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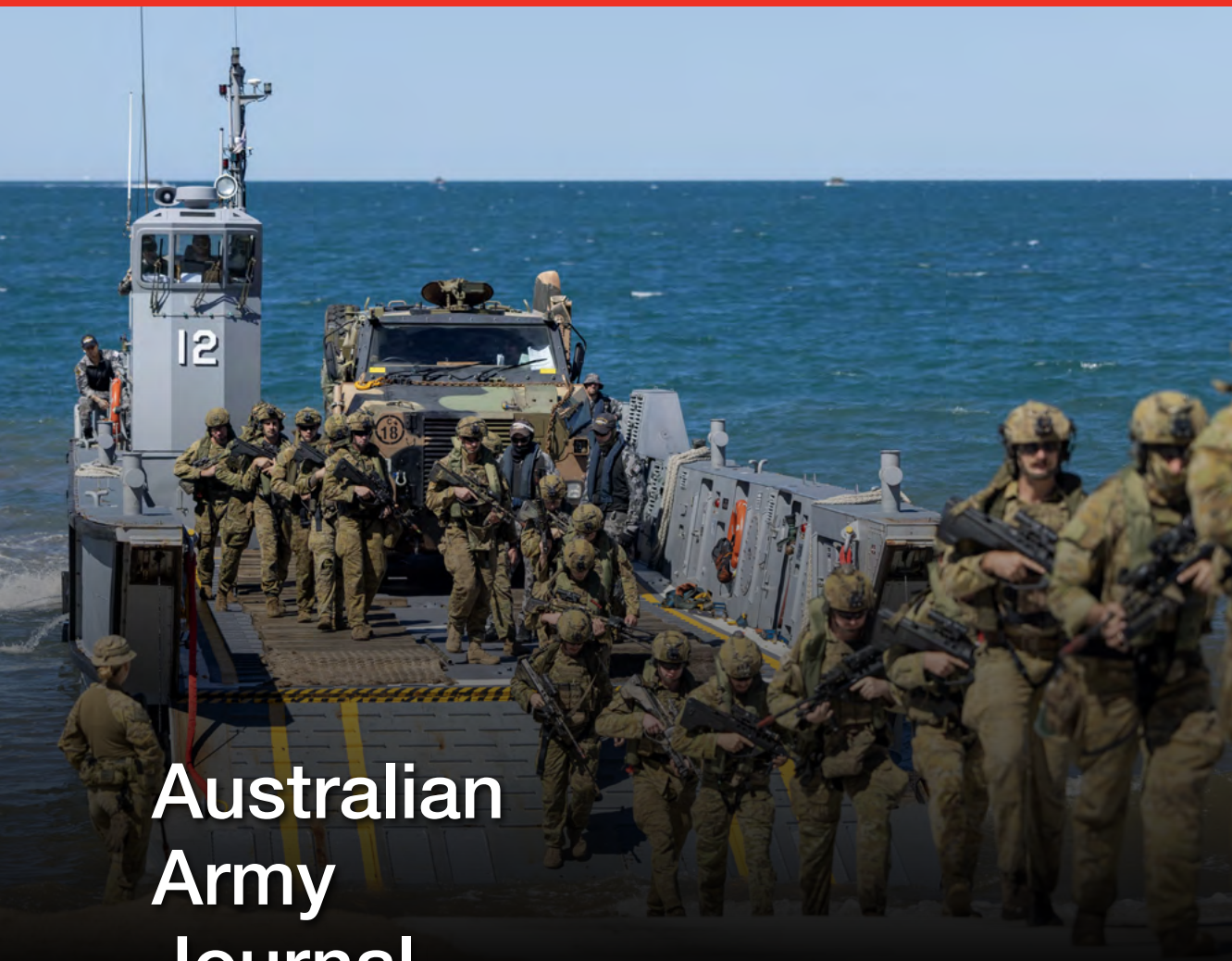

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Serving the Nation

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Cover image: Australian Army soldiers of the Australian Amphibious Force disembark an in-service Navy Littoral Landing Craft at Cowley Beach Training Area in June 2024 as part of Exercise WADER 24.
(Source: Defence image gallery)

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Foreword

Luisa Powell, Director Australian Army Research Centre

As Director of the Australian Army Research Centre, I am pleased to introduce this first edition of the *Australian Army Journal* for 2025. This edition comprises a diverse range of articles about relevant contemporary subjects that are worthy of discussion within Army.

Army needs academic debate and discourse. It has always been important for members of the Army to think critically about their profession. In 2025, at a time of significant and continuing change in the means and methods of warfare and in geopolitics more broadly, this need is ever more present.

On 12 September 2024 the Chief of Army, LTGEN Simon Stuart, took the stage at the annual Chief of Army Symposium and issued a call to action. He declared his intent for a wholesale, holistic review of the Australian Army profession – a first since the creation of the Australian Regular Army in 1947.[1] He has since framed this review across three pillars: jurisdiction, expertise (or professional mastery), and self-regulation as a profession.[2]

The *Australian Army Journal* answers that call.

The *Australian Army Journal* is the only Australian peer-reviewed journal that fosters debate on land power and strategic studies. It offers a platform to disseminate academic thinking, providing a diverse range of perspectives and insights. It aims to foster a culture of learning and professional development for Army, and to ensure its professionals continue to wield the intellectual edge in any contemporary or future conflict.

This edition represents a milestone in Army's long campaign to master the profession. For the first time in many years this journal predominantly features contributions by Army members, with further pieces from academia and experts within the Australian Public Service. It is encouraging, both for the Army profession and for the future, to see military members reading and writing for the journal, presenting their expertise and well-reasoned arguments on topics that matter to Army and the Australian Defence Force more broadly.

The articles cover a wide range of topics, from how to transform the Australian Army's full-time cavalry for the next major conflict to exploring the Indo-Pacific grey zones and examining the potential benefits of using artificial intelligence on military operations.

Understandably, academic writing can be an intimidating task for many; it demands time, dedication, deep thought, and a willingness to question your own knowledge and experience. Yet it is a crucial skill that is both humbling and rewarding. It is humbling in that your carefully crafted arguments and evidence are intensely scrutinised by a peer, who may offer significant (though constructive) criticism that requires you to re-evaluate your position on a topic. It is rewarding in that, after the process is completed, you become acknowledged as an expert on that topic and immortalised in print to inform decision-making and for future generations to learn from. The rewards of academic writing outweigh the fears, which is why authors come back time and time again.

In my experience, academic writing can be distilled into four steps: **read**, **research**, **write** and **debate**.

- You need to **read** and consume reputable information in all its formats, including books, audiobooks, podcasts and blogs. Scan and peruse topics across a wide range of topics and dive deeper into the areas of particular interest. There are reading lists and book reviews available on the Australian Army Research Centre website, as well as recommendations through The Cove. Gathering information leads to the generation of questions and the development of hypotheses to test, which, in turn, prompt the quest for further information.
- **Research** leads to the identification of knowledge gaps which, through the development of methodology, can be systematically set out and addressed.

- **Writing**, in its simplest form, is recording information. As an extension, academic writing has standards and requirements across four main styles: descriptive, analytical, persuasive and critical.[3] The prescribed nature of academic writing forces the author to work within a basic structure and to consider extant literature in order to generate writing methodologies. The writing itself needs to synthesise results without bias, and must be presented in such a way as to be both highly readable and compelling. Academic writing is an iterative process with first drafts read by colleagues and friends, then final drafts submitted for peer review.
- The peer review process can be one of the most rewarding and uncomfortable experiences, as this forms the initial stage of the **debate** process. It marks the beginning of the contest of ideas where the author's analysis is scrutinised by experts in similar professional fields. Your ideas need to stand on their own. When this process is embraced, the work becomes more robust. Once published, the work will be read and debated, and may in turn spark new research questions on land power that need answering, fulfilling the cycle of academic thinking.

