feel a sense of ownership over its military, which will enable the public to take seriously the obligations that come with that role.

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/ PLANS OF WAR: MILITARY-STRATEGIC WARGAMING BEFORE THE FIRST WORLD WAR

James Halstead

Introduction

In December 2023, the *Washington Post* reported that after US officers ran ‘eight major tabletop war games’ to test plans for Ukraine’s 2023 counteroffensive, Ukrainian officials concluded that these wargames had been unsuccessful because ‘it doesn’t work like that now’.¹ Wargaming, apparently, has failed to keep pace with ‘a war unlike anything NATO forces had experienced: a large conventional conflict, with World War I-style trenches overlaid by omnipresent drones and other futuristic tools’.² Critics of this interpretation in the wargaming community argued that it failed to consider the context of the wargames— especially that the Ukrainians ultimately did not adopt the plan developed by these wargames.³ Understanding their context is a vital part of interpreting wargames. This article therefore uses the history of wargaming to explore how different institutional, strategic and planning contexts can all shape the conclusions and information which wargames provide to decision-makers.

These debates are relevant to the Australian Army and the Australian Defence Force (ADF), both of which belong to a long tradition of militaries using wargames to educate personnel and test plans. The Australian Army Battle Lab aids in tactical experimentation through products like the Australian Platoon Commander wargame.⁴ At the operational and strategic levels, the ADF relies on the Joint Experimentation Directorate and the Defence Science and Technology Group’s Joint Experimentation and Wargaming Laboratory.⁵

While wargaming is frequently used to test and refine courses of action at the tactical level, this article examines the use of wargaming to explore, test and refine strategic options. It argues that wargaming does not automatically create good plans. Instead, it is a nuanced tool that fits into a broader planning process. Wargames serve multiple purposes, including both the communication and the generation of useful information.

These are all influenced, consciously and unconsciously, by the varied contexts within which the wargames are played.

This article presents case studies of three land warfare games played by the German, British and Russian armies to test, refine and communicate plans for the first weeks of a European war. These wargames took place in very different contexts:

- The British wargame, organised by Major General James Grierson in 1905, was carried out before serious planning had started to explore the transport of a British Expeditionary Force (BEF) to Belgium in case of a German invasion.
- German Field Marshal Alfred von Schlieffen's wargame was played in 1905 in the context of a potential single-front war with France.
- The Russian wargame, conducted in Kiev during April 1914, took place in the context of a fierce debate over military strategy for the early weeks of a war with Austria-Hungary and Germany.

These wargames were also played at different points in the planning process, for different reasons and with different outcomes. The British wargame helped to explore and shape planning assumptions before formal planning had begun. Schlieffen's exercise validated a war plan designed for a highly specific strategic context which was later obscured by hindsight. The Russian wargame functioned primarily as a tool for internal strategic communication rather than for refining strategic plans.

This historical approach offers a novel way of understanding how wargames fit within the wider machinery of planning. In the past decade, wargaming scholarship has expanded and advanced. One line of enquiry has begun to examine more closely the different ways in which wargames can create knowledge, including by increasing experimentation.⁶ David Banks, in making a case for consideration of the 'methodological machinery of wargaming on its own terms', has drawn attention to the need for histories of wargaming to inform current practices.⁷ However, the historiography of wargaming remains underdeveloped for this kind of analysis. Where the history of wargaming contributes to these discussions, case studies are frequently illustrative, superficial and inaccurate, with particularly weak historical methods.⁸ While many works on wargaming do study its history, this is frequently a framing device for discussion of theory.⁹ This is unfortunate, as the study of historical wargaming can offer unique insights to modern wargamers, by demonstrating the intent of the wargame, what it concluded, how it was played, and the institutional and strategic context within which it was conducted.¹⁰

The historiography of wargames has therefore traditionally been poor, especially for the purposes of understanding the nuances of wargames. This article unites historical research with an understanding of wargames, so it is important to state the sources used. Both the German and Russian case studies utilise entirely secondary sources,

while the case study of the British 1905 strategic wargame uses primary source focused research. All these examples, however, benefit from a strong secondary literature with minimal separation from the primary sources, which often directly cite (and, indeed, argue over) key archival sources. This article therefore generates its conclusions mainly from the consideration of existing secondary source evidence and the comparison of the three case studies with one another. Novelty comes from this comparison and from the unification of the previously siloed wargaming and historical literatures. It uses this to understand what knowledge these wargames produced, and the factors which shaped this knowledge.

It is therefore also important to understand the relationship of wargames to knowledge. This is a key facet of understanding where wargames offer value. Wargames are commonly divided into two broad categories: educational and analytical.¹¹ Analytical games 'generate synthetic data that researchers can use to discover new knowledge', while the purpose of educational games is 'for players to internalise some core concept, gain information, or participate in a synthetic experience'.¹² This simple categorisation, however, belies a messier reality, and games are rarely exclusive to one of these two types.¹³ This article therefore adopts Elg's basic definition to define two categories used to understand the value of wargames to contemporary decision-makers: extraction (analytical) and communication (educational) of knowledge. Importantly, extraction and communication can happen simultaneously within the same game, even where the game is framed as being carried out for one purpose, such as analysis.

This article therefore uses strong historical primary and secondary sources to carry out three case studies of military-strategic wargames played before the First World War. It compares how institutional, planning and strategic contexts impacted the knowledge these games provided to strategic decision-makers. It also makes the case for stronger communication between the historical and wargaming literatures. The history of wargaming has, to date, not taken full advantage of historians' deep acquaintance with the historical records or of their frequently superior understanding of the strategic contexts of wargames and decisions made because of these wargames. This can be seen most clearly in the debate on both sides surrounding Schlieffen's wargaming of his eponymous war plan in 1905.

German Wargames, 1905

Wargamers have long idealised the use of wargaming by Field Marshal Alfred von Schlieffen, the most famous of Germany's prewar Chiefs of the General Staff. However, the historical legacy of these wargames is more complicated than they are currently given credit for.¹⁴ This is because there is a severe disconnect between the historical

scholarship and the wargaming scholarship. Especially pertinent is a lack of awareness among wargaming scholars of the (sometimes acrimonious) debate among historians between 1999 and 2020 about whether the Schlieffen Plan existed. In this debate, the type of wargaming carried out by the German General Staff is a key element in demonstrating the shaping of the German General Staff's deployment plans for a future war.¹⁵

Wargaming scholars have adopted the traditional view of the Schlieffen Plan as a one-size-fits-all war plan in which Germany would defeat France with the famous right hook through Belgium before encircling Paris from the west. In the historical literature, there is a greater subtlety of understanding. Historical debate has centred around Schlieffen's 1906 *Denkschrift*, which outlined the idea of—in a single-front war with France—a vast turning movement with the strong German right wing advancing through Belgium and Holland to circumvent the formidable Franco-German border fortresses. Since 1999 Zuber has contended that Schlieffen's *Denkschrift* was not intended as a war plan; instead, Schlieffen's plans were entirely defensive and centred around carrying out counterattacks against French and Russian invasions.¹⁶ Rather than a war plan, it was an attempt by Schlieffen to make a political case for an expansion of the German Army. Where the debate has rested is that Schlieffen considered the classic plan of a long right hook through Belgium and Holland only in the case of a one-front war with France. Schlieffen's doctrine for a two-front war was instead the successive counterattacks against French and Russian incursions that Zuber describes.¹⁷

A crucial part of Zuber's evidence is the records of German General Staff wargames played from 1905 onwards. Zuber argues that these demonstrated that Schlieffen focused on counterattacks against expected French and Russian offensives into Germany rather than on the famous envelopment plan.¹⁸ As this historical debate pertains to wargaming, there are two key aspects: argument around the function of wargames (whether they are intended principally to extract knowledge or to communicate knowledge) and what these wargames demonstrate about German war planning.

Unfortunately, evolving interpretations of both the Schlieffen plan and the importance of wargaming to this debate have not yet been identified by wargaming scholars.¹⁹ Instead, wargaming scholars have focused on a conclusion that German wargaming outcomes were too readily accepted, so long as they did not upset other officers, and that Germany declined to wargame the political and strategic repercussions of its war plans.

A key topic of debate among historians is how the German General Staff employed wargames. Zuber uses evidence of staff rides held in 1906 and 1908, which revolved around German counterattacks against French invasions, to argue that Schlieffen never planned for an outflanking movement into the depths of France.²⁰ In reply, Foley and Gross identify the use of such games as training tools rather than directly as war

planning, with 'no evidence to suggest that these rides were based on any real war plans or played a significant role in the formulation of war plans'.²¹

Although Zuber has continued to argue that these wargames were simultaneously used to test real war plans and to train officers, the available evidence does not support this interpretation. Staff ride scenarios were not reflected by contemporary deployment plans. In late 1905 a staff ride scenario concentrated seven-eighths of the German Army in the east against Russia, having assumed Dutch and Belgian support in the west. This was not reflected in the plans for a two-front war drafted later that year.²² Also, the records of these wargames were available for use as a source only because they were both more widely distributed and given a lower security categorisation than real war plans would warrant.²³ This was not a negligible risk given the threat of espionage. Russian intelligence successfully obtained copies of German General Staff wargaming and mobilisation plans in 1911 or 1912.²⁴ German security classifications of deployment plans were so strict that most or all of the copies of these annual plans were burned once they were no longer current. Another factor was the risk of diplomatic embarrassment should a wargaming scenario for the invasion of another country be leaked. Both Britain and Russia were also unwilling to use scenarios in which they conducted an unprovoked invasion of another nation. Given their lower security classification and their role as broader training exercises, it is understandable that wargames might cause anxieties about diplomatic damage being done. Given the divergence between staff ride scenarios and actual war plans, and the security concerns of the German General Staff, it is therefore likely these wargames were indeed intended to test training rather than plans.

A majority of German wargaming in the period therefore focused on generating knowledge by testing officers on a variety of different situations and circumstances, rather than rote rehearsal of real war plans. Pre-1914 German wargaming demonstrates the extent to which the knowledge produced by wargames depends on the context and, indeed, the doctrine being taught in the first place, given the result in 1914 of these German preparations and the fact that such unrestricted wargaming is not always a panacea.

Wargames which directly tested strategic plans were rarer, although not unheard of. In 1905 Schlieffen played through the basic idea of his *Denkschrift* against his best staff members multiple times.²⁵ In this scenario:

[Schlieffen] commanded the German troops which advanced in a sweeping wheel of the right wing through Belgium to the Lille-Mauberge line, circumventing Verdun in the north, and crossed the Seine west of Paris near Rouen.²⁶

Following a first iteration, the senior quartermasters and heads of division of the general staff prepared four possible courses of action to counterattack with the French left wing.²⁷

After wargaming three of these options, an interim assessment was carried out, after which French plans were altered then tested in a third round of wargames. However, rather than being a broad and commonly applied method of wargaming across the army, this was a planning exercise restricted only to the most senior members of the General Staff. Unlike the annual exercises which tested officers, the sole purpose of this exercise was to test and refine Schlieffen's plan for a single-front war with France.

This wargame was not without some criticism, and Gross argues that Schlieffen deliberately excluded the French response he considered most dangerous.²⁸ Other wargames may have been played, but it is difficult to prove just how commonly wargames were part of planning. Those records which Gross quotes on the game survived only by chance in the personal papers of participants. Records of other games might have been lost in Allied bombing during the Second World War or destroyed by the German General Staff at the time.

It is therefore difficult to link wargaming directly to the outcome of the Schlieffen Plan. Criticisms by wargaming scholars stem from an inadequate understanding of both the history and the context of German plans and wargaming.²⁹ They do not consider that Schlieffen never developed the Schlieffen Plan as a universal war plan. Instead, it was developed in 1905 for the case of a single-front war with France following the diminution of the Russian threat after the Russo-Japanese war.³⁰ This is an explicit aspect of the 1906 *Denkschrift* which described the plan and was a document which 'incorporated a spectrum of scenarios', not solely the single-minded right hook through Belgium.³¹ The eventual employment of the right hook in a two-front war in 1914 instead reflected a significant rupture with Schlieffen's strategic thinking by Moltke, his successor.³²

Wargaming was heavily integrated into a much broader planning and training process. Schlieffen also used wargames to educate the General Staff on his 'concepts and intentions' and to 'understand the situation of a large army and the tasks of an army corps operating in it'.³³ Attempts to study it should be carried out within this broader context, and those who make claims about wargaming as succeeding or failing to predict the success of German planning should consider more closely exactly what this evidence tells us about German wargaming.

British Strategic Wargame, 1905

By 'startling coincidence', in the same year in which Schlieffen wargamed his right hook through Belgium, a British wargame studied moving an expeditionary force to support Belgium against just such an invasion.³⁴ In 1905, the British Army was in the early phases of its post-South African War reforms and reorganisation. These reoriented the army towards a potential European commitment—causing a strategic debate that would rage

most hotly between 1906 and 1910.³⁵ Concern about German ambitions, however, had begun to gestate several years earlier with Major General James Grierson's appointment as Director of Military Operations in the then newly formed British General Staff.³⁶ Grierson had argued for a focus on Germany for several years prior to this. This position was bolstered by the addition of Colonel (future Field Marshal) William Robertson as his Director of Military Intelligence.³⁷ In January 1905, 'influential representatives of the General Staff' met at Camberley for a conference on imperial strategy. Grierson argued for the strengthening of the British Army, pointing out that the continuing Russo-Japanese War (1904–1905) proved that even naval powers required land power to support naval operations. Validated by the discussions, Grierson left the conference with plans to prepare a wargame to explore the deployment of an expeditionary force to the European continent.³⁸

Unlike the German wargame of 1905, which tested already established plans, this wargame was at the opposite end of the planning process and was intended to start 'the process of replacing nebulous ideas with practicable military options'.³⁹ It was shaped by a list of assumptions about the strategic situation, communicated to participants in background briefings on the scenario.⁴⁰ In the game scenario, a German invasion of France had been stopped on the Franco-German frontier by a line of French fortresses between Sedan and Metz.⁴¹ In order to break this deadlock, the Germans would attack France through Belgium with a small force of approximately seven corps several months into the war.⁴² Another assumption of the game was that British troops would operate with their current equipment, organisation and training. Because of significant reorganisations in structure, doctrine and equipment, British troops were judged to be incapable of reaching Belgium in under three weeks.⁴³ Each game turn was carried out according to British wargame regulations, with an intelligence report briefing the results of the previous turn's orders, the players issuing new orders in response to this developed situation, then umpires resolving these orders. Teams represented the British and Belgian armies, and the game lasted for nine turns.⁴⁴

German troops concentrated south of the Meuse and pushed the smaller Belgian Army to the north as they advanced towards the French border. Liège was not directly attacked, apart from when a small German force carried out a diversion to the north. From 9 March, the Belgian team was converted to an Allied one as British forces began to arrive according to an embarkation program which was drawn up by the British players before the game.⁴⁵ By 12 March, German forces were ready to move across the French frontier; however, the Allies struck first and British and Belgian troops attacked the German right flank, capturing the town of Ciney. Although the game director concluded that the town could not have been held and that Allied retreat was inevitable, it was nonetheless determined that this constituted a very serious check which would have thrown already strained German logistics into chaos.⁴⁶

Despite these dramatic results, it is difficult to draw a direct line from any element of the 1905 wargame to strategic decisions made. To Robertson, who commanded the German team, the game 'went to show that there would be little chance of stopping the German turning movement unless the British forces arrived on the scene quickly and in considerable strength'.⁴⁷ Grierson's report of the game was also circulated among senior figures. Sir John French, the BEF's future Commander-in-Chief, informed Grierson that he had 'nearly finished' the account of the game 'once and shall probably start it a second time before I go to bed tonight!'.⁴⁸ However, Robertson was vague as to who else actually saw these results, writing that 'presumably these results were made known to the Government by the Chief of the General Staff, under whose instructions the war game took place'.⁴⁹ Given the lack of serious plans at the time, it is likely that the value of the wargame was mostly in the demonstration of the hazards and urgency of planning for any such continental commitment.

In fact, the wargame's preliminary nature may have had a negative impact. Gooch writes that it 'resulted in a belief that Britain would have both time and space at her disposal' and an assumption that:

such a violation would not take place until a war between Germany and France had gone on for some months and that when it did, the German move would be predominantly south of the Meuse.⁵⁰

None of these conclusions had been generated from gameplay. The assumption that Germany would only invade Belgium several months into a continental war, and with only seven corps (limiting them thus to an advance south of the Meuse) was generated by the scenario and therefore could also have been part of a wider set of assumptions within the army at the time. This preliminary exercise resulted in fundamental assumptions in British strategy which would 'take some years to eradicate'.⁵¹ This demonstrates one of the hidden risks of wargaming: that even though bound and understood by participants in a certain context, wargames can look and feel both so compelling and so immersive that decision-makers can take their conclusions as reaching further than intended.

Wargame scholars have struggled to define the contributions of wargames and in doing so have dramatically overstated them in several different ways.⁵² Andrew Wilson argues that the 1905 wargame demonstrated the extreme length of time it would take to deploy the BEF to Belgium and that 'France could not be expected to resist an attack on her own'. Wilson notes that this conclusion resulted in subsequent staff talks with the French Army.⁵³ This is overstating the evidence, however. This pivot only occurred at the end of 1906 when a number of other considerations—the poor state of the Belgian Army, the efficiency of the French Army, and concerns about the violation of the neutrality of the Low Countries—prompted renewed reliance on the French General Staff.⁵⁴ Elsewhere, Matt Caffrey concludes that 'the Germans would destroy the French Army before the BEF

could intervene in strength'.⁵⁵ In fact the 1905 game concluded with the French and British armies (who were only just beginning to arrive in Belgium) intact and, indeed, having just severely disrupted the German advance with their flank attack.⁵⁶ More sensationally, the UK Ministry of Defence's Wargaming Handbook states that the 1905 strategic wargame allowed Britain 'to presciently anticipate the Schlieffen plan'.⁵⁷ This, however, was simply a condition of the scenario, and the scenario was substantially different from the situation the Allies would face in 1914. The most persistent claim is that the game showed the requirement to revise British mobilisation and deployment planning.⁵⁸ However, there is no direct causal link between the results of this wargame and the eventual revision of mobilisation plans in 1910, some five years later.⁵⁹

A common theme of the wargaming scholarship, therefore, is a misunderstanding of the nature of the 1905 wargame. This was not a wargame designed—or, indeed, intended—to produce decisive decisions or to produce important data or information. It was the beginning of a process of assessing Britain's ability to deploy an expeditionary force to the European continent in time to influence operations.⁶⁰ It was a preliminary exercise intended to introduce the problem and to study the rough parameters. Attempts to link the conclusions of the wargame directly to strategic decision-making are therefore misguided. This is not to say that the wargame was not valuable; it began the process of presenting Britain's strategic problems in a practical perspective. This kickstarted a process in which serious planning was invested into a continental commitment and demonstrated many of the basic risks that needed to be understood and mitigated. Such misunderstandings have been common, and similarly misunderstood is the wargaming carried out by the Russian Army before 1914.

Russian Strategic Wargame, 1914

Existing analysis of pre–First World War Russian wargames by wargaming scholars is lacking, despite a good range of sources. Mason writes:

The Russian Army was enormous. Their wargames indicated resources were insufficient to equip and supply the entire army. It was better to fully support two field armies than mobilization of the entire army. The second issue involved how to invade East Prussia. The Masurian Lakes was a barrier that forced the Russians to divide their forces. One army would sweep north while a second army swung around the southern tip of the lakes. The wargame indicated the geography could prevent the armies from supporting each other. It also revealed the Germans could use this barrier to defeat each army in turn.⁶¹

This has set the tone for how wargaming scholars have viewed the interactions between prewar Russian wargames and the early battles of the First World War: that the Russians

invading East Prussia ‘found themselves’ divided by the lakes and subsequently were defeated in detail by the German Army.⁶² To wargaming scholars, Russian wargames acted as unwelcome prophets, rejected by a blinkered or overconfident Russian Army establishment.

In fact, the April 1914 Kiev wargame that Mason references did not simulate a Russian invasion of East Prussia. Instead it simulated an initial *German* offensive against the Russian First and Second Armies, as part of a much larger wargame which studied not the threat of Germany but how ‘the destruction of the Austro-Hungarian Army’ could be achieved.⁶³ New sources and interpretations, made available in the last decade, make possible a broader analysis of the nature and outcomes of these Russian wargames.⁶⁴

Hitherto emphasis has been on the lessons which senior Russian leaders learned from the wargame. Through this lens, there has been ample criticism of Russian leadership by historians. A ‘common thread’ of lessons by historians emphasises that the wargame primarily indicated lessons on logistics, which were ignored.⁶⁵ This focus on analytical lessons that could be learned from the game is misleading. More detailed examination of this wargame demonstrates a very different picture of what the game was intended for and what its intended outputs were.

Russian Army wargaming had a difficult legacy in 1914. Minister of War Vladimir Sukhomlinov had tried several times to organise large-scale wargames.⁶⁶ An attempt was first made in 1911 to organise a large game in Saint Petersburg which would use a whole wing of the Tsar’s winter palace as a venue. This aimed both to test the then-developing Russian war plan and to judge the performance of senior officers.⁶⁷ It was intended to contribute to the debate about the radical overhaul of Russia’s 1912 Mobilisation Schedule.⁶⁸ This game, however, was cancelled when the Tsar’s first cousin Grand Duke Nicholas Nikolaevich, commander of the St Petersburg military district, asked the Tsar to cancel it because he did not want general officers to be subjected to ‘examinations’.⁶⁹

In the interim, debate continued over the 1912 Mobilisation Schedule. This war plan reoriented Russian strategic focus away from the Germans in East Prussia and towards the Austro-Hungarian Army in Galicia.⁷⁰ There was significant debate over this plan among the heads of military districts, and in February 1912 the concession was made of developing two war plans: A and G.⁷¹ Plan A focused on Austria but also included an invasion of East Prussia. G focused on Germany alone. Military district commanders, especially General Nikolai Kliuev, Chief of Staff of the Warsaw Military District, were convinced that the plan did not allocate enough troops against Austria-Hungary and sought to alter the plan away from any offensives into East Prussia.⁷² Kliuev was consequently removed from command of the Warsaw military district and transferred to a corps command in the Caucasus by the GUGSh (the Russian General Staff).⁷³ The GUGSh wielded a considerable stick in its ability to remove dissenters, yet dissent

was too widespread to transfer everyone. In April 1914 the GUGSh therefore deployed the carrot: a wargame that aimed to communicate to senior officers in the military districts the 'success of strategic planning'.⁷⁴

This wargame aimed to demonstrate the 'correctness of the general considerations for the deployment of our armies in a war with the powers of the Triple Alliance'. It also held a subordinate training purpose of providing 'practice in making decisions and giving orders to persons designated for higher positions in the event of complications on the Western borders'.⁷⁵

The political setting for the game was that Russia and France were at war with Germany and Austria-Hungary. Romania remained neutral, while Great Britain signalled that it was ready to support France with an expeditionary force.⁷⁶ Germany focused on the west, deploying only five corps in East Prussia. Austria-Hungary, meanwhile, deployed its forces in Galicia in line with the Austro-Hungarian mobilisation plan, which had recently been obtained by Russian intelligence.⁷⁷ Russian deployments were made in line with the 1912 Mobilisation Schedule, with action in the game starting on the 10th day after mobilisation, allowing for the armies to be mobilised and ready to make strategic decisions. The Russian plan was to wait for, and counterattack against, a German offensive on the Middle Neman, while in Galicia (modern-day western Ukraine and southern Poland), the Third and Eighth Armies were to attack the flank of the expected Austrian drive north into Poland against the Fourth and Fifth Armies.⁷⁸

In the game, the Russians suffered an early crisis: the German offensive on the Neman against the First Army, with the Second Army too far away to offer any support. The First Army's counteroffensive against the Germans was pushed 'to the brink of defeat', having not had time to fully mobilise its reserve divisions.⁷⁹ Although General Zhilinsky, commanding the North-Western Front, countered with an immediate invasion of East Prussia, the German offensive was only repelled after the BEF's arrival in France forced the removal of three German corps from East Prussia.⁸⁰ As the game ended, the First and Second Armies began operations to invade East Prussia.⁸¹

Meanwhile, in Galicia the Russian envelopment of the Austro-Hungarians proceeded to plan. By the second turn, the Third and Eighth Armies were enveloping Lemberg (now Lviv). A massive Austrian counteroffensive failed to stop them after a transfer of Russian reserves restored momentum. By the end of the game, the promised envelopment of the Austrians around Lemberg was unfolding as planned. This was accompanied by a simultaneous success on the Austrian left flank in modern-day southern Poland as the Austrian drive northwards was defeated and driven back.⁸²

In the immediate aftermath, few wider lessons were drawn from the game by its directors. Its principal purpose, after all, had been to demonstrate the superiority of the GUGSh's deployment plan.⁸³ Victory by the Russian team in the game more than validated this concept in the eyes of the game directors. However, this success also concealed several deficits: the invasion of East Prussia was only achieved after the transfer of three German corps away from East Prussia and an initial period of defensive fighting for the two Russian armies there (which even then almost ended badly for the First Army). An extremely heavy thumb, therefore, was placed on the scale to allow for the success of the wargame.

What is equally clear even from a compressed summary of the game is the poor analysis to date by wargaming scholars. It is a grotesque stretching of the evidence to argue that the Russians wargamed the same invasion of East Prussia which they attempted in 1914. Wargaming scholars have similarly ignored the four Russian armies fighting in Galicia at the same time. This is especially egregious as it was a key part of the strategic question around resource allocation between the South-Western and North-Western Fronts. Nor did the wargame demonstrate the potential dangers of the isolation of each of the two armies invading East Prussia (which were obvious to anyone who could read a map, and indeed were noted). Instead, the wargame saw a successful invasion of East Prussia after the narrow defeat of an initial German offensive, aided by the transfer of reserves to counter the arrival of the BEF in France.

Understanding the conclusions created by this game is a task far beyond simple prediction and much more about the purpose, design and intent of wargame exercises. This was certainly not a wargame intended to predict how the early weeks of a war with the central powers would happen. Nor was it a wargame carried out to test and analyse plans. At its base it was carried out to validate Russian plans, but most of all it was a piece of internal messaging intended to present and then validate the GUGSh's war plans, which were heavily opposed across much of the Russian Army at the time.

Conclusion

This article has studied three military-strategic wargames played in the decade before the outbreak of the First World War by the German, British, and Russian armies. By studying the knowledge both created and communicated by these games and how this was influenced by the different institutional, strategic, and planning contexts, this article provides three case studies of both the varied roles and the hidden dangers of the use of wargaming within planning processes. These case studies also offer several corrections to existing literature while using the history of wargames to create a more nuanced understanding of the knowledge that wargames have historically produced for decision-makers.

Britain's 1905 wargame was played as a very early preliminary exercise, designed to shape planning assumptions for a British intervention in Belgium. It was intended to explore the strategic problem and to shape the constraints on and potential requirements for future planning. However, this game has been incorrectly represented in scholarship as far more important than it was in shaping British predictions about German strategy. Although it was an impactful wargame and appears to have remained in key decision-makers' minds years later, its legacy is marred by the series of assumptions baked into British strategy by politicians following the game. These were insights gained not from gameplay itself but instead by the scenario and assumptions. While this wargame extracted knowledge about the required planning assumptions for a future expeditionary force, it also ultimately communicated the wrong kind of knowledge to decision-makers: assumptions and scenarios for the game rather than the results of play.

Schlieffen's wargame of the same year, on the other hand, was intended to rigorously test and validate a military plan which had been developed in depth over the preceding years. All three games discussed in this article produced knowledge useful to their respective institution's planning but each had significant risks and drawbacks. Schlieffen's 1905 wargame demonstrated the success of his *Denkschrift* in militarily defeating France with a right hook through Belgium. But this should be qualified by the specific context of 1905 in which Schlieffen foresaw a single-front war while Russia recovered from the Russo-Japanese War. Schlieffen's other plans, in fact, focused on more limited wars of counterattack. When war came, Moltke adopted Schlieffen's right-hook plan, ignorant of the condition that it was intended for a single-front war against France. Hindsight has tended to obscure this specific context in which Schlieffen was wargaming. Until now, this context of both the broader planning and the game itself has been obscured by a longstanding disconnect between historical and wargaming literature on Schlieffen's wargames.

The Russian Kiev wargame was carried out after planning had finished and was—more overtly than Schlieffen's wargames—an attempt to disseminate the plan and settle debates among the senior leadership of the Russian Army about the plan's suitability. This is a key aspect of the wargame, which focused more on communicating than on extracting knowledge, but it has—like the Schlieffen wargames—been misunderstood. To date, most wargaming scholars covering this game have instead concentrated on the game's findings both for Russian plans for an invasion of East Prussia and for the game's discounting of the logistical implications. The game, in fact, was much wider and the main emphasis was on demonstrating the lack of risk being taken in East Prussia to defeat the Austro-Hungarians in Galicia.

The wargames compared in this article were conducted in entirely different contexts, at different stages in the planning process and with very different objectives, while their institutional and strategic contexts naturally varied dramatically too. The British wargame was employed as a preliminary exploration ahead of serious planning. Schlieffen's 1905 wargame was played to test and validate a finished plan. The Russian wargame was conducted when planning had finished, and it was intended to communicate the intent and validity of the plan to senior Russian commanders.

Strategic, planning, and institutional contexts all dramatically alter both the knowledge produced by the game and how it can be used. To get the most out of wargames therefore requires rigorous and careful bounding within the right contexts, and extreme care in communicating the results and their contexts. Wargaming's value lies as much in how it is conducted as in how the outcome is understood, contextualised and developed. Wargames are not magic bullets but sensitive media that are innately attuned to their contexts, capable of both creating and communicating poor-quality information with unfortunate implications if not managed correctly. Wargaming is an inherently introspective technique, and any utilisation of the knowledge must carefully contextualise and present any conclusions. This article is by no means the final word; both a greater quantity and better quality of historical wargame case studies will assist scholars in understanding the contribution that wargames can provide to decision-making, creating a more rigorous and thorough grounding for the technique.

About the Author

James Halstead studied for a BA in War Studies at University of Kent, and for an MA at Kings College London. James discovered wargaming at Kings College, enabling him to truly engage with and understand the nuances of military operations and war. James studied for his PhD in Military History at Brunel University and also worked as a professional wargamer. Currently James is working on converting his thesis into a book while continuing to work in professional wargaming and analysis.

James has given lectures at: Kings College London, the University of Leeds, the Institute of Historical Research, the RAF Museum, the National Army Museum, British Commission for Military History and the Society for Army Historical Research and has helped to deliver wargames both across defence and other parts of government.

ENDNOTES

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- 14 This article has neither the space nor the intellectual emphasis to focus on the wider debate; it therefore touches on and describes only those elements relevant to wargaming's role. For the points most pertinent to the debate consult Terence Zuber, *The Real German War Plan, 1904–1914* (The History Press, 2011); Gross, 'There Was a Schlieffen Plan'; Foley, 'The Real Schlieffen Plan'; Terence M Holmes, 'Back to the Sources: An Attempt to Resolve the Schlieffen Plan Controversy', *War in History* 28, no. 3 (2020): 525–543.