Until a piece of writing has transitioned through each one of these four steps, it is just an opinion piece. And opinions are easy to come by. We hear them every day in our personal relationships and in the media, offering insights into attitudes, reflections on individual experiences, or gut feelings that may in turn spark further opinions in response. While written opinion pieces have their place, it is only through the practice of academic writing that critical thinking skills are honed and opinions, biases and assumptions are fully critiqued. When practised regularly, these skills naturally permeate into the conduct of everyday tasks across the profession, building a culture of evidence-based decision-making.

I would like to express my gratitude to all the contributors to this edition of the *Australian Army Journal*. Your insights, expertise and experience have created a valuable resource for the Australian Army and the wider defence community. I hope that by reading these contributions, others will be prompted to start their own journey of academic writing. I encourage all our readers to engage with the ideas and arguments presented in this edition, and to consider how they can contribute to the ongoing development of the Australian Army and its capabilities.

Endnotes

1 Chief of Army, 'The Human Face of Battle and the State of the Army Profession', speech, Chief of Army Symposium, 12 September 2024, transcript at: https://www.army.gov.au/news-and-events/speeches-and-transcripts/2024-09-12/chief-army-symposium-keynote-speech-human-face-battle-and-state-army-profession.

2 Chief of Army, 'The Challenges to the Australian Army Profession', speech, Australian University National Security College, 25 November 2024, transcript at: https://www.army.gov.au/news-and-events/speeches-and-transcripts/2024-11-25/challenges-australian-army-profession.

3 'Types of Academic Writing', *The University of Sydney* (website), at: https://www.sydney.edu.au/students/writing/types-of-academic-writing.html.

How Small Nations Influence Great Powers in War

David Cave

Introduction

If war comes to Australia, the decisions of greater powers will determine our fate. Australia's grand strategy remains one of alliance with a great power democracy, in expectation that the wartime support of that nation will mitigate our various defence and economic weaknesses. Initially dependent on Britain owing to our colonial heritage, and now on America as the defender of the international order, Australia's wartime survival has arguably always relied on the strong support of a great power. This raises difficult and troubling questions. How can we ensure our partner assists us and preserves our values and interests during and after any potential conflict? How might we influence allied decision-makers most effectively during a war? And how do we ensure our national interests are prioritised amid the many competing priorities of a great power executing its own grand strategy in conflict? History provides some potential answers to these questions through examination of a similar relationship during the last global war.

This article examines how Britain supported its European allies during the Second World War, and identifies lessons for contemporary strategists and planners.[1] These distant nations may seem of limited relevance to Australia; however, they provide the most recent examples of military

alliances between smaller nations and a democratic great power in global war. While there are limits to the applicability of their experiences, they can inform Australia's pursuit of a great power alliance in an increasingly unpredictable world. This work commences by describing the establishment of a wartime alliance between Britain and the governments of European nations driven into exile by German conquest. The nature and character of this alliance are then documented, with particular emphasis on the techniques employed by the exiles to gain influence and leverage with their British hosts. Finally, five observations that are applicable to Australia's present position as a junior alliance partner are discussed. What emerges from the analysis is a greater understanding of the complexities of managing alliances in wartime, the many dilemmas faced by junior alliance partners, and the potential benefits and hazards of employing military and diplomatic power to achieve influence.

Building and Maintaining an Alliance

Germany's rapid conquests of 1939 and 1940 comprehensively reshaped Europe. Belgium, Czechoslovakia, Luxembourg, the Netherlands, Norway and Poland were occupied. The leaders of these states fled to Britain, followed in mid-1941 by the Yugoslavs and Greeks.[2] Defiant in defeat, all eight nations soon established governments-in-exile in London and set about rebuilding their political administrations and militaries as best they could. Seeking allies and strength wherever they could be found, the governments-in-exile were strongly supported by Britain as they sought to create a unified coalition of 'occupied allies' to assist its war effort. This Anglo–exile partnership, while outwardly united, was initially fraught with mutual suspicions, disorder and distrust as all nations adapted their strategy and methods to dramatically altered circumstances. The relationship was always dominated by Britain, and throughout the war the minor allies remained subordinated to their great power sponsor. But subordination is not the same as subservience, and both sides exercised agency to influence the other and to further their national interests. Despite the inequality of power, the Anglo–exile relationship grew into an arrangement that was both equitable and enduring. At war's end, six of the exiled governments were successfully restored and sought to perpetuate their alliance with Britain. The outcomes of these wartime arrangements still dominate Europe and possess contemporary global influence. The Anglo–

exile partnership was the direct antecedent of the most significant Western international organisations of the post war era: the North Atlantic Treaty Organisation (NATO), the European Union (EU) and the United Nations (UN). These wartime arrangements between the European exiles and their British sponsors therefore provide a rich source of examples for students and scholars of strategic alliances.

The Anglo–exile relationship commenced following Germany's conquest of Poland in 1939 and the Poles' flight into exile. However, it took its true form following the occupation of Western Europe in the summer of 1940. As each European nation was defeated and occupied, its leaders fled to London. The first Dutch officials arrived within hours of the invasion of their territory on 10 May 1940, soon followed by the Norwegians and Poles in early June 1940, with the Czechoslovaks, Luxembourgers and Belgians arriving progressively over the following months.[3] Interestingly, of the various Western European nations occupied by Germany, only the Danish and French chose capitulation, the remainder preferring to continue their war from British exile. It was a difficult but logical choice for those who wanted to continue to fight. Many leaders had prepared for this eventuality by evacuating their national gold reserves early in the war, or by withdrawing naval forces from tactically hopeless positions to Britain early in the conflict.[4] However, fleeing into exile was a traumatic experience for all involved and was very much an option of last resort. Only a tiny number of leaders and officials reached London, and upon arrival their position remained uncertain. Many held little confidence that Britain would be able to resist German invasion and initially avoided committing too deeply to their host's cause. This manifested as a reluctance to formally ally with Britain, even as they rebuilt their shattered militaries with British weapons, ships and aircraft, and continued combat from British ports and airfields. Instead, the exiles kept their options open by fighting Germany on a nominally independent basis and rebuffed early British attempts to form an alliance.

The exiles' early notions of independence appear somewhat absurd in retrospect—declining British offers of alliance even as their militaries sortied from British bases using British-supplied ships, planes and ammunition. Nevertheless, they are explicable through the understanding that all parties prioritised their own national survival in the first part of the war.[5] Most had firm pre-war policies of neutrality that shaped them towards continued independence, and the trauma of their flight inhibited rational

examination of their new circumstances. The Dutch, for example, initially considered hedging their bets by moving their government to the Dutch East Indies (modern Indonesia) colonies, seeking to preserve a semblance of independent authority despite German occupation of the Netherlands.[6] The first Dutch Prime Minister in London, Premier De Geer, advocated in a BBC broadcast for surrender to Germany and, after being removed by his monarch, fled back to the Netherlands and collaborated with the occupiers.[7] Similarly, the Belgians were badly divided as a consequence of King Leopold III's decision to surrender and remain in occupied Belgium, and only a few of their political leaders eventually made it to London. The Norwegians had been dragged into the war in part by British infringement of their neutrality and were therefore initially hesitant about joining too closely to Britain. Only the Polish were eager to arrange an alliance as quickly as possible and did so via a military support agreement.