- 15 For a list of the main publications in this debate see Zuber's website with the addition of Holmes's article, published since this list was published: Terence Zuber, 'The Schlieffen Plan Debate 1999–2014', *Terence Zuber, Military Historian*, at: <https://terencezuber.com/schlieffendebate.php> (accessed 18 February 2026); Holmes, 'Back to the Sources'.
- 16 Terence Zuber, 'The Schlieffen Plan Reconsidered', *War in History* 6 (no. 3) (1999): 262–305. Much of this debate around the details of German war planning misses the main point of Zuber's contention, which was that Germany never planned a war of aggression. This contention was opposed in Hans Ehlert et al. (eds), *The Schlieffen Plan: International Perspectives on the German Strategy for World War I*, trans. David T Zabecki (University Press of Kentucky, 2014).
- 17 Holmes, 'Back to the Sources'.
- 18 Zuber, *The Real German War Plan*, p. 9.
- 19 Mason, 'Wargaming', p. 83; Wilson, *The Bomb and the Computer*, p. 39.
- 20 Zuber, *The Real German War Plan*, p. 87.
- 21 Foley, 'The Real Schlieffen Plan', p. 98 (quoted); Gross, 'There Was a Schlieffen Plan'.
- 22 Holmes, 'Back to the Sources', pp. 538–539.
- 23 Foley, 'The Real Schlieffen Plan', pp. 96–97.
- 24 Nikolai N Golovin, *The Russian Campaign of 1914: The Beginning of the War and Operations in East Prussia* (The Command and General Staff School Press, 1933), pp. 181, 201; Robert A Doughty, *Pyrrhic Victory: French Strategy and Operations In The Great War* (The Belknap Press of Harvard University Press, 2005), pp. 12–13.
- 25 Foley, 'The Real Schlieffen Plan', pp. 96–97; Gross, 'There Was a Schlieffen Plan', p. 411.
- 26 Gross, 'There Was a Schlieffen Plan', p. 410.
- 27 Ibid., p. 410.
- 28 Ibid., p. 411.
- 29 Matthew B Caffrey, *On Wargaming: How Wargames Have Shaped History and How They May Shape the Future*, Newport Papers 43 (Naval War College, 2019) p. 39; Wilson, *The Bomb and the Computer*, pp. 20–21.
- 30 Foley, 'The Real Schlieffen Plan', pp. 99–100; Holmes, 'Back to the Sources', p. 533.
- 31 Dennis Showalter, *Instrument of War: The German Army, 1914–1918* (Osprey Publishing, 2016), p. 31.
- 32 Holmes, 'Back to the Sources', p. 533.
- 33 Gross, 'There Was a Schlieffen Plan', p. 409.
- 34 George Ashton, 'The Entente Cordiale and the "Military Conversations"', *The Quarterly Review* 258, no. 512 (1932): 363–83, 369.
- 35 Hew Strachan, 'The British Army, Its General Staff and the Continental Commitment, 1904–1914', in David French and Brian Holden-Reid (eds), *The British General Staff: Reform and Innovation, 1890–1939* (Frank Cass, 2002), pp. 76–77.
- 36 The establishment of a General Staff was a key outcome of the post–South African War reforms for the British Army. See John Gooch, 'The Creation of the British General Staff, 1904–1914', *Journal of the Royal United Services Institute* 116 (1971): 50–54.
- 37 Strachan, 'The British Army, Its General Staff and the Continental Commitment'.
- 38 Ashton, 'Entente Cordiale and the "Military Conversations"', p. 367; Christopher Yi-Han Choy, 'British War-Gaming, 1870-1914' (Masters Thesis, King's College, 2013), p. 26. Previous assessments have argued that the game was much larger, taking place between January and May 1905. Ashton notes only that the game was 'worked out by Grierson in April and March', which implies a much shorter time scale that included planning.
- 39 William Philpott, 'The General Staff and the Paradoxes of Continental War', in David French and Brian Holden-Reid (eds), *The British General Staff: Reform and Innovation, 1890–1939* (Frank Cass, 2002), p. 96; Ashton, 'Entente Cordiale and the "Military Conversations"', p. 368.
- 40 Ashton, 'Entente Cordiale and the "Military Conversations"', p. 369; TNA, WO 33/364: Records of a Strategic War Game.
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- 43 Ibid., p. 81.
- 44 Ibid.
- 45 Ibid., p. 16.
- 46 Ibid., p. 136, 156.
- 47 William Robertson, *Soldiers and Statesmen, 1914–1918*, Volume 1 (Cassell and Company, 1926), pp. 24–25.
- 48 DS MacDiarmid, *The Life of Lieutenant-General Sir James Moncrieff Grierson* (Constable & Company Ltd, 1923), p. 212.
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- 50 John Gooch, *The Plans of War: The General Staff and British Military Strategy c. 1900–1916* (Routledge & Kegan Paul, 1974), p. 280.
- 51 Ibid., p. 280.
- 52 TNA, WO 33/364: Records of a Strategic War Game; Strachan, 'The British Army, Its General Staff and the Continental Commitment', pp. 77, 80, 82; Philpott, 'General Staff and the Paradoxes of Continental War', p. 96; Gooch, *Plans of War*, p. 280; Perla, *The Art of Wargaming*, p. 62.
- 53 Perla, *The Art of Wargaming*, p. 63; Wilson, *The Bomb and the Computer*.
- 54 Gooch, pp. 282, 283.
- 55 Caffrey, *On Wargaming*, p. 38.
- 56 TNA, WO 33/364: Records of a Strategic War Game, pp. 155–156.
- 57 MoD, *Wargaming Handbook*, p. 2.
- 58 Wilson, *The Bomb and the Computer*, p. 25; MoD, *Wargaming Handbook*, p. 2.
- 59 Christopher Phillips, *Civilian Specialists at War: Britain's Transport Experts and the First World War* (University of London Press, 2020), p. 66.
- 60 Philpott, 'General Staff and the Paradoxes of Continental War', p. 96; Gooch, *Plans of War*, p. 96; Strachan, 'The British Army, Its General Staff and the Continental Commitment', p. 80.
- 61 Mason, 'Wargaming', p. 83.
- 62 Wilson, *The Bomb and the Computer*, p. 27. Wilson entirely used Golovin's account of the Russian Army in the First World War for his sources. Golovin, *The Russian Campaign of 1914*, pp. 35–38; Caffrey, *On Wargaming*, p. 29; Mason, 'Wargaming', p. 83.
- 63 Bruce Menning, *Bayonets Before Bullets: The Imperial Russian Army, 1861–1914* (Indiana University Press, 1992), p. 252.
- 64 Most existing interpretations of these games are based on Suvorov's article, produced shortly after the war in 1919. Alpeev recently produced an article reinterpreting these wargames, using a greater range of sources than Suvorov. AA Suvorov, 'Voennaia Igra Starshikh Voiskovykh Nachal'nikov v Aprele 1914 Goda', *Voenno-Istoricheskii Sbornik* 1 (1919): 9–29; Menning, *Bayonets Before Bullets*, pp. 250–254; Golovin, *The Russian Campaign of 1914*; Oleg Alpeev, 'Стратегическая Военная Игра Старших Войсковых Начальников в Киеве 20–24 Апреля 1914 Года [The Strategic Wargame by Senior Army Leaders in Kiev on 20–24 April 1914]', *Военно-Исторический Журнал* [*Military History Journal*] 2019, no. 10: 14–23.
- 65 Menning, *Bayonets Before Bullets*, p. 253; Golovin, *The Russian Campaign of 1914*, pp. 37–39.
- 66 For Russian naval wargaming see Toby Ewin, 'Naval Wargaming up to WW1', paper presented at Connections UK, *Insights from Historical Wargaming*, 10 September 2025, <https://professionalwargaming.co.uk/25UKTobyEwin.mp3>; <https://professionalwargaming.co.uk/CUK25-Ewin-ConnectionsSlides-NavyWargamesUpToWW1.pdf>.
- 67 Menning, *Bayonets Before Bullets*, p. 251.
- 68 Alpeev, 'Strategic Wargame', p. 15.
- 69 Menning, *Bayonets Before Bullets*, p. 251.
- 70 Alpeev, 'Strategic Wargame', p. 16.
- 71 Ibid., p. 16.

- 72 Ibid., pp. 16–17.
73 Ibid., p. 18.
74 Ibid., p. 18.
75 Ibid., p. 15.
76 Ibid., p. 19.
77 Ibid., p. 19.
78 Ibid., p. 20.
79 Ibid., pp. 20–21.
80 Note the pretext created for such an invasion of East Prussia created by a German offensive into Russia.
81 Alpeev, 'Strategic Wargame', p. 21.
82 Ibid., p. 22.
83 Menning, *Bayonets Before Bullets*, p. 253.

/ THE THEORY OF ASYMMETRY: ITS HISTORICAL DEVELOPMENT AND SOME THOUGHTS ON FUTURE USE

Robert Bruce

I never shall forget the way
That Blood upon this awful day
Preserved us all from death.
He stood upon a little mound,
Cast his lethargic eyes around,
And Said beneath his breath:
'Whatever happens we have got
The Maxim Gun, and they have not'

Hilaire Belloc, 'The Modern Traveller'¹

Introduction

Asymmetry has become pervasive in contemporary Australian defence discourse. It has appeared in all recent major strategic documents, including the 2023 Defence Strategic Review (DSR)² and the various iterations of the National Defence Strategy (NDS),³ the Integrated Investment Program (IIP)⁴ and the Army Contribution to the National Defence Strategy (Army Contribution).⁵ This saturation has filtered through to the professional development spaces, with all manner of capabilities, technologies, personnel strategies and training systems being recommended based on their *asymmetric* qualities. Arguably, the term's application has become so profligate that it has ceased to communicate any real thought or analysis. With such broad usage, the concept's employment threatens to exceed its utility, and what was once a meaningful theory of war has devolved into another useless staff officer sophism.

This paper attempts to restore the utility of asymmetry as a theory. It will do so by examining asymmetry's historical development, and it contributes to the literature by proposing a new genesis for this development.⁶ This genealogy forms the basis to then analyse and amend asymmetry's contemporary use. Importantly, the paper draws attention to Lieutenant General (Ret.) Philip D Shutler's 1987 article 'Thinking About Warfare', an often overlooked but foundational text on asymmetry.⁷ Shutler's article, together with Andrew Mack's seminal piece 'Why Big Nations Lose Small Wars', form the basis of two distinct early theories of asymmetry. The paper will also explore a key critique of the theory of asymmetry, which emerged in the wake of the wars in Iraq and Afghanistan. This critique is important, as it highlights when the theory of asymmetry ceases to be useful. By examining the re-emergence of asymmetry within Australian discourse (DSR, NDS, IIP and the Army Contribution), this paper will argue that contemporary use is largely derivative of these original approaches, albeit lacking important nuance. This will be achieved through comparative analysis, whereby contemporary approaches to asymmetry will be read alongside the historical theories of asymmetry. The paper will conclude by making recommendations to develop a usable theory of asymmetry in the Australian context.

To restore utility to the theory of asymmetry, conceptual boundaries must be re-established. This paper makes two major recommendations to do this. Firstly, asymmetry should not be expressed as though it is synonymous with technological advantage; instead, greater nuance is required to ensure that asymmetry focuses on the employment of technology. Secondly, the ADF's conception of asymmetry must be developed in relation to a particular problem frame. The original theories of asymmetry were designed to address particular problems, which provided—at least initially—the bounds for consistent expression. From these initial markers, the conceptual stretching of asymmetry can be limited and a useful theory of war resurrected.

The Current Problem with Asymmetry

The theory of asymmetry has changed over time, leading to confusion regarding its meaning and application. The theory is plagued with a lack of clarity and often 'incongruent' interpretations.⁸ As a 2005 Defence Science and Technology Organisation report highlighted:

There is a degree of ambiguity ... Definitions range from simple statements relating to the use of non-conventional tactics, through to the broader view that 'all warfare is asymmetric'. In some publications one combatant is stated as having an asymmetric advantage over another based purely on differences in technology. Many definitions of asymmetric warfare bear a close similarity to definitions of manoeuvre warfare as this relates to seeking 'asymmetry of force' (i.e. using strength against an enemy's weakness).⁹

As the theory's application has expanded, its meaning and clarity have eroded. Abstracted from the original context, asymmetry has 'become politicized rather than being truly analytical'.¹⁰ Asymmetry has increasingly been employed for prescriptive purposes rather than descriptive analysis, and its meaning has thus become somewhat mercurial.

Reflecting on the purpose of theory provides a way to address this issue. As Carl von Clausewitz tells us:

Theory will have fulfilled its main task when it is used to analyse the constituent elements of war, to distinguish precisely what at first sight seems fused, to explain in full the properties of the means employed and to show their probable effects, to define clearly the nature of the ends in view, and to illuminate all phases of warfare in a thorough critical inquiry. Theory then becomes a guide to anyone who wants to learn about war from books; it will light his way, ease his progress, train his judgement, and help him to avoid pitfalls.¹¹

This paper seeks to restore the utility of the theory of asymmetry by exploring its origins, which—the paper proposes—contains three distinct approaches. These origins and their contexts reveal the original problems to which the theory of asymmetry was applied, which is essential to further understanding. The first approach was born out of a desire to explain why 'military and technological superiority' had become an 'unreliable guide to the outcome of wars'.¹² This approach focused on political attrition or what might be labelled 'strategic asymmetry', and was first articulated by Andrew Mack in his 1975 article 'Why Big Nations Lose Small Wars'.¹³ The second conception of asymmetry was an attempt to understand the battlespace more holistically. This second approach focused on 'operational/tactical asymmetry' and is contained in Shutler's 1987 article 'Thinking About Warfare'.¹⁴ The third approach was not so much a unified theory of asymmetry as a series of similar critiques. Typified by Andrew Krepinevich and Barry Watts in their piece 'Regaining Strategic Competence', it focused on describing when the theory of asymmetry ceased to have utility.¹⁵ By situating the first two approaches to asymmetry within their original problem frames, meaning is restored to the theory, and the theory can then be used more purposively in the analysis of contemporary use. The third approach provides a useful measure to guard against sophistry.

Asymmetry and Its Aetiology

Mack and 'Strategic Asymmetry'

The theory of asymmetry first emerged in the 1970s and was focused on the strategic implications of the concept. Andrew Mack's article 'Why Big Nations Lose Small Wars: The Politics of Asymmetric Conflict' provides the earliest articulation of a theory of asymmetry. This is significant, as most modern scholars writing on asymmetry have failed to identify this work.¹⁶ Mack's aim was to explore the outcomes of 'asymmetric conflicts', an area of study previously neglected.¹⁷ Central to Mack's analysis was the idea that conventional military superiority could be undermined by a belligerent through the 'progressive attrition of their opponents' *political* capability to wage war'.¹⁸ For Mack, political attrition was a 'function of the structure' of asymmetric conflict.¹⁹ He contrasted the *big nation's* relatively limited interests (as an invader) with the *small nation's* existential interests (as the invaded). Mack quotes from Henry Kissinger's famous article the 'The Viet Nam Negotiations' to underscore this point:

The North Vietnamese and Viet Cong, fighting in their own country, needed merely to keep in being forces sufficiently strong to dominate the population after the United States tired of the war. We fought a military war; our opponents fought a political one. We sought physical attrition; our opponents aimed for our psychological exhaustion. In the process, we lost sight of one of the cardinal maxims of guerrilla war: the guerrilla wins if he does not lose. The conventional army loses if it does not win.²⁰

In doing so, Mack draws attention to a key asymmetry: asymmetry of interest or will. For the invaded country, the threat is existential and therefore creates a unity of purpose and urgency. For the invader, the interest is limited to the extent the war is a priority over competing interests; to use Mack's words, this is a 'guns or butter' argument.²¹ At the core of Mack's concept of asymmetry is a belief that conventional military strength can be dislocated through asymmetric strategic aims.

'Strategic asymmetry' re-emerged in the early 1990s, albeit as a subtly different concept from that of Mack's original thesis. The catalyst was the US's overwhelming success in the first Gulf War.²² This led US strategists and policymakers to become concerned that potential adversaries would seek to circumvent US military strength by other means.²³ The US-led coalition defeated the Iraqi Army in such a convincing fashion that it was believed that adversaries would not seek to symmetrically oppose US conventional forces, and would instead seek to develop weapons of mass destruction, ballistic missiles or nuclear weapons.²⁴ As a result, the strategic concept of asymmetry grew to become associated with conventionally inferior opponents of the US. The Office of Net Assessment report *The Military-Technical Revolution: A Preliminary Assessment*, released in 1992, provided one such account.²⁵ The author, Andrew Krepinevich, described the 'Streetfighter State':

Such a threat, while pursuing objectives hostile to U.S. interests, would not want to confront the United States. Rather, it would have every incentive to learn from the lessons of the recent past, avoiding the direct approach practiced by Iraq in the Gulf War, while exploiting the successful, indirect, 'unconventional' approaches followed by Iran since the late 1970s, and by North Vietnam in the Second Indochina War.

A 'Streetfighter State' would pursue its plans for aggression by emphasizing the social dimensions of strategy. That is to say, the aggressor would attempt to exploit those aspects of the U.S. social culture that would inhibit the effective application of American military power. Specifically, acts of aggression would be low-intensity in nature and ambiguous in execution, with emphasis on terrorism, subversion, and insurgency.²⁶

Krepinevich's articulation of the Streetfighter State, although not explicitly labelled asymmetric, was representative of much of the US Defence discourse of the 1990s.

The theory of strategic asymmetry had effectively been repurposed as a description of future threats to the US in the wake of its conventional dominance. Steven Metz and Douglas Johnson II describe this as 'American Centrism', which had permeated the theory of asymmetry since the Gulf War.²⁷ This is evident in the US 1997 Quadrennial Defense Review Report released by US Secretary of Defence William Cohen, which stated:

Indeed, U.S. dominance in the conventional military arena may encourage adversaries to use asymmetric means to attack ... That is, they are likely to seek advantage over the United States by using unconventional approaches to *circumvent* or *undermine* our strengths while *exploiting* our vulnerabilities.²⁸ [emphasis in original]

Similar rhetoric was employed by the US National Defense Panel in its 1997 report, which observed:

We can assume that our enemies and future adversaries have learned from the Gulf War. They are unlikely to confront us conventionally with mass armor formations, air superiority forces and deep-water naval fleets of their own, all areas of overwhelming U.S. strength today ... They will look to match their strengths against our weaknesses.²⁹

Independently of Mack, US thinkers became concerned about the future threats to the US, and asymmetry was repurposed to describe these emerging threats.

The development of strategic asymmetry presents two different but connected problem sets to inform the theory of asymmetry. Mack's original thesis was explicitly trying to explain why 'big nations' lose expeditionary wars. On the other hand, the post Gulf War version of strategic asymmetry was about describing threats to the US. Both attempted to make sense of how the preponderance of conventional force on one side impacts conflict, with a particular emphasis on strategy. For the purposes of the comparative analysis, this approach will be relevant to contemporary use that seeks to address conventional military power imbalance.

Shutler and 'Operational/Tactical Asymmetry'

In the late 1980s, a different approach to asymmetry emerged that focused on the operational and tactical aspects of asymmetry. In 1987, the *Marine Corps Gazette* featured an article by Lieutenant General (Ret.) Philip Shutler entitled 'Thinking About Warfare'. Shutler's article was predominantly a reflection on the way in which 'technology alters the pattern and form of warfare'.³⁰ In his conception, asymmetry was defined by the ability of unlike forces to engage.³¹ Enabled by advances in technology, forces could engage enemy forces from different 'aspects' of the battlespace (what might be described as echelons such as tactical, operational, logistics and production) and across regimes (what today would be described as domains—space, land, air, sea and undersea).³² For instance, tactical air forces could attack land logistics. This 'mode of combat' was deemed to be 'asymmetric'.³³ In Shutler's estimation, these attacks could prove devastating if not adequately countered. Shutler proposed the idea of 'combat shields' as a way to cope with these asymmetric modes of combat.³⁴ For instance, a theatre commander seeking to conduct an amphibious landing against an adversary who possesses submarines should generate an anti-submarine shield by employing forces from all regimes to attack all aspects of the adversary's undersea regime.³⁵ In essence, Shutler was describing what he called 'fighting theatres' in response to advances in technology that increased the range of vehicles and communications and the lethality of weapons.³⁶ Shutler's piece was a proposal for a more holistic methodology in appreciation of asymmetry, and this forms the basis of the second distinct approach.

Shutler's methodology quickly became derivative. The following year, Colonel (Ret.) JJ Edson wrote a review article in the *Marine Corps Gazette* entitled 'The Asymmetrical Ace'.³⁷ As the title might suggest, Edson focused primarily on the idea of asymmetry, neglecting Shutler's nuance in proposing combat shields or in thinking holistically about the 'fighting theatres'. In 1991, asymmetry made its debut in US doctrine in *Joint Publication 1: Joint Warfare of the US Armed Forces* (JP-1). In this doctrine, asymmetric engagements were defined as:

battles between dissimilar forces. These engagements can be extremely lethal, especially if the force being attacked is not ready to defend itself against the threat. An example is air versus land (such as the air attack of land targets ...).³⁸

It is worth noting that Shutler's article was cited in the endnotes of JP-1. Again, but in a more pronounced fashion than by Edson, asymmetry was emphasised at the expense of Shutler's nuance regarding combat shields and fighting theatres. JP-1 goes on to highlight the power of asymmetry when employed by a joint force:

The properly functioning joint force is powerful in asymmetric attack, posing threats from a variety of directions with a broad range of weapon systems to stress the enemy's defenses. The land attack on a submarine pen, the sea-launched cruise missile strike or special operations force raid against a key air defense radar, the air strike against a vital ground transportation node—such asymmetric attacks afford devastating ways to attack or create enemy weaknesses and can avoid casualties and save resources.³⁹

This saw a more rudimentary concept of asymmetry develop, which had become increasingly divorced from Shutler's original thesis. The emphasis shifted from thinking holistically about 'fighting theatres' to simply attacking in the most devastating fashion.

For the purposes of comparative analysis, only Shutler's original theory of operational/tactical asymmetry provides a useful problem frame and theory to consider. Shutler presented a novel way to understand the battlespace. Its devolution into simply a description of unlike forces in pursuit of advantage represented an unfortunate regression.

The Revisionist Turn: Critiquing Asymmetry as a Hollow Theory

In the 2000s and 2010s, a revisionist turn emerged out of frustration with the West's lack of progress in the wars in Afghanistan and Iraq. This frustration was best expressed by Rupert Smith in his seminal text *The Utility of Force*: 'Labelling wars as asymmetric to me is something of a euphemism to avoid acknowledging that my opponent is not playing to my strengths and I am not winning.'⁴⁰ Smith was not alone in his critique of asymmetry. Stephen Blank observed of the term's devolution:

[I]n media discussions of the wars in Afghanistan and Iraq, the concepts of asymmetry and asymmetrical threat have been repeatedly invoked. In other words, the terms 'asymmetric' and 'asymmetry' have become mantras or slogans that are trotted out for any and all occasions but which have been devoid of useful analytical content.⁴¹

Many other scholars have also critiqued the concept. Colin Gray labelled the concept of asymmetry as 'hollow'⁴² and 'empty'.⁴³ Hew Strachan stated that the term 'asymmetric' was reflective of 'the weakness of war's conceptual vocabulary'.⁴⁴ Lawrence Freedman, while slightly less critical, noted that if the concept were logically expanded to include asymmetry of a stronger belligerent, it would be 'deprived of useful meaning'.⁴⁵ The theory of asymmetry was accused of being too broad, and therefore useless.

Examples of conventionally strong belligerents exploiting asymmetry formed a key argument to critique the existing theory. Dr Bell's broader critique of asymmetry was explicitly that all colonial wars of the 19th century were asymmetric.⁴⁶ The Battle of Omdurman (1898) in Sudan is a case in point; machine guns and magazine-fed rifles were used to great effect against a technologically inferior foe.⁴⁷ During the battle, 11,000 Dervish were killed, while Lord Herbert Kitchener supposedly rued the 'dreadful waste of ammunition'.⁴⁸ A Major Watson recalled the battle in a letter to his father:

Now they are getting closer and the Martinis of Blacks [Sudanese] and Egyptians speak. Guns, Maxims, Rifles, a terrible concert. Our mens' black powder [from the Martini-Henry rifles] stopped the view but you could hear the shouts, and occasionally through a rift in the smoke catch sight of a banner and black face. This part of the fight was at its height. Modern weapons versus numbers, the din was terrific and stretchers were plying. Then their fire slackened, and great cheers began to go up. They were stopped. Cease fire sounded. We got the first clear view of what we had done, and it was sufficiently appalling ...⁴⁹

In return, the British suffered just 140 casualties.⁵⁰ The battle was terribly 'one-sided', demonstrating the powerful effects that non-symmetrical forces can impart on each other.⁵¹ The presence of machine guns on colonial battlefields ensured that both the force structures before the battle and the casualty estimates after it were 'asymmetric'.

The corollary of asymmetry being exploited by either conventionally strong or weak belligerents is that exploiting asymmetry is simply a function of good strategy. Andrew Krepinevich and Barry Watts provide a cogent account of this position in their paper 'Regaining Strategic Competence'.⁵² They state:

Strategy is fundamentally about identifying or creating asymmetric advantages that can be exploited to help achieve one's ultimate objectives despite resource and other constraints ... At its core, strategy is about finding asymmetries in competitive situations that can be exploited to one's advantage.⁵³

Gray provides a similar assessment that 'choices for asymmetric activity merge with common-sense approaches to strategy'.⁵⁴ This critique is both compelling and logical. If asymmetry is reduced to such an extent that it becomes simply a euphemism for good strategy, then it ceases to be a meaningful theory of war. For the purposes of comparative analysis, the revisionist turn therefore marks the limits of a useful theory of asymmetry.

Asymmetry in Current Australian Discourse

Asymmetry is referenced in all the major public-facing strategic documents of the last few years (DSR, NDS, IIP and the Army Contribution) and has gone on to permeate many of the ADF's and the Army's intellectual spaces. It simultaneously describes the Australian

Defence Innovation, Science and Technology Strategy, *Accelerating Asymmetric Advantage*,⁵⁵ and features in Army-branded professional development articles on mobilisation and training.⁵⁶ This pervasiveness is underscored by a breadth of expression that has diluted the meaning of asymmetry.

Within the major Australian strategic documents (DSR, NDS and IIP), there is a disconnect between the way asymmetry is defined and the way it is then discussed. These documents tend to define a broad application of asymmetry that includes capabilities, tactics and strategies. However, in the body of the documents, 'asymmetric advantage' is overwhelmingly only discussed in relation to technology. The DSR's definition of asymmetric advantage is:

Asymmetric Advantage: Asymmetric warfare refers to military actions that pit strength against weakness, at times in a non-traditional and unconventional manner, against which an adversary may have no effective response.

In relation to cost imposition or denial, asymmetric refers to the application of dissimilar capabilities, tactics or strategies to circumvent an opponent's strengths, causing them to suffer disproportional cost in time, space or material.⁵⁷

The 2024 NDS broadly repeats this definition,⁵⁸ and while the 2026 NDS does not restate the definition, it approaches the topic in similar terms.⁵⁹ The 2026 NDS momentarily appears to advance the discussion on asymmetry in relation to employing 'innovative approaches', but unfortunately it does so primarily in the context of capability and technology.⁶⁰ When it comes to the discussion of asymmetry in all the documents, this is mostly confined to their respective technology chapters ('Technology and Asymmetric Advantage' in the DSR and 'Defence Innovation, Science and Technology' in the 2024 and 2026 NDSs). In the DSR, the term 'asymmetric' is used 14 times and—except for twice in the definition—only ever in relation to technology. Within the 2026 NDS, 'asymmetry' is used three times and 'asymmetric' 15 times, and in the 2026 IIP these terms are used one and 10 times respectively; once again, the usage is overwhelmingly in reference to technology or capability.⁶¹ This inspires a degree of conceptual confusion, as asymmetry is defined as all-inclusive (capabilities, tactics and strategies) but expressed throughout the body of the documents as simply technological. To be clear, technological asymmetry may be an important source of advantage, but this seems overly emphasised in the current discourse. As textual analysis reveals, asymmetry's expression within the documents is almost entirely weighted towards being a function of technology.

The Army Contribution focuses on a different aspect of asymmetry, preferring to consider asymmetry in the context of relative mass—that is, the small and the few versus the large and the many. In the 2024 version, this was evident from the introduction, where generating asymmetry is held to allow the Army to be 'more than the sum of [its] parts'.⁶²

The 2026 iteration goes on to state:

Small, well-prepared Army units can generate asymmetry against larger forces, especially when fortified; any potential adversary requires a high ratio of soldiers to dislodge even a modest defensive position.⁶³

This excerpt typifies the Army approach to asymmetry, with its operational and tactical focus. This position was reinforced in a recent article in the U.S. Naval Institute's *Proceedings* journal, by Commander of the 1st Division, Major General Ash Collingburn, and the Director of the Chief of Army's Initiatives Group, Colonel Tom McDermott. Their paper states that 'no military force ever seeks a fair fight. Instead, it seeks "asymmetry"'.⁶⁴ Again, the article invokes the image of a small force preparing defensive positions to defeat a larger adversary through the generation of asymmetry. This interpretation is more than an expression of technological superiority; it is a conceptual *modus operandi* for defeating larger opponents. Thus, the Army, at least in its declared contributions to the strategy, has preferred to view asymmetry through an operational and tactical lens.

Comparative Analysis

Australian contemporary use of asymmetry can be distilled into two strains for the purposes of comparative analysis: 'asymmetric advantage' as discussed in strategic documents, and asymmetry as discussed in the Army Contribution. This analysis uses problem frames as the starting point of comparison between Australian contemporary use and historical approaches. By comparing approaches with similar problem frames, their nuances provide the substance for analysis.

Asymmetric Advantage

'Asymmetric Advantage' is employed in the DSR, NDS and IIP. Somewhat problematically, the all-encompassing approach to asymmetry defined in the documents is not supported in the body of the texts. Overwhelmingly, asymmetry is discussed in the context of technology, leaving strategic asymmetry underdeveloped. This means that—despite the espousal of the strategic form of asymmetry in Australia's strategic discourse—ultimately, technology emerges as the implied impetus to generate both asymmetry and advantage. *Prima facie*, this seems comparable to the problem frame of Shutler's original theory of asymmetry, as both approaches attempt to grapple with the effects of technology on the battlefield.

However, Shutler indirectly opposes the premise of 'asymmetric advantage'—namely, that technology is the animus for advantage. Shutler argued that technology provided an opportunity for cross-domain and echelon strike (or in his words, regime and aspect respectively). His point was that modern advances permit unlike forces to engage

one another in novel ways. Importantly, the effect of this was to circumvent traditional ‘shields’, which emphasised the tactical or operational employment of these forces to exploit asymmetry. This is evident in Shutler’s entreaties to ‘adjust doctrine and modify organizations in order to fight in new ways’.⁶⁵ Recent criticisms of the ADF’s technological focus, *vide* asymmetric advantage, expose a similar point. In a piece published by the Australian Strategic Policy Institute, it was alleged that Australia’s defence policy reduces asymmetry to ‘basically the idea of weapon overmatch’.⁶⁶ This is not asymmetry. To be clear, technology can convey advantage, but this does not necessarily ‘strip away’ the enemies’ shields in line with Shutler’s prescriptions.⁶⁷ Technology is not asymmetric; its *employment* is.

Somewhat ironically, the only significant historical use of the exact phrase ‘asymmetric advantage’ is by Krepinevich and Watts in a fashion inimical to the current expression. As part of the previously described revisionist turn, Krepinevich and Watts made clear that the search for asymmetric advantage could simply be described as strategy.⁶⁸ Their point was that if asymmetry is equally applicable to both sides of a conflict, there is little analytical utility.

Furthermore, technology is an unstable source of advantage. In the article ‘Cavalry to Computer: The Pattern of Military Revolutions’, Krepinevich condemns the reliance on technologically based advantage.⁶⁹ This article tracks several technological revolutions of adoption and adaptation cycles, such as the cavalry and pike revolution and adaptation. Advantage delivered through technology is likely to be short-lived. Alternatively, this might be conceived as the ‘innovation cycle’ between adversaries, in which the benefits of technological innovation in a particular operation become increasingly brief.⁷⁰ This is a well-documented finding, both in strategic studies literature⁷¹ and in current writings on the war in Ukraine.⁷² It is also why the colonial examples of asymmetry should be treated with caution; the advantage conferred is fleeting and contextual.

Recommendation 1

The concept of ‘asymmetric advantage’ as a function of technology should become more nuanced. Currently, overstated as it is in the strategic discourse, it threatens to create reliance on dubious ideas of technological overmatch. We cannot afford to become ‘enamoured’ with our own ‘digital mythology’.⁷³ We should continue to pursue technological advantage, but this should not undergird our strategy or concepts,⁷⁴ and we should avoid empty and misleading aphorisms wherever possible. We should recast asymmetric advantage to focus on asymmetry through the *employment* of new technology, rather than simply classifying the technology itself as asymmetric. Ultimately, as a concept, ‘asymmetric advantage’ requires sensible conceptual boundaries and an agreed definition for *disciplined* use in the ADF that extends beyond simply being synonymous with advantage or technology. Shutler’s model provides an appropriate starting point.

Asymmetry in the Army Contribution

The problem frame of the Army Contribution appears to lend itself equally well to a comparative analysis with both Mack's and Shutler's approaches. On one hand, there are strong similarities with Mack's strategic asymmetry with its focus upon relative size and conventional combat power. On the other hand, Shutler's version of operational/tactical asymmetry lends itself to the Army Contribution's specific examples of 'dug in' defenders and the local correlation of forces. However, reflection on the broader strategic context reveals that Mack's strategic asymmetry is invalidated as an approach for the Army by the NDS.