Yet despite this ambivalence, all the exile nations accepted British assistance to re-create both their political administrations and their military forces within the British Isles. Those exiles with global colonies or sizeable commercial shipping fleets were able to fund their own activities, and the remainder accepted British loans. British forces provided facilities, weapons and training to re-forge militaries from whatever personnel the exiles could find in Britain or recruit from their global diasporas. Through these activities Britain and the exiles became increasingly integrated and mutually dependent. By mid-1941, the conditions were right for a collective commitment. On 12 June 1941, the eight exiled governments and Britain signed the Inter-Allied Declaration and thereby entered an alliance of 'United Nations' to fight together until Germany was defeated.[8] It was an important agreement, but its prominence was short lived.

Ten days after the Inter-Allied Declaration was signed, on 22 June 1941 the Soviet Union entered the war, followed six months later by the United States in December 1941.[9] The entry of these nations on the Allied side significantly reduced the exiles' influence with Britain. It also demoted the exiles to secondary concerns in comparison to Britain's maintenance of a relationship with the other 'Big Three' members.[10] What followed was a period of uncertainty in which both Britain and the exiles were unsure how best to use their relationship for advantage. As small nations, the exiles found themselves excluded from the Allied strategic decision-making process and therefore hostage to the plans of their great and powerful

friends. Britain refused to guarantee their restoration to power and began instead conducting extensive subversive operations in the exiles' occupied homelands without consulting them. The United States showed little interest in their affairs, appointing a single inexperienced ambassador to cover all the exiled nations. The ambassador, Anthony Biddle, was the United States minister and ambassador to the Polish, Czechoslovakian, Dutch, Norwegian, Belgian, Greek, Luxembourg and Yugoslav governments-in-exile while they were resident in London throughout most of 1941–43. The post was then left vacant for the most critical year of the war.[11] The exiles responded by repeatedly seeking admission to key Allied conferences and planning events. They were just as repeatedly refused. Complicating their challenges, several exile governments were undermined by internal divisions, mutinies, and increasingly depleted resources.[12] The nadir of their influence came during the North African Operation Torch landings in late 1942. To achieve a local ceasefire, American commanders appointed a German-collaborationist Vichy French leader, Admiral Francois Darlan, to govern the liberated territories of French North Africa.[13] This was an ominous precedent, and the head of the British Foreign Office labelled it 'a compact with the devil'.[14] The governments-in-exile panicked; concerned they might also be replaced by more malleable German collaborators when their countries were liberated.[15] This panic forced tighter relations between the various exile governments as they sought to apply collective pressure on Britain. Although their economic, diplomatic and military influence had been depleted by the war, the exiles soon found new strength in this nascent form of European unity.

Leveraging this new unity, the exiles increasingly cooperated and formed a 'united front' to pressure the British into more exile-friendly policies.[16] In response to Darlan's appointment, the Western European exiles launched a 'frontal attack' on British officials to gain a guarantee of restoration to power.[17] They also began cooperating far more closely on post-war plans. This increasingly unified approach was aided by the growing importance of the exiles as the time for liberating their homelands grew closer. By late 1943, many exile governments could rely on considerable support from resistance organisations at home, small but useful exile armed forces in Britain, and substantial moral authority as symbols of unconquered defiance. Recognising their importance to assisting future Allied efforts to liberate, pacify and govern German-occupied territories, the exiles marshalled their collective influence to insist the Allies commit formally

to their restoration. The Western Europeans were able to do this most effectively, and the British supported them by pushing aside US resistance to agree a formal Allied commitment to restoring their governments after liberation.[18] In contrast, the Eastern European exiles grew progressively more fragmented from internal divisions and the growing strength of rivals in their occupied homelands. Soviet influence played an increasingly important role in their fates, and it was evident these nations would only succeed with Stalin's support.

By early 1944, the British policy was one of clear commitment to restoring all the exiles, and its actions reinforced this intent. After Operation Overlord the governments-in-exile and their various supporters became central to Allied plans for liberating and governing Europe.[19] These carefully prepared liberations worked largely as intended, and the return to self-government in Western Europe was a relatively smooth and peaceful process. By the end of the war all four Western European governments-in-exile (Belgium, Luxembourg, the Netherlands and Norway) had been restored to power. Each government made substantial contributions to the security of Allied lines of communication and therefore the offensive into Germany. Conversely, only two of the four Eastern European exile administrations returned home. The Greek government returned with the assistance of British military force, and the Czechoslovaks negotiated an agreement to return with Soviet support. Disappointingly, the London-based governments of Poland and Yugoslavia were usurped by Soviet-backed alternatives, and at war's end the British withdrew recognition of their exile regimes to placate Stalin. Nevertheless, by mid-1945 the Anglo–exile relationship had played a central role in the restoration of European democracy. It also endured. After the war, the former exiles leveraged their wartime experience to create a series of collective European governance institutions, ultimately culminating in the EU in 1993.[20] From a security perspective, the former exiles petitioned the British to join the Brussels Pact of 1948, and then incorporated the US to create NATO.[21] The Inter-Allied Declaration proved the inception point of the UN.[22] The traumatic experiences of exile convinced the Western Europeans their future lay in European unity, a perspective made possible by the generally fair and respectful approach of their British hosts.

How the Nations Fought for Influence

The Anglo–exile relationship was a unique arrangement forged by the particular demands of the European theatre in the Second World War. Nevertheless, it possessed several notable features that are informative for present-day strategists and scholars. First, the British were generally sympathetic hosts who subordinated but did not exploit their significantly weaker partners, paving the way for a more united post-war Europe. This equitable and collective treatment of the exiles enhanced the long-term value of the alliance but also reinforced British determination to treat the exiles consistently and not prioritise any one nation. This led directly to the second feature: that significant exile economic, diplomatic and military contributions were critical to favourable British perceptions of individual exiles and the alliance, but nevertheless generated insufficient leverage to change major British decisions in wartime. However, the goodwill generated by mutual sacrifice was important in transitioning wartime relationships to successful post-war partnerships. Third, the creation of substantial subversion and resistance networks within occupied Europe enhanced the power and prestige of the Western Europeans even as it unleashed internal divisions detrimental to the Eastern Europeans. Finally, the British prioritised the interests of allies that were the most geographically relevant when deciding where to allocate scarce diplomatic and military resources. This was particularly the case towards the end of the war. The result of these factors was that exiles critical to Britain's core interests—the Western Europeans and Greece—prospered, while the less important Poles, Czechoslovaks and Yugoslavs did not.

The British executed their policy towards the exiles within a collective, comprehensive and largely equitable framework that prioritised consistency in Anglo–exile decision-making. Despite its unrivalled dominance of the relationship, Britain did not cynically exploit its monopoly on power. The exiles retained genuine sovereignty and agency to act within the bounds of British war strategy. They exercised substantial control over their own finances and personnel, and over the structure and employment of their armed forces. The British continued to treat them as sovereign nations with individual national interests, and managed bilateral relations accordingly. Accordingly, the exiles were not mere puppets or vassal states but instead exercised substantial autonomy, albeit from a considerably diminished position. Nevertheless, there were significant limits to the influence these

small states could wield as minor members of a wider coalition. The British consistently treated the exiles as second-tier partners, with the top tier reserved exclusively for Britain, the Soviet Union and the United States. The relationship was therefore equitable but unequal. In response, each exile adopted different methods to attempt to influence their host, shaped by their individual objectives, policies and available resources. Their relative success or failure illustrates how these diminished nations sought to influence a democratic great power in war.