The Army Contribution is subordinate to the NDS; its logic is not its own. This means that Army conceptual approaches are confined to supporting a strategy of denial, with the primary strategic objective of deterrence. This is an issue for the potential use by Army of Mack's strategic asymmetry, as the NDS articulates a strategic context in which Mack's theory cannot apply. Although arguably there is a theme of conventional military 'inferiority' in the NDS,⁷⁵ the logic of Mack's strategic asymmetry is not present. In his conception, the smaller power prevails because it is motivated by an existential threat against an opponent who might otherwise prefer 'butter' over 'guns'.⁷⁶ The smaller nation can exploit this 'political asymmetry' by imposing cost,⁷⁷ knowing that they will better endure sacrifice than their opponents will. The NDS describes no such situation. Instead, the NDS articulates a context in which Australia desires to preserve regional peace and prosperity, not defend the homeland at all costs.⁷⁸ This is not to say that the ADF would not do this; it is just not the current context, guidance or funding of the NDS and IIP.⁷⁹ Australia's interests as reflected in the NDS are no more compelling than a potential adversary's, at least not compared to the dynamic which Mack articulates as the invader versus invaded. Were Mack's theory to be used by Army in the current context of the NDS, it would be denuded of its logic, leaving the Army unable to take advantage of the political attrition inherent in strategic asymmetry's structure.

Therefore, Shutler's focus on operational and tactical asymmetry is more pertinent to the Army Contribution. This is evident in Shutler's descriptions of the local correlation of forces. For example, Shutler states:

Use your maneuver capability to go quickly to an area where your enemy is weak, but which he can't ignore. Then take advantage of terrain and asymmetric shields to shift the local correlation of forces in your favour ... Strip away your enemies defending shields. Use your forces in asymmetric modes to systematically reduce his forces where and when they are most vulnerable. If you must fight symmetrically use your maneuver capability to achieve high local correlation.⁸⁰

The connection can be seen in discussions of force ratios of ‘dug-in’ defenders present in the Army Contribution.⁸¹ In both approaches, there is a sense that asymmetry is situational; it is a description of the structures and dispositions of forces in time and space. However, Shutler’s model takes this further and proposes clear conceptual boundaries and structures. According to Shutler, asymmetry can be analysed through the respective regimes and aspects (domains and echelons). Furthermore, Shutler describes the product of this analysis as an understanding of the various ‘combat shields’ within broader theatres.⁸² Shutler’s approach, while addressing a similar problem frame to the Army Contribution, provides a model of asymmetry theory worth emulating.

Recommendation 2

If Army seeks to employ asymmetry in the manner articulated in the Army Contribution, Shutler’s model provides a good starting point to develop a more rigorous theory. Key to this recommendation is recognising the limitations of the current problem frame, as a subset of the NDS. A new theory should seek to reify the conceptual boundaries of asymmetry and discourage further spurious use of the term. The original theories of asymmetry were designed to address particular problems, which provided the structure for consistent expression. By providing a common problem frame to which asymmetry is applied, the conceptual stretching can be limited and a useful theory of war resurrected.

Towards a New Theory of Strategic Asymmetry for the ADF

As the above analysis demonstrates, there is a gap in the ADF’s expression of strategic asymmetry. The strategic asymmetry espoused by Mack is an inappropriate model for an ADF theory of asymmetry. The ADF is committed to a strategy of denial, seeking the primary objective of deterrence. From the outset, this minimises the political attrition that theories of strategic asymmetry seek to exploit. By design, the strategy of denial in the Australian context cannot rely on the will of the people generated by a dynamic of invader versus invaded. A new theory of strategic asymmetry is required to address the ADF’s needs.

For a new theory of strategic asymmetry to be applicable to the ADF, it needs to approach political attrition in a new way. A recent article by Andrew Lambert entitled ‘How Does Asymmetric Advantage Differ from Strategic Advantage?’ provides an interesting perspective on this topic.⁸³ Lambert’s argument advocates ‘abandoning conventional military balances to favour approaches which exploit and enhance national interests, aptitudes and capabilities’.⁸⁴ His key example is the British blockades during the Napoleonic Wars. Britain was unable to contend with Napoleon’s France on land and therefore turned to a strategy of maritime blockade. The analogy of that time was the elephant on land (the French) versus the whale at sea (the British Navy).⁸⁵ Lambert’s idea has profound implications for the theory of strategic asymmetry by providing a new dimension to Mack’s focus on will. It means that Mack’s focus on will was simply a focus

on a competitive advantage peculiar to the circumstances of invader versus invaded. To synthesise Lambert and Mack, strategic asymmetry should be considered as politically *attriting* an adversary through a competition advantageous to the nation's 'interests, aptitudes and capabilities'. This requires a more sophisticated theory of asymmetry than is currently conveyed in the Australian strategic discourse.

Conclusion

There is a way forward for the ADF and Army to continue to use asymmetry in a meaningful way. This starts with establishing sensible conceptual boundaries and delimiting asymmetry's employment as a catch-all aphorism. An immediate improvement in the use of asymmetry as a concept would be to decouple it from a simplistic association with technology. At the operational and tactical level, per Shutler's model, asymmetry should be considered through the *employment* of new technology, rather than simplistically ascribing the technology as asymmetric. Additionally, if asymmetry is to be used at the strategic level, careful consideration should be given to the structural implications of the relevant conflict and political will, in alignment with Mack's thesis. For Australia and its strategy of denial seeking deterrence, this may require an entirely new theory. In either case, a prudent first step to establishing the conceptual boundaries of asymmetry would be to determine what problem asymmetry is being used to solve. Successful remediation of the term would see an agreed foundational theory, with clear and disciplined expression, used in defined circumstances.

Without reform, asymmetry is at the precipice of becoming another staff officer sophism—a hollow term, deployed carelessly to cultivate support for whatever project requires it. The original conceptualisation of asymmetry by Mack and Shutler was not like this. They proposed distinct, mature approaches worthy of consideration and use. However, as these increasingly became shallow derivatives, a revisionist turn critiqued the concept of asymmetry to the point of disuse. This does not have to be the fate of the current iteration of asymmetry. With the appropriate effort and development, the disciplined use of the theory of asymmetry can provide utility to the ADF and Army's thinkers at all levels.

About the Author

Major Robert Bruce is an Australian Army Officer with over 15 years of service. He is a graduate of the Australian Defence Force Academy with a Bachelor of History and Politics, and a Chief of Army Honours student. He is also a graduate of the Australian War College, where he graduated with a Masters in Military and Defence Studies, and was awarded the Secretary of Defence Prize for excellence in strategic thinking.

ENDNOTES

- 1 Hilaire Belloc, 'The Modern Traveller', *Complete Verse* (London: Gerald Duckworth, 1970), p. 184. Dr Coral Bell, in her presentation to the 2005 Rowell Seminar and Chief of Army's Conference, references Belloc's verse to support her argument about the term 'asymmetric' also applying to colonial wars. Coral Bell, 'Asymmetric Wars', in Scott Hopkins (ed.), *Asymmetry and Complexity: Selected Papers from the 2005 Rowell Seminar and 2005 Chief of Army's Conference* (Canberra: Land Warfare Studies Centre, 2007), p. 10.
- 2 Australian Government, *National Defence: Defence Strategic Review 2003* (Canberra: Commonwealth of Australia, 2023), p. 71, at: <https://www.defence.gov.au/about/reviews-inquiries/defence-strategic-review>.
- 3 Australian Government, *2024 National Defence Strategy* (Canberra: Commonwealth of Australia, 2024), p. 64, at: <https://www.defence.gov.au/about/strategic-planning/2024-national-defence-strategy-2024-integrated-investment-program>; Australian Government, *2026 National Defence Strategy* (Canberra: Commonwealth of Australia, 2026), pp. 80–81, at: <https://www.defence.gov.au/about/strategic-planning/2026-national-defence-strategy-2026-integrated-investment-program>.
- 4 Australian Government, *2026 Integrated Investment Program* (Canberra: Commonwealth of Australia, 2026), at: <https://www.defence.gov.au/about/strategic-planning/2026-national-defence-strategy-2026-integrated-investment-program>.
- 5 Australian Army, *Australian Army Contribution to the National Defence Strategy 2024* (Canberra: Australian Government, 2024), at: <https://www.army.gov.au/our-work/strategy/australian-army-contribution-national-defence-strategy-2024>; Australian Army, *Australian Army Contribution to the National Defence Strategy 2026* (Canberra: Australian Government, 2026), at: <https://www.army.gov.au/our-work/strategy/australian-army-contribution-national-defence-strategy-2026>.
- 6 The genesis of the concept is confused in the literature with a variety of suggestions about periods and authors. Dr Coral Bell states that it had roots in the Revolution of Military Affairs concept as early as the 1980s. Bell, 'Asymmetric Wars', p. 10. Michael Mazarr claims that the concept of asymmetry emerged from the 1980s, and makes reference to Martin Van Creveld, despite no explicit mention of the term in his cited work: Michael J Mazarr, 'The Folly of 'Asymmetric War'', *The Washington Quarterly* 31, no. 3 (Summer 2008): 33, at: <https://doi.org/10.1162/wash.2008.31.3.33>. Christofer Berglund and Emil Souleimanov state that 'the notion of asymmetric conflicts caught on in the 1990s': Christofer Berglund and Emil Aslan Souleimanov, 'What Is (Not) Asymmetric Conflict? From Conceptual Stretching to Conceptual Structuring', *Dynamics of Asymmetric Conflict* 13, no. 1 (2020): 88, at: <https://doi.org/10.1080/017467586.2019.1680855>. Steven Metz and Douglas Johnson provide one of the most comprehensive histories of the term, but claim the first 'explicit' use of the term occurred in 1995 in *JP-1 Joint Warfare of the United States*, 2nd edition. This is not strictly correct, as the 1991 1st edition of JP-1 also details the term: Steven Metz and Douglas V Johnson, *Asymmetry and U.S. Military Strategy Definition, Background, and Strategic Concepts*, Strategic Studies Institute, US Army War College (2001), p. 2, at: <http://www.jstor.org/stable/resrep11225>. Only Sir Lawrence Freedman has rightly pointed to Andrew Mack's 1975 article 'Why Big Nations Lose Small Wars': Lawrence Freedman, 'The Third World War?', *Survival* 43, no. 4 (2001): 70, at: <https://doi.org/10.1080/00396330112331343135>.
- 7 This article is no longer available in the *Marine Corps Gazette* archives online; I am indebted to the Defence Library Service for locating a copy.
- 8 Berglund and Souleimanov, 'What Is (Not) Asymmetric Conflict?', p. 88.
- 9 W Hobbs, P Dexter, M Egudo and D Grieger, *An Analytical Framework for the Study of Asymmetric Warfare* (Restricted) (Defence Science and Technology Organisation, Land Operations Division Systems Sciences Laboratory, 2005), pp. 1–2. Quoted in Chris Field, *Asymmetric Warfare and Australian National Asymmetric Advantages: Taking the Fight to the Enemy*, Working Paper No. 136 (Land Warfare Studies Centre, Australian Army, November 2009), p. 12, at: <https://researchcentre.army.gov.au/library/land-warfare-studies-centre/asymmetric-warfare-and-australian-national-asymmetric-advantages-taking-fight-enemy>.
- 10 Stephen Blank, *Rethinking Asymmetric Threats* (Strategic Studies Institute, US Army War College, 2003), p. 4, at: <http://www.jstor.com/stable/resrep11640>.

- 11 Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Oxford, New York: Oxford University Press, 2007), p. 90.
- 12 Andrew Mack, 'Why Big Nations Lose Small Wars: The Politics of Asymmetric Conflict', *World Politics* 27, no. 2 (1975): 175, at: <https://www.jstor.org/stable/2009880>.
- 13 Ibid.
- 14 Phillip D Shutler, 'Thinking About Warfare,' *Marine Corps Gazette* 71, no. 11 (1987).
- 15 Andrew Krepinevich and Barry Watts, *Regaining Strategic Competence* (Washington DC: Center for Strategic and Budgetary Assessments, 2009), at: <https://csbaonline.org/resource/regaining-strategic-competence>.
- 16 Mack, 'Why Big Nations Lose Small Wars'. It should be noted that Mack references his own earlier work entitled 'The Concept of Power and Its Uses in Explaining Asymmetric Conflict'. See endnote 2 for a description of various academic accounts of the first theory of asymmetry. I concur with Sir Lawrence Freedman, who identifies Mack's article as the first to use the term. Freedman, 'The Third World War?', p. 70. I note that Henry Kissinger uses the term 'asymmetry' twice in his seminal article 'The Viet Nam Negotiations', but not with the fidelity or conceptual maturity of Mack. Henry A Kissinger, 'The Viet Nam Negotiations', *Foreign Affairs* 47, no. 2 (1969): 27 and 212, at: <https://doi.org/10.2307/20039369>.
- 17 Mack, 'Why Big Nations Lose Small Wars,' pp. 175–76.
- 18 Ibid., p. 177.
- 19 Ibid., p. 184.
- 20 Kissinger, 'The Viet Nam Negotiations', p. 214.
- 21 Mack, 'Why Big Nations Lose Small Wars,' p. 184.
- 22 Ahmed Hashim, 'Conventional War Is Dead! Long Live Conventional War?,' *Australian Journal of Defence and Strategic Studies* 5, no. 2 (2023): 236, at: <https://www.defence.gov.au/sites/default/files/research-publication/2023/AJDSS%20V5N2%20accessible.pdf>.
- 23 Ibid., p. 236. See also Metz and Johnson, *Asymmetry and U.S. Military Strategy Definition, Background, and Strategic Concepts*, pp. 2–3.
- 24 Hashim, 'Conventional War Is Dead!', p. 236.
- 25 Andrew Krepinevich, *The Military-Technical Revolution: A Preliminary Assessment*, (Washington DC: Center for Strategic and Budgetary Assessments, 2002), pp. 46–47, at: <https://csbaonline.org/research/publications/the-military-technical-revolution-a-preliminary-assessment>.
- 26 Ibid., p. 47.
- 27 Metz and Johnson, *Asymmetry and U.S. Military Strategy Definition, Background, and Strategic Concepts*, pp. 4–5.
- 28 William S Cohen, *Report of the Quadrennial Defense Review* (Department of Defense, May 1997), p. 4, at: <https://history.defense.gov/Historical-Sources/Quadrennial-Defense-Review>. A similar version of this quote is cited in Metz and Johnson, *Asymmetry and U.S. Military Strategy Definition, Background, and Strategic Concepts*, p. 3. As previously noted, Metz and Johnson incorrectly date the first mention of asymmetric warfare in US doctrine as 1995.
- 29 National Defense Panel, *Transforming Defense: National Security in the 21st Century* (Department of Defense, December 1997), p. 11, at: <https://www.govinfo.gov/content/pkg/GOVPUB-D-PURL-LPS15419/pdf/GOVPUB-D-PURL-LPS15419.pdf>. Cited in Metz and Johnson, *Asymmetry and U.S. Military Strategy Definition, Background, and Strategic Concepts*, p. 3.
- 30 Shutler, 'Thinking About Warfare', p. 18.
- 31 Ibid., p. 20.
- 32 Ibid., p. 20.
- 33 Ibid., p. 20. See also Figure 8 of Shutler's article.
- 34 Ibid., pp. 20–21.
- 35 Ibid., p. 21. See Figure 9 of Shutler's article.
- 36 Ibid., pp. 21–22.
- 37 JJ Edson, 'The Asymmetrical Ace', *Marine Corps Gazette*, 1 April 1988, at: <https://www.mca-marines.org/gazette/the-asymmetrical-ace>.

- 38 Joint Chiefs of Staff, *Joint Publication 1: Joint Warfare of the US Armed Forces*, 1st edition (Washington DC: National Defence University Press, 1991), p. 59, at: <https://archive.org/details/jointwarfareofus00unit/page/76/mode/2up?q=shutler>.
- 39 Ibid., p. 60.
- 40 Rupert Smith, *The Utility of Force* (London: Penguin Books, 2006), p. 6. See also Berglund and Souleimanov, 'What Is (Not) Asymmetric Conflict?', p. 88.
- 41 Blank, 'Rethinking Asymmetric Threats', p. 3.
- 42 Colin S Gray, 'Thinking Asymmetrically in Times of Terror', *Parameters* 32, no. 1 (2002), at: <https://doi.org/10.55540/0031-1723.2079>. Gray, like Freedman below, acknowledges that a more contrived version of the concept may be used.
- 43 Colin S Gray, 'Irregular Warfare: One Nature, Many Characters', *Strategic Studies Quarterly* 1, no. 2 (2007): 43, at: <https://doi.org/10.2307/26267370>.
- 44 Hew Strachan, *The Direction of War: Contemporary Strategy in Historical Perspective* (Cambridge: Cambridge University Press, 2013), p. 82.
- 45 Freedman, 'The Third World War?', p. 70.
- 46 Bell, 'Asymmetric Wars', p. 5.
- 47 Azar Gat, *War and Strategy in the Modern World: From Blitzkrieg to Unconventional Terror*, Case Military Studies (Abingdon: Routledge, 2018), p. 72.
- 48 David Petraeus and Andrew Roberts, *Conflict* (London: William Collins, 2023), p. 199.
- 49 Stephen Manning, *Bayonet to Barrage: Weaponry on the Victorian Battlefield* (Yorkshire: Pen & Sword Military, 2020), p. 170. Manning quotes from Major JK Watson's letter dated 7 September 1898 (NAM 1983-04-112).
- 50 Gat, *War and Strategy in the Modern World*, p. 72.
- 51 Strachan, *The Direction of War*, p. 191.
- 52 Krepinevich and Watts, 'Regaining Strategic Competence'.
- 53 Ibid., p. 19.
- 54 Gray, 'Thinking Asymmetrically in Times of Terror', pp. 6–7.
- 55 Australian Government, *Accelerating Asymmetric Advantage: Delivering More, Together*, Defence Innovation, Science and Technology Strategy (Canberra: Commonwealth of Australia, 2024), at: <https://www.defence.gov.au/about/strategic-planning/accelerating-asymmetric-advantage-delivering-more-together>.
- 56 This is reinforced simply by searching for the terms 'asymmetry' or 'asymmetric' on the *Land Power Forum* or in the *Australian Army Journal*. The point here is to demonstrate its pervasiveness; two examples that demonstrate the breadth of application are Jarrod Brook, 'Finding Asymmetry with Army's Train, Advise and Assist Capability', *Land Power Forum*, Australian Army Research Centre, 22 August 2023, at: <https://researchcentre.army.gov.au/library/land-power-forum/finding-asymmetry-armys-train-advise-and-assist-capability>; and McLeod Wood, *Finding Asymmetry During Mobilisation in the Australian Army*, Australian Army Occasional Paper No. 30 (Australian Army Research Centre, 2025).
- 57 Australian Government, *Defence Strategic Review 2003*, p. 71.
- 58 Australian Government, *2004 National Defence Strategy*, p. 64.
- 59 Australian Government, *2026 National Defence Strategy*, pp. 80–81.
- 60 Ibid., p. 81.
It is worth noting there is a single reference in the NDS 2026 Chapter 1—where a discussion on the character of war indicates that asymmetry is generated through a combination of technology and novel employment. But again it stands alone in this chapter until the more significant discussion in the technology chapter (Chapter 9).
- 61 In 2024, 'asymmetric' was used nine times in the NDS and five times in the IIP.
- 62 Australian Army, *Australian Army Contribution to the National Defence Strategy 2024*, p. 1.
- 63 Australian Army, *Australian Army Contribution to the National Defence Strategy 2026*, p. 24. A very similar version of this quote appeared in the 2024 Army Contribution, p. 22.

- 64 Ash Collingburn and Tom McDermott, 'Australia's Army is Adapting for the Littorals', *Proceedings* 151/5/1467 (May 2025), at: <https://www.usni.org/magazines/proceedings/2025/may/australias-army-adapting-littorals>.
- 65 Shutler, 'Thinking About Warfare', p. 1.
- 66 Jason Thomas, 'Asymmetry Is More Than Technology', *The Strategist*, 5 June 2024, at: <https://www.aspi.org.au/strategist-posts/asymmetry-is-more-than-technology>.
- 67 Shutler, 'Thinking About Warfare', p. 26.
- 68 To be clear, Krepinevich contributes to the idea of strategic asymmetry through his writing on the 'street fighter state' but, as stated above, he does not explicitly label this 'asymmetric'.
- 69 Andrew Krepinevich, 'Cavalry to Computer: The Pattern of Military Revolutions', *The National Interest* 37 (1994), at: <https://research.ebsco.com/linkprocessor/plink?id=ca1bd342-2728-3e8b-924c-50e213efe879>.
- 70 John Stillon and Bryan Clark, 'What It Takes to Win' (Washington DC: Center for Strategic and Budgetary Assessments, 2015), p. 19, at: <https://csbaonline.org/wp-content/uploads/2026/03/What-it-Takes-to-Win.pdf>.
- 71 In the following examples, the discussions range from outright critique of relying on technological advantage to more general discussions on the difficulty of predicting the impact of future technology: Murray Williamson, 'Clausewitz Out, Computers In: Military Culture and Technological Hubris', in *War, Strategy, and Military Effectiveness* (New York: Cambridge University Press, 2011); Strachan, 'Technology and Strategy', in *The Direction of War*; Krepinevich, 'Cavalry to Computer'; Gat, 'The "Revolution in Military Affairs" (RMA) Compared with Earlier Military-Technological Revolutions of the Nineteenth and Twentieth Centuries', in *War and Strategy in the Modern World*.
- 72 David Betz and MLR Smith, 'Smart Weapons, Dumb Assumptions: Western Strategic Delusions Meet Industrial Reality in Ukraine', *Military Strategy Magazine*, 26 June 2025, at: <https://www.militarystrategymagazine.com/exclusives/smart-weapons-dumb-assumptions-western-strategic-delusions-meet-industrial-reality-in-ukraine>.
- 73 Ibid.
- 74 Thomas, 'Asymmetry is More than Technology'.
- 75 Sally Burt, David Kilcullen, Ian Langford and Andrew Maher, *Unconventional Deterrence in Australian Strategy* (Australian Strategic Policy Institute, 2025), pp. 4–5, at: <https://www.aspi.org.au/report/unconventional-deterrence-in-australian-strategy>.
- 76 Mack, 'Why Big Nations Lose Small Wars,' p. 184.
- 77 Ibid., p. 188.
- 78 See Michael Pezzullo, 'NDS 2026—the Right Strategy for the Wrong Era', *The Strategist*, 30 May 2026, at: <https://www.aspistrategist.org.au/nds-2026-the-right-strategy-for-the-wrong-era>. He states: 'NDS 2026 does not seek to rapidly build a heavier force that could defend us against an attack before 2030 by a great power in a major war. That should be the immediate focus of policy... However, there is nothing in current policy to suggest that we are undertaking an urgent and expansive mobilisation of the Australian Defence Force or that we are preparing our economy and population for war.'
- 79 Former Chief of Army Peter Leahy has made a similar argument, although a more critical one, regarding funding for the defence force: Peter Leahy, 'Defence Cops Blame for Strategic Mistakes—but This One Belongs to Our Leaders', *The Australian*, 2 June 2025, at: <https://link.gale.com/apps/doc/A842528199/GIC?u=defence&sid=ebsco&xid=6f8e801d>.
- 80 Shutler, 'Thinking About Warfare', p. 26.
- 81 Australian Army, *Australian Army Contribution*, p. 22.
- 82 Shutler, 'Thinking About Warfare', pp. 20–21.
- 83 Andrew Lambert, 'How Does Asymmetric Advantage Differ from Strategic Advantage?', *Britain's World: Council on Geostrategy*, 17 July 2025, at: <https://www.britainworld.org.uk/p/the-memorandum-29-2025>.
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/ OPTOMECHANICAL SENSORS USING SQUEEZED STATES: PROSPECTS FOR MILITARY APPLICATIONS

Ria Rushin Joseph

Introduction

In recent decades, the emergence of quantum technologies has ushered in a new era of precision and innovation, with far-reaching implications across scientific, industrial and defence domains. Among these, quantum imaging¹—a technique that exploits the unique properties of quantum states—has attracted much attention for its ability to exceed classical imaging constraints.² In particular, the use of squeezed states of light³ has demonstrated potential to enhance resolution, noise suppression and performance.⁴ For military or security applications, where precision and operational effectiveness are of particular significance, these capabilities offer new possibilities for improvements in surveillance, reconnaissance and target detection.

This article examines how squeezed states of light can be integrated with optomechanical sensors to improve measurement sensitivity under suitable operating conditions. It considers both propagating-field squeezing and intracavity squeezing. These approaches can reduce quantum measurement noise when optical loss, phase noise, thermal fluctuations and other technical disturbances are sufficiently controlled. The article also discusses theoretical schemes for surpassing the conventional 3 dB steady-state intracavity squeezing limit and considers potential applications in GPS-denied navigation and target detection.

Optomechanics Explained

Cavity optomechanics studies the interaction between light in an optical cavity and a mechanical resonator. Mechanical motion changes the optical response of the cavity, while the optical field can exert radiation-pressure forces on the resonator. The outgoing optical field can then be measured to infer displacement, force, acceleration or added mass.

Optomechanical sensing devices typically utilise coherent light sources⁵ but their performance is constrained by quantum noise. Depending on the sensor architecture, a squeezed probe may be used with a coherent carrier, or squeezed vacuum may be injected into a readout port, to reduce measurement noise. Yet in many Army field scenarios, technical noise sources (like vibrations or temperature swings) may dwarf quantum noise. Where quantum noise does dominate—for instance, in highly tuned or cryogenically cooled sensor set-ups—squeezing can slash the shot-noise⁶ floor and yield unmatched sensitivity. By reducing noise in one variable (such as amplitude or phase) while increasing it in its conjugate counterpart, squeezed states result in enhanced signal-to-noise ratios and heightened sensitivity.⁷ Optomechanical sensors using squeezed states can improve performance when quantum noise is significant and optical loss, phase noise and environmental disturbances are sufficiently controlled. The following section introduces the concept of squeezed states, which improve optomechanical sensors by strategically reducing quantum noise in one variable (e.g. amplitude or phase) while allowing increased noise in the conjugate variable. This primer provides the basis for this article's further examination of measures to overcome traditional limitations on the use of quantum imaging in military contexts.

Squeezed States: a Brief Primer

Squeezed states of light are quantum states where the quantum uncertainty in one quadrature is reduced, or squeezed, at the expense of increased uncertainty in the orthogonal quadrature. For practical sensor design, including Army applications, the key is to align or 'twist' this reduced-noise quadrature with the physical parameter of interest (e.g. a displacement signal), so that the sensor reads out smaller fluctuations than a coherent- or vacuum-state reference would allow. With the convention used here, a coherent or vacuum state has a quadrature standard deviation of $1/2$. A squeezed state has a standard deviation below $1/2$ in one appropriately chosen quadrature and a larger standard deviation in the conjugate quadrature. In the optical phase space, a coherent state is represented by a circular Gaussian distribution, while a squeezed state is represented by an elliptical Gaussian distribution, centred at a point corresponding to the amplitude and phase. The quadratures of both coherent states and squeezed states of light in the optical phase space are plotted in Figure 1 for comparison. The amount of squeezing is characterised by the squeeze factor, which typically refers to how much the uncertainty in one quadrature has been reduced relative to the vacuum state.

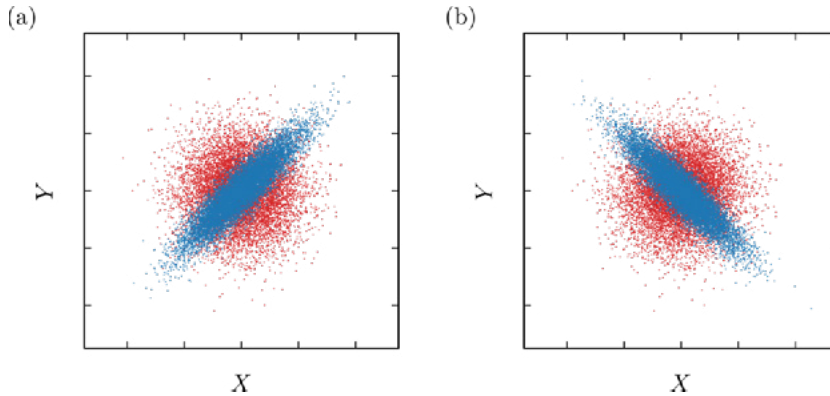


Figure 1: Phase-space samples for a coherent-state reference (red) and a squeezed state (blue). In each panel, the blue distribution has reduced variance along its minor principal axis and increased variance along the orthogonal major axis. Panels (a) and (b) show two different squeezing angles. The measurement basis must be aligned with the squeezed quadrature to observe sub-vacuum noise.

The ‘quadrature of light’ in Figure 1 refers to the components of the electric field of a light wave that are used to describe its quantum state. The amplitude quadrature X corresponds to the in-phase component of the electric field, while the phase quadrature Y corresponds to the out-of-phase component of the electric field. The quadratures of light are subject to the uncertainty relation $\Delta X \Delta Y \geq 1/4$, where ΔX and ΔY are the standard deviations of the X - and Y -quadrature distributions. This relation means that the two conjugate field quadratures cannot both have arbitrarily small fluctuations. ΔX and ΔY are the standard deviations of the distribution of the quadratures X and Y . This relation means that the two conjugate field quadratures cannot both have arbitrarily small fluctuations.

In quantum optics, light can be described as a quantum harmonic oscillator. The energy levels of light are discrete and they correspond to different numbers of photons, with each photon adding a quantum of energy $\hbar\omega$ to the system, where $\hbar$ is the reduced Planck’s constant and ω is the angular frequency. The ground state that corresponds to the vacuum state of light has a vacuum energy of $\hbar\omega/2$. Despite having no photons, the vacuum state still exhibits quantum fluctuations due to the uncertainty principle. In any optical measurement, quantum noise arises due to these inherent fluctuations in the vacuum state. This noise is unavoidable and sets a fundamental limit on the precision of measurements. Coherent states are quantum states of light that most closely resemble classical light waves. They have the minimum possible uncertainty in both amplitude quadrature and phase quadrature, which is equal to that of the vacuum state. The quantum uncertainties in both quadratures are each equal to $1/2$.

There are two approaches to generating squeezed light: propagating field squeezing and intracavity squeezing. These are outlined briefly below.

Propagating Field Squeezing

Propagating field squeezing⁸ refers to squeezed light that leaves its source and propagates through free space or optical fibre. Laboratory homodyne measurements have observed up to 15 dB of squeezed-vacuum noise reduction. Squeezed light has also been used in gravitational-wave detectors to reduce quantum noise. In propagating field squeezing, one of the widely used techniques is parametric down-conversion (PDC).⁹ In parametric down-conversion, a strong pump interacts with a nonlinear crystal to generate correlated lower-frequency optical fields that can exhibit quadrature squeezing. The first experimental observation of squeezed light was reported in 1985 using four-wave mixing. Squeezing generated by degenerate parametric down-conversion was demonstrated in 1986.¹⁰

The efficiency of PDC can be further enhanced by employing optical parametric oscillators (OPOs), which have become the standard for generating continuous-wave squeezed light. OPOs use nonlinear crystals to achieve phase matching, enabling efficient energy transfer between the pump and the generated photons.¹¹ Another prominent technique is four-wave mixing (FWM),¹² which occurs in nonlinear media such as optical fibres and atomic vapours. In FWM, multiple light waves interact within the medium, leading to the generation of squeezed light. This approach has demonstrated high-quality squeezed states, particularly in rubidium vapour, with noise reduction of 9.2 dB below the vacuum-noise level.¹³ The Kerr nonlinearity offers another approach to generating squeezed light by making use of the intensity-dependent refractive index of a medium. Squeezing can be achieved through self-phase modulation or cascaded interactions.¹⁴ Advances in PDC techniques, for instance, could lead to more efficient and reliable generation of squeezed states.

The difficulties in implementing squeezed states when they are generated external to the optical cavity are well known. These challenges are primarily due to transmission and injection losses. Specifically, when squeezed light is transmitted through optical components or injected into cavities, losses can degrade the squeezing by introducing additional noise. These losses are detrimental because they can negate the advantages provided by the squeezed states, especially in precision measurement applications.

Intracavity Squeezing

Intracavity squeezing¹⁵ refers to the generation and manipulation of squeezed states within the optical cavity itself. Achieving significant squeezing inside a cavity is challenging because the intracavity-field dynamics are affected by vacuum fluctuations,

optical loss and other noise processes. The conventional steady-state intracavity squeezing limit for a semiclassical degenerate parametric amplifier is 3 dB.¹⁶

Generating squeezing within the sensing cavity can remove a separate squeezed-light injection path and may reduce some coupling losses. Internal optical loss, finite escape efficiency, pump noise, thermal fluctuations and phase instability can still limit the usable squeezing.