The Poles sought to gain influence by making a substantial military contribution, drawing upon existing resources and their large émigré population in France, Britain and North America. The rationale for making a strong military contribution to the war was best expressed by the Polish slogan 'We do not beg for freedom, we fight for it'.[23] Indeed, Polish Prime Minister Sikorksi emphasised the military nature of this strategy when it was announced, stating he wanted the 'Polish Army to weigh heavily when the fate of Poland is determined'.[24] The Poles proved well placed to execute this plan. Much of the Polish Navy had sailed to Britain at the outbreak of war, and the Admiralty quickly pressed its ships into service, expanding it significantly throughout the war.[25] The Polish Army and Air Force were re-formed from soldiers escaped from Europe, released from Soviet gulags, and recruited from Polish migrants across the world. By early 1944 Poland possessed the largest exile forces, with a nearly 80,000-strong army, a 3,000-strong navy (one cruiser, six destroyers and two submarines), and a 14-squadron air force.[26] Far from being a boutique or fragile force, these personnel were engaged in some of the most dangerous and decisive combat operations of 1940 and later in 1944–45.[27]

The Poles made the greatest military contribution to Allied success of all the exiles and were highly respected for this commitment. For example, the folklore around Polish pilots in the Battle of Britain remains strong even today.[28] Yet their contribution provided little leverage when it mattered. British and American gratitude did not translate to commitments to restore the Polish government-in-exile or Poland's pre-war territories. This was partly due to the fact that geography meant the Soviets would dominate post-war Eastern Europe, and partly due to the limited strategic influence that military contributions often generate in practice. The Polish desire to make a valued military commitment necessitated integrating their forces completely into British command and control structures. As an important

and relied-upon component of British military power, these forces could not then be leveraged for political advantage without immediately undermining the respect and prestige they had bled to establish. They were in effect decisively engaged within the British war effort, and the only way Polish military leaders could exercise influence was to threaten not to fight. This only happened once, when Polish General Anders threatened to withdraw his forces from the Italian front line because they felt betrayed by the outcomes of the 1945 Yalta Conference. His British superior, Field Marshal Alexander, prevented this action by pointing out that there were no reserves to replace the Polish II Corps, and an American colleague advised that to refuse battle 'would have an ill effect on the Polish cause'.[29] The Poles reluctantly fought on until the end of the war but were not even invited to the post-war victory parade.[30] By pursuing a primarily military strategy, the Poles had found themselves in a true catch 22: their military had to be committed to operations to gain leverage over British decision-makers, but once committed it lost the freedom of action to provide that leverage.[31]

In a similar manner, non-military contributions to the war effort generated British gratitude towards the exiles but conferred disappointingly little practical influence. For example, the Dutch, Belgians and Norwegians paid for their own war effort by drawing on their substantial global resources, and even financially assisted Britain when the latter's gold reserves were almost empty.[32] Their contributions of military forces, merchant shipping fleets and colonial exports often exhausted their remaining resources and were highly valued by their hosts. Nevertheless, these contributions bought these exiles little real influence over the major decisions of the war. The exiles made several individual and collective attempts to access the primary Allied decision-making forums of the British War Cabinet, and later the Anglo-American Combined Chiefs of Staff. They were consistently refused by British leaders reluctant to cede influence to their minor allies. For example, in early 1942, British leaders denied Norwegian requests for involvement in planning the liberation of Norway on the basis that it 'would inevitably lead to the Dutch, the Belgians, the Free French—and possibly the Poles and Czechs—demanding a similar privilege when their territories are concerned'.[33] Soon afterwards, the exiles made an appeal for representation within 'an Allied General Staff to direct operations on the European Front'.[34] After discussion of this proposal in parliament and at the War Cabinet, it was firmly rejected on the basis that 'agreement within such a heterogeneous body would be extremely difficult to obtain … security

would be impossible' and it would lead to 'the unjustifiable dispersion of effort' in pursuit of the exiles' individual objectives.[35] Britain was determined to retain control over war planning, and the exiles were never granted significant influence over Allied decision-making.

British efforts to establish subversion and resistance networks in occupied Europe provided an alternative but problematic method for the exiles to gain influence. The cultivation of support in occupied territories is hazardous, and Czechoslovakia offers a cautionary example. The exiled Czechoslovak leaders commanded few personnel, possessed no independent financial or colonial resources, and struggled to find means of effectively influencing British policymakers. In an attempt to gain prestige and leverage with his British hosts, exiled Czechoslovak President Beneš sought to spark a popular revolt via a targeted assassination of the German governor of occupied Prague. *Obergruppenführer* Reinhard Heydrich was killed in May 1942 by Czechoslovak agents parachuted into the country by the Royal Air Force. The result was a propaganda coup for the exiled president, but a disaster for the occupied population. Savage German reprisals followed, largely extinguishing Allied intelligence networks within the country. The goodwill generated among British leaders was therefore short lived, and the government-in-exile responded by looking to other nations for assistance. President Beneš increasingly pursued an accommodation with the Soviets, who sought at least a semblance of legitimacy for the post-war Czechoslovak government, even as they planned its subordination to communist influence. This 'third way' worked, and in May 1945 Beneš was restored to the presidency with Soviet support. His victory proved Pyrrhic, and he was progressively marginalised before being deposed by communist rivals in a 1948 coup.

The Czechoslovak exiles were always among the weakest of the exiles, and their decision to seek influence by promoting resistance against the German occupiers ultimately diminished their strength further. Indeed, across Europe resisting German occupation proved to be a largely ineffective strategy, as the ruthless efficiency of German security forces soon destroyed or suppressed most active resistance organisations. Instead, the British and exiles changed their strategy to one which required the occupied populations to bide their time and hide their strength until the Allies returned to the European continent. British and exile tactics therefore pivoted to the creation of 'secret armies' that would rise and strike only

when Allied liberation was imminent.[36] This concept proved successful both in directly assisting Allied liberation efforts and in preserving the latent potential of the exiles' influence prior to liberation. It was most successful in Norway and France, and also to a lesser extent in Belgium and the Netherlands, where the security of British supply lines was critical to the last six months of the war. However, strong and loyal resistance forces did not guarantee success. The strongest of the exile 'secret armies' was the Polish Home Army, an organisation wiped out by the Germans during the 1944 Warsaw Uprising while the Soviets watched on passively.[37] The 'secret armies' concept also proved hazardous to exile and Allied post-war plans. In Yugoslavia and Greece, the Allies' support of resistance forces did little to accelerate German withdrawal but instead produced deeply fractured societies that struggled with the resultant division and recriminations for generations. Even in the comparatively homogenous nations of France and Belgium, the political forces unleashed within competing resistance groups proved difficult to contain. Promoting subversion was therefore an effective but problematic method for both Britain and the exiles.

Finally, geography was a key determinant in exile outcomes. The two Balkan governments-in-exile, the Yugoslavs and Greeks, were similar at first glance. Both possessed meagre resources, had largely ineffectual monarchs and political leaders, and were continually riven with internal dissent and rebellion. Yet while the Yugoslavs dissolved in exile, the Greeks returned home in triumph. The reason was articulated by Sir Orme Sargent, a senior British Foreign official: 'Greece is and always has been a vital British interest', in contrast to the minimal importance of Yugoslavia.[38] Greece's proximity to Eastern Europe and the Balkans and to British military and economic interests in the Mediterranean, Egypt and the Middle East made it critical to post-war British plans. Britain was therefore prepared to invest significant resources and political capital into ensuring Greek success, including securing the 'percentages agreement' for regional influence with Stalin and dispatching an occupation force following German withdrawal from Greece in late 1944.[39] The Greek government exercised little influence throughout much of its exile, but its importance to British leaders who sought a Greece that was 'prosperous, our friend, and at peace' meant it remained at the forefront of British calculations regardless.[40]

In direct contrast, the geographically proximate Yugoslavs remained only peripheral concerns to Britain but of significant interest to the Soviets. In

late 1944, British forces were stretched to near breaking point in Western Europe, and there was little appetite and no military capacity to force the return of the exile Yugoslav government. Most of the government-in-exile's supporters within Yugoslavia were loyal to General Mihailovic, an individual with whom the Allies had cut ties after he proved reluctant to engage the German occupiers. Britain and America instead switched their support to the communist leader Tito in the mistaken belief that he would be more active and open to ongoing British influence. Tito instead rebuffed the Western Allies after gaining control of the country, and Churchill noted regretfully 'in Tito we have nursed a viper'.[41] The Yugoslav government and monarchy then dissolved ignominiously in exile. Yugoslavia's peripheral importance necessitated Britain's provision of political rather than physical support, an approach that proved totally ineffective in the face of far stronger communist competitors. The Yugoslav exiles were of distinctly secondary importance to Britain and they suffered accordingly.

In contrast, the geography of Western Europe made it critical to British plans for the post-war era. Any concepts of the governments-in-exile returning to their pre-war policies of neutrality were therefore firmly discouraged by the British Foreign Office throughout the war. Always confident of victory, in early 1941 Foreign Office leaders believed 'British and American bases in Norway [would be] of utmost interest' to 'enable this country to maintain its position vis-à-vis the Continent of Europe'.[42] Norway's proximity to the shipping routes to Russia only increased this importance as the war progressed and concern about future Soviet intentions mounted. The exiles of the Netherlands, Belgium, Luxembourg and France were even more essential to British leaders, who perceived Britain's strategic frontiers as being 'on the Rhine' and wanted strong allies to act as their continental shield after the war.[43] Furthermore, in the short term the British (and Americans) needed these exiles' support. Allied supply lines ran through the exiles' territories as the battlefront moved towards Germany, and the secure administration of these rear areas was essential. Short- and long-term strategic calculations therefore necessitated strong mutual commitments between the Western Europeans and their geographically proximate British hosts.

Lessons from the Relationship

Analysis of the Anglo–exile relationship gives rise to several observations that inform contemporary strategists and planners. The first is that alliances require the subordination of individual preference to the collective strategy. Nations enter alliances for reasons of self-interest, but surrender a level of influence to the collective in the process. Power disparities within the alliance often mean the strongest member's power is enhanced at the expense of the weaker partners. This was certainly the case when Britain was the primary nation fighting Germany during 1940 and 1941, and its moral and military power was bolstered by the exiles' presence. In turn, Britain also experienced this effect as it found itself the increasingly weaker partner in the Anglo-American alliance, and to a lesser extent in its later dealings with the Soviet Union. Nevertheless, its position as one of the 'Big Three' ensured that it always dominated the Anglo–exile relationship. In comparison, the meagre resources of the exiles resulted in their complete exclusion from all significant strategic decision-making forums of the war. Consequently, despite their frequent appeals for the Allies to prioritise the removal of their German occupiers, the exiles' territories were liberated on a timeline and in a manner decided by their more powerful allies. The same intra-alliance power dynamics meant that when the London-based Polish and Yugoslav exiles fell from Soviet favour there was little their British sponsors could do to alter this fact. Britain was simply not willing, or militarily ready, to risk war with the Soviet Union over their fate. It was therefore the demands of realpolitik, not British indifference that condemned these Eastern Europeans to continued exile.

A secondary observation emerges from the various successes and failures of the Anglo–exile alliance. When threatened or stressed, states prioritise the protection and advancement of their core interests. Lesser powers must therefore ensure their interests align closely to the greater power's priorities. For the British, their image as the 'sole champion of Europe' was essential to their early grand strategy of recruiting the United States into what remained a principally European conflict.[44] This image required an alliance with the exiles, an arrangement Churchill labelled 'a symbol of our common determination to see the war through to a successful conclusion'.[45] Once the US had entered the conflict, British priorities for the Anglo–exile relationship shifted to the practical requirements of liberating Western Europe, and the promotion of post-war British interests in that region.

In contrast, the desire of the Eastern Europeans for a restoration of the pre-war status quo became increasingly divergent with British prioritisation of a constructive relationship with the Soviets. This led to the British ceding influence in Eastern Europe. By the time the Poles and Yugoslavs identified this shift they were ideologically and diplomatically incapable of transitioning from British to Soviet sponsorship, and were usurped accordingly. In contrast, the Czechoslovaks' meagre resources and limited alliance contributions meant they were not as committed to Britain and instead independently negotiated a return to power with the Soviets in return for accepting substantial communist representation in parliament. Ironically, their comparative irrelevance to the British had preserved their freedom of action and granted them success.[46]

The third observation is that the Anglo–exile relationship confirmed the aphorism that geography is destiny. The Western Europeans and Greece prospered under British sponsorship precisely because they were central to British post war interests. In 1943, the British had demonstrated the importance of maintaining sympathetic governments in these nations by arguing for their restoration against the objections of United States officials. Fearing that American preferences for maintaining post-conflict military rule would do 'lasting harm to our relations with the small Allies', the British argued instead for the restoration of the governments-in-exile.[47] This often-acrimonious disagreement raged within Anglo-American headquarters for a full year until the Americans finally agreed to exile restoration.[48] Similarly, British officials provided troops to support the Greek government's return and to keep it in power by force even at the peak of the British personnel crisis of late 1944. These examples demonstrate the British were 'deeply committed' to the smaller allies whose geography made them most important to Britain's post-war position.[49]

A fourth point is that the exiles' future potential importance to Britain consistently outweighed the importance of any previous contributions. Some nations were able to 'get away' with making lesser contributions and still prosper because they were important to Britain's post-war plans. For example, the Belgians made only minor contributions to the war effort and were resented for their previous indecision and prominent role in the fall of France. Nevertheless, Churchill informed their prime minister 'my policy is to look forward and not to look back', and repeatedly put aside his personal view that they were the 'most contemptible' and 'ungrateful' ally

for the sake of Britain's strategic objectives.[50] He believed suppressing such animosity was worthwhile if it ensured British-aligned rulers dominated the Low Countries after the war.[51] Similarly, the Norwegian exiles were initially viewed as of marginal importance, but Churchill's persistent fascination with potentially re-entering Europe through Norway meant they became increasingly involved in Allied operations as the war progressed.[52] Norway remained prominent in British post-war plans due to the advantages an Anglo-Norwegian alliance conferred on the Royal Navy's dominance of the North Sea and the sea-lanes to Russia. The Greek exiles were consistently supported despite their internecine politics and deadly mutinies among their army and navy.[53] Likewise, France's immense importance to Britain's long-term security saw Britain initially employ a hedging strategy in dealing with the competing administrations of Vichy and de Gaulle. Early in the war Britain sought to 'ride two horses at once' by maintaining a pragmatic relationship with the nominally neutral French Vichy administration while simultaneously backing de Gaulle as the leader of the separatist Free French.[54] This approach paid dividends when de Gaulle later emerged as the dominant force in a deeply divided post-war France. Although de Gaulle was never as compliant or as invested in the Anglo-French alliance as Britain would have preferred, British officials supported him throughout the war despite strenuous American objections.[55] The same British officials also restored France to eminence by lobbying for it to play a role in the post war occupation of Germany, and later to gain a permanent seat on the UN Security Council. It is perhaps unjust, but nations that will be important after a war will retain influence that may far outweigh their wartime contribution.