Cavity optomechanics¹⁷ has emerged as a pivotal field in quantum imaging and sensing, utilising the intracavity squeezed states to achieve better sensitivity and precision, with profound implications for military applications. These advancements hold the potential to transform surveillance, reconnaissance, target detection and secure communication, providing a decisive edge in modern defence operations. Recent technological advances highlight the potential of cavity optomechanical sensors (particularly when enhanced by quantum phenomena such as entanglement and squeezed light) to push sensor capabilities beyond classical limits. This enables extremely sensitive detection of forces, displacements, and subtle changes in optical signals. For instance, Xia et al. demonstrated that optomechanical sensors, when probed with entangled light, outperform those using classical laser light. By achieving superior force resolution and measurement bandwidth, such sensors have potential applications in inertial navigation and acoustic imaging.¹⁸ Scientists attribute this enhancement to the ability of entangled light to reduce quantum noise, thereby improving measurement sensitivity. Moreover, the integration of nanostructures, such as semiconductor nanowires, into cavity optomechanical systems has opened new avenues for developing hybrid sensors. These nanowires have the potential to facilitate novel quantum hybrid systems, which could significantly enhance the capabilities of optomechanical sensors.¹⁹

Quantum-interference effects have been proposed as a method for cooling a nanomechanical resonator towards its ground state, thereby reducing thermal occupation and associated force noise.

To enhance the sensitivity of gravitational-wave detectors, a widely adopted strategy involves injecting squeezed light into the interferometer.²⁰ Although gravitational-wave detection is beyond the Army's immediate scope, squeezed-light readout may inform advanced inertial-sensing and precision force-sensing architectures within Defence. It is significant that the capacity to measure weak forces with high precision is vital for various applications, including astrophysics and fundamental physics experiments. Furthermore, the exploration of imaging-based cavity optomechanics has revealed that information about mechanical resonator motion can be encoded into the spatial modes of optical fields. This innovative approach allows for enhanced imaging capabilities and for the potential of these systems to provide detailed insights into mechanical dynamics.²¹ The integration of advanced imaging techniques with cavity optomechanics could support advances in biomedical imaging and materials science.

Utilising Squeezed Light

By using squeezed light in optomechanical systems, the precision and sensitivity of these systems can be enhanced. Representative optomechanical platforms that can employ squeezed-light readout include cold-atom systems, photonic-crystal cavities and membrane-in-the-middle systems. A cold atom²² optomechanical system²³ combines cold atomic ensembles with mechanical elements and optical techniques. A photonic crystal²⁴ cavity optomechanical system²⁵ integrates photonic crystals with mechanical elements to perform high-precision measurements. A membrane-in-the-middle optomechanical system²⁶ is a type of optomechanical system where a thin membrane is placed inside an optical cavity.

When we use light in these sensors—what we call optically transduced sensors—we shine light on the system and then analyse how certain properties of the light change after interaction. In Army contexts, these platforms would require robust packaging, vibration isolation, stable alignment, low optical loss, temperature control and stable laser phase and frequency. The ability of a sensor to detect very small changes in the quantity we're measuring—its sensitivity—depends on several factors. Firstly, it depends on how strongly the sensor responds to changes in the quantity. Secondly, it depends on the inherent noise or fluctuations in the light we use to probe the sensor. Lastly, it depends on how many times we repeat the measurement to improve accuracy.

When the squeezed quadrature is aligned with the measured observable, its noise can be reduced below the coherent-state reference. The detected improvement depends on the usable squeezing, optical efficiency, detector performance and phase stability.

Increasing probe power generally reduces shot-noise imprecision, but it can also increase radiation-pressure backaction, optical heating and detector saturation. The balance between measurement imprecision and backaction defines the standard quantum limit for a conventional continuous measurement. Properly phased squeezing can redistribute these noise contributions, while optical loss and phase fluctuations limit the achievable improvement.

Quantum Fisher information quantifies the information available about a specified parameter in a quantum state. For a given parameter-encoding model and number of independent measurements, the Quantum Cramér–Rao bound gives a lower bound on the variance of a locally unbiased estimator. An appropriate measurement may attain the bound under suitable conditions. Jointly measuring both optical quadratures does not automatically improve precision.

Observations Concerning the Use of Optomechanical Sensors in the Military

Optomechanical sensors have potential applications in inertial navigation, structural monitoring and weak-force detection. In theory, incorporating intracavity squeezing can further suppress quantum noise and boost sensor performance. However, real-world military environments typically introduce far more intense sources of noise—such as vibrations, thermal fluctuations and electromagnetic interference—than those targeted by squeezing. Consequently, while many types of optomechanical sensors exist, their practical benefits in military contexts often hinge on whether these classical disturbances can be reduced to levels where quantum noise truly becomes the limiting factor.

The following overview highlights various sensor categories, discusses their potential operational value, and addresses the noise-related barriers that must be overcome for quantum-enhanced sensing to deliver robust, field-ready capabilities.

- Displacement sensors form the foundation for many other sensor types by detecting changes in the position of a mechanical resonator, which may be internal to the optical cavity or externally coupled.²⁷ They can serve military needs in precise alignment, structural health monitoring and weapon stabilisation systems, though controlling environmental noise is crucial for reliable performance.
- Mass sensors²⁸ rely on shifts in the resonance frequency of a mechanical resonator caused by the adsorption of an additional mass. The sensitivity of these sensors is determined by the effective mass and quality factor of the resonator, with optomechanical systems achieving femtogram-range sensitivity.²⁹ Sensors of this type have the potential to detect trace chemical deposits on surfaces. Mass sensors, however, require carefully controlled conditions to be effective to avoid overshadowing quantum noise with environmental disturbances. The near-term field utility of these sensors may be limited by environmental sensitivity and the need for controlled or selectively functionalised surfaces.
- Force sensors³⁰ detect forces acting on a mechanical resonator by measuring the resulting displacement, with sensitivity linked to displacement sensitivity through the mechanical susceptibility of the resonator. They could aid in military applications such as vibration monitoring of sensitive installations or early detection of tampering, but high environmental noise might limit their quantum-level advantages.
- Acceleration sensors measure acceleration by detecting the displacement of a test mass. They can be highly useful for inertial navigation in GPS-denied environments, though practical deployment requires robust noise mitigation to realise their quantum-level precision.

- Magnetic field sensors³¹ employ magnetostrictive materials, which change dimensions in response to magnetic fields, coupling these changes to a mechanical resonator for optical readout.
- Ultrasound sensors³² can detect acoustic waves via photoelastic effects or pressure-induced deformations. From a military perspective, this technology could potentially aid in stand-off detection of hidden structures. However, classical noise disruption would likely overshadow the potential to achieve quantum noise reduction in a military context.
- Micro-electro-mechanical systems (MEMS)-based gravimeters can detect subtle gravitational anomalies associated with subterranean structures such as tunnels or bunkers. While squeezing could theoretically improve sensitivity, in a military context seismic vibrations and inefficient detectors reduce their practical effectiveness. For instance, reconnaissance missions in complex terrains, such as the Indo-Australian archipelago, may not significantly benefit from squeezing due to high environmental noise floors.
- Optomechanical gyroscopes measure rotation and acceleration via optical resonance shifts. Such gyroscopes could theoretically benefit from intracavity squeezing to reduce quantum noise and improve accuracy. However, military deployments typically encounter much higher noise levels from mechanical vibrations, temperature fluctuations and platform movements. Consequently, quantum squeezing may have limited practical impact in most field scenarios.

Despite factors that generally inhibit the effective use of optomechanical sensors in military contexts, there are nevertheless some areas of practical application, including those outlined below.

- In surveillance and reconnaissance, sensors can detect small environmental disturbances, aiding in the identification of hidden threats.
- Navigation and guidance systems can benefit from optomechanical sensors, providing accurate acceleration and orientation data critical for missiles, drones and autonomous vehicles. These systems are especially valuable in GPS-denied environments, where traditional methods fail.
- The sensitivity of optomechanical chemical and biological sensors, which detect hazardous substances through frequency shifts caused by molecular adhesion, might be improved with intracavity squeezing. Nevertheless, challenges such as surface contamination, temperature and humidity variations, and detector inefficiencies significantly limit these theoretical benefits in practical conditions.
- Certain niche Army-specific applications, such as detection of buried improvised explosive devices, navigation of UAVs in GPS-denied environments, and surveillance of concealed threats, could potentially benefit from squeezed-light techniques in

situations where quantum noise becomes a relevant contribution to the overall sensor noise budget. In those cases, squeezing may improve sensitivity by reducing the quantum-noise floor and enhancing the detectability of weak signals. However, achieving this in practice would require substantial engineering effort to produce robust, field-deployable systems that can operate reliably in harsh environments.

Key Innovations and Contributions

This article takes the novel approach of diverging from the theoretical approach outlined above by making use of another theoretical approach: quantum phase-space methods.³³ Phase space provides a powerful framework for visualising and analysing quantum states using representations like the positive P.³⁴ Rather than assuming that extra nonlinear terms automatically lift the longstanding intracavity-squeezing limit, this article uses quantum phase-space methods and numerical optimisation to test that proposition directly. Phase-space methods provide a practical way to analyse non-classical states in driven, lossy cavities, while the optimisation routine helps identify the most favourable operating points for the model studied here.

Having established the promise of optomechanical sensors—and the practical constraints imposed by loss, instability and environmental noise—the article then examines whether a nonlinear cavity model with Kerr interaction, parametric coupling and detuning can relax the conventional 3 decibel steady-state limit for intracavity squeezing. The value of this analysis is not that it proves a beyond 3 decibel result in the present system; rather, it shows how far the model can be pushed and where its limitations remain.

This distinction matters. Qin, Miranowicz and Nori show that squeezing beyond 3 decibels can, in principle, arise in a fully quantum two-mode degenerate parametric amplifier with two-tone driving and engineered dissipation. Our analysis does not reproduce that result in the single-cavity setting considered here. Instead, it indicates that the squeezing remains limited in this model, even after systematic exploration of Kerr nonlinearity, parametric interaction and detuning.

In simpler terms, the model describes optical modes in a nonlinear cavity, one affected by intensity-dependent Kerr shifts and another driven parametrically by an external laser. Detuning changes the relative frequency offset between the optical modes and the drive, which can improve stability and reshape the noise landscape. These elements can enhance squeezing and help identify favourable operating regimes. In the present study, however, they do not justify a claim that the longstanding 3 decibel steady-state limit has been decisively broken.

The model Hamiltonian therefore serves a diagnostic role as well as a predictive one. It captures the key ingredients needed to explore how nonlinear interactions, external driving, and photon loss interact in a realistic cavity system. Through analytical calculations and numerical simulations, the model shows where quadrature noise can be substantially reduced, but it also reveals the constraints that still prevent a clear beyond 3 decibel steady-state result in this particular formulation.

The Kerr nonlinearity, parametric coupling and carefully chosen detuning remain valuable because they map the boundaries of improved performance. Our optimisation results show that these parameters can reduce quadrature noise and identify promising operating regions, even though the present single-cavity model does not establish steady-state intracavity squeezing above 3 decibels. The next step is therefore to explain clearly why this result differs from the Qin–Miranowicz–Nori proposal and which physical ingredients must be retained if beyond 3 decibel squeezing is to be realised in practice.

The squeeze factor is commonly expressed in decibels by comparing the variance of the squeezed quadrature with the vacuum variance. On that scale, -3 decibels corresponds to a 50 per cent reduction in noise. The practical significance of the present results is therefore not that they demonstrate nearly 10 decibels of intracavity squeezing in this system. Instead, they show where meaningful noise reduction is achievable, where the limit appears to persist, and why clarifying the route to a genuine beyond 3 decibel steady state remains an important research problem for quantum sensing.

By clarifying why the conventional 3 decibel limit remains hard to beat in this model, the research still makes a useful contribution to quantum measurement science. It separates achievable noise reduction from unsupported extrapolation and it provides a more credible foundation for the next generation of sensor proposals.

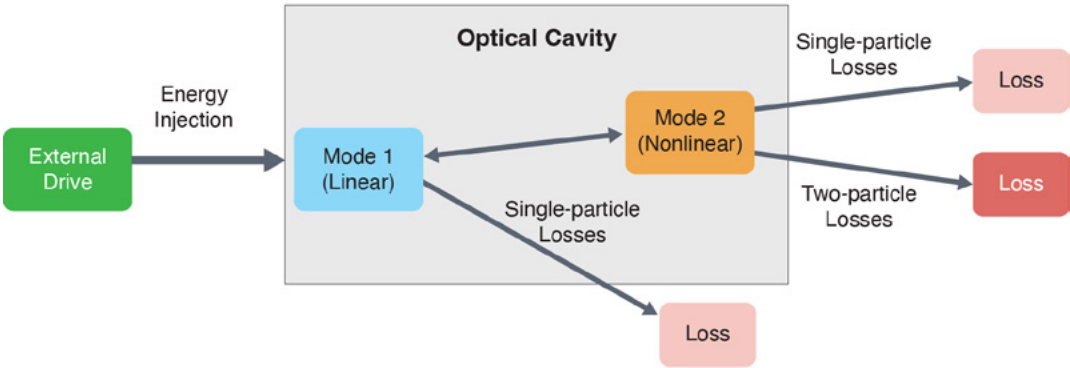


Figure 2: Description of the Hamiltonian used for calculations

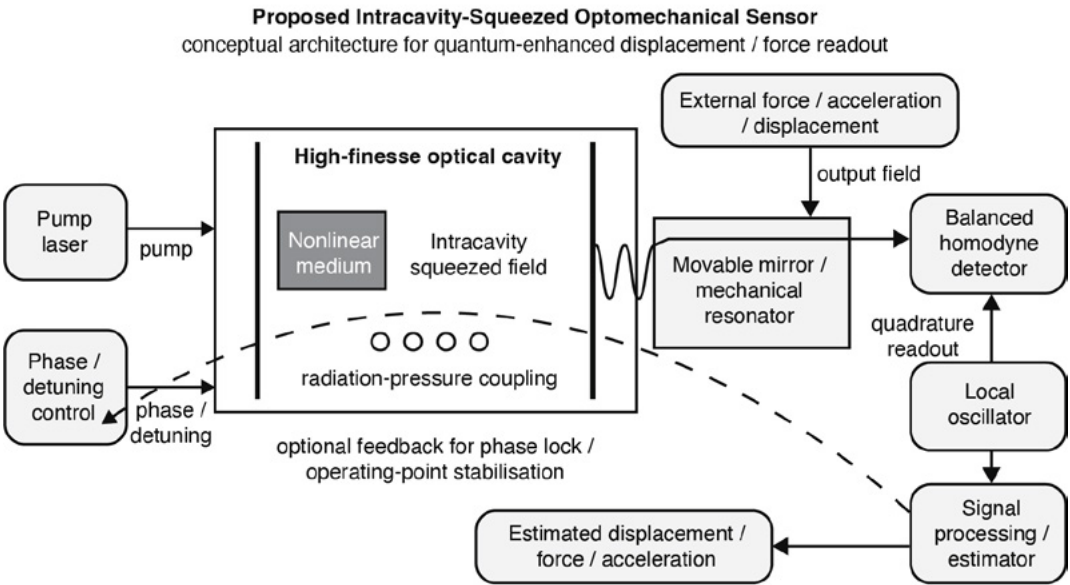


Figure 3: Proposed quantum optomechanical sensor using squeezed light

Building on the concepts discussed in this article, we propose a quantum optomechanical sensor (Figure 3) that uses intracavity squeezing to reduce measurement noise and improve readout precision. The proposal is intentionally presented as a sensor architecture, not as a claim that the specific model analysed here has already demonstrated steady-state squeezing above 3 decibels. Its purpose is to show how a practical system might exploit intracavity nonlinear interactions while also providing a framework for testing the remaining limit experimentally.

The core of the proposed sensor is a high-finesse optical cavity with a movable end mirror or membrane that functions as the mechanical resonator. A nonlinear medium inside the cavity generates intracavity squeezing, while a pump laser drives the system at a controlled detuning. External forces, displacements or accelerations perturb the resonator and imprint phase or amplitude changes on the optical field. The output is then measured by balanced homodyne detection and processed to estimate the quantity of interest.

The advantage of this proposal is that it keeps the squeezed field inside the cavity, reducing the transmission and injection losses that often weaken externally generated squeezing. In principle, that makes the architecture attractive for high-precision sensing. In practice, its performance will depend on whether sufficient squeezing can be stabilised under realistic loss, phase-noise and environmental conditions. For that reason, the proposed sensor should be presented as a credible next-step platform for testing quantum-enhanced readout, rather than as proof that the 3 decibel steady-state limit has already been overcome.

The Impact on Army of Exceeding 3 Decibels of Squeezing

Traditionally, the 3 decibel intracavity-squeezing limit has been treated as a major benchmark because deeper steady-state noise suppression would translate into more sensitive optical readout. If future architectures can robustly exceed that benchmark under realistic operating conditions, the military pay-off could be substantial, particularly for niche platforms where classical noise has already been suppressed and quantum noise becomes the dominant remaining floor.

In a defence context, that could matter for optomechanical accelerometers or inertial sensors operating in carefully engineered GPS-denied navigation systems, or for specialised surveillance platforms trying to resolve very weak signals. However, the present work does not yet justify claiming such a performance step in the model analysed here. What it does provide is a more honest and strategically useful conclusion: before the Army can count on beyond 3 decibel intracavity squeezing, the field must clarify why the Qin–Miranowicz–Nori scheme predicts it and why simpler single-cavity nonlinear models do not.

Existing quantum sensors based on cold atoms remain strong competitors for inertial measurement, but squeezed-light platforms still offer potential advantages in optical integration, fibre compatibility, miniaturisation, and operation in dynamic environments. Even without a verified beyond 3 decibel result in the present model, the proposed sensor remains relevant because moderate squeezing, careful loss reduction and robust readout design can still improve practical sensitivity. The most convincing military message is therefore not that the 3 decibel barrier has already been beaten here, but that resolving this question is a necessary step towards fieldable quantum optomechanical sensors.

Conclusion

This study underscores the pivotal role of squeezed states in advancing quantum sensing technologies, demonstrating their capacity to surpass classical measurement limitations by significantly reducing quantum noise. However, such advantages primarily manifest in regimes where classical and technical noises are minimised—something that must be carefully addressed if these sensors are to be used in typical Army settings. Our research highlights how optimised squeezed states, generated and maintained through sophisticated quantum phase-space methods and advanced optimisation algorithms, can mitigate the detrimental effects of quantum noise, photon losses and environmental disturbances. This breakthrough not only enhances the performance of quantum sensors in principle but also ensures potential reliability if the environment can be well controlled, an ongoing challenge for the demanding conditions inherent in military operations.

To fully realise the potential of squeezed-state quantum sensors within the defence framework, several critical steps must be undertaken. Firstly, continued investment in research and development is essential to overcome existing challenges related to the generation and stabilisation of squeezed states in real-world environments. Collaboration between quantum physicists, engineers and military strategists will be crucial to tailor these technologies to specific defence needs. Furthermore, the development of robust integration protocols will facilitate the seamless incorporation of quantum sensors into existing military infrastructure, ensuring scalability and portability for field deployment. Equally important is the systematic testing of these systems in relevant noise environments—only then can we confirm whether the extra decibels of squeezed light genuinely translate into fieldable capabilities that surpass today's classical sensors.

Final Recommendations and Call to Action

1. **Foster collaborative partnerships:** Encourage partnerships between academic institutions, defence research organisations and industry leaders to drive innovation and expedite the transition from theoretical advancements to practical applications.
2. **Invest in training and expertise:** Develop specialised training programs to build a cadre of experts proficient in quantum sensing technologies, ensuring the Australian Army is equipped with the knowledge and skills to deploy and maintain advanced quantum sensors effectively.
3. **Pilot deployment and testing:** Initiate pilot programs to test squeezed-state optomechanical sensors in real-world military scenarios, gathering critical data on both quantum and classical noise performance to inform further development and refinement.

4. **Strategic integration:** Develop comprehensive strategies for integrating quantum sensors into existing military systems, ensuring interoperability and maximising the strategic advantages offered by these technologies. Include explicit plans for dealing with classical noise sources and potential performance trade-offs in practical conditions.

While squeezed-state quantum sensors could represent a significant leap forward for military capabilities, they currently demand a high level of engineering control to provide enhanced precision, reliability and operational effectiveness under Army conditions. A balanced approach that acknowledges both the extraordinary potential and the real-world limitations will guide the Army in deciding where—and how—these emerging quantum tools can deliver genuine, mission-critical benefits.

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/ HOW WELL SUITED IS THE BRITISH ARMY FOR LARGE- SCALE COMBAT OPERATIONS AND HOW CAN IT BEST PREPARE FOR THESE IN THE FUTURE?

Charlie Kenzie

Acknowledgement. This essay is based on a paper selected from student essay submissions to the United Kingdom Intermediate Command and Staff Course (Land). This course exists to educate, train and assess British Army and Royal Marine Majors, instilling a manoeuvrist mindset and intellectual edge essential to winning in war. The views expressed in this essay are not official UK policy and do not represent the official UK view.

Introduction

Large-scale combat operations (LSCO) represent the most demanding form of land warfare and remain the British Army's core purpose.¹ Yet after two decades shaped by counterinsurgency, fiscal retrenchment, and reductions in force structure, questions persist about the Army's suitability to conduct high-intensity conflict.² As the British Army's focus returns to state-on-state competition, this paper assesses its suitability for LSCO within the realistic context in which it would fight: as a contributor to NATO collective defence. The central question is not whether the British Army can defeat a peer adversary alone. This is neither a realistic benchmark nor a practical one.³ More valuable is determining the distinctive value the British Army can contribute to maximise alliance warfighting. Just as success in Iraq depended on US–UK coalition, so too will future LSCO depend on NATO integration. This shifts the debate, often dominated by concerns about mass and capability gaps, towards a more productive focus on the comparative strengths of the British Army.

The analysis adopts a two-stage methodology. First, it examines whether the Army of today could conduct the LSCO of yesterday, using the most recent example of British LSCO: the 2003 invasion of Iraq (Operation TELIC 1). Second, it evaluates the Army's suitability against the most likely future adversary, a Russian ground force. In both cases, the assessment applies the physical, conceptual and moral components of fighting power. The TELIC 1 comparison raises the most critical question of this paper: does the Army's historical readiness to enter combat despite inadequate preparation indicate extraordinary moral resilience, or enduring institutional failure?⁴ Ultimately, the paper contends that while the Army of today could conduct a timebound LSCO such as TELIC 1, future LSCO will be far more intensive and demanding. For the future, significant challenges exist across the components of fighting power, but it is in the conceptual and moral components where comparative success within NATO can be cultivated. The British Army's relative strengths in doctrine, operational experience, staff competence, and morale should be the focus.

Defining Large-Scale Combat Operations

The British Army categorises LSCO under the broader descriptions of 'warfighting' and 'major combat operations'. Unlike the stabilisation campaigns of recent decades, LSCO are defined not simply by intensity but by their scale, their complexity, and the demands they impose on the force.⁵ LSCO involve significant armed conflict requiring the application of the manoeuvrist approach at the operational level and the orchestration of cross-domain integrated action. The defining threshold is the manoeuvre of combat formations of at least divisional strength. Operations at this scale generate consumption rates that fix the entire focus of the field army and sharply differentiate LSCO from smaller, sustainable interventions.⁵

Although LSCO do not necessarily entail an existential threat or full national mobilisation, they invariably carry major strategic consequences and demand strong political will. By these doctrinal criteria, the Army's recent historical benchmarks for LSCO include the invasion of Iraq (TELIC 1), the liberation of Kuwait (GRANBY) and the Korean War. Conversely, the protracted counterinsurgency campaigns in Afghanistan and the later phases of Operation TELIC, despite their complexity, do not meet the threshold for LSCO.⁶

Comparing Today's Army to That of Op TELIC 1: Considerations for a Future LSCO with Russia

A. The Physical Component: from the 'Non-Visible' to the 'Non-Existent'

In 2003, the deployment of 46,000 personnel within 10 weeks was a significant logistical achievement. Operational success during TELIC 1 was driven primarily by the UK's technological overmatch—specifically, the combination of the Challenger 2 tank, superior night vision and absolute air supremacy.⁷ Critically, this technological overmatch allowed the British Army to easily overwhelm a much larger Iraqi Army.

However, beneath the tactical supremacy lay a logistic system operating at the edge of collapse, characterised by the breakdown of asset tracking and by critical shortages in equipment. These deficiencies raised fundamental questions about the Army's ability to sustain high-intensity warfighting beyond the invasion phase.⁸ TELIC 1 demonstrated that the Army had become a 'one-operation force': capable of mounting a single large-scale intervention but lacking the mass to regenerate, or the stockpiles to sustain, successive operations.⁹ Applying this benchmark to the contemporary Army reveals both evolution and regression. While the Army today is markedly smaller and would be unable to deploy a force of the same size, reductions in mass have been compensated, on paper, by technological shifts which increase lethality.¹⁰ The pivot towards deep fires, network-enabled targeting and reconnaissance-strike integration suggests that a modern 3rd (UK) Division could deliver lethality broadly comparable to that achieved in 2003.¹¹

However, any lethality gains are undermined by a parallel reduction in enablers. The critical vulnerability remains munitions stockpiles and vehicle spares, with estimates suggesting that artillery ammunition would be exhausted in days, not weeks, under high-intensity consumption rates.¹² Additionally, the gifting of 155 mm artillery to Ukraine, without immediate replacement, has degraded the Army's divisional firepower to the point where the lethality of any British-led LSCO would be questionable. During Telic 1, the operational logistics challenge centred on forward delivery and the effective management of contracted supply chains, exacerbated by limited visibility over considerable materiel stockpiles.¹³ Today, that challenge has been deepened by a more fundamental deficiency: the stockpiles themselves no longer exist at requisite scale. Therefore, if Telic 1 were to happen tomorrow, the constraint would shift from the visibility of supplies to the existence of them. Against a future Russian threat, this fragility becomes acute. In Iraq, technological overmatch compensated for a lack of mass; against Russia, the asymmetry would be reversed. Deficiencies in electronic warfare, air defence, counter-UAS capabilities and networked deep fires would be rapidly exposed.¹⁴ The Army would face a deficit not only of mass but also of technology relative to its adversary.

This physical fragility has profound implications for how the Army must prepare. Attempting to match Russian mass unilaterally would be futile and unaffordable.¹⁵ Instead, the Army must accept its role as a specialised contributor within NATO's collective capability, focusing investment on capabilities where Britain can offer disproportionate value: in intelligence, surveillance and reconnaissance (ISR), precision fires and electronic warfare integration, while relying on alliance partners for mass. However, the focus on a lighter but more lethal Army cannot be at the expense of wishing away the logistics to sustain it.¹⁶ The physical component alone is not Britain's competitive advantage; it must, however, serve to enable the conceptual and moral components where comparative strength lies. In short, the British Army must still have sufficient physical depth to survive beyond the first battle.

B. The Conceptual Component: Atrophied Warfighting Competency

Comparing the conceptual component of fighting power of today's Army with that of 2003 reveals a divergence in corporate warfighting knowledge but many similarities in the doctrinal competence to fight and win LSCO at the tactical level. In 2003, the Army deployed with a mindset, organisational culture and intellectual heritage shaped by the Cold War and reinforced by the experience of Granby in 1991. Although the generational link between 1991 and 2003 was far from seamless, the lasting institutional effect was significant: the Army's collective outlook remained fundamentally oriented towards adversarial, high-intensity conflict.¹⁷ Underlying this mindset were the doctrinal pillars of the manoeuvrist approach, mission command, and the adoption of AirLand Battle concepts, embedded during General Bagnall's reforms of the 1980s. Designed originally to defeat a Soviet armoured ground force, in many respects the concepts were tailor-made for the characteristics of the Iraqi Army in 2003. A combination of operational design and operational art, the invasion was in many ways a near-perfect expression of the doctrinal theory the Army had spent two decades refining.¹⁸

In contrast, the British Army of today emerges from a very different intellectual landscape. Two decades of counterinsurgency operations have fundamentally reshaped the Army's institutional mindset, its professional military education and much of its doctrinal development. The experience of Afghanistan and Iraq has been 'etched so deeply into the psyche' of those who served there that it has proved difficult to reorient thinking beyond concepts optimised for stabilisation operations.¹⁹ A generation of commanders have thus emerged educated primarily for counterinsurgency rather than for LSCO.²⁰

However, Russia's invasion of Ukraine has catalysed a rapid conceptual pivot back towards warfighting. Contemporary doctrine such as integrated action (IA) remains anchored in the manoeuvrist approach and mission command. IA seeks not to replace warfighting but to situate it within a broader framework that synchronises all available levers of national and military power. Crucially, then, the Army has not lost the doctrinal

foundations that underpinned its tactical effectiveness in 2003. Mission command and manoeuvre remain core principles, and modern concepts such as IA, reconnaissance-strike, and multi-domain integration represent evolutionary continuations of AirLand Battle.²¹ These concepts, had they existed in 2003, would almost certainly have accelerated the destruction of Iraqi forces.

The deeper conceptual challenge, however, lies not in doctrine but in institutional mindset. The habits of thought required for sustained, attritional, high-intensity conflict have atrophied. The Army is sluggishly emerging from its counterinsurgency hibernation, a period in which dangerous assumptions were made about logistic lightness, short-duration deployments, industrial depth and procurement processes.²² While conceptual attention has refocused on defeating Russian tactical formations, broader questions remain underexamined: how to sustain divisions under intense attrition; how to manage tens of thousands of casualties or prisoners of war; how to balance homeland resilience, reinforcement and fighting strength.²³ In summary, the British Army has done much of the thinking required to deliver a single large-scale operation grounded in strong doctrine and credible tactical competence, but arguably lacks the conceptual depth for a future war. In 2003, this deficiency resulted in a catastrophic misunderstanding of the stabilisation requirement; in a future conflict with Russia, it would manifest as an inability to sustain divisional operations for more than a few weeks.

Thus, for the future, the British Army should double down on the doctrinal sophistication which brought it success in Iraq, recognising that the British Army's operational experience, refined doctrine and military education are of unique value to NATO. The British Army's 'get to the start line' approach flows from an operational mindset and agility which takes decades to foster and will be vital in the next NATO LSCO. Investment and focus, therefore, must concentrate not on matching Russia vehicle for vehicle, but on ensuring that British headquarters, targeting cells and doctrinal innovation remain at NATO's intellectual cutting edge. That said, Army leadership must be prepared to think more widely than simply warfighting doctrine. Even within NATO, an LSCO with Russia will require a reanimation of a Cold War mindset focused on regeneration, national resilience and mobilisation—topics with which the Army is yet to fully engage.

C. The Moral Component: the Will to 'Make It Work'

The moral component, when 2003 is compared with today, shows continuity in leadership and fighting spirit but divergence in the strategic environment that shapes the Army's moral foundations. The 2003 invasion was among the most politically contentious military decisions of the postwar era. Public opposition peaked at 77 per cent prior to the invasion.²⁴ Yet the political controversy surrounding TELIC did little to affect the immediate morale and combat effectiveness of deployed forces. That the Army preserved such cohesion despite ambiguous public backing and acute logistical shortfalls only underscores the depth of its professional ethos and its soldiers' confidence in their units and leaders.

This highlights an enduring characteristic of the British soldier—the willingness to ‘make it work’ despite imperfect conditions—which remains central to the Army’s moral resilience. As Colonel David Kelly, commander of 8 Transport Regiment on TELIC 1, reflected: ‘[When we deployed], we weren’t fully confident that we had everything we needed to be able to do it ... but we did. We just made it work. That’s what we do’.²⁵ This disposition remains an enduring cultural trait of the Army today and would be critical to the success of any future LSCO.

Despite this, in a future conflict, the depth of moral resilience would be far less assured. Whereas in 2003 the government retained a degree of control over the narrative environment, such insulation would be virtually impossible today. Contemporary LSCO will take place in a ‘global goldfish bowl’²⁶ of pervasive social media, real-time reporting, and adversaries adept at manipulating perceptions. Considering these elements in a potential future conflict with Russia, the moral component presents a complex challenge. The Army retains the institutional confidence and the intrinsic willingness among its soldiers to fight the first major battle regardless of public ambivalence. Yet the broader political environment is shaped not by mobilisation or national resolve against Russia (or against any other threat) but by fiscal constraint, geopolitical caution and an increasingly transactional understanding of national security. The public simultaneously perceives Russia as a threat while resisting material trade-offs—only 29 per cent support increased defence spending if it requires reductions in National Health Service funding.²⁷ For the Army’s suitability to conduct future LSCO, this disconnect is problematic. Soldiers in combat will confront adversaries adept at exploiting these vulnerabilities through disinformation, deepfakes and targeted psychological operations designed to fracture public support and erode unit cohesion.

In this environment, Clausewitz’s assertion that the ‘will of the people’ is indispensable becomes more relevant, not less.²⁸ Large-scale combat with Russia would demand not only the mobilisation of equipment and doctrine but the preservation of the moral contract between society, the state and the Army. This is an agreement increasingly strained by the UK’s current politics and worsened by a small number of high-profile cases of sexual assault, racism, bullying and procurement delays within the British Army.

In preparing for the future, preserving the British Army’s fighting spirit—ingrained in its culture well before TELIC 1—will be critical to the success of future LSCO. It builds into the expeditionary mindset which is valuable both to the UK and to NATO. In detail, future LSCO success will be dependent upon the Army countering adversarial information campaigns, working with government to pre-emptively build public understanding of LSCO realities (casualties, duration, costs) before commitment. Most critically, the Army must advocate forcefully for rebuilding the civil–military compact, addressing internal failings in conduct that erode public trust, and ensuring that when commitment comes, it is politically sustainable. The moral component cannot be generated in crisis; it must be cultivated in peace.

Discussion: the British Army Has Only the Pants It Is Wearing

The preceding analysis points to a clear strategic conclusion: the British Army cannot prepare for future LSCO by pursuing physical parity with peer adversaries. Instead, it must embrace its role as a high-value contributor to NATO in a specialised physical capability which supports the British Army's comparative strengths in the moral and conceptual components.

On the positive side, the TELIC comparison suggests cautious optimism if future LSCO is short, discrete, and fought against an adversary where technological advantage compensates for limited mass. It also highlights that physical shortfalls in mass or fragile logistics can be offset by an expeditionary mindset, a will to win and the application of appropriate doctrine. However, LSCO against a peer adversary would almost certainly be more intensive and more challenging, and would be conducted over months rather than days or weeks. In such protracted operations, the UK's constrained sustainment capacity and insufficient strategic depth would quickly become decisive liabilities, even within NATO.

Therefore, the British Army's capacity to endure LSCO remains contingent on closing critical gaps, mostly in logistics and magazine depth, either through urgent operational requirements—as in TELIC 1—or through NATO provision. Both are plausible; neither is guaranteed. The reliance on late-stage augmentation and procurement is a gamble that soldiers instinctively distrust but both soldiers and politicians have repeatedly accepted. It is reflected in countless historical LSCO failures: Singapore, the First Boer War, France in 1916, and Dunkirk.²⁹ These examples raise the uncomfortable question that threads throughout British military history: does this pattern of willingness to fight despite unpreparedness demonstrate extraordinary moral resilience, or repeated institutional negligence?

In reality, it reflects a broader truth: armies tend to expand only when public and political appetite coincides with pragmatic need. The pervasive 'negligence' is less a failure of military foresight than a recurrent product of a democratic political economy. History shows that states routinely downsize their armies in periods of perceived peace, only to rebuild them hurriedly and unevenly when threats re-emerge. Despite this, the ambition for the Army to possess strategic depth is nothing new, and it was neatly illustrated by General Rupert Smith in an early meeting with Prime Minister Tony Blair: 'You need three pairs of underpants—one to wear, one in the wash, and one kept aside for accidents—so it is with military campaigns'.³⁰ His point, simply, is that it is insufficient for the Army to generate only the force required for the immediate task, such as the UK's single Strategic Reserve Corps, without understanding that if the capability is committed, you need another 'pair of pants in the wash' and ideally you would have a third pair for 'accidents'.³¹ The British Army of today has only the pants it is wearing.

Most concerning is that Britain's future strategic depth is likely to be more constrained than in the past. Today, a politically polarised society, economic strain and pervasive social media distortions complicate the mobilisation of national will. The Army must therefore confront a paradox: it must be capable of winning the first major engagement with what it currently possesses, while simultaneously recognising that the resources required to win a war may not materialise until the moment of crisis or, possibly, not until it's too late. The difficulty lies in the fact that it is neither affordable nor politically credible to argue that the British Army should maintain three corps to generate the single Strategic Reserve Corps required by NATO. Within this constraint, the Army must therefore double down on its enduring strengths: doctrinal sophistication, tactical competence, and the fighting spirit of its soldiers. Addressing critical capability gaps remains essential, but this must occur within a broader conceptual and moral framework focused on how Britain would fight successive large-scale operations, not merely the first. This demands serious, immediate thinking about how the Army could expand at pace should a Russian threat crystallise— planning for recruitment surges, accelerated training pipelines, increased industrial output, replenished ammunition stocks, replacement equipment programs, mobilisation infrastructure and national information resilience. In short, the moment calls for the kind of coherence and clarity once provided by General Bagnall.

Furthermore, future strategy must also call for the British Army's comparative advantages to be cultivated within a NATO context: first, by maintaining an intellectual edge that makes British headquarters and tactical innovation indispensable to alliance operations; second, by building the institutional and societal foundations to sustain commitment; and last, by accepting limitations in mass by focusing on force multiplying capabilities. These capabilities include ISR, deep fires integration, electronic warfare and strategic communications, which will enable alliance warfighting disproportionate to their cost. If TELIC 1 offers a positive lesson, it is that shortfalls in equipment and logistics, however serious, are the elements most readily rectified in crisis.³² They can be bought, surged, or supplied by allies. By contrast, the doctrinal competence and moral resilience required for LSCO take years to cultivate and are far harder to improvise. Napoleon's observation that 'the moral is to the physical as three is to one' remains instructive; wars are often lost by the army that is out-thought rather than out-fought.³³ The analysis does not call for downplaying the physical component; it simply notes that while a small lethal force must be properly resourced, the British Army's most worthwhile contribution to NATO lies in its conceptual and moral strengths, which should remain the focus of preparation for future LSCO.

Conclusion

This paper has evaluated the British Army's suitability for LSCO by comparing its present capabilities with those of TELIC 1 and assessing its ability to contribute to NATO defence against Russia. The analysis shows that while the Army remains capable of delivering one decisive large-scale operation, its ability to sustain successive campaigns remains critically limited—a constraint reflecting a longstanding political reality in which strategic depth is chronically undervalued until crisis makes it unavoidable.

Physical shortcomings, while acute, are ultimately most tractable: equipment, munitions and logistics can be expanded under pressure, as urgent operational requirements demonstrated in 2003. What cannot be generated in extremis are the conceptual clarity and moral resilience that underpin tactical excellence and operational cohesion. TELIC 1 succeeded because of Cold War thinking and the extraordinary professional ethos of British Army soldiers. These are strengths that remain the Army's most reliable comparative advantages.

The British Army cannot resolve the political and fiscal constraints that shape its force structure, but it can ensure that it is intellectually and morally prepared to fight within those constraints. The British Army must therefore commit to three preparation priorities: first, investing in the doctrinal, educational and intellectual infrastructure that makes it NATO's conceptual leader; second, addressing moral resilience through strategic communications, institutional reform and civil–military engagement; and third, accepting physical limitations while focusing on sustaining capabilities that enable alliance warfighting and provide disproportionate lethality against reduced mass. Only by concentrating on these comparative advantages can the British Army hope to be suited to future large-scale combat operations.

About the Author

Major Charlie Kenzie commissioned from the Royal Military Academy Sandhurst into The 1st Battalion The Royal Irish Regiment in 2016. After completing infantry training at the Infantry Battle School, Brecon, Charlie commanded a Platoon on Operation TORAL 4, Afghanistan. On return to the UK, he instructed at the Divisional infantry training team and was employed as an Observer Trainer for the 3rd Royal Australian Regiment's mission rehearsal exercise to Afghanistan. Charlie has deployed on various UK and NATO exercises, including to Norway and Oman and a tour of Mali in 2022, spanning employments as a Company Second in Command, commander of the Regiment's Light Close Reconnaissance Platoon and as the Adjutant of the 1st Battalion. Most recently, he completed two years as an Assistant Military Assistant to Commander Land Forces. He completed the Intermediate Command and Staff Course (Land) at the UK Defence Academy in 2026. He is currently employed in the Land Forces Headquarters.

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/ BRITISH ARMY AND LSCO – ESSAY RESPONSE

Michael Krause

This essay raises some fundamentally important questions pertinent not only for the UK Army, but also other armies, such as The Australian Army, preparing for future Large Scale Combat Operations (LSCO). At its core it asks: ‘how suitable is the UK Army to fight a near future LSCO against a modern comparable Army such as Russia?’

I agree with the definition used for LSCO but I was surprised that the author chose the UK’s experience in Op TELIC- the 2003 invasion of Iraq - as a benchmark for assessing current capability. I say that for a few reasons. First, OP TELIC was not conducted within a NATO framework. Many of the challenges in a war against Russia would come from NATO alliance issues, whereas in Op TELIC there was relative simplicity with two five-eyes nations sharing the bulk of the fighting. Second, the invasion of Iraq was not against a peer adversary. Whilst the Iraqi Army was large, it was technologically well below the UK’s level, a situation that is unlikely against Russia. Third, the UK and US had the initiative and could choose the time, place and nature of the fighting. This is highly unlikely in any future conflict with Russia – NATO countries would likely need to respond to Russian aggression with uncertainty about which nations would commit forces and in what manner. This is of particular concern given the wavering support the US has shown recently towards NATO. I would have thought that a more appropriate benchmark would have been the situation facing the British Army of the Rhine when it was facing off against the Soviet Union and the Warsaw Pact in the Cold War. While further removed from the present day than Op TELIC, it shares better similarities with the situation facing Europe today. Not only was the Cold War BAOR situation in a NATO setting and against a peer adversary, but it required the constant readiness to respond to a sudden attack. By this benchmark NATO is poorly prepared both in posture and readiness to fight a LSCO against Russia. As noted in the essay, stocks of equipment and supplies are woefully deficient for sustained combat. Rehearsal of mass response are poorly practiced, and the hope that mass can be replaced by exquisite new technologies is unproven.

One area where I was in complete agreement with the author is the intangible but crucial question of whether the UK as a nation is ready to bear the burden of a LSCO. The Clausewitzian trinity of Government – People – Army [Armed forces] is a crucial

question: is there alignment and agreement between the three points of the trinity? Is the government willing and able to persuade the people that war is worth fighting, and are the people willing to bear the costs of a long war? Whether the British people can steel themselves for such a challenge remains uncertain.

The author has no doubt that the soldiers will fight, and I certainly have no reason to question the professional readiness of the UK Army, but without the steadfast backing of Government and the united will of the people, how long can an Army fight? In our lifetime, we have seen the heroic resistance of the Ukrainian nation when the National trinity is as one, but we have also seen the swift collapse of the nascent Afghan Army in the face of a Taliban resurgence when there was no solid relationship between Government, people and Army. History has many tales worth considering. We can read about the heroic resistance and ultimate triumph of the French people after years of fighting in World War I, but also the swift defeat of the same country twenty years later at the start of World War II. Same country, vastly different result. It is well worth asking where Australia is on the scale between Ukraine and Afghanistan – are Australians ready to bear the brunt of prolonged conflict, where the mainland is likely to be targeted, or would we be unable or unwilling to mobilise as a Nation? Would we be able to bear the brunt of initial setbacks and rise to the challenge like the French did in WW I, or would we buckle quickly and seek an armistice like the French did in WW II?

I commend this essay to you. It asks the key question: what should we really be preparing for in the event of LSCO? The answer is not just equipment or even logistic stockpiles, although these are critically important. Of deeper and more fundamental importance is the continual development and reinforcement of the National Will to survive the initial blow and then have the fortitude and moral courage to rise as a Nation to endure and fight for a better peace. This is not something an Army can do by itself: it is a reflection of its society and rises and falls based on what society is prepared to do and allows it do. We should be asking and answering the same questions in Australia.

About the Author

Major General Michael Krause is a cavalry officer and has commanded 2nd Cavalry Regiment and 1st Brigade when it was the Army's mechanised brigade. He has also served as an operational staff planner, both as the J5 at Headquarters Joint Operations Command and as the Chief of Staff Plans on Headquarters IJC in Afghanistan. He has served on operations in Iran, Iraq, Afghanistan and Solomon Islands. He was the operations instructor at Australian Command and Staff College, and served as Military Advisor to the Deputy Chief of Army and Chief of Staff to the Vice Chief of Defence

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/ WHAT IS THE DIFFERENCE BETWEEN CONFIDENCE AND ARROGANCE, AND HOW CAN THE LATTER BE MITIGATED WITHIN MILITARY DECISION-MAKING?

Charles Bevan

Acknowledgement. This essay is based on a paper selected from student essay submissions to the United Kingdom Intermediate Command and Staff Course (Land). This course exists to educate, train and assess British Army and Royal Marine Majors, instilling a manoeuvrist mindset and intellectual edge essential to winning in war. The views expressed in this essay are not official UK policy and do not represent the official UK view.

Introduction

Confidence is essential to effective military command because it enables decisive action under uncertainty. Yet confidence becomes dangerous when it slips out of contact with evidence and hardens into conviction that resists challenge and screens out disconfirming cues. This essay argues that confidence and arrogance differ not in intensity but in how they are regulated. Confidence remains adaptive when belief stays open to correction; arrogance appears when that corrective space collapses and certainty becomes self-sealing.

This essay employs and develops a reflective confidence framework, which holds that in a military setting, sound judgement depends on three interacting components: self-efficacy, epistemic humility and a feedback architecture that transmits reality to the commander. Confidence remains reflective only when these components work together to keep belief answerable to the environment under pressure.

Drawing on contemporary psychological research on judgement and decision-making, the analysis focuses on the cognitive, emotional and organisational mechanisms that protect or erode this balance, rather than attempting a survey of wider leadership theories. It first clarifies the conceptual distinction between confidence and arrogance, then introduces the framework, examines the mechanisms that govern drift between the two concepts, and illustrates these dynamics through a comparison of the command performances of General William Slim and General Douglas MacArthur. It concludes by showing how individual habits and institutional practices sustain these mechanisms and thereby mitigate arrogance in military decision-making.

Conceptual Distinction: Confidence and Arrogance

Confidence in command is often described as a personal attribute, yet psychological research suggests it is better understood as a regulated judgement state which balances conviction with uncertainty and feedback. It reflects a leader's sense that they can influence events despite the manifold ambiguities of war. That belief remains adaptive only while it remains permeable to correction and grounded in changing conditions. Confidence is therefore not a fixed disposition but an ongoing calibration between intuition, evidence and reflective oversight.¹

Although arrogance is often characterised as excessive confidence, the difference is more structural than quantitative. Arrogance emerges when confidence loses its capacity to be informed and revised by new information. It is a self-sealing form of certainty in which conviction protects itself from challenge and fails to register disconfirming cues. Leaders often rely more heavily on familiar interpretive habits, and over time, the reflective processes that keep belief answerable to reality fade. Where confidence engages with uncertainty, arrogance explains it away.²

Dual-process models can clarify such drifts in decision-making. Under pressure, commanders depend on fast, experience-based judgements that allow rapid action. These intuitions are often valuable, but their reliability depends on a slower, reflective capacity that tests coherence against evidence. Without that oversight, interpretations that come easily can feel accurate because processing fluency is mistaken for validity. Repeated success will often deepen this metacognitive illusion, allowing cognitive ease to masquerade as evidence.³ Arrogance is thus not merely 'too much' confidence but the breakdown of reflective governance over intuitive judgement. This regulatory account sits between heuristics-and-biases perspectives⁴—which emphasise systematic error in intuitive judgement—and naturalistic decision-making approaches that stress the adaptive value of expert intuition in time-pressured operations.⁵

Affective and social influences deepen this shift. Stress narrows attention and reduces cognitive flexibility, making it harder to question assumptions or hold alternative interpretations in mind.⁶ Organisational hierarchy amplifies the problem. Subordinates will often moderate their candour to avoid reputational or career risk, and that silence can be mistaken for agreement. As that upward challenge diminishes, belief becomes increasingly insulated and more vulnerable to distortion.⁷

Confidence and arrogance therefore represent different regulatory conditions rather than different levels of conviction. Confidence is a calibrated equilibrium between agency and doubt; arrogance is conviction that no longer responds to evidence. The decisive distinction is whether belief remains permeable to challenge. This regulatory account, which provides the conceptual foundation for the reflective confidence framework that follows, contrasts with trait-based views that treat arrogance as a fixed personality trait; instead, it identifies the regulatory levers that leaders and organisations can deliberately adjust.

Existing accounts of ‘hubris syndrome’ describe arrogance as an acquired personality change produced by prolonged power, suggesting a quasi-trait rather than a situational state.⁸ The reflective confidence framework is compatible with this view but locates the mechanism in cumulative regulatory failure: power, success and insulation gradually erode humility and feedback until confidence becomes self-confirming. This understanding aligns with the multi-component model of arrogance developed by Cowan et al., which distinguishes early miscalibration of self-knowledge from later features such as resistance to feedback, failures of perspective-taking, and denigration of others.⁹ It is these later-emerging components that the framework interprets as the behavioural expression of regulatory breakdown.

The Reflective Confidence Framework

The reflective confidence framework used here is an analytical model introduced and developed in this essay from the psychological literature discussed above. It is useful in this context because confidence and arrogance in command are adequately explained not by a single trait but by the interaction between agency, openness to correction and the quality of the feedback environment. Reflective confidence remains adaptive under uncertainty when judgement stays open to correction. It depends on the interaction of three components: self-efficacy, epistemic humility and a feedback architecture that communicates operational reality to the leader. Together, these components regulate how intuition is used, how conviction is revised and how situational awareness is sustained in military decision-making. Different imbalances between them produce different patterns of command judgement, ranging from apprehension and hesitancy to reflective confidence or arrogance.

Self-efficacy, defined here as a leader's belief in their capacity to organise and execute action effectively under pressure, provides the sense of agency required for decisive action. It reflects a leader's sense that their efforts can shape outcomes even when information is incomplete.¹⁰ That confidence supports initiative but becomes fragile when insulated from evidence. Past success can also inflate perceived control, making familiar patterns feel more reliable than they are and giving intuitive interpretations an unwarranted sense of accuracy. Self-efficacy is therefore beneficial only when paired with awareness of its limits.

Epistemic humility sustains that awareness. Defined here as a disciplined openness to uncertainty, it keeps leaders receptive to challenge and willing to revise their understanding when necessary. It is important to emphasise that such reflection does not weaken authority; rather, it strengthens judgement by preserving cognitive flexibility, by supporting the reflective habits that regulate intuition. Humility also signals to others that dissent is legitimate, shaping whether subordinates treat feedback as a professional contribution rather than as a personal threat.¹¹ In doing so it carries a moral function, restraining the drift towards self-sealing certainty and keeping authority answerable to evidence rather than to a leader's own conviction.

Feedback architecture describes the interpersonal and organisational conditions within which accurate information, dissent and correction can reach the leader. Commanders often operate at distance from events, and their understanding depends on the candour of those around them. Psychological safety is central here because it shapes whether people feel able to raise concerns or present unwelcome evidence.¹² In military milieus, effective feedback environments are not permissive; instead, they are disciplined spaces where candour is expected and protected because it serves the mission. Structured mechanisms such as red-teaming, assumption testing and after-action reviews reinforce this environment by revealing not only errors but the assumptions that produced them.¹³ Self-efficacy and humility define the orientation of judgement within the framework, while feedback architecture regulates how leaders move within this space and helps to prevent drift into self-doubt, indecision or arrogance.

Reflective confidence emerges when these components reinforce one another. Self-efficacy provides momentum, epistemic humility creates evaluative space, and feedback architecture keeps judgement responsive to the environment. Together they regulate intuition by ensuring that conviction remains open to correction. Figure 1 illustrates the framework, showing how this interaction keeps confidence reflective and how confidence can drift towards arrogance when a leader's internal regulatory conditions weaken.

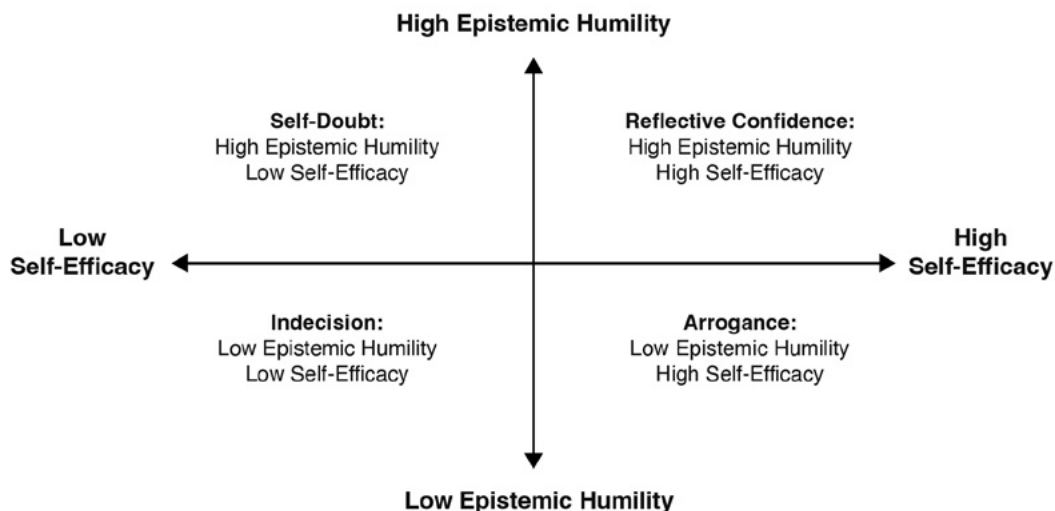


Figure 1. The reflective confidence framework

Self-efficacy and epistemic humility define four patterns of judgement: reflective confidence, self-doubt, indecision and arrogance. Feedback architecture (not shown) regulates how leaders move within this space.

Psychological Mechanisms Shaping Drift Between Confidence and Arrogance

Confidence and arrogance do not develop abruptly. In a military context, they emerge through cognitive, emotional and social processes that shape how leaders interpret information and respond to uncertainty, and they are reinforced successively through success and failure. These mechanisms exert pressure on the components of the reflective confidence framework and determine whether self-efficacy remains grounded, humility is sustained, and feedback continues to reach the leader.

Cognitively, commanders under pressure rely heavily on intuitive pattern recognition that draws on experience. Intuition accelerates judgement in complex environments, yet it can mislead when surface similarities mask deeper differences.¹⁴ Human cognition favours cognitive ease, so interpretations feel accurate when they fit familiar narratives.¹⁵ Without reflective habits that check these interpretations, ‘ease of fit’ is frequently mistaken for evidential strength. Overconfidence bias then magnifies this pattern by inflating the perceived reliability of one’s own judgement, particularly after repeated success,¹⁶ while confirmation bias entrenches it by giving greater weight to information that supports

existing beliefs and by screening out disconfirming cues.¹⁷ These biases erode epistemic humility and weaken the reflective oversight that ordinarily keeps intuition answerable to reality. In positions of command, this can make familiar patterns feel more trustworthy than they are, especially when tempo and prior success make initial interpretations difficult to challenge.

Emotional mechanisms intensify these vulnerabilities. Stress narrows attentional scope and erodes the cognitive flexibility on which reflective thought depends.¹⁸ Under sustained pressure, prefrontal systems that support inhibitory control and working memory degrade, reducing one's capacity to inhibit first interpretations, hold alternatives in mind and revisit assumptions. Emotional threat then compounds this: challenges to judgement are experienced as threats to competence or identity, and leaders defend familiar interpretations instead of revising them. Such defensive reasoning arises precisely when humility is most needed and often remains invisible to those experiencing it because it appears as realism rather than defensiveness. The result is a form of judgement that feels resolute to the leader but becomes progressively less able to revisit assumptions, absorb unwelcome information or test itself against alternatives.

Social mechanisms exert a further amplifying influence. Military organisations are structured around hierarchy, and subordinates will adjust their candour in response to a leader's perceived openness. When leaders project certainty or react poorly to friction, subordinates will frequently soften critique or avoid presenting unwelcome evidence.¹⁹ As upward challenges diminish, leaders become increasingly reliant on their own intuition and less exposed to the corrective friction that sustains reflective confidence—they place greater emphasis on their own interpretation and decision-making than on accepting external observations and suggestions. Research on power highlights this risk; as authority increases, individuals tend to overestimate the accuracy of their own judgements while receiving less corrective feedback.²⁰ Confidence invites deference, deference reduces challenge, and reduced challenge increases overconfidence. This is problematic when it sidelines relevant external contributions to the decision-making process. In a military headquarters, the effect is that warning signals may still exist but no longer travel upward with enough candour or force to alter decisions.

These mechanisms rarely operate in isolation. Cognitive shortcuts become more attractive under stress, emotional defensiveness grows when feedback feels risky, and hierarchical filtering screens out the disconfirming information required to correct misjudgements. Success reinforces familiar interpretations and can dull curiosity about alternatives. Over time, these pressures shift leaders from adaptive intuition towards a more rigid interpretive stance.

Taken together, these mechanisms show how reflective confidence becomes vulnerable to erosion. Self-efficacy inflates when cognitive ease displaces scrutiny, humility weakens when emotional strain narrows interpretive space, and feedback architecture degrades when candour becomes costly. When all three conditions fail, confidence detaches from evidence and hardens into self-sealing certainty. This transition is not simply a failure of character but the cumulative effect of psychological and social pressures acting on judgement under demanding conditions. In practice, these pressures become visible when early interpretations harden too quickly, disconfirming reports are softened as they move upward, and commanders receive less challenge precisely when uncertainty is greatest.

These dynamics also explain variation in command performance. The disparate leadership approaches of two senior generals—Sir William Slim and Douglas MacArthur—provide helpful case studies to observe how such traits can play out in wartime scenarios. Leaders who remain reflective, like Slim, intentionally cultivate habits that protect humility, maintain emotional steadiness and sustain feedback pathways even in adversity. Others, such as MacArthur, appear to exhibit a breakdown in these regulatory processes, leading to a conviction that becomes progressively insulated from correction. The next section examines these contrasting trajectories through an assessment of each respective leadership performance.

Case Studies of Reflective Confidence: Slim and MacArthur

The experiences of General William Slim in Burma and General Douglas MacArthur in Korea provide a useful comparison of how reflective confidence is either sustained or lost under pressure. Their divergence is explained less by context than by how they regulated judgement through self-efficacy, humility and feedback architecture. Slim assumed command of the 14th Army in October 1943 after severe setbacks. Rather than projecting certainty, he began by scrutinising his own assumptions and wrote candidly about early errors, which suggests a leader more concerned with learning than image.²¹ He moved widely among subordinate units, sought ground-level perspectives and encouraged honest reporting even when such information was unwelcome.²² These behaviours strengthened the feedback architecture around him and created conditions in which subordinates could challenge planning assumptions without fear of reprisals. Slim's self-efficacy supported decisive action yet remained open to revision. He routinely tested his interpretations against alternative explanations, treated success as provisional and showed a willingness to alter assessments when evidence required it. Emotional steadiness reinforced this approach; contemporary accounts describe his composure under pressure, indicating that challenging information could be raised safely.²³ In this way Slim sustained the regulatory balance that keeps confidence connected to reality.

MacArthur's experience followed the opposite trajectory. Early victories—such as the landings at Inchon in September 1950—deepened his belief in the reliability of his intuitive judgement. Success magnified his sense of strategic insight and narrowed his receptivity to competing interpretations.²⁴ This impacted the quality and credibility of the information his staff fed him; intelligence assessments warning of Chinese intervention were reframed to fit his expectations rather than used as prompts to revisit assumptions.²⁵ As self-efficacy intensified, humility eroded and reflective oversight of intuition weakened. Feedback architecture around MacArthur deteriorated in parallel. Staff officers reported that dissent was unwelcome and that presenting contradictory evidence that challenged MacArthur's assumptions carried the risk of marginalisation.²⁶ Power amplified this pattern. Deference constrained upward candour, and information increasingly reflected what subordinates believed MacArthur wanted to hear. This narrowing removed the friction needed to challenge his interpretive stance, while emotional volatility further discouraged dissent and signalled that challenge was unsafe, accelerating the drift towards self-sealing certainty.



Image 1. General Douglas MacArthur

Harris & Ewing Collection, Library of Congress, [LC-DIG-hec-18381](#).

Slim and MacArthur thus show how the reflective confidence framework operates under stress. Slim reinforced the conditions that kept his self-efficacy grounded, sustained his humility and protected feedback channels. MacArthur allowed each of these components to erode in the face of his own sense of right. Rising confidence invited deference; deference reduced challenge; reduced challenge strengthened conviction. Confidence hardened into arrogance, not because MacArthur lacked ability but because the regulatory system around his judgement was progressively eroded, including by his own resistance to correction.

Methodologically, these cases demonstrate that reflective confidence is not a fixed trait but a regulatory state maintained through habits of judgement and organisational permeability. Both leaders faced uncertainty and time pressure, yet their approaches diverged in ways that shaped their campaigns' outcomes. Slim went on to lead the successful defeat of Japanese forces in Burma and the reoccupation of Rangoon. For MacArthur, the campaign in Korea deteriorated following the arrival of Chinese communist forces and his own unilateral ultimatum to China. The comparison strengthens the central claim of this essay: confidence remains adaptive only when belief is exposed to evidence, tested by challenge and supported by emotional steadiness, whereas arrogance emerges when these conditions collapse.

Mitigation: Sustaining Reflective Confidence in Command

Sustaining reflective confidence requires more than appeals to humility. It depends on reinforcing the regulatory balance between self-efficacy, epistemic humility and feedback architecture. Each component degrades differently under pressure, so mitigation must target their specific vulnerabilities. The aim is not to slow tempo but to keep confidence open to correction rather than protected by momentum or rank.

Protecting the cognitive dimension of self-efficacy begins with creating brief but reliable opportunities for evaluation during planning and execution. High tempo compresses the space in which leaders can question their assumptions and increases reliance on intuitive coherence. Short reflective moments such as pre-mortems, assumption checks, decision exercises in rehearsals and peer interrogation help to counteract this narrowing.²⁷ In the British Army these practices can be built into tools such as the Combat Estimate and treated as cognitive battle drills so that reflective checks become routine rather than discretionary. A common concern is that such practices reduce tempo. However, this risk diminishes once evaluation becomes routine rather than discretionary, as the checks then regulate intuition without undermining momentum.

Strengthening epistemic humility requires sustained habits of reflection as well as institutional reinforcement. Humility is an active orientation to uncertainty that preserves interpretive flexibility. Individual practices such as brief reflective journaling or short post-decision reviews help leaders identify the triggers that cause reflective oversight to weaken and make cognitive drift easier to detect.²⁸ Humility also has an interpersonal function. Leaders who acknowledge uncertainty invite alternative perspectives and normalise doubt, signalling that ‘challenge’ is both safe and valued and demonstrating that evidence, rather than ego, governs decision-making.²⁹

Humility must also be supported by organisational incentives. When promotion and evaluation systems reward candour, reflective critique and intellectual honesty, humility becomes an indicator of competence rather than a performative posture.³⁰ Yet military institutions face trade-offs: encouraging openness can be perceived as undermining unity or decisiveness, especially in cultures that prioritise conformity and cohesion. Without careful calibration, leaders may feel pressure to project unwavering certainty, encouraging the defensive reasoning that accelerates drift towards arrogance.

Reinforcing feedback architecture is critical because confidence becomes brittle when deprived of challenge. Commanders operate at distance from events, and their judgement depends on the candour of those who report to them. Psychological safety sits at the centre of this architecture; leaders shape it through their micro-behaviours, reactions to bad news, openness to junior perspectives and treatment of uncertainty.³¹ Structural mechanisms such as red-teaming, independent challenge and rigorous after-action reviews can improve behaviours by revealing assumptions and blind spots that are difficult to identify from within the command team itself.³²

Mitigation must also address the emotional dimension of command, because emotional steadiness underwrites both humility and feedback. Stress narrows attentional bandwidth and weakens the cognitive functions needed for reflective override. Short decompression intervals, focused breathing techniques and other simple regulation routines help maintain access to these capacities.³³ Leaders who manage emotional strain effectively become more predictable in their responses and reduce the interpersonal threat that makes subordinates hesitate to raise unwelcome information.

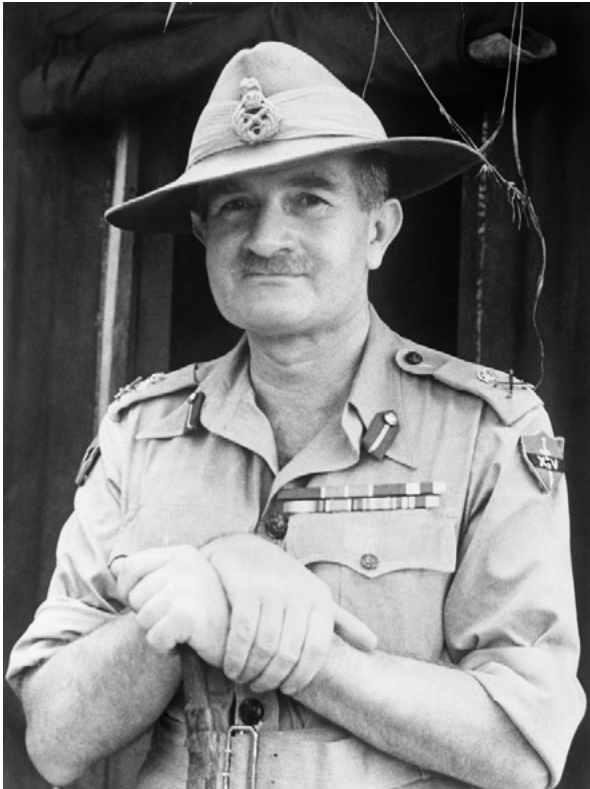


Image 2. Field Marshal Sir William Slim, 14th Army Commander

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These interventions are not without limits. Cognitive checks can become performative if framed as administrative requirements, feedback mechanisms also lose diagnostic value when cultural norms discourage genuine challenge, and emotional regulation techniques require discipline that may be difficult to sustain during prolonged operations. They are most effective when embedded in habitual practice rather than introduced episodically during moments of crisis. Taken together, however, these measures help to maintain reflective confidence by reinforcing the balance between self-efficacy, humility and feedback architecture. They protect commanders from the gradual drift towards self-sealing certainty and preserve the permeability needed for accurate judgement under operational tempo.