A fifth observation is the importance of prioritising grand strategy over shorter-term military strategies or operational concerns. This depends on proficient and appropriately focused political leaders being advised by experienced and well-resourced diplomatic and military establishments.[56] The Norwegians recognised that their pre-war policy of neutrality had been comprehensively destroyed by Germany's invasion. They therefore quickly pivoted to becoming a reliable and committed British ally while maintaining cordial relations with Soviet Russia, with whom they shared their northern border. They were deeply disappointed by the low priority assigned to the liberation of Norway, but remained faithful allies nonetheless and benefited from this loyalty after the war. The Dutch were slower to grasp the immense strategic shift the war had imposed on their fading empire, but identified the considerable benefits of partnering with Britain during the war and

afterwards. They were therefore able to navigate the loss of their colonial possessions and implosion of their neutrality policy to emerge secure and relatively prosperous in the post-war years, ideally placed to benefit from the increasing integration of Europe. Conversely, the Czechoslovaks prioritised their assassination of Heydrich to achieve a moment of admiration and influence, and had their resistance networks comprehensively destroyed in response. Their later failure to prevent a communist takeover was a direct result of this diminishment. The British understood both their own central role in post-war Europe and the importance of having faithful European partners to realise it. Initial plans for widespread revolt against German occupation were therefore quietly dropped in favour of the more controllable and predictable 'secret armies' of resistance. British diplomats and military leaders were also prepared to forcefully challenge their American partners for the exiles' return so that a more stable and united post-war Europe could emerge. None of these positions were inevitable, and the transitions to them were sometimes traumatic and often required the sacrifice of military or operational objectives. But by prioritising their strategic aims the participants eventually succeeded.

Conclusion

Britain's championing of the Western European nations was simultaneously both generous and self-interested. For centuries, Britain had managed the challenge of containing the dominant European power by maintaining coalitions of various European allies, and it continued this policy.[57] The wartime coalition of Europeans that assisted in defeating Germany was rapidly repurposed to contain further Soviet expansion. However, the prominence of the Europeans in creating NATO indicates the co-dependence that evolved as a result of Britain's wartime arrangements. For it was the Belgians, Luxembourgers, Dutch and French who initiated the Brussels Pact of 1948 with Britain.[58] The further incorporation of the United States and Norway soon afterwards evolved this pact into NATO proper. Britain had initiated the Anglo–exile alliance to keep all available nation's in the war in mid-1940, but by mid-1945 was most supportive of those it judged most essential to its future security and broader interests. British power was increasing limited by its crippling war debts, its limited population, and the growing strength of its American and Soviet competitors. It therefore prioritised the nations most vital to its future

position. Abandoning the exiled Poles, Yugoslavs and Czechoslovaks may seem callous, but Britain's success in focusing on Western Europe to enhance its post-war position is undeniable.

Australian strategists and planners can learn much from these experiences despite their geographical and chronological distance from our current strategic situation. Britain designed a comprehensive policy towards its alliance partners that considered them as a collective, and prioritised consistency in their treatment. But alliances reduce the individual agency of their members and can place harsh limits on the influence of smaller nations. The junior partners were denied significant influence over wartime strategy and excluded from the most consequential decision-making forums. As a junior alliance partner Australia can similarly expect to be a strategy-taker, not a strategy-maker. However, as long as our interests align sufficiently with that of our great power sponsors this may not be a grave concern. The exiled nations were subordinated but not subservient, and they worked individually and collectively to steadily increase their influence and power by identifying and employing various elements of hard and soft power that mattered to their British sponsors. Australia must likewise continually consider the resources it brings to any strategic partnership or alliance, and ensure it promises future value rather than relying on often worthless historical contributions or unquantifiable goodwill. In war difficult and selfish decisions may have to be made to balance the force contributions required to be a faithful ally with the necessity to preserve power for later needs. Most importantly, Australia must keep the desired strategic ends at the forefront of its policy and actions, and not squander forces, resources or diplomatic capital on objectives that do not directly further those ends. Advancing our own national interests and setting clear boundaries at the start of a conflict may be necessary to preserve sovereignty through the difficult times that will likely follow.

Winning a war is hard. Turning a military victory into an enduring peace is harder still. The Anglo–exile relationship provides a recent and useful example of a military alliance that both achieved victory and created the most important Western institutions of the past century. We should learn from their experience.

About the Author

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Endnotes

1 Based on recent doctoral research by the author. David Cave, *Honoured Partners: The British Relationship with Governments-in-Exile during the Second World War*, PhD thesis, UNSW, 2024, at: http://hdl.handle.net/1959.4/101790 or https://doi.org/10.26190/unsworks/25494.

2 A group of Free French dissidents under General Charles de Gaulle also sought to create an exiled alternative to the Vichy administration in France but were never a formally recognised government-in-exile.

3 The Poles had established an initial government-in-exile in France during October 1939 after Poland's invasion by Germany, and that government was able to flee relatively intact to London after its chief ally, France, was defeated in June 1940.

4 The Dutch and Belgians had evacuated their gold reserves to Britain and North America before the war, and the Polish Navy sailed to Britain just prior to German invasion. Mark Jones, 'Experiment at Dundee: The Royal Navy's 9th Submarine Flotilla and Multinational Naval Cooperation in World War 2', The Journal of Military History 72, no. 4 (2008): 1185.

5 David French, 'British Military Strategy', in John Ferris and Evan Mawdsley (eds), *The Cambridge History of the Second World War: Volume 1* (Cambridge: Cambridge University Press, 2015), pp. 38–39. See also Colin Strang, 'War and Foreign Policy 1939–45', in David Dilks (ed.), *Retreat from Power* (London: Macmillan Press, 1981), p. 71.

6 The Dutch East Indies comprised present-day Indonesia.

7 Louis de Jong, *The Kingdom of the Netherlands during World War II: Part 9* (Amsterdam: Rijksinstituut Voor Oorlogsdocumentatie Amsterdam), p. 10 (translation).

8 *Lift up Your Hearts: A Record of the First Inter-Allied Meeting Held at St James's Palace, London, 12 June 1941* (Edinburgh: Pillans & Wilson, 1941).

9 The Soviets on 22 June 1941 following Germany's invasion, and the United States on 11 December 1941 following Pearl Harbor.

10 'The Big Three' was a common wartime term that referred to the United Kingdom, the United States and the Soviet Union.

11 'Ambassador Biddle', *Life Magazine*, 4 October 1943, pp. 107–120.

12 For example, the Greek and Belgian forces experienced significant mutinies throughout the war, and the Yugoslavs and Greeks were riven with internal divisions.

13 Telegram Churchill to Roosevelt, WM(42) 154, T15192/2, No. 193, Churchill Papers/422, quoted in Llewellyn Woodward, *British Foreign Policy: Volume 2 (London: HMSO, 1962)*, p. 369.

14 Alexander Cadogan, *The Diaries of Sir Alexander Cadogan, O.M. 1938–1945*, edited by David Dilks (London: Cassell, 1971), p. 493.