Limitations and Boundary Conditions

The reflective confidence framework offers a structured way to explain how confidence remains adaptive under pressure, but its effectiveness is constrained by several boundary conditions. These limitations do not invalidate the framework but indicate the contexts in which reflective confidence becomes most vulnerable and where mitigation must be applied most carefully.

The first limitation concerns tempo and emotional strain. Operational environments compress decision cycles to a degree that restricts the cognitive space required for reflection. Even well-designed checks may be abbreviated or omitted when urgency dominates. Reflective cognition is resource dependent, so the framework's regulatory functions weaken under fatigue, threat and time pressure.³⁴ Stress, moral pressure and personal strain further degrade the capacities that support reflective confidence, so moments of greatest operational significance may coincide with moments when leaders have the least access to reflective control.³⁵

A second limitation relates to organisational culture and power asymmetry. Feedback architecture depends on cultural norms that legitimise challenge and protect dissent, not just on formal mechanisms. In hierarchical or conservative units, subordinates may moderate candour even when leaders attempt to model openness,³⁶ and senior commanders receive more filtered information as their authority increases.³⁷ Psychological safety cannot be produced by instruction alone; it develops through consistent behaviour over time. Current Defence efforts to promote psychological safety are necessary but not sufficient: they can reduce interpersonal threats, yet without routinised reflective practices and aligned incentives, they risk producing surface-level declarations of openness rather than the deep, habitual reflective confidence that holds under high tempo and threat. Cultural pressures for unity can also cast disagreement as disloyalty, further weakening upward challenge.

A further limitation is methodological and rhetorical. The framework is derived from psychological theory and historical case analysis, so its empirical generalisability remains uncertain, and confidence, humility and feedback may not map cleanly onto behaviour in live decision environments. It should therefore be operationalised and tested in high-tempo training and decision-making exercises to clarify where it adds diagnostic value beyond existing doctrine. A parallel risk is rhetorical misuse: leaders may adopt the language of 'humility' and 'psychological safety' while preserving cultures that in practice punish dissent, so any application demands scepticism about whether behavioural and structural change have genuinely occurred. In sum, the framework is most effective when operational tempo permits reflection, culture supports candour and leaders are able to sustain emotional steadiness. Recognising these boundary conditions clarifies where confidence is most vulnerable and where the risks of drift into arrogance are greatest.

Conclusion

Confidence in command is not simply a matter of temperament. It is a regulated cognitive process shaped by humility, sustained by organisational permeability and vulnerable to psychological and social pressures that narrow interpretation under stress. Reflective confidence emerges when self-efficacy, epistemic humility and feedback architecture operate in balance. When this balance deteriorates, confidence becomes brittle and begins to detach from evidence. The contrasting experiences of Slim and MacArthur show how this drift unfolds in practice: Slim reinforced the conditions that kept his judgement open to challenge, while MacArthur allowed success, tempo and authority to erode the mechanisms that ordinarily prevent confidence from hardening into arrogance.

The framework outlined here can help to explain how judgement remains adaptive, but also highlights the fragility of its regulatory conditions. Mitigation requires deliberate institutional practices to maintain cognitive friction, reinforce humility and protect the flow of honest feedback. Nonetheless, such measures do not eliminate drift. Instead, they reduce its likelihood and slow its progression, making confidence more resilient by limiting the conditions in which arrogance takes root. In doing so, these measures reduce operational risk by keeping plans responsive to disconfirming information. Future research could test this framework empirically in high-tempo training environments to examine how emerging AI-enabled decision-support tools alter feedback architecture and humility, clarifying whether they strengthen reflective confidence or further insulate commanders from disconfirming evidence.

Until then, reflective confidence remains an aspiration as well as a discipline, yet it offers a practical route towards more resilient judgement in complex operations. It strengthens authority not by reducing decisiveness but by ensuring that conviction remains answerable to reality. When cultivated deliberately, it provides a durable foundation for sound command in uncertain environments and helps to prevent the gradual slide from confidence into arrogance.

About the Author

Major Charles Bevan RLC commissioned into the Royal Logistic Corps in April 2017 after completing officer training at the Royal Military Academy Sandhurst. He has served in a range of regimental roles, including Adjutant and Squadron Commander at 9 Regiment RLC, alongside staff appointments in strategic logistics, defence capability and acquisition, and information operations. He also served as Military Assistant to the Standing Joint Command Chief of Staff during the UK COVID-19 response. He holds a BA in Philosophy and is completing an MSc in Psychology, focusing on decision-making, cognitive bias, and leadership in complex environments. An avid sportsman, he represents the Army at cricket and has a longstanding interest in the role of sport in developing leadership, resilience and team cohesion.

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/ WHAT IS THE DIFFERENCE BETWEEN CONFIDENCE AND ARROGANCE, AND HOW CAN THE LATTER BE MITIGATED WITHIN MILITARY DECISION-MAKING? ESSAY RESPONSE

Anne Goyne

The argument contained in this essay that arrogance is a consequence of self-regulation, rather than primarily a personality trait, is an interesting perspective. It raises the possibility that every military leader is at risk of arrogant decision making under pressure. Moreover, it suggests that training can be designed to mitigate the risk. According to this argument, a cultural bias towards arrogance, arguably more common in the military, is an Achilles' heel. While decisive, independent minded, self-assured and even arrogant leaders have generally been preferred by the military, these same characteristics may make them vulnerable to arrogant/error prone decision making, especially in combat. The point being, if they could admit they don't always know everything and valued the input of their subordinates, they might be better leaders.

Anyone who has had the misfortune of working for an arrogant commander, will know they tend to treat opposing views as disloyalty. So, a model promoting humility as a sign of confidence rather than weakness is certainly welcome. It isn't particularly new but would perhaps still require a significant cultural shift for the military. While the paper's author acknowledges there are cultural barriers to adopting this idea, the potential benefits of a more collaborative approach to decision making, in their view, outweigh the limitations. While I agree with this idea in principle, I will make the point that in the absence of a moral element to this framework the author has not accounted for a major source of leadership arrogance.

To emphasise this point, the paper compares two famous Generals: William Slim and Douglas MacArthur. Slim is portrayed as a thoughtful, self-reflective leader with a deep sense of humility who was, as a result, a great leader. By contrast, MacArthur is portrayed as the arrogant, out of touch leader, who refused to listen and was eventually fired for his arrogance. But this is only scratching the surface of the differences between Slim and MacArthur, the real issue was what drove their convictions. Slim's willingness to listen was a central theme in his success, but he also had moral convictions, such as deeply felt basic humanity, which shaped his decision making.¹

MacArthur achieved a godlike status in the aftermath of the Second World War², and while arrogance was a component of his makeup, arrogance alone did not demean his successes nor entirely cause his fall from grace during the Korean War. MacArthur believed letting Chinese communists have control of North Korea was a threat to the stability of the Western world. This was not an issue of emotional regulation, humility, or listening to his subordinates. It was a core belief, and he staked his entire career on it. MacArthur was also quite prepared to use nuclear weapons against the people of China, fully knowing the devastating consequences of these weapons for the people of Japan.³ This was the closest the world came to nuclear catastrophe before the Cuban Missile Crisis, and perhaps if MacArthur had not publicly embarrassed President Truman by stating his views in a letter read out loud to the US Congress, the world might have come very close to nuclear annihilation.

While MacArthur was arrogant, and Slim was ostensibly humble, both had intense convictions about the way power was used in war. Slim actively minimised the devastation, especially the unnecessary brutality of it. His underlying message was that human life – even a soldier's life – was precious.⁴ MacArthur repeatedly overlooked massacres committed by the South Korean and US Forces against North Korean civilians.⁵ His sense of the value of human life was skewed, making the deaths of millions of Chinese civilians seem an acceptable price for Western supremacy.

The central argument of this paper – that fostering greater humility and openness to different perspectives helps military leaders develop convictions grounded in evidence – is certainly timely. Nevertheless, as world events show us every day, in the absence of basic humanity and a belief in the rights of all living things, arrogant leadership is quite capable of destroying the planet we live on. The sudden shift to threaten a nuclear option when arrogant leaders do not get their way is breath taking. While this reader agrees wholeheartedly with the main premise of this paper, the absence of morality in the model proposed overlooks an important source – perhaps the most important source – of leadership arrogance. It is not just stress, or the pressure of combat that makes some leaders become unethical killers; it is the conviction their actions are justified regardless of the consequences.

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/ DOES THE OPERATIONAL LEVEL EXIST?

Georgina Edwards

Acknowledgement. This essay is based on a paper selected from student essay submissions to the United Kingdom Intermediate Command and Staff Course (Land). This course exists to educate, train and assess British Army and Royal Marine Majors, instilling a manoeuvrist mindset and intellectual edge essential to winning in war. The views expressed in this essay are not official UK policy and do not represent the official UK view.

The operational level of war continues to generate significant debate among military theorists. Often described as the bridge between strategy and tactics, it enables campaign design and sequencing to achieve strategic objectives.¹ Its status as a distinct level is disputed—a question shaping how militaries plan, allocate resources, and integrate actions across domains. Early theorists such as Clausewitz (1832) and Jomini (1838) linked tactics directly to strategy,² but the industrialisation and mass mobilisation of World War I introduced unprecedented depth and complexity,³ prompting the emergence of operational art without clearly institutionalising a separate echelon.⁴ World War II reinforced this perceived need through global mechanised warfare and joint operations,⁵ though coordination often occurred without formal operational headquarters.⁶ Western doctrine codified the operational level in the 1980s,⁷ a move that critics argue reflects institutional belief rather than a universally accepted truth and often conflates operational art with the operational level.⁸ Contemporary multi-domain operations and networked command models have led NATO to embed operational headquarters and more collaborative planning processes,⁹ highlighting its perceived functional necessity. This analysis concludes that while the operational level has evolved as a functional necessity in complex warfare, its legitimacy remains largely socially constructed and its existence should be understood as contingent rather than universal.

Debate over the operational level of war is often linked to its historical evolution. When battles were sequential and nations fielded a single army, military thought recognised only two levels: strategy, (the conduct of war) and tactics (the execution of battles).¹⁰ Achieving strategic objectives requires aligning ends (outcomes), ways (methods), and means (resources).¹¹ The debate centres on whether 'ways' necessitate a distinct operational level to translate strategy into coherent tactics, or whether this link

occurs without an intermediate construct. Napoleonic-era theorists largely rejected such a necessity.¹² Clausewitz (1832) emphasised connecting tactics to strategy, viewing war as politics by other means.¹³ Jomini (1838) offered principles that bridged manoeuvre and campaign planning, proto-operational in nature yet prescriptive and geometric.¹⁴ Hamley (1866) refined these theories with lines of operation and communications, improving planning without creating a third level.¹⁵ Foch (1903) urged coordination of large-scale operations but focused on doctrine and morale rather than institutionalising any operational concepts.¹⁶ Few articulated an intermediate level of warfare. Owen (2012) argues that this absence proves that the operational level is a fallacy, an artificial construct that obscures the natural link between strategy and tactics.¹⁷

The emergence of operational concepts is often linked to changes in warfare's scale and complexity. Moltke (1857–1888) advanced decentralised command and, through railways, telegraphs and staff processes, sought to coordinate multiple armies across space and time;¹⁸ these developments are often seen as precursors to modern operational art, though he never coined the term. Early 20th-century industrialisation, mass mobilisation, and technologies such as heavy artillery and aviation introduced significant depth and logistical complexity to World War I, contributing to its character as a global war of attrition.¹⁹ The German Army's expansion from 840,000 to 3.8 million highlighted the growing gap between strategy and tactics, creating pressures to coordinate forces across space and time.²⁰ This necessity segmented campaigns into 'operations', shaping the development of operational art, a concept focused on sequencing actions across multiple fronts to support strategic objectives.²¹

Soviet theorists codified operational art during the interwar period to support strategic objectives. Svechin (1926) contrasted positional and manoeuvre warfare and emphasised planning under static conditions, highlighting the need for adaptable operational planning.²² Triandafillov (1929) argued that mechanisation created operations too vast for tactics yet too detailed for strategy, highlighting a conceptual gap that operational art sought to address.²³ Varfolomeev (1933) stressed synchronising technology, logistics and tempo, underscoring the systemic integration required for modern campaigns.²⁴ Tukhachevsky (1933) advanced campaign design that integrated multiple battles, contributing to operational art's emergence as an influential concept.²⁵ Isserson (1936) introduced deep battle theory for continuous operations in depth, which informed Soviet doctrine and later manoeuvre warfare.²⁶ Although Soviet thinkers embedded the concept in doctrine, its legitimacy remains debated. Friedman (2021) characterises operational art as a 'myth', suggesting that it emerged to enable planning while preserving Lenin's political primacy.²⁷ This critique reframes the issue, suggesting that although modern warfare's complexity made operational art indispensable, it does not imply a fixed operational level. Soviet theorists saw operational art as fluid, occurring wherever conditions demand rather than within a rigid echelon.²⁸ Yet the growing scale and technological sophistication of warfare introduced systemic complexities that arguably supported the case for an operational level as a practical solution.

The operational level debate stems from recognising that tactical success does not guarantee strategic success; nor does failure ensure defeat. The 1916 Battle of the Somme illustrates this: despite heavy losses and limited territorial gains, the Allies achieved strategic aims by relieving pressure on Verdun and forcing German attrition.²⁹ Integrating dispersed tactical actions towards strategic objectives illustrates the value of operational art as a planning methodology, yet it does not confirm a distinct operational level; it may simply reflect effective application of operational principles. Isserson (1936) warned against assuming that tactical victories ensure operational or strategic success, urging commanders to conceptualise the whole and cautioning that without operational art, wars become 'tacticised' and lack decisive results.³⁰ Critics challenge the assumption that formalising an operational level solves this problem. Kelly and Brennan (2009) suggest that operational art has become a 'catch-all' term, sometimes obscuring planning shortcomings through vague terminology.³¹ Owen (2012) argues that the concept is an artificial construct that complicates the link between strategy and tactics, contributing to doctrinal ambiguity and allowing planning weaknesses to be concealed by operational language.³² Strachan (2010) notes that in the absence of clear strategy, operational planning has occasionally acted as a proxy for strategic direction.³³ At its core, this debate asserts that whether the operational level exists hinges on its perceived function, either as a bridge strengthening the link between strategy and tactics or as a barrier that obscures it.

World War II, a global mechanised conflict marked by rapid manoeuvre and combined arms operations across multiple theatres, highlighted the importance of planning beyond the tactical level.³⁴ Joint operations such as Normandy illustrated the value of synchronising land, sea and air forces under unified plans, yet this coordination reflected emerging practice rather than established doctrine.³⁵ Griffin (2005) argues that the evolution of joint warfare drove operational thinking by shifting from service-centric approaches to joint design, requiring integrated planning that connected ends, ways and means across phased campaigns while introducing depth, sequencing and multi-domain integration.³⁶ The complexity of World War II suggests the case for a formal operational level to manage operational demands. Luttwak (1980) notes that Allied practice lacked a clearly defined operational echelon, observing that while operations were coordinated, command structures jumped from theatre-level strategy to tactical execution without a distinct operational headquarters, indicating a perceived gap in military thought.³⁷ Supporters of the operational level concept, including Strachan (2010),³⁸ Griffin (2015)³⁹ and Eikmeier (2015),⁴⁰ argue that it offers an important planning layer for complex, multi-domain operations, helping commanders maintain coherence across campaigns, allocate resources effectively, and sequence tactical actions in ways that align with strategic goals. Its value is often highlighted in coalition warfare, where strategic intent and tactical execution are often separated by national boundaries, differing command structures and varying operational cultures.⁴¹ World War II illustrates a conceptual tension: whether the application of operational thinking in practice constitutes the existence of an operational

level or simply reflects adaptive practice, given that there was no formal doctrine or distinct headquarters to make it a concrete, structured entity. As a result, its status as a distinct echelon remains contested.

If we accept the premise that complex joint manoeuvre warfare underpins the operational level's existence, the Cold War altered its relevance by shifting emphasis from large-scale campaigns to nuclear deterrence, proxy conflicts and technological rivalry, focusing instead on escalation control, credibility and integrated theatre planning.⁴² The advent of nuclear weapons and mutually assured destruction made decisive victory highly improbable; exercises such as Proud Prophet in 1983 predicted catastrophic outcomes, supporting a strategy centred on deterrence rather than on decisive campaigns.⁴³ In this environment, operational planning persisted but adapted, prioritising escalation control and credibility over manoeuvre and attrition. This evolution suggests that managing escalation and theatre-level complexity may have demanded more than aggregating tactical actions, hinting at a possible role for an intermediate level of command and planning. However, escalation control and theatre-level coordination were largely strategic functions, managed by national and alliance headquarters rather than by an intermediate echelon.⁴⁴ Furthermore, nuclear deterrence and proxy conflicts reduced the perceived functional necessity of large-scale manoeuvre campaigns, the very conditions that originally justified operational art, making the concept of an operational level less compelling.

Operational concepts entered doctrine at different times across militaries, influenced by differing cultures and strategic imperatives.⁴⁵ Soviet thought emphasised operational art, mass, and deep battle, integrating manoeuvre and attrition at scale, while Western militaries were late adopters; NATO tended towards scientific management and technological superiority rather than fully integrated approaches.⁴⁶ The US Army explicitly introduced the operational level in 1982, emphasising campaign design and operational frameworks.⁴⁷ Britain's *Design for Military Operations* (1989), influenced by NATO's manoeuvre warfare and joint operations, advanced multi-domain thinking by synchronising deep, close and rear operations to counter Soviet tempo—a focus reinforced by the developed Higher Command and Staff Course (1988).⁴⁸ These milestones signalled a move from implicit practice to explicit doctrine, introducing a layer between strategy and tactics. Yet doctrinal presence does not guarantee ontological reality.⁴⁹ Critics argue that the operational level is socially constructed, reflecting institutional beliefs more than universally accepted principles; Høiback (2015) describes doctrine as 'institutionalised beliefs about what works in war'.⁵⁰ Mattis and West (2019),⁵¹ Fuller (1926)⁵² and Vego (2009)⁵³ caution that doctrine can become inflexible, dated or politically influenced, while Jackson (2013) notes that without epistemological foundations, it risks devolving into jargon.⁵⁴ Latawski (2011) stresses definitional clarity,⁵⁵ and Eikmeier (2015) highlights conflation of operational art and operational level, proposing clearer

definitions to preserve doctrinal precision.⁵⁶ Definitional clarity is therefore important: if doctrine cannot specify the operational level's purpose and function, it risks becoming a theoretical layer with limited practical relevance.

The evolution of headquarters structures illustrates the institutionalisation of an operational level. During the Cold War, NATO established regional commands under Allied Command Europe and Allied Command Atlantic to translate strategy into multinational operational plans, suggesting acknowledgement of an intermediate level.⁵⁷ Britain's creation of the Permanent Joint Headquarters in 1996 similarly consolidated operational planning for overseas operations within a joint framework.⁵⁸ These examples suggest that the operational level is more than conceptual, as it was being embedded institutionally to support integrated operations across large theatres. Variation in form reflects strategic culture and geography, challenging any notion of a universal model.

Alongside doctrinal and structural changes, a command revolution in collaborative planning influenced the operational level. Friedman (2005) shows that growing data volumes expanded staffs and shifted command from personality-driven leadership to staff-centric processes,⁵⁹ suggesting the operational level as a practical requirement. McChrystal (2015) argues that hierarchical structures are too slow for complex environments and advocates networked approaches built on shared consciousness and empowered execution—principles increasingly incorporated into operational headquarters to improve decision cycles.⁶⁰ King (2019) adds that command is increasingly collective and distributed, and he supports the operational level as a headquarters function.⁶¹ Wass de Czege (2009) highlights operational design as an iterative, collaborative process embedded in headquarters practice,⁶² while planning frameworks in doctrine and education indicate its institutionalisation rather than leaving it theoretical.⁶³ Yet critics challenge this interpretation: Friedman (2021) claims that operational art is a staff discipline rather than a level,⁶⁴ Vego (2009) observes that continuous reframing in operational headquarters leads to ineffective planning,⁶⁵ and Sjøgren (2023) warns that routinisation may risk diminishing operational art into procedural practice.⁶⁶ Thus, while the operational level is institutionalised, reliance on routinised processes may erode creativity and manoeuvre, undermining operational art.

The central question remains whether the operational level represents a genuine tier between strategy and tactics or an artificial doctrinal construct. This essay has explored both perspectives. Critics maintain that it is a doctrinal invention: historically, war was conceived through strategy (ends) and tactics (means), with no intermediate level. From this standpoint, operational art is a planning methodology rather than a distinct echelon, and its formalisation risks conceptual confusion, masks strategic failure and substitutes planning for strategy. Conversely, proponents argue that the evolving character of war—evident in World War I, World War II and the Cold War—rendered an intermediate level increasingly significant. Industrialisation, mass mobilisation

and multi-domain operations widened the gap between strategy and tactics, creating pressures for coordination across time and space. NATO institutionalised operational headquarters and processes to manage campaigns, supporting claims that the operational level offers coherence, resource allocation, and sequencing of tactical actions. This analysis concludes that while the operational level has developed as a functional response to the complexity of modern, multi-domain operations, its legitimacy remains socially constructed and contingent rather than universal. Conceptual ambiguity and doctrinal rigidity risk diminishing operational art into procedural practice, underscoring the need for definitional clarity. Future research should examine how emerging technologies, particularly artificial intelligence, may transform operational planning by reducing staff burden and accelerating decision cycles. Discovering whether these developments lessen the requirement for human-centric coordination will be critical to determining whether the operational level remains necessary or becomes obsolete. Ultimately, the question of whether the operational level endures as a practical tier or proves to be a contingent doctrinal construct will shape the future architecture of command systems and the effectiveness of joint operations in an era defined by complexity and technological disruption.

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/ THE OPERATIONAL LEVEL STILL MATTERS FOR AUSTRALIA – ESSAY RESPONSE

Matthew Jones

The accompanying essay correctly resists the proposition that the operational level of war constitutes a timeless law. It is more persuasive when understood as a contingent response to the changing scale, complexity and institutional demands of war than as an immutable doctrinal truth. Yet for an Australian audience, the more useful question is not whether the operational level exists in the abstract. It is whether the concept remains useful for translating strategy into campaigning effect in the kinds of wars Australia is likely to fight. Judged against that standard, the concept retains clear utility.

Part of the confusion in this debate arises from the fact that the ‘operational level’ and ‘operational art’ are too often erroneously used interchangeably. Operational art is a way of thinking: the logic by which military force is sequenced, connected and sustained over time and space in pursuit of strategic purpose.¹ The operational level, by contrast, is best understood as the command-and-planning stratum in which that logic is usually expressed in practice. This distinction is important, as once the two concepts are collapsed into one another, critics are justified in arguing that the operational level becomes either jargon or doctrinal convenience.² If they are properly distinguished, however, the concept remains defensible, accepting that operational art may occur wherever commanders and staff link tactical action to strategic purpose, while still recognising that modern armed forces frequently require a level of command dedicated to precisely that task.

This distinction is particularly significant in the Australian context. The Australian Defence Force (ADF) is not a great-power military, structured principally for large-scale, unilateral, continental warfare. Nor is it simply a force generator that can afford to think only in tactical terms while others design and direct the campaign. Australia is a middle power that must routinely translate political intent into joint, combined and coalition activity, while preserving national agency within broader theatres of operation. In that context, the operational level remains useful because it provides a practical means of translating national strategy into campaigns, major operations, and integrated military contributions that are coherent in purpose, geography, and time.³ For the ADF, therefore, the operational level is less a matter of reproducing an inherited doctrinal template

than of preserving strategic agency. This applies whether one is considering regional contingencies in Australia's littoral approaches, coalition stabilisation operations, or wider Indo-Pacific crises involving multiple domains and competing political constraints. In each case, decisions must be made about the relationship between tactical action and strategic intent, the prioritisation of military effort over time, and the integration of joint and multinational contributions. These are operational questions, notwithstanding that the precise headquarters structure or command relationships may vary across contingencies.

In this respect, the most persuasive contribution of the accompanying essay lies in its demonstrating that the operational level is not universal in form. Its institutional expression has varied across periods, doctrines, and theatres, and at times has been implicit rather than formally named. That fact should not be interpreted as evidence of irrelevance, but rather suggests that the operational level ought to be treated as a practical construct whose value depends on context. At the same time, the critics of the operational level remind us that the concept can become a substitute for strategy when strategic direction is weak or imprecise.⁴ It can also become bloated, procedural and self-important, especially when staff process overwhelms judgment. These genuine concerns, however, do not require discarding the concept. Rather, they indicate the need for greater conceptual discipline, with doctrine and professional military education clearer in presenting the operational level not as a mystical third realm of war, but as a practical command function concerned with linking tactics to strategy through the design, integration and adaptation of campaigns.⁵

For the ADF, then, the appropriate conclusion lies between doctrinal absolutism and theoretical dismissal. The operational level need not exist as a universal, fixed law of war to remain useful. It is sufficient that it continues to perform necessary work for a middle power that must translate strategy into joint and coalition action. The term should be retained only insofar as it clarifies that work; where it obscures, it should be refined. Where it assists understanding, it should be taught, exercised and applied with confidence. The central issue, therefore, is not whether the operational level exists everywhere, at all times, and in identical form. It is whether Australia can prudently afford to think and campaign without it. In an era characterised by joint campaigning, coalition dependence and contested regional approaches, that would be a poor gamble.

About the Author

Major Matthew Jones is an Army Reserve infantry officer and civilian Paediatric Surgeon currently serving as SO2 Strategic Analysis at the Australian Army Research Centre. He has commanded at a company level, posted as an instructor on the Combat Officers' Advanced Course, and deployed on multiple domestic operations. A recent graduate of the Australian Command and Staff Course, he holds a PhD in paediatric surgery, a Doctor of Medicine and a Master of Surgery, among several other tertiary qualifications. His current research focuses on the Chief of Army's priority research area 'Defence of Australia'. He lives in Melbourne with his wife, Natalie, and their two daughters.

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/ BOOK REVIEW

Conflict Realism: Understanding the Causal Logic of Modern War and Warfare

Author: Amos Fox

Hampshire: Howgate Publishing, 2024, 230 pp, ISBN 1912440539,
RRP £24.99

Reviewed by: Sam Baumgarten

Amos Fox's *Conflict Realism* is a bold, revisionist attempt at reinvigorating military theory. The author combines systems theory and quantitative data analysis to query and propose an improved methodology for military operations. *Conflict Realism* is fearless in its assault on accepted Western military orthodoxy. It is also constructive in its suggestions for improvement. Critiques of military theory are relatively common in recent years and this volume appropriately fits alongside the works of other contemporary iconoclasts such as Jim Storr¹ and Major General Mick Ryan.² The latter has lent his authoritative hand to a preface.

Fox is well suited to the task he attempts in this work. He is a retired US Army armour officer who graduated first in his class at the School of Advanced Military Studies and who served in the full range of post-9/11 conflicts. In addition, he is a Fellow at Arizona State University, where he is well known for his unbridled critique of the present state of military theory. Fox also hosts the *Revolution in Military Affairs* podcast. Despite the podcast's title, the analytical perspective taken by Fox in *Conflict Realism* shows that he does not subscribe to the orthodoxy that technology makes radical and sudden changes to armed conflict.

The busy military professional may query the benefit of fitting this volume into their already limited reading time. Fox's key point of difference is his analytical method of theorisation that uses data to prioritise threat as the predominant determinant of operational decision-making. This reasoning fits well within the Western school of military theory, which is analysed and succinctly summarised in the book's first chapter. Here, Fox showcases his knowledge of key theorists' works such as Carl von Clausewitz's *On War*, Geoffrey Blainey's *The Causes of War*, and especially Cathal Nolan's *The Allure of Battle*.

Following this introductory survey, chapter 2 delves into Fox's concept of 'conflict realism'. Fox defines this term as an attempt to:

understand how military forces—both state and non-state—conduct war. As such, 'conflict realism' is a concept that operates just below the level of international relations scholarship and is a companion to conflict and security studies.³

This chapter presents the first of many heuristics that complement the book's underpinning premise. These heuristics have specific titles, namely verities in the case of those in this chapter. Specifically, Fox's first verity provides that:

an adversary always has more resources and bases of power than what correlation of forces and means (COFMs) comparisons prior to, and during the initial days of a conflict indicate.

While this proposition will be familiar to almost anyone who has studied or experienced conflict, the reassertion of this (and other) truisms helps reinforce the logic of Fox's arguments throughout the book.

In *Conflict Realism*'s third chapter, 'The Paradoxes of Modern (and Future) Armed Conflict', Fox unpacks many of his concerns about modern military doctrine. These misgivings strike at the heart of the concepts and foundational assumptions of Western military organisation. For example, Fox queries the continued relevance of the 'centre of gravity', arguing that the 'underlying logic behind these ideas remains anchored in the long obsolescent belief that centres of gravity (COGS) are some sort of magic button'.⁴ More broadly, he uses data and heuristics to demonstrate that five of the fundamental tenets of contemporary military theory are logically unsound, arguing that they should be characterised as paradoxes. These paradoxes are (1) 'the command paradox', (2) 'small, light and dispersed is better', (3) 'the looming importance of battlefield transparency', (4) 'warfighting preference matters' and (5) 'defeat mechanisms'. His dismissal of the second paradox (small, light, dispersed) nests strongly within his subsequent discussion concerning the centrality of attrition to modern warfare.

A welcome feature of the book is the way Fox juxtaposes the concepts of war and warfare in chapter 4 as possessing mutual characteristics. While 'war' concerns the use of the military to deliver strategic objectives, 'warfare' is more concerned with the delivery of military effects at an operational level. Drawing on another useful recent work on military theory, *Understanding Land Warfare* by Christopher Tuck,⁵ Fox presents the two concepts as possessing inverse characteristics effected by the adversary. In this context, inverse relates to the fact that a threat of war by one party will inevitably trigger the opponent to consider options for a quick military response. In this way, Fox uses the inverse principles to underpin how parties respond to the chaos of war and, in particular, how decisions are made in conflict.

Beyond chapter 4, most principles and heuristics presented in *Conflict Realism* follow a similar pattern of apportioning to an opponent a logical response to any actions taken against it. In this way, Fox seeks to demonstrate that conflict is never a zero-sum game and that conditions of victory are always assessed against one's own side's criteria as well as those of the opponent generating the threat. This assertion is at odds with the commonly accepted 'Principles of War', which are predicated on one's own side's capability. While accepting that his proposition is controversial, Fox supports his position using data that demonstrates how existing military theory is ill-adapted to the chaotic nature of modern warfare, both now and into the future. In making his case, Fox's arguments are compelling.

Having generated a new conceptual foundation for modern military theory, Fox applies his analysis to several practical scenarios. The first of these is urban warfare, which he discusses in chapters 5 and 6. Here he uses data to review the strategy and operational practice that commonly prevail in this type of warfare and to provide a methodology for understanding this form of conflict, which is frequently characterised as too complex for structured analysis. Fox asserts that urban warfare has the characteristic of siege warfare, which is a more familiar concept in the canon of Western conflict but seemingly of reduced significance in the modern era—another example of his willingness to confront existing orthodoxy. He provides informative observations about the nature of victory in this category.

Chapter 7 is a study of attrition. Here, Fox characterises attrition as *the* key characteristic of conflict. In doing so, he takes a theoretical viewpoint that is anathema to contemporary Western military doctrine. Specifically, it is usually accepted that the preferable and most economical way to achieve victory is to undermine the enemy's cohesion. By contrast, attrition warfare is a method that is generally perceived as having critical shortcomings. Fox summarises these as assertions which he disputes—for example, 'attrition abuses one's own logistics' and 'attrition is a lesser form of warfare'. Fox does not shy from the controversial nature of his position. Instead, he considers five common criticisms of attrition warfare and convincingly refutes them. Fox determines that attrition needs to be better understood, as it is prevalent in all forms of conflict.