15 Letter from Ambassador Biddle to President Roosevelt of 23 November 1942, Franklin D. Roosevelt, papers as President: the President's Secretary's file (PSF) 1933–1945, Series 3, Box 24, Biddle, Anthony J. Drexel, 1942–1944.

16 The National Archives (TNA), W3709/G, Minute by J.G. Ward of 5 March 1943, FO 371/36533.

17 TNA, comment by J.G. Ward of 27 January 1943, AT(E)P(43)5 in FO 371/36533. W3927/G, Foreign Office paper 'Restoration of Allied authority in Allied territory in Europe and the return of the Allied Governments in the United Kingdom to their own countries' by J.G. Ward of 8 March 1943, FO 371/36533.

18 Frank Donnison, *Civil Affairs and Military Government North-West Europe* (London: HMSO, 1961), pp. 19–26; for the American perspective see Harry Coles and Albert Weinberg, United States Army in World War II Special Studies: Civil Affairs: Soldiers become Governors (Washington DC: Office of the Chief of Military History, 1964), p. 654.

19 The account of Allied planning and execution for governing liberated Europe is contained within Donnison, *Civil Affairs and Military Government North-West Europe*; Frank Donnison, *Civil Affairs and Military Government Central Organization and Planning* (London: HMSO, 1966); Coles and Weinberg, *United States Army in World War II Special Studies: Civil Affairs: Soldiers become Governors*.

20 The influence of exile is clear through a review of the 11 original 'Founding Fathers' identified by the European Union, who include two Germans and two Italians. Of the remaining seven from Allied countries, five spent much the war in London: Joseph Bech (exiled Luxembourg Foreign Minister), Jean Monnet (Free French and British official), Johan Beyen (an exiled Dutch finance advisor), Paul Henri-Spaak (exiled Belgian Foreign Minister) and Winston Churchill. European Commission, Directorate-General for Communication, *The Founding Fathers of the EU* (Publications Office, 2013), at: https://data.europa.eu/doi/10.2775/98747 (accessed 30 March 2023).

21 Britain's military relationship with the Belgians and Dutch evolved into the 1948 Brussels Pact, an arrangement initiated by the former exiles who sought the continuance of the wartime alliance. The pact expanded to the Norwegians, French and others the following year as it became the North Atlantic Treaty Organisation (NATO). The British used the allegiance of the Western Europeans to persuade the United States to remain in Europe and join NATO, and Greece would join them in 1952. John Baylis, 'Britain and the Formation of NATO', in Joseph Smith (ed.) *The Origins of NATO* (Exeter: University of Exeter Press, 1990), pp. 8–10.

22 The UN explicitly identifies the Inter-Allied Declaration of 12 June 1941 as being the seminal moment for the creation of the United Nations. 'Milestones: A Selective Chronology', *UN Chronicle* 32, no. 3 (1995): 15.

23 Imperial War Museum Poster, Haar, Zygmunt and Leopold, Polish Public Relations Unit, 1944, Art. IWM PST 3194.

24 George Kacewicz, *Great Britain, the Soviet Union and the Polish Government in Exile (1939–1945)* (Dordrecht: Springer Netherlands, 1979), p. 52.

25 See reference to Anglo-Polish Naval Agreement of 18 November 1939 in TNA, WO 33/2389.

26 TNA, CAB 66/49/30, Organisation of Allied Naval, Army and Air Contingents, 27 April 1944, Appendices I–IV.

27 For example, the Polish Armoured Division sealed the Falaise Pocket in Normandy; the Polish II Corps fought its way up the length of Italy, including the bitter Battle of Monte Cassino; and the Polish Airborne Brigade was decimated in Operation Market Garden.

28 See for example *Hurricane: 303 Squadron/Mission of Honour* (film directed by David Blair, Kaleidoscope Film Distribution, 2018); Lynne Olson and Stanley Cloud, *A Question of Honor: The Kosciuszko Squadron: The Forgotten Heroes of World War II* (New York: Alfred A Knopf Incorporated, 2003).

29 General Wladyslaw Anders attributes this perspective to American General Mark Clark. Wladyslaw Anders, *An Army in Exile: The Story of the Second Polish Corps* (London: Macmillan, 1949), p. 252.

30 Norman Davies, *Rising '44: The Battle for Warsaw* (London: Macmillan, 2018), pp. 507–508.

31 It is perhaps ironic that this catch 22 for the Polish presented itself during the Italian campaign, which was also the historical setting for Joseph Heller's novel of the same name.

32 The Belgians agreed to lend up to three-quarters of their national gold reserves (£60 million (equivalent to £2.4 billion in 2024)) to Britain in March 1941. Herman Van Der Wee and Monique Verbreyt, *A Small Nation in the Turmoil of the Second World War: Money, Finance and Occupation (Belgium, Its Enemies, Its Friends, 1939–1945)* (Leuven: Leuven University Press, 2009), pp. 247–249.

33 General Ismay to Hambro, TNA, HS2/127 Anglo-Norwegian Collaboration Regarding the Military Organisation in Norway, quoted in Chris Mann, *British Policy and Strategy towards Norway, 1941–1945* (New York: Springer, 2012), p. 62.

34 TNA, COS(42) 101 (15 April 1942) Letter and Memorandum by Sikorski in CAB 80/62/3; Hansard, Parliamentary Debates, House of Lords, 22 April 1942, vol. 122, cc688.

35 TNA, JP(42) 465 Memorandum by Joint Planning Staff of 1 May 1942 in CAB 79/20/41.

36 David Stafford, 'The Detonator Concept: British Strategy, SOE and European Resistance after the Fall of France', *Journal of Contemporary History* 10, no. 2 (1975): 208.

37 Davies, *Rising '44*, pp. 417–422.

38 TNA, R7742 Statement by Sir Orme Sargent in FO 371/37198 of 1943, quoted in Richard Clogg, *The Greek Government in Exile, 1941–44* (London: Palgrave Macmillan, 2000), p. 390.

39 Stalin had consented to Britain having '90 per cent' preponderance in Greece, with the Soviets having 10 per cent. This was in exchange for a reversal of these percentages in Romania. Clogg, *The Greek Government in Exile*, p. 397.

40 TNA, FO 371/43747, R 18937 of 25 November 1944. Quoted in Lars Baerentzen, 'British Strategy towards Greece in 1944', in William Deakin, Elisabeth Barker and Jonathan Chadwick (eds), British Political and Military Strategy in Central, Eastern and Southern Europe in 1944 (London: Macmillan Press, 1988), p. 150.

41 Margaret A Kay, 'The Yugoslav Government-in-Exile and the Problems of Restoration', *East European Quarterly* 25, no. 1 (1991): 16.

42 TNA, N1307/87/30 Letters Sargent to Eden, and response, 8–9 April 1941, FO 371/29421.

43 A view espoused by Stanley Baldwin on 30 July 1934 in response to the increased threat from the air: 'When you think of the defence of England you no longer think of the chalk cliffs of Dover; you think of the Rhine. That is where our frontier lies.' Baldwin was then Lord President of the Privy Council and soon to become the British Prime Minister. Hansard, Parliamentary Debates, House of Commons, 30 July 1934, vol. 292, cc2340.

44 Winston Churchill, 'The Few', Hansard, Parliamentary Debates, House of Commons, 20 August 1940, vol. 364, cc1168.

45 TNA, Telegram Churchill to Roosevelt, PREM 3/45/3.

46 This success was only temporary, as the communist takeover of 1948 would oust President Beneš and cement Soviet dominance of Czechoslovakia.