Building on his analysis of attrition, chapter 8 is devoted to a critique of precision strike. Precision strike is a method that contrasts sharply with attrition warfare in that it seeks to apply minimum force surgically to enable enemy defeat. This chapter references recent conflicts, such as Operation Inherent Resolve and the war in Ukraine, to support the assertion that precision strike fails to deliver on its promise to swiftly end battles and wars through the decapitation of enemy leadership or by paralysing its command and control apparatus. Instead, attrition remains as a proven method that has consistently achieved success on the battlefield.

While not all readers will accept Fox's conclusions, *Conflict Realism* undoubtedly opens the aperture for new ways of thinking about military theory. For example, Fox provides valuable perspectives on common decision-making processes adopted by militaries, perceiving them as too rigid.⁶ The ADF has recently reflected on this issue and attempted to address it through new doctrine, such as the *Decision-Making and Planning Processes* (DMPP). In a recent article in the *Australian Army Journal*, the doctrine's author, Major General Michael Krause, described military decision-making as a reductionist analytical process that reflects low levels of flexibility. In the face of such concerns, Fox's principles, paradoxes and conclusions may offer suitable substitutes for existing doctrines. As Krause recently observed, 'To achieve sound military decisions, the key is to effectively harness both analytical process and individuals' intuitive tendencies'.⁷

In sum, *Conflict Realism* provides both the methodology for review and specific recommendations to reinvigorate military theory. It is not narrative in nature but contains well-connected observations and suggestions regarding the topics under analysis. Some military professionals may be drawn to the comprehensive reconfiguration of military theory offered by Fox, and the specific tools he identifies to support its analysis and critique. Others may welcome the opportunity to enhance their understanding of military theory. Ultimately, this reviewer assesses that *Conflict Realism* is most suited to readers seeking a polemic reappraisal of planning and the operational art. Fox's military theory, and the heuristics upon which his analysis is based, are both unique and useful. As part of a broader analysis, this book has much to offer anyone seeking to shape a much-needed intuitive reappraisal of the ADF's tactical and operational approach to decision-making processes.

About the Author

LTCOL Baumgarten was commissioned as an Artillery officer in 2006 and had operational service in Iraq and the UAE. He transferred to the Reserve in 2013 and served as an Engineer and Infantry officer, with sub-unit command of A Company, 1st/19th RNSWR. He attended the Canadian Forces College, graduating in 2023. He practised as a solicitor in private practice and with the New South Wales Office of the Director of Public Prosecutions for a decade.

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/ BOOK REVIEW

The Battle of Manila: Poisoned Victory in the Pacific War

Author: Nicholas Evan Sarantakes

Oxford Press, 2025, 504 pp, ISBN 9780199948857, RRP £23.99

Reviewed by: Brian P Farrell

The US Army studies the Battle of Manila of February 1945 in its efforts to analyse combat in urban and built-up areas. Nor have historians ignored it. For example, Filipino literature includes Alfonso Aluit's landmark 1994 study *By Sword and Fire*. While less extensive, Japanese literature features Maehara Toru's *Manira Boeisen*, published in 1982, as well as relevant volumes of the massive official history project *Senshi Soshō*, published from 1966 to 1980. Meanwhile, American literature ranges from the 1963 volume of the US Army official history series *Triumph in the Philippines* by Robert Ross Smith to *Rampage: MacArthur, Yamashita, and the Battle of Manila* by James Scott, published in 2018, with miscellaneous studies in between. *The Battle of Manila* is a British–Australian co-authored study by Richard Connaughton, John Pimlott and Duncan Anderson. It was commissioned as part of a heritage anniversary commemoration in 1995 and it also made a mark.

In combination, the existing literature concerning the Battle of Manila has identified major themes, generated enduring controversies, connected different discussions, and produced stubborn gaps. What has been missing, however, is a single study to consolidate these varied perspectives. Finally, *The Battle of Manila: Poisoned Victory in the Pacific War* by Nicholas Sarantakes accomplishes exactly that, adding substantial original research and providing a 'must read' study of the subject.

The Battle of Manila remains relevant to historians and military practitioners alike. Controversy exists about why so many civilians died, why so much of the city was destroyed (and whose 'fault' it was), what else could/should have been done, and what part Douglas MacArthur played in these matters. Beyond this, questions exist about the impact of the battle on subsequent events in the Pacific Theatre and on various postwar experiences. The battle also offers enduring lessons concerning urban warfare.

Sarantakes navigates through the sources and the controversies with clarity and skill and addresses all of the previously unanswered questions.

A key strength of the book is Sarantakes's decision to approach the Battle of Manila as a comprehensive 'whole of army' problem requiring analysis of all aspects of the battle on all 'sides'. As a result, the book spans higher strategy and operations, tactics, and command and control in both attack and defence. Beyond combat power, Sarantakes also covers supply, communications, medical and civil services and support. He makes connections between why the battle was fought (by all concerned) and its relevance to the wider war in the Pacific Theatre. This approach allows Sarantakes to avoid merely repeating, for example, the extensive accounting of civilian suffering (first fully chronicled by Aluit) or devoting too many pages to MacArthur and his legacy (something that weakened Scott's well-written but not terribly analytical study). Sarantakes contextualises his treatment of all these factors and draws from an impressively wide base of primary sources to produce an analysis of real value to readers of the *Australian Army Journal*. *The Battle of Manila: Poisoned Victory in the Pacific War* critically evaluates the strategic, operational and tactical levels of the battle with insight that connects them to each other and that generates a convincing 'whole of battle' conclusion.

Sarantakes makes five particularly salient points. First, MacArthur and his staff were right to see Manila as the centre of gravity of the campaign for Luzon, but did not realise (before it was too late) that the Japanese Army's dysfunctional chain of command would force it to fight a bloody battle to liberate the city. Second, MacArthur provided too little higher direction to his senior subordinates, who as a result focused too much on tactical considerations at the expense of operational concerns. Third, weaknesses in the Japanese defence could have been better exploited had the Americans been able to move more quickly or been more imaginative in their advance into the city (for example, by mounting a direct amphibious assault). Instead, the US wound up having to defeat a fanatical but disjointed Japanese defence in detail, relying too much on firepower to do so. Fourth, the battle was so destructive that it virtually negated the reasons for which Manila was attacked in the first place. Those reasons included to seize a base hub necessary to stage the invasion of Japan and to redeem the political bonds between the US and the Philippines by liberating the capital. Finally, the damage the battle caused to postwar relations (the 'poison' in the victory) was definitely mitigated by the rogue Japanese decisions both to stand and fight in central Manila and to carry out a sickening rampage of mass murder, widespread atrocity and wholesale destruction as they did so. Sarantakes is clear. The Americans were caught by surprise by having to fight for Manila, in a battle environment for which they were not prepared, but moral culpability for both battle and atrocity rested squarely on Admiral Iwabuchi and those who obeyed him.

Sarantakes' account of street fighting is clear, detailed and analytical. It emphasises the extent to which US forces had to adapt and improvise, how heavily they came to rely on firepower, and how infinitely complicated such a battle environment was—especially in a 'friendly' city full of civilians being liberated from brutal occupiers defending so stubbornly and behaving so atrociously. By devoting attention to the corps, division and other subordinate commands that actually fought the battle, Sarantakes goes beyond the focal points of 'MacArthur and Japanese savagery' that characterise most previous studies.

In sum, this book is an important study of urban warfare, a skillful analysis of a truly unique battle, and a model example of how to pull together a mature historical literature. Here, indeed, is 'the' book on Manila 1945.

About the Reviewer

Professor Brian P Farrell is Professor of Military History at the National University of Singapore, where he has been teaching since 1993. His research interests include the military history of the British Empire, the Western military experience in Asia, grand strategy and problems of imperial defence. Major publications include *The Basis and Making of British Grand Strategy 1940–1943: Was There a Plan?* (1998), *The Defence and Fall of Singapore 1940–1942* (2005), *From Far East to Asia Pacific: Great Powers and Grand Strategy 1900–1954* (co-edited, 2022), and *Misfire: British Empire Special Forces and Defeat in Malaya in the Second World War* (2025).

/ BOOK REVIEW

Mightier Than the Sword: Civilian Control of the Military and the Revitalization of Democracy

Author: Alice Hunt Friend

Stanford University Press, 2024, 298 pp, ISBN 9781503637300
RRP \$70.00USD (hardcover)

Reviewed by: Matthew Jones

In *Mightier Than the Sword*, Alice Hunt Friend presents a compelling case for revitalising civilian control of the military as both a normative pillar of democracy and a practical imperative for national security. Drawing on her experience within the US Department of Defense and her academic background, Friend advances a clear thesis: in modern democracies, the effectiveness of military force is a function not simply of capability but of how well it is governed by civilians. For readers within the Australian Defence Force (ADF), particularly those concerned with strategic policy and civil–military relations, this is a timely, if at times confronting, work.

Friend's core argument is that civilian control is not self-executing. It requires deliberate, professional skills from civilians across political, bureaucratic, and policy domains. She argues that three attributes underpin effective civilian control: *authoritative status* (legal power), *institutional power* (access and influence within the defence apparatus), and *political expertise* (the judgement to align military force with national interests and democratic values). When these attributes are absent or underdeveloped (as they increasingly are in polarised, populist democracies), the military risks becoming either unduly autonomous or inappropriately politicised. Friend is particularly attuned to the risk of 'civilian drift', where elected officials and senior civil servants defer too readily to the military under the guise of respect for expertise.

These themes map directly onto Australia's evolving defence landscape. The 2023 Defence Strategic Review (DSR)¹ and the 2024 National Defence Strategy² mark a clear shift towards a strategy of denial, focusing on preventing coercion against Australia and its near region. Civilian leaders have taken bold steps to reshape the ADF accordingly: restructuring the Army for littoral operations, scaling down programs such as the

procurement of infantry fighting vehicles, and accelerating missile and strike capabilities. These reforms reflect Friend's model of *civilian direction of strategy and force design*, where the Minister for Defence and the Cabinet identify strategic ends, and the ADF is tasked with generating appropriate ways and means.

Crucially, when reflecting on Australia's own unique defence diarchy—the shared leadership of the Department of Defence by the Secretary (civilian) and the Chief of the Defence Force (military)³—it can be seen that this model embodies Friend's call for *institutionalised civil–military partnership*. It ensures that the Minister for Defence receives integrated advice that is both strategically sound and operationally informed, aligning well with Friend's insistence that civilian control is not merely a legal relationship but a professional practice that is learned, exercised and accountable. Furthermore, in applying Friend's framework to the Australian Government, the Minister for Defence (who exercises delegated command from the Prime Minister and Cabinet) occupies the critical civilian node, possessing legal authority, policy tools and political accountability. Additionally, the Prime Minister (as Chair of the National Security Committee of Cabinet) sets the overarching strategic direction. Thus, Australia's system exhibits the layered, networked model of civilian control that Friend champions: from strategy-setting at Cabinet, through ministerial command, to diarchic execution and military compliance.

However, Friend would caution that structures alone are not enough. She argues that civilian expertise and confidence must be cultivated continuously. In Australia, this means investing not just in the professional development of military officers but also in senior public servants, ministerial staff and political decision-makers. Friend's book suggests that one response is to enhance the 'civilian ethic' in defence governance, ensuring that non-uniformed actors are not only legally empowered but also strategically literate and ethically grounded.

The book's relevance has sharpened further in light of recent global events. With Donald Trump returning to the US presidency, Australian policymakers face renewed uncertainty about the consistency of American strategic commitments. This concern underscores the DSR's call for greater Australian self-reliance and the importance of investing in sovereign capabilities and deterrence options. Friend's analysis supports this shift: she highlights how civilian leaders must tailor defence planning to present political realities rather than past assumptions, even when it is uncomfortable to do so. Australia's continued public rhetoric of alliance assurance must now be balanced with genuine capability investment and contingency planning for scenarios where US support is delayed, conditional or absent.

The 2025 re-election of the federal Labor government also reinforces this civil–military theme. With an emboldened mandate and bipartisan acceptance of the DSR's threat assessment, the civilian leadership has a political window to enact deeper reform.

Friend's framework would suggest that this is a critical test of civilian control: whether the government can transition from a declaratory strategy to meaningful capability delivery, industrial reform, and regional engagement, while maintaining public trust and alliance credibility.

Friend's work is particularly resonant for those who straddle both military and civilian professions, such as Army Reserve officers who also serve in demanding civilian roles, offering a dual perspective on the practical tensions and synergies within civil–military boundaries. Her argument that civilian control is both a privilege and a responsibility resonates strongly. In uniform, we are trained to respect lawful authority, maintain apolitical service, and execute orders following government direction. Out of uniform, we work in civilian systems that habitually prize open debate, professional autonomy, and institutional transparency. Friend's emphasis on the point that both realms must be understood and that civil–military interaction must be grounded in mutual competence and trust rings true in both professional worlds.

There is a clear lesson for the ADF: while military professionalism is necessary, it is not sufficient, by itself, to achieve strategic effectiveness. Achieving this depends on a system in which civilians are not just nominally in charge but demonstrably in control by virtue of expertise, engagement and resolve. The burden lies not just on generals to respect civilian oversight but on ministers, advisers and bureaucrats to earn that oversight through performance and principle.

Mightier Than the Sword is an essential addition to the strategic bookshelf of any Australian military officer, academic, policymaker or Defence public servant. It is not a treatise on military misconduct or constitutional mechanics; it is a timely guide to how democracies should, and must, govern the instruments of war. For Australia, a middle power facing unprecedented regional pressure and alliance ambiguity, the message is both sobering and empowering. To preserve the legitimacy and effectiveness of our armed forces, we must ensure that the pen continues to guide the sword—not by tradition but by deliberate and enduring practice.

About the Reviewer

Major Matthew Jones is an Army Reserve infantry officer and civilian paediatric surgeon currently serving as SO2 Strategic Analysis at the Australian Army Research Centre. He has commanded at a company level, posted as an instructor on the Combat Officers' Advanced Course, and deployed on multiple domestic operations. A recent graduate of the Australian Command and Staff Course, he holds a PhD in paediatric surgery, a Doctor of Medicine and a Master of Surgery, among several other tertiary qualifications. His current research focuses on the Chief of Army priority research area 'Defence of Australia'. He currently resides in Melbourne with his wife, Natalie, and their two daughters.

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/ BOOK REVIEW

Battleground: Ten Conflicts That Explain the New Middle East

Author: Christopher Phillips

New Haven, CT: Yale University Press, 2024, 320 pp,
ISBN 9780300263428, RRP \$28.00

Reviewed By: William Westerman

Few regions on earth manage to take hold of international attention quite like the Middle East. A stark reminder of this fact was the large-scale terrorist attack conducted by the Palestinian Islamist group Hamas against southern Israel on 7 October 2023, followed by Israel's two-year war in Gaza to recover hostages and destroy the perpetrators. External interest in the region is multifaceted: in some instances it has been driven by geopolitics, such as by superpower competition during the Cold War; in other cases it has to do with energy resources, particularly the abundance of oil found in the Persian Gulf and its surrounds. For the world's Muslims, the Middle East is home to many of their most sacred sites, while Christians and Jews have theological ties to the land between the Jordan River and the Mediterranean. There is also a considerable degree of emotion invested in the perpetually fraught Arab–Israeli conflict, especially among diaspora communities.

For all the wealth of commentary and activism that takes place in relation to wars and unrest in the Middle East, one suspects that, among the general public, the level of detailed knowledge about the topic is relatively low. Seeking to address this deficit is Christopher Phillips, a Professor of International Relations at Queen Mary University of London and an Associate Fellow at Chatham House. His recent book *Battleground: Ten Conflicts that Explain the New Middle East* explores several conflicts that have plagued the region over the past two decades. In so doing, Phillips seeks to challenge pervasive and simplistic explanations of how and why they have erupted, such as religious sectarian differences, ancient hatreds and the legacy of colonialism. Instead, he sets out his argument in the book's first sentence: 'The international relations of the Middle East are complicated.'¹ The remainder of the book serves to demonstrate this complexity.

As its subtitle indicates, *Battleground* is divided into 10 chapters, each covering an area of the wider Middle East that has experienced conflict in recent years and particularly since 2011. The areas covered are Syria, Libya, Yemen, Palestine, Iraq, Egypt, Lebanon, Kurdistan, the Gulf states and the Horn of Africa. Each chapter provides history, geopolitical context and a narrative of recent events for the respective locality, explaining the various factors that have caused conflict, whether intranational or international. The book's focus is political, military, diplomatic and occasionally economic; thus those seeking social and cultural surveys of the region need look elsewhere. Each chapter also examines the role of external players in regional unrest. This consideration naturally includes the United States but also covers Russia, Qatar, Saudi Arabia, Israel, Iran, the European Union, Turkey, China and the United Arab Emirates (UAE). This array of external actors is a valuable demonstration of how much 'local' intervention by regional powers such as Iran and Saudi Arabia is a feature of conflict in the region. If nothing else, *Battleground* is a helpful corrective against the solipsistic view of some in the West that all conflicts in the world come about as a result of either Western action or Western inaction.

Certain themes run throughout the book. For instance, it is notable how much foreign intervention by regional powers has occurred in the interests of regime preservation, often in response to the so-called 'Arab Spring' in 2011. For instance, following protestors' demands for political reform in Bahrain inspired by the fall of Egyptian President Hosni Mubarak (and driven largely by the country's Shi'a community), both Saudi Arabia and the UAE were worried a Shi'a-led revolution could create a pro-Iranian satellite on their doorstep. As a result, 2000 troops deployed from both countries, as well as from Qatar, to help the regime quell the unrest. Another theme concerns the decline of US influence and intervention in the region since the presidency of Barack Obama and the rise of regional actors to fill the void. In his conclusion, Phillips offers his view as to whether a return to US dominance in the Middle East is in the best interests of both the United States and the region.

The great value of *Battleground* is that Phillips has impressively condensed the labyrinthine politics of each of the 10 localities into digestible chapters, allowing a reader to gain a solid overview of each topic from a reputable scholar. The book is particularly valuable for those seeking insight into conflicts where Western attention has been limited. In this regard, Phillips's canvassing of the Horn of Africa and of Saudi Arabia's meddling in Yemen are among the most valuable chapters, as is the discussion of Kurdistan, often neglected because it is not a formal nation state in the traditional form.

Specialists and those with a deep knowledge of the areas under examination would no doubt find quibbles with the representations of each conflict, pointing to insufficient specificity or nuance. For instance, in his discussion of Iraq, Phillips neglects to note that Saddam Hussein's regime sought to retain possession of weapons of mass destruction following the 1991 Gulf War, and that its attitude towards international disarmament efforts

heavily influenced the US decision to invade the country in 2003.² This is a minor point but it illustrates the way in which Phillips has needed to elide certain details to avoid being bogged down. The book is perfectly manageable at 320 pages; to have added additional detail would probably have defeated its purpose, which is to provide a broad overview of conflicts to an educated non-expert.

Phillips writes with knowledge and authority but always, as he acknowledges early in the book, as a Western outsider. In addition, books like this are always hostage to the moment and risk becoming dated when overtaken by events. In the chapter on Syria, for instance, President Bashar al-Assad is still clinging to power.³ With the book published in June 2024, Phillips was not to know that in December that year Assad's regime would collapse and he would flee to Moscow. Similarly, in writing about Palestine, Phillips cannot do more than sketch out the start of the war in Gaza, leaving readers to pick up elsewhere the significant developments that have occurred since 7 October 2023. Such gaps in recent history do not undermine the value of the book as a summation of recent history, yet readers would do well to make themselves aware of developments that are more contemporary.

Ultimately, for those with the desire to know more about the Middle East, *Battleground* serves as an authoritative introduction to the conflicts of the region, admirably achieving the author's intention of demonstrating the complexity of the region and its many tensions and fracture points. The book can be read from cover to cover but its structure also enables it to function as a reference book, allowing readers to engage with separate topics in the largely self-contained chapters. At the end of the book, Phillips provides a modest selection of further readings for anyone wishing to follow up on any particular locality. With the Middle East unlikely to recede from global significance any time soon, this is a valuable resource for anyone wishing to begin thinking deeply about the region.

About the Reviewer

Dr William Westerman is a historian at the Australian War Memorial writing the Official History of Australian Operations in Iraq, 2003–2011. A Fellow of the Royal Historical Society, he has research expertise in the First World War and is also the co-author of the Official History of Australian Peacekeeping Operations in Timor-Leste, 2000–2012. Among his other work, he has written a history of the Fitzroy Lions' 1996 merger with the Brisbane Bears in the Australian Football League.

ENDNOTES

- 1 Christopher Phillips, *Battleground: Ten Conflicts That Explain the New Middle East* (New Haven CT: Yale University Press, 2024), p. 1.
- 2 Ibid., pp. 122–23.
- 3 Ibid., p. 18.

/ BOOK REVIEW

The Doctrine of the British Army: The Conception and Implementation of Field Service Regulations 1900–1918

Author: David Keable-Elliott

Helion and Company Ltd, Warwick, 2025, 265 pp, ISBN 9781804517680,
RRP £29.95

Reviewed by: Chris Roberts

Many military historians surmise that the British Army went to war in 1914 without a warfighting doctrine.¹ They base their opinions on the fact that *Field Service Regulations 1909* (FSR) did not present the clear rules and strictures found in the French and German armies' doctrines. David Keable-Elliott rejects that view. In *The Doctrine of the British Army* he argues persuasively, and correctly in this reviewer's opinion,² that two pocket-sized books (*Part I Operations* and its companion volume, *Part II Organization and Administration*) provided a doctrine for the British Army. While largely based on principles to be applied depending on the situation and conditions facing commanders, *FSR* laid down clear and firm guidance on command, on the conduct of military operations, and on the organisation of the administrative and logistic support for an expeditionary force. Moreover, Keable-Elliott believes that this doctrine (with some adaptation in certain areas and when correctly applied in action) served the British Expeditionary Force (BEF) well on the Western Front for the duration of the war.

Keable-Elliott's book is presented in two parts. Part I is devoted to the prewar years. These 10 chapters provide a detailed account of the inception and development of *FSR* through various drafts and manuals issued from 1902. The author discusses the fundamental principles contained in them, the way in which they were tested and revised, and the manner in which the agreed doctrine was implemented throughout the Regular Army prior to the outbreak of the Great War (1914–1918). Part II (10 chapters) covers the application or otherwise of *FSR* on the Western Front through to the end of the war. It largely provides analysis and observations on the tactical and administrative instructions issued during the conflict, with an emphasis on the extent to which they accorded with *FSR*. In each part, Keable-Elliott includes a chapter on the historiography

of *FSR* relating to the prewar years, and later on the Western Front. In each of these chapters, he highlights the lack of—or, at best, brief—mention of *FSR* in the military histories covering these periods written by professional and academic historians. These omissions, he asserts, have led to flawed assessments and even inaccuracies in many of those histories, and he provides examples to support his case. He ably rejects the view held by many historians that Sir Douglas Haig was the author of *FSR*, highlighting (in some detail) those authors who credit Haig with their production.

The central theme of the book is that *FSR* provided a sound warfighting doctrine for the British Army. While aspects of the doctrine had to be adapted to fit the environment facing the BEF in France (especially regarding logistics, administrative, and artillery command arrangements), Keable-Elliott argues that when the principles in *FSR* were applied they resulted in success, but when they were ignored, failure ensued. Here his argument is somewhat simplistic given the many factors that also contributed to wartime failures. While his claim has some foundation, Keable-Elliott tends to push his case too far, with some questionable examples and observations, and a certain rigidity in his views on the application of *FSR*'s principles. Despite this criticism, Part I of *The Doctrine of the British Army* provides a valuable insight into the approach the British Army took to producing and implementing a warfighting doctrine.

FSR embodied an approach to command that is still relevant today. Specifically, the guidelines gave considerable latitude for initiative and judgement in determining a course of action, depending on the operational situation facing commanders. Much of that guidance is applicable a century later, including the importance *FSR* placed on decentralised control (today called mission command), reconnaissance, covering fire during the infantry assault, and combined arms tactics. As a study in the production of doctrine, Keable-Elliott's work demonstrates the importance of top-down involvement, testing the doctrine on annual Army-level manoeuvres, high-level annual conferences to debate the issues being considered, and revising the doctrine in accordance with the agreed conclusions. He also shows the extent of efforts to implement the regulations. Specifically, *FSR* was implemented throughout the Regular Army, and commanders (at all levels) were held responsible for training their officers according to the guidelines. Supporting this endeavor, an Inspector-General toured commands to report on whether units were conversant with the application of *FSR*, and promotion exams tested officers' knowledge of how to apply the principles contained in the manuals.

Keable-Elliott admits that he is not from a military background,³ nor does he seem to have a sound knowledge of the operational issues confronting the combatants on the Western Front. This is evident in some of his analysis in Part II of the book. Nonetheless, he believes he has had authoritative guidance from the diaries and letters of his grandfather, a junior artillery officer during the war. Most of this portion of the book is devoted to an assessment of the tactical and administrative instructions issued by BEF

General Headquarters during the war, and whether they reflected the doctrine contained in *FSR*. Much of this assessment concerns artillery and command issues. While many of his observations are reasonable, Keable-Elliott has a tendency to take his criticisms too far. For example, when discussing Central Distribution Service (CDS) 50 *Tactical Notes* issued in July 1915, he states that it makes no reference to *FSR* and that it does not engage with *FSR* principles. Consequently, it is ‘not an impressive document’. He criticises omissions of certain *FSR* principles, despite the fact that the instruction contains sound information applicable to the use of artillery fire. This tendency to criticise those instructions that, to his mind, do not accord with *FSR* is evident in other areas. Where instructions do accord, he is complimentary about them. Nonetheless, Part II of *The Doctrine of the British Army* contains useful information on how the British Army adapted to meet the new conditions facing them on the Western Front—but Keable-Elliott’s observations and criticisms need to be viewed with care.

A secondary theme running through the book is an ongoing criticism of Sir Douglas Haig. Keable-Elliott’s bias against Haig shows its hand early when he implies that his grandfather did not necessarily respect Haig. While several of Keable-Elliott’s criticisms of Haig are justified, much of his position is informed by his view that Haig was not imbued with the principles of *FSR* and did not always follow them. At times Keable-Elliott’s stance borders on churlishness, and at other times it seems to be based on assumptions about Haig’s views concerning the manuals, rather than direct evidence. Recognising that some may regard his book as ‘a sustained attack on Haig and his contribution to victory’, Keable-Elliott rejects this, stating that his approach merely avoids ‘Haig-centrism’. Subsequently, in the penultimate chapter, he lauds Haig as a ‘great war leader’ for addressing the many logistical and administrative problems facing the BEF when he became Commander-in-Chief. Furthermore, he credits Haig for his prescient handling of artillery (something he appears to criticise the man for in earlier chapters), stating that *FSR* was not always applicable and adherence to it was not always the right course. This simply adds to a sense of contradiction running through the book.

Despite some flaws and bias in its arguments *The Doctrine of the British Army* is a useful addition to the historiography of the British Army in the early 20th century. This is especially the case in relation to the development and implementation of the British Army’s doctrine during the prewar years. Above all, the book firmly establishes that the British Army had a clear and largely enduring warfighting, administrative and logistical doctrine when it went to war in 1914. However, a more objective and impartial study of how *FSR* was applied and adapted to meet the new conditions confronting the BEF on the Western Front still awaits us.

About the Reviewer

Brigadier Chris Roberts AM, CSC graduated from RMC Duntroon in 1967 and saw operational service in South Vietnam with 3 SAS Squadron. More senior appointments included Commanding Officer The SAS Regiment, Commander Special Forces, Director General Corporate Planning - Army and Commander Northern Command. Retiring in 1999' he spent 7 years in executive appointments with the Multiplex Group. He is the author of *Chinese Strategy and the Spratley islands Dispute*, the highly acclaimed *The Landing at Anzac, 1915*, several book chapters and articles, and is co-author of *Anzacs on the Western Front* and *The Artillery at Anzac*.

ENDNOTES

- 1 See for example Spencer Jones, *From Boer War to World War: Tactical Reform of the British Army, 1902–1914* (University of Oklahoma Press, 2013), p. 56; Stephen Badsey, *Doctrine and Reform in the British Cavalry 1880–1918* (Aldershot: Ashgate, 2008), p. 4; Albert Palazzo, *Seeking Victory on the Western Front: The British Army and Chemical Warfare in World War I* (University of Nebraska Press, 2000), pp. 8–17; Shelford Bidwell and Dominick Graham, *Fire-power: British Army Weapons and Theories of War 1904–1915* (London: Allan & Unwin, 1982), pp. 2–3, 295; Tim Travers, *The Killing Ground: The British Army, the Western Front, and the Emergence of Modern Warfare, 1900–1918* (London; Boston: Allen & Unwin, 1987), p. 41; Andy Simpson, *Directing Operations: British Corps Command on the Western Front 1914–18* (Spellmount, 2006), p. 20; Aimée Fox, *Learning to Fight: Military Innovation and Change in the British Army, 1914–1918* (Cambridge University Press, 2017), pp. 20–21.
- 2 See Chris Roberts and Paul Stevens, *The Artillery at Anzac: Adaptation, Innovation and Education* (Newport, NSW: Big Sky Publishing, 2021), pp. 20–26. They argue that the prewar British manuals represented a flexible warfighting doctrine based around principles to be applied according to the situation.
- 3 He is a medical general practitioner.

/ BOOK REVIEW

The Political Army: How the U.S. Military Learned to Manage the Media and Public Opinion

Author: Thomas Crosbie

Columbia University Press, 2025, 280 pp, ISBN 9780231219785, RRP \$35.00

Reviewed by: Julian Weaver

The current geopolitical landscape, saturated with fake news and generative artificial intelligence (AI) capable of fabricating video and photographic media, presents a unique social and political challenge. Furthermore, the westernisation and idealisation of war movies raises questions about how integrated militaries must be with media and public opinion. There is no longer a strict separation that allows militaries to remain truly apolitical;^{1, 2} rather, the successful adoption and integration of media and reporters into military units now generates significant strategic and tactical benefits.

Thomas Crosbie's *The Political Army* aims to account for this 'democracy of war', specifically the entwining of the media and the military from 1939 to 2000. Thomas Crosbie is an Associate Professor of Military Operations at the Royal Danish Defence College, with numerous published titles on the military profession, military politics and professional military education. The book investigates the democratic and civilian oversight of militaries that has emerged alongside advances in recording and distribution technology. Specifically, it provides insight into the varying degrees of media involvement permitted by militaries (ranging from micro-level management to holistic access) and into the second- and third-order effects of this. Crosbie argues that although the US Army has historically viewed itself as an apolitical institution, it has often adopted a profoundly political warfighting approach, including varying attempts to repress or accept media integration over the 60 years covered within the book.

The book provides an in-depth account of the development of military media management. This is a field which, as Crosbie notes, has not been covered in much depth previously, outside of the Sidle Panel report (1984), the monograph *Vietnam 10 Years Later: What Have We Learned?* (1984), and *Joint Publication 3-61: Doctrine*

for Public Affairs in Operations (1997).³ In pursuit of best practice, Crosbie frames the point where Army and media engagement first fell out of sync in the post-World War II era. The Page Report of 1945, submitted to military and political leadership, underscored the ‘centrality of messaging activities to military success’, sparking the initial rise of the US Army’s public affairs department.⁴ This was followed by the conflict in Korea, where MacArthur initially freed the press to report as they saw fit. However, this latitude quickly materialised into proof for the Army’s top leadership of the ‘severe issue’ with a free press, particularly regarding reporting on low morale.⁵

It is from this basis that Crosbie explores the Vietnam War era of the 1960s and 1970s. Here, the ‘mightiest global military power’ commenced battle with the guerrillas and regular forces of a singularly underdeveloped nation. Assessing the situation as a ‘recipe for disaster’, Crosbie contends that the Vietnam War revealed a singular truth—that ‘Operational victory and political victory are fundamentally decoupled’.⁶ Crosbie’s concept of this so-called ‘Tet Paradox’ offers clear insight into how poor media management and attempts at ‘Army utopianism’ (attempts to strongarm civilian opinion through operational success) can lead to dissatisfaction and the withdrawal of public support. Unfortunately, the post-Vietnam period was marked by the suppression of this critical lesson, a lesson that still resonates today. As Crosbie notes, ‘Public affairs were downgraded and removed from operational concerns by [General William] DePuy (1975) and [General Donn A] Starry (1982) ... despite increasingly [becoming] an element of top commanders’ daily lives’.⁷

The book continues through the 1983 invasion of Grenada to explore how, despite the doctrinal downgrades by DePuy and Starry, media management remained relevant. Suppression of reporting or media access, Crosbie notes, ‘was never absolute ... [military public affairs officers] found work to occupy and justify their place’.⁸ These events set the stage for Operations Desert Shield and Desert Storm, which better utilised the lessons from Vietnam (finally explored in the Sidle Panel report of 1984). This period saw the establishment of media pools—a logistical system that grants a small, rotating group of journalists access to restricted conflict zones. In an effort to reflect upon an expanding and fracturing ‘mediascape’ with 24/7 news channels, Crosbie attributes the successful integration of military public affairs officers (PAOs), civilian media reporters and the media pool framework as the basis for the US Army’s standing today as the ‘most trusted institution in American public life’.⁹

It is unfortunate that *The Political Army* abruptly ends its analysis prior to the terrorist attacks in the United States on 11 September 2001. Instead, it finishes with a discussion about the October 2000 publication of *Field Manual 3-61.1*, which enshrined public information as a central element of US military planning. As a result, the book’s ending feels artificial, concluding with doctrine but missing the critical test of its execution during Operation Enduring Freedom. Given this omission, the stage is indeed set

for a complementary analysis, using Crosbie's framework, to question whether the 'Tet Paradox' has been solved or has instead been supercharged by the digital age. Observations from the Iraq and Afghanistan conflicts would necessarily inform such analysis.

If Vietnam demonstrated that a free press could decouple tactical success from strategic victory, the current era of social media and generative AI threatens to shatter that link entirely. We have moved from the 'Golden Hour' of news cycles to the 'Golden Second' of social media, where narratives are established by algorithms and influencers long before a PAO can verify facts. The 'Tet Paradox' is no longer just about a trusted news anchor like Walter Cronkite as 'the most trusted man in America' swaying opinion. It is about decentralised disinformation campaigns, deep fakes, and echo chambers that render 'objective' military truth increasingly irrelevant. In this sense, *The Political Army* acts as a foundational textbook on media mismanagement. It does, however, require the reader to actively bridge the gap between the year 2000 and today's 'mosaic war', where the weaponisation of information is as decisive as kinetic force. While the academic style of the book may make it less accessible to a general audience, it nonetheless contains substantive contributions that make it worthwhile reading for policymakers, PAOs and staff officers. This is especially so given the recent focus of Lieutenant General Simon Stuart, Australia's Chief of Army, on the army profession. Specifically, he has proposed a 'jurisdiction' pillar that explores Army's relationship with the society it serves.¹⁰ In this context, Crosbie's *The Political Army* is a valuable case study for Army to consider in examining whether it is doing enough to ensure that its story, and its contribution to national defence, is being heard by the society it serves.

About the Reviewer

Lieutenant Julian Weaver is an Australian Army officer.

ENDNOTES

- 1 Huntington's concept of objective versus subjective civilian control of the military—see Chapter 4 of Samuel P Huntington, *The Soldier and the State: The Theory and Politics of Civil–Military Relations* (Cambridge MA: Harvard University Press, 1957).
- 2 See Morris Janowitz's 'Convergence Theory' as discussed by Cate Carter, 'The Janowitz Citizen', *Australian Army Research Centre* (website), 28 August 2019, at: <https://researchcentre.army.gov.au/library/land-power-forum/janowitz-citizen>.
- 3 See Richard Halloran, 'Pentagon Issues News Guidelines for Combat Zones', *The New York Times*, 24 August 1984, at: www.nytimes.com/1984/08/24/world/pentagon-issues-news-guidelines-for-combat-zones.html; Howard K Smith et. al, *Vietnam 10 Years Later: What Have We Learned?* (Defense Information School, 1984).
- 4 Thomas Crosbie, *The Political Army: How the U.S. Military Learned to Manage the Media and Public Opinion* (Columbia University Press, 2025), p. 55.
- 5 Ibid., pp. 62–74.
- 6 Ibid., p. 98.
- 7 Ibid., p. 137.
- 8 Ibid., p. 158.
- 9 Ibid., p. 188.
- 10 See, for example, Simon Stuart, 'Strengthening the Australian Army Profession' (speech), Lowy Institute, Sydney, 3 April 2025, transcript at: <https://www.army.gov.au/news-and-events/speeches-and-transcripts/2025-04-03/strengthening-australian-army-profession>.

/ BOOK REVIEW

Uncertain Allies: General Joseph Stilwell and the China-Burma-India Theatre

Author: Eric Setzekorn

Naval Institute Press, 2024, 266 pp, ISBN 9781682472033,
RRP AU\$35 (hardcover)

Reviewed by: David Connery

The history of the China-Burma-India (CBI) Theatre of World War II is not well known in Australia, where the focus usually falls upon Australian and American campaigns in New Guinea, the Solomon Islands or Borneo. On the rare occasions when the focus moves further afield it centres upon Field Marshal William Slim and his drive across Burma. Yet there is much more to the CBI Theatre, as Eric Setzekorn shows in his relatively short book *Uncertain Allies*. Setzekorn uses his deep knowledge of this theatre to provide a sharp analysis of one of its key leaders, General Joseph ‘Vinegar Joe’ Stilwell, United States Army. The book is an important one because it examines a unique theme, namely why a highly competent, values-based battlefield leader and operationally successful general was ultimately relieved of his command.

Eric Setzekorn had already established himself as a significant author on the topic of the Chinese military across multiple eras, and more generally on United States strategic policy in East Asia. This is his first work on the CBI Theatre, and he has used a number of previously unpublished sources (drawn from the US Army archives at Fort Leavenworth) to create this rich picture of Stilwell’s command, relationships and challenges.

Setzekorn divides his examination of Stilwell’s tenure into three periods. The first period (1942) covers Stilwell’s assumption of command and his related challenges concerning political support and mission clarity. This analysis illuminates the ambiguity of Stilwell’s command relationships and mission, and how he struggled to articulate a clear strategic plan to Washington while dealing with counter-narratives coming from within his own command.

The analysis of the second period of his command (1943) shows Stilwell’s skill in raising and training forces to execute a complex manoeuvre in northern Burma. It also covers how Stilwell lost control of the debate about the use of air power in the theatre and—in

competition with the major operations planned in Europe—was unable to argue for more resources. However, this operational success was not replicated when the strategic focus shifted into China. Here, political factors dominated the third and last period of Stilwell's tenure (1944). This period was shaped by competition within Nationalist Chinese forces, a poorly supported offensive, and conflicting objectives of the Allies.

Through this narrative structure, Setzekorn examines his two key themes and assesses the ultimate reasons why Stilwell was unable to create a unified campaign in the CBI Theatre. The theme of uncertain allies (which gives the book its title) is clearly shown in the way Stilwell needed to reconcile Chinese, British and multiple domestic sources of power and influence at the same time. Stilwell, who Setzekorn describes as ill-disposed to the British, thought Vice Admiral Louis Mountbatten's priority—even though he was the Supreme Allied Commander South East Asia—was to protect Britain's colonial interests in Burma and India. Setzekorn also explains that Stilwell deeply mistrusted the Chinese Nationalist leader, Generalissimo Chiang Kai-Shek, who was popular in the United States but perceived (by Stilwell at least) as being more concerned about his grip on power and the Chinese Communists than about the Japanese.

On top of this, Stilwell failed to establish a positive relationship with President Franklin D Roosevelt or to see the importance of influencing broader audiences. His 'straight down the road' approach of dealing through his chain of command meant, for example, he could not (and did not) counter popular and persuasive arguments about the relative merits of independent air power versus more land forces in the CBI Theatre (Chapter 7). Nor was Stilwell prepared to manage the global strategy conferences that could have linked the CBI Theatre more closely to wider strategic efforts (Chapter 3). Further, his lack of attention to 'political niceties' delayed his eventual appointment to overall command of US and Chinese forces in the theatre (Chapter 6). Setzekorn attributes the general's ultimate removal to this lack of political astuteness.

The ambiguity of Stilwell's role and mission in China was also a significant problem. When deployed to China in early 1942, Stilwell was ordered to coordinate and increase the effectiveness of US military assistance to the Chinese Nationalist Army. Further, he was appointed as 'Chief of Staff' to Chiang as the supreme Chinese military commander, an undefined position with authority only as far as the Chinese leader would allow. According to Setzekorn, Stilwell's inability (or unwillingness) to shape his poorly defined mission and consequent orders was a further factor contributing to this unsatisfactory situation.

Reading Setzekorn's narrative and his analysis of Stilwell's generalship brings to mind a newish adage, 'What got you here won't get you there'.¹ Stilwell's directness and integrity, his professional passion and his tactical acumen, as described in this book, are exactly what an army seeks in battalion and brigade commanders. That Stilwell applied his

personality and professionalism on a larger scale is a tribute to the training and selection process that took him to Burma. Yet, as Setzekorn demonstrates, Stilwell's inability to grasp the political dimension of his role as a theatre commander ultimately diminished his position and led to his dismissal.

While this is a significant book and a most useful one, it assumes a lot of knowledge of the reader. There is no real description of Stilwell as a person, which means not every reader will understand why he was called 'Vinegar Joe' or appreciate the key forces that shaped his personality. Nor is there a good link between General George Marshall's assessment of Stilwell as the best person for the role of dealing with China and the relatively fast breakdown in Stilwell's relationship with Chiang Kai-Shek. An outline of the CBI campaign would also help those without background knowledge of this campaign.

These points are, however, minor. This work is a significant addition to the literature on civil–military relations, coalition operations and the strategic competition for resources. The lessons presented could be well absorbed by any officer given either a senior command role in coalition operations, or national command of any operation.

About the Reviewer

Colonel David Connery PhD is currently serving with International Policy Division. His most recent roles include Army Liaison to the Official Histories of East Timor, Afghanistan and Iraq. His past appointments include Commanding Officer University of New South Wales Regiment, and Battery Commander 111th Air Defence Battery (Light).

ENDNOTES

- 1 A phrase popularised by Marshall Goldsmith, *What Got You Here Won't Get You There: How Successful People Become Even More Successful* (Profile Books, 2008).

/ BOOK REVIEW

Evolution on Demand: The Changing Roles of the U.S. Marine Corps in Twenty-first Century Conflicts and Beyond

Editor: Joanna Siekiera

Marine Corps University Press, 2025, 316 pp, Open Access,
ISBN 9798987336281

Reviewed by: Jason Kirkham

Is the United States Marine Corps (USMC) transforming swiftly and intelligently enough to win the next major war? Joanna Siekiera tackles this question in *Evolution on Demand*, her edited collection of contributions from fellows of the prestigious Brute Krulak Centre for Innovation and Future Warfare. By analysing a diverse scope of future warfare challenges, Siekiera and her contributors detail how innovation, adaptability and cooperation will be the most critical building blocks of operational success in an increasingly complex world.

The book consists of 13 chapters that cover four themes: force design, logistics, asymmetric capabilities, and wargaming. Each chapter analyses a pre-eminent challenge that is shaping the evolution of warfare and provides recommendations to the USMC and like-minded allies on how to meet these challenges.

The book features a fresh and gripping analysis of force design transformation in the shadow of looming great power conflict in the Pacific. Three chapters in particular question the suitability of the USMC's order of battle and mindset for contemporary threats. Leo Spaeder, Zach Ota and Austin Duncan persuasively contend that the USMC must adopt a defensive, lightly equipped and geographically distributed posture. Brian Kerg develops this line further by underscoring the USMC's criticality to the 'Stand-In Forces' warfighting concept, whereby an 'immediate line of scrimmage' is generated to challenge regional aggressors. These chapters provide grounded, insightful and refreshing perspectives that bear strong relevance to Australia.

The complex discipline of combat logistics also receives welcome attention. Drake Long invokes uncanny parallels between the Burma campaign of 1943 and today's geostrategic

setting to highlight logistical frictions that are likely to re-emerge in a future Pacific conflict. Sidharth Kaushal proposes that logistical burdens can be greatly reduced if the USMC reorganises into a strike-centric contact layer that is lighter, smaller, and therefore easier to sustain. His argument relies on excessive optimism regarding the ability of unmanned submarines and heavy-lift drones to sustain widely dispersed marines across a contested battlespace. Despite this, both authors' efforts to advance logistical thinking are commendable.

The book also explores a range of topics that can be categorised under asymmetric capabilities. Kelly Grieco and Maximilian Bremer effectively illuminate the growing importance of the air littoral as a major disruptor of traditional airpower, and the urgent need for the USMC to expand its capabilities there. Preston McLaughlin effectively places irregular warfare within the context of the USMC's newest warfighting paradigms, namely expeditionary advanced basing and distributed maritime operations. Less compelling and evolutionary are Kurtis Kjobech's chapter on stability policing, and Arun Shankar's on cyber warfare. Both authors eloquently define their topics, but their contributions are more retrospective than prospective. They give less attention to presenting recommendations for how one might apply these disciplines in new, nuanced and inspired ways to gain advantage in today's complex warfighting environment.

The book finishes with two excellent chapters on wargaming. James Fielder addresses wargaming's long and unfortunate image problem and presents recommendations to more effectively embed it into USMC culture. Kevin Williamson then narrows the aperture to the cutting-edge arena of digital wargaming. He neatly presents the advantages in education, open-source intelligence and collaboration that can be gained in this emergent space. Both chapters provide fresh perspectives to help address a challenge in professional military education that is common to many militaries, including the Australian Defence Force.¹

The book's greatest strength is that it delivers on its promise of providing recommendations relating to a complex problem. For comparison, Tim Sweijs and Jeffrey Michaels's *Beyond Ukraine* is a fantastic but largely theoretical analysis of future war.² *Evolution on Demand* is, on the other hand, grounded in tangible, actionable recommendations of contemporary relevance. It covers an impressively diverse scope of multidomain and interdisciplinary topics, which serves to amplify its relevance and utility far beyond the USMC and into an international and interagency readership.

As with many edited collections, the book's primary shortcoming is its minor inconsistencies across certain chapters. Chapter 11 ('Cyberspace as a Critical Component of Future Marine Corps Missions'), for example, does not provide specific recommendations to the reader on its topic of cyberspace; nor does it convincingly argue why cyberspace will become a 'win-or-lose asset in future warfare'.³ Additionally, the

content of Chapter 9 ('U.S. Marine Corps and Stability Policing') is based almost entirely on examples from the Global War on Terror without a robust linkage to the USMC's current warfighting concepts, contemporary adversaries and geographic challenges.

Evolution on Demand is an important contribution in the context of the USMC's controversial Force Design 2030 transformation.⁴ It acts to counterbalance the tumultuous attention that Force Design has received by offering clear-eyed perspectives from a diverse group of experts, many of whom are not military. The book exists in a very large body of future war literature. It is less concerned with a revisionist perspective on war and its increasingly blurred definition, as in Lawrence Freedman's *The Future of War: A History*.⁵ Nor does it entreat the reader to reimagine traditional military power structures through a technocentric lens, as in Christian Brose's *The Kill Chain*.⁶ *Evolution on Demand* resides somewhere in the middle, offering a multidisciplinary but balanced perspective on many factors that are shaping future war.

Evolution on Demand exemplifies the USMC's identity as an adaptive and forward-thinking warfighting institution. It is an excellent assortment of robustly analytical and visionary analysis that details how innovation, adaptability and cooperation will be pivotal to operational success as the world grows ever more complex. It highlights the deepening importance of deliberate force design, logistics, asymmetric capabilities, and wargaming to the conduct of future war.

This book greatly deserves the attention of military leaders, public servants in international policy and diplomatic fields, and anyone seeking to enhance their understanding of future war.

About the Reviewer

Major Jason Kirkham is a student at the Australian Command and Staff Course. He is a qualified logistics and artillery officer who has served in the 1st Brigade, 3rd Brigade, the School of Artillery, Headquarters 1st Australian Division, and Special Operations Command.

ENDNOTES

- 1 Jim Bryant, 'Are We a Thinking Army?', *Australian Army Journal* 3, no. 2 (2006): 191–199.
- 2 For a review of Sweijts and Michaels's *Beyond Ukraine*, see Jason Kirkham, 'Book Review—*Beyond Ukraine: Debating the Future of War*', *Australian Army Journal* 22, no. 1 (2026).
- 3 Joanna Siekera and Arun Shankar, 'Cyberspace as a Critical Component of Future Marine Corps Missions: Why the U.S. Marines Can Be Used as a Role Model for Other NATO Allies and Like-Minded Partners in This Domain', in Joanna Siekera (ed.), *Evolution on Demand: The Changing Roles of the U.S. Marine Corps in Twenty-first Century Conflicts and Beyond* (Quantico VA: Marine Corps University Press, 2025), p. 213.
- 4 Grant Newsham, 'US Marine Force Design 2030: Hatred and Hubris', *Asia Times*, 5 March 2024, at: <https://asiatimes.com/2024/03/us-marine-force-design-2030-hatred-and-hubris>.
- 5 See Lawrence Freedman, *The Future of War: A History* (London: Penguin, 2018).
- 6 See Christian Brose, *The Kill Chain: Defending America in the Future of High-Tech Warfare* (New York: Hachette, 2020).

/ BOOK REVIEW

War Without Oversight: Why We Need Humans on the Battlefield

Author: Paddy Walker

Howgate Publishing Limited, 2025, 352 pp, ISBN 9781912440580,
RRP £19.99

Reviewed by: Callum Hamilton and Benjamin J Wood

The integration of artificial intelligence (AI) into weapons systems has become the new paradigm for major militaries, motivated by desires to overcome human limitations and to achieve superior operational effects. States, militaries and non-government organisations alike are considering the prospects of integrating AI and robotic and autonomous systems (RAS) in military operations. This has triggered international debate about the legality and ethics of autonomous weapons systems (AWS)¹—‘killer robots’ capable of ‘selecting targets and initiating attacks without human involvement’.²

Paddy Walker’s *War Without Oversight* contributes to this conversation by presenting a multidisciplinary argument against the military use of AWS. The book analyses the development and use of AWS, assessing both practicality and feasibility across legal, operational and technological dimensions. In doing so, it articulates the opportunities and challenges relating to the development of lawful and operationally effective autonomous functions in weapons systems. By introducing the ‘Delivery Cohort’³ concept, Walker enhances the text’s analysis and broadens the discussion beyond developers and end users to the wider ecosystem of actors that shape AWS capability outcomes. In a field often dominated by hype and futurist speculation, the provision of counterfactuals to claims of the inevitable ubiquity of AWS in military operations adds necessary nuance to anchor the AWS debate in what is possible and practical. Walker concludes that ‘truly unsupervised’ AWS are neither practical nor feasible for military use, and that autonomy in the targeting cycle must be limited to preserve human judgement.

The book’s focus on end-to-end autonomy in the targeting cycle means its scope exceeds what is immediately relevant to capability planners, commanders or developers, who generally work with more limited autonomisation efforts. Although the book never defines its intended audience, its argument for a legislated standard of ‘meaningful

human control' (MHC) clearly aims to shape the views of policymakers and international advocacy groups. This gives it particular relevance to forums such as the Group of Governmental Experts on Lethal Autonomous Weapons Systems⁴ and the Summit on Responsible Artificial Intelligence in the Military Domain (REAIM).⁵ The book contends that the principles emerging from these forums have had limited practical effect, largely due to a lack of consensus on how they should be operationalised and because of the fragmented international and interdisciplinary understanding of the subject. To counter this, Walker recommends establishing mechanisms to ensure that the use of AWS is subject to MHC applied to 'when, where and how weapons are used; what or whom they are used against; and the effects of their use'.⁶

War Without Oversight also examines the drivers behind increasing weapon autonomy and the extent to which it is here to stay. Walker explores how elements of the character of warfare both shape and are shaped by the use of AWS, particularly through the capability offset provided by small, inexpensive RAS platforms that support force dispersal and mass. Walker argues that this offset has become increasingly important as personnel and exquisite platforms grow more vulnerable and more costly to sustain on a per-unit basis. The book illustrates this trend through examples from Ukraine, where the 'fragility' of modern military hardware has seen autonomy used to enhance platform resilience to electronic warfare and reduce reliance on radio-based control. This shows how weapon autonomy is currently being applied, mainly to functions for which humans are poorly optimised or otherwise limited in comparison, including traditional command, control and communications models. These sections reflect a view of military operations clearly informed by contemporary conflicts, particularly the ongoing Russo-Ukrainian War.

The book further explores the strengths and weaknesses of various deployment models for autonomous systems. Walker emphasises that no single set of deployment rules can equip AWS to navigate the inherent uncertainty of military environments. Although the book recognises that AWS deployment must be aligned to fit between a system's capabilities and its intended use case, it does not examine the architectural implications of such an approach or reconcile it with a unified standard for MHC. The author notes in later sections—without expanding on the point—that there is a need for a process that can continually determine an appropriate battlefield standard aligned with variations in context rather than depending on a single, fixed and fragile one. Further analysis of this issue would have added significant value to the book, given its centrality to operationalising military RAS and AI responsibly.

Environmental uncertainty introduces further challenges to prevailing narratives of technological feasibility of AWS across hardware, software, firmware and 'wetware', the latter being 'the human element of information technology architecture ... describing programmers' efforts to replicate the essentials of human intelligence and to effect this through code and code alone'.⁷ Walker argues that the technological complexity involved in developing a system capable of achieving a semantic understanding of its environment

makes it impracticable to develop and deploy ‘truly unsupervised’ AWS without unacceptable sacrifices relating to output quality, legal compliance, and exposure to risk. This argument is bolstered by the text’s exploration of non-technological limitations to AWS deployment, including adherence to international humanitarian law (IHL), accountability for AWS use, reluctance to adopt innovative but unproven technologies, and the proliferation of countermeasures. One of the book’s findings is that, regardless of whether it is technologically feasible to do so, the unsupervised nature of AWS would prevent their use in accordance with legal and operational expectations.

Much of the book’s analysis stops short of synthesising recommendations for how autonomy in weapons systems should be practically controlled. This is partly because it focuses on AWS with ‘humans out of the loop’, rather than the more immediate trend toward autonomous systems with narrow functions that are expected to shape the near-term conduct of warfare under ‘human-in-the-loop’ or ‘human-on-the-loop’ control models. Consequently, the book’s emphasis on the most advanced and speculative forms of AWS makes its core arguments less immediately relevant to practitioners and to the military use of RAS and AI today. As a result, its discussion of how MHC might be achieved for hypothetical AWS misses the opportunity to explore the transitional steps towards such systems that could support the development of MHC as a practical framework.

In regard to concepts of ethics, control and agency, many of *War Without Oversight*’s assumptions go untested despite diverging interpretations continuing to frustrate international and interdisciplinary consensus. To illustrate, at one point the author claims that AWS ‘are the manifestation of handing over the decision to kill to a computer’.⁸ This claim assumes that machines enabled by probabilistic algorithms actually make decisions when performing actions. This assumption diverges from the practitioners’ view that autonomous systems merely implement the commander’s decision to deploy the system, according to the range of potential behaviours and outcomes which the Delivery Cohort accepts and has oversight of through development and training. The presentation of such an assumption as ‘a given’ weakens the text’s arguments and cannot be readily contested by readers who are not engaged in the AWS debate.

The book further reflects a lack of consensus within prominent AWS-focused ‘communities of practice’, inheriting their conceptual limitations, interdisciplinary challenges and ambiguous terminology. The author defines AWS in several ways, so it is sometimes difficult to determine whether arguments are relevant to AWS, narrow autonomy in weapons systems, or both. Likewise, the terms ‘supervision’ and ‘oversight’ are often used interchangeably, with neither being defined explicitly. ‘Control’—the essential function of MHC—is not defined until the book’s penultimate chapter. This omission limits the capacity of the text to explore how to operationalise MHC and uplift the Delivery Cohort’s ability to address AWS challenges throughout the lifecycle, rather than as an afterthought for technologically flawed or limited systems.

This review's key criticism of *War Without Oversight* is that it does not explore how to practically operationalise MHC of AWS, or autonomy in weapons systems more broadly. Walker calls for the addition of a statutory requirement for MHC, and makes various recommendations for the principles of MHC as a framework. These recommendations include the need to address control requirements on a case-by-case basis; generate capacity for timely intervention; and apply MHC principles before, during and after use of force. However, these principles are not accompanied by an exploration of how they might be translated into practice. Nor does the text include the legal doctrinal analysis required to show that existing IHL principles are insufficient to regulate AWS. The book's penultimate chapter raises further questions about how to establish such a requirement for MHC. In what legislation or treaty should it be enshrined? How will states navigate differing concepts of human control, and distinct motivations for pursuing weapon autonomy? To what extent should MHC frameworks apply to extant uncrewed systems? How and by what metrics would adherence to MHC be measured, and by who? What confidence would signatories have that other states will comply? The text does not provide practical guidance on approaching these challenges.

It is worth noting that, by aiming to comprehensively address the topic of AWS from a multidisciplinary perspective, the author set himself a near-impossible task. It is to his credit, then, that the book's exploration of the drivers and limitations that affect military AWS is so thorough in its treatment of issues and perspectives. However, much like the conversations that the concept of AWS generates among practitioners and scholars alike, the text does not delineate a path to actualise and practically implement the principles it espouses. As military interest and investment in autonomy increase, the extent to which principles such as MHC will inform the future use of AWS will be determined by the ability of countries and international bodies to ensure and incentivise adherence to these principles during conflict. *War Without Oversight* provides a wealth of relevant information that will support further research and operationalisation of principles for the use of autonomy in weapons systems.

About the Reviewers

Benjamin J Wood is a Land Autonomy Policy Liaison Officer within Army HQ. He has also performed international policy and engagement roles within International Policy Division and Air Force HQ. Prior to employment with Defence, Benjamin graduated from Macquarie University, receiving a Bachelor of Security Studies alongside the Macquarie University Award for Academic Excellence.

Callum Hamilton is an AI Policy Lead within Army HQ. In this role, Callum supports the Australian Army's responsible application and use of AI and autonomous systems in the land domain. Callum holds a Bachelor of Laws (Honours) and Bachelor of International Relations from Bond University and is currently completing a Graduate Diploma of Legal Practice at the College of Law.

ENDNOTES

- 1 Describing weapons systems that are enabled by end-to-end autonomy in the targeting cycle, and distinct from RAS with lower levels of autonomy.
- 2 Paddy Walker, *War Without Oversight: Why We Need Humans on the Battlefield* (Howgate Publishing Limited, 2025), pp. 99–100.
- 3 The text defines the term ‘Delivery Cohort’ as ‘a device to convey the parties involved in delivering the deployment of AWS and will include, inter alia, the following taskings: neurophysiologists to coordinate AWS networks; psychologists to coordinate learning and cognition; biologists for adaption strategies; engineers for control routines; logisticians; roboticists; electrical specialists; behaviorists; politicians, civil servants and diplomats; people working in non-governmental organisations; sociologists; lawyers; company directors; weaponists; military tacticians; manufacturers; professionals involved in miniaturisation, simulation, configuration, coding, power supply and modularity; specialists in sensors, in distributed and decentralised routines; ethicists; data scientists and data engineers; and specialists in tooling and calibration’. Walker, *War Without Oversight*, pp. 11–12.
- 4 This group is formulating an international legal instrument in the area of AWS for High Contracting Parties to the Convention on Certain Conventional Weapons.
- 5 Where states have committed to a call to action, blueprint for action and pathway to action related to the military use of AI, informed by a specialist global commission.
- 6 Walker, *War Without Oversight*, p. 32.
- 7 Ibid., p. 180.
- 8 Ibid., p. 6.

/ BOOK REVIEW

Professionals Talk Logistics: Sustaining Strategy and Operations

Written By: Jon Klug (Editor) and Steve Leonard (Editor)

Howgate Publishing Limited, 2025, 220 pp, ISBN 9781912440672,
RRP £24.99

Reviewed By: Jacob W Thomas

Just as tacticians study the great strategists of history, logisticians must learn from the sustainment successes and failures of the past. As the character of war evolves and contested logistics becomes the norm, there has never been a greater need for dialogue about the sustainment implications of modern military operations. *Professionals Talk Logistics* initiates this conversation, offering a timely and thought-provoking contribution to the discourse on military sustainment. Now more than ever, it is essential for professionals to 'talk logistics'.

Jon Klug and Steve Leonard assemble a compelling and well-structured work arguing that military strategy—defined by ends, ways and means—is profoundly shaped by logistics. They contend that logistics supports the *means* by which military strategy is given operational effect. It either enables or constrains the *ways* in which such strategy is achieved. Further, logistics requirements heavily influence the timeline within which strategic *ends* are realised. Throughout the book, the authors present logistics as a persistent challenge, demonstrating that strategic planning is not the sole determinant of whether a campaign is successful. Instead, planners also need to consider the practical realities of sustaining operations. Drawing on their extensive military experience and current roles in academia, Leonard and Klug curate this anthology of scholarly and practical essays into three chronological parts, illustrating how the task of sustaining armies has evolved across millennia and how it can impact future operations.

Part One of the book explores how history's great strategists sustained their forces through gruelling, multi-year campaigns across vast distances. Rather than allowing logistical constraints to dictate operations, successful strategists consistently adapted logistics to the unique nature of their armies. This principal theme runs throughout the book, suggesting that today's sustainment practices must adapt in the same way. By integrating emerging technologies such as artificial intelligence (AI), logisticians can ensure that sustainment asserts itself as an innate element of the Army's system of warfighting.

Part Two examines the interplay between logistics and strategy during the Global War on Terror. The chapter titled 'Operational-Level Warfare and Logistics' analyses how domestic and foreign policy profoundly shaped the logistical and operational plans during the 2003 invasion of Iraq and further influenced later phases of the Afghanistan conflict. Part Two also underscores the importance of setting the theatre during interwar periods through continuous shaping activities such as securing access to ports, airfields or other infrastructure. These measures create critical options for logisticians and manoeuvre forces in the event of future expeditionary operations or in times of crisis. In the chapter 'At the End of a 6,000 Mile Screwdriver', the book builds on lessons learned from Alexander the Great to demonstrate how effective logisticians rapidly adapted to shifting political and battlefield conditions to maintain operational momentum during the US troop surge in Afghanistan in 2009. They contend that adaptability will be critical for sustaining future combat operations, particularly because campaigns will face constraints beyond extended and politically pressured lines of communication. Successful campaigns will require logisticians to craft redundant, hardened supply routes from the homeland to the front lines. Importantly, such routes will need to be capable of withstanding the effects of multi-domain assaults.

Part Three lays the theoretical foundation of logistics operations in the US Army and joint services, as well as examining how AI integration, coupled with contested logistics, demands that leaders manage sustainment within the manoeuvre space and not as a separate afterthought. One of the most compelling themes is the transformative role of AI. Far from merely enhancing existing processes, AI fundamentally reshapes how militaries plan, execute and manage sustainment operations. Even with the inclusion of AI to improve sustainment processes, several essays emphasise the growing exposure of fragile supply lines in the event of a Pacific campaign. Extensive distance, limited infrastructure, susceptibility of multi-domain actions, and adversarial long-distance strike capabilities make sustainment in the Pacific a significant operational challenge. Given these constraints, the authors persuasively argue that modern logisticians must embrace adaptability and technological innovation, mirroring the flexibility of their historical predecessors to succeed in the next generation of conflict.

One particular strength of the essays in *Professionals Talk Logistics* is that numerous authors ground their discussions at the doctrinal level, providing an excellent starting point for junior logisticians or supply chain practitioners in the security studies field. From this foundation, the authors deliver thought-provoking insights into how future conflict and the integration of advanced technologies will challenge even the most experienced logistics professionals. The book's segmented design enables readers to select chapters that address current operational concerns, examine historical examples, or engage with the entire work to encourage broader dialogue and critical thinking.

By following the evolution of sustainment operations through history and projecting its future course, Klug and Leonard make a compelling case for why logisticians must remain proactive, adaptable and intellectually curious.

While the book is well organised, its broad scope limits the depth of analysis on specific historical examples or logistical processes, a feature which some readers may find unsatisfying. Moreover, the essays are primarily framed through a land-combat perspective. While the implications of logistics to land operations have enduring relevance, future conflicts will require seamless integration across joint services, as well as cyber and space domains, combined with significant reliance on the military-industrial base to ensure success. Additionally, apart from a few deliberate examples, the text largely focuses on US military doctrine and historical Western campaigns. A revised edition would benefit from incorporating views and additional case studies from the perspectives of non-Western militaries and involving non-conventional warfare. This would provide a more global and comprehensive view of sustainment.

In sum, *Professionals Talk Logistics* is an excellent book for anyone engaged in the spectrum of military operations and should be considered essential reading for junior members of the armed forces. Its chronological structure, doctrinal footing and relevant case studies provide a strong foundation for understanding how the integration of logistics by history's great strategists must be mirrored—and adapted—by today's logisticians and planners. In an era of contested logistics, where adversaries will seek to disrupt and degrade our sustainment capabilities throughout the entirety of the supply chain, the insights in this book are not merely theoretical. They may prove vital to the success of future military operations. As the authors of the individual essays make clear, the ability to sustain the force is not just a matter of efficiency; it is a matter of survival and victory. As warfare enters a new era shaped by AI and multi-domain warfare, this book stresses the necessity for modern leaders to incorporate emerging technologies into sustainment strategies if they are to adequately prepare for the next generation of conflict.

About the Reviewer

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