47 TNA, W3927/G, Foreign Office paper 'Restoration of Allied authority in Allied territory in Europe and the return of the Allied Governments in the United Kingdom to their own countries' by J.G. Ward of 8 March 1943, FO 371/36533.

48 Coles and Weinberg, *United States Army in World War II Special Studies: Civil Affairs: Soldiers become Governors*, p. 677.

49 TNA, W3927/G, Foreign Office paper 'Restoration of Allied authority in Allied territory in Europe and the return of the Allied Governments in the United Kingdom to their own countries' by J.G. Ward of 8 March 1943, FO 371/36533.

50 TNA, Letter Churchill to Prime Minister Pierlot of 21 February 1941, PREM 3/69A, 69; TNA, Churchill Minute 639/4 of 27 May 1944, 58, PREM3/69A.

51 TNA, Memorandum of Churchill–Pierlot meeting record of 1 June 1944, 37–38, PREM 3/69A.

52 Mann, *British Policy and Strategy towards Norway*, pp. 170–174.

53 Churchill's account of the April 1944 mutinies is found at Churchill, *The Second World War: Volume 5*, pp. 470–488.

54 Quote from a Foreign Office official in 1940. Philip Bell, *A Certain Eventuality: Britain and the Fall of France* (Farnborough: Saxon House, 1974), p. 94.

55 See for example the Giraud episode in Peter Mangold, *Britain and the Defeated French: From Occupation to Liberation, 1940–1944* (London: I.B. Tauris, 2012), pp. 179–207.

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Optimising the Cavalry for Littoral Manoeuvre

Mark Sargent

Introduction

At the start of World War II, the Australian Army formed divisional cavalry regiments to support the 6th, 7th and 9th divisions. Equipped with a diverse array of vehicles, these regiments successfully supported their parent divisions during operations against the Axis in the Middle East in 1940–1942. Following the recall of the Australian divisions to fight against Japan, it was determined that the divisional cavalry regiments were unsuited to the style of fighting required in the Pacific islands. As a result, they were reformed as cavalry commando regiments optimised for asymmetrical operations. These regiments successfully supported the conduct of littoral manoeuvre throughout the archipelago in Australia's primary area of military interest until the end of the war.

As Mark Twain is reported to have said, 'history doesn't repeat itself, but it often rhymes'.[1] Today, the Australian Army's cavalry finds itself in a similar position to that of 80 years ago. Following many years of successful service in the Middle East, the cavalry must now optimise for the next fight in the Pacific. The Defence Strategic Review 2023 (DSR) directs the Australian Defence Force (ADF) to evolve into an integrated force[2] able to manoeuvre in all domains to achieve the aims of national defence. To give effect to this strategy, the DSR tasks the Australian Army to transform and optimise

for littoral manoeuvre operations by sea, land and air from Australia.[3] The National Defence Strategy 2024 (NDS) expands on this priority by directing the Army to 'optimise... for littoral manoeuvre and control of strategic land positions'.[4] This capability is intended to enable the integrated force to achieve an asymmetrical advantage in support of the nation's strategy of denial. The timeframe for this transformation is aggressive, with the enhanced force-in-being to be achieved by the end of 2025.

The aim of this article is to outline how the Australian Army's cavalry can modernise and optimise to achieve an asymmetrical advantage in support of a national strategy of denial enabled by a focus on littoral manoeuvre.[5] The article will first describe the challenges for the cavalry due to the evolving operational context. It will then outline an optimised cavalry contribution to littoral manoeuvre. It will conclude by suggesting solutions and investment priorities to optimise the cavalry for the challenges of the future.

Current Cavalry Contribution

To establish a baseline for how the cavalry can optimise to support the integrated force in littoral manoeuvre, it is useful to describe the current cavalry contribution to the combined arms team. The purpose of the combined arms team is to defeat the adversary. As part of the combined arms team, however, the cavalry rarely defeats the adversary directly. Instead, it typically enables something else (usually described as the supported force or main body) to defeat the adversary. The majority of the cavalry's actions have the purpose of enabling the supported commander to achieve their mission.[6]

The cavalry does this by exploiting asymmetry to gain a relative advantage for the supported commander. Specifically, it fights for information about the adversary's strengths and weaknesses, and where and when they will present. This allows the supported commander to apply their own strengths against adversary weaknesses, while avoiding adversary strengths. This is the heart of manoeuvre warfare. In parallel, the cavalry denies the adversary information about the supported force, degrades its cohesion, and pre-empts the employment of its critical capabilities. The adversary is thereby compelled to react to the cavalry's actions rather than executing its own course of action, often expending its strength at the wrong place and time. These actions act as a force multiplier, and allow a supported force that is smaller and weaker than the adversary to achieve victory.

To achieve these effects, the cavalry conducts reconnaissance and security tasks. Reconnaissance tasks have a primarily offensive focus_to identify battlefield opportunities and enable the supported commander to exploit these opportunities. This is known as 'reconnaissance pull'. Security tasks have a primarily protective focus—preventing the adversary from achieving surprise or from applying its strengths against the supported force. The cavalry employs both offensive and defensive techniques while conducting reconnaissance and security tasks. In particular, it employs the techniques of raid and reconnaissance in force to reduce the cohesion of the adversary and to pre-empt the employment of its critical capabilities. The cavalry is also a primary capability available to the supported commander to achieve deception, with the cavalry able to conceal or simulate the main effort in support of the deception objective.

Currently, the majority of the full-time cavalry is equipped with the Australian Light Armoured Vehicle (ASLAV). This proven vehicle is in the process of being replaced by the Boxer Cavalry Reconnaissance Vehicle (Boxer CRV).[7] This is an exceptionally capable vehicle; however, it is much larger and heavier than the ASLAV. Following the DSR, the full-time cavalry capability is being concentrated in the 2nd Cavalry Regiment and the 2nd/14th Light Horse Regiment.[8] Cavalry troops will re-adopt a six-vehicle structure, providing greater capability and endurance at lower levels of command.

What Has Changed?

The DSR tasks the Army to optimise for littoral manoeuvre. However, as the only arm of government able to conduct sustained close combat, the Army is also expected to continue to provide 'close combat capabilities … able to meet the most demanding land challenges in our region'.[9] In effect, the Army must be able to fight as part of a coalition, as well as to lead regional operations, including stability operations. The cavalry, therefore, must remain capable of the full suite of cavalry tasks in support of land manoeuvre, in addition to developing new capabilities and competency in littoral manoeuvre.

While there is continuity in the Army's taskings, the new operational context of littoral manoeuvre introduces new challenges, particularly for the cavalry. These can be summarised as follows:

The nature of the supported force. The foremost difference is that the nature of the supported force has evolved. The supported force is no longer likely to be a concentrated brigade or division seeking decision in close combat. Instead, it is more likely to be a dispersed force package operating to secure strategic land positions in Australia's primary area of military interest.[10] This force package is likely to include long-range strike and ground-based air and missile defence capabilities, able to project combat power into the air and maritime domains to achieve sea and air denial. This change reflects a doctrinal shift away from the traditional paradigm of 'fire to manoeuvre' to one of 'manoeuvre to fire'.[11] Since the cavalry's purpose is to enable the supported commander to achieve their mission, it is this change that most affects the nature of the cavalry contribution.

The littoral battlespace. The next (obvious) difference is the challenge posed by the battlespace itself. Australia's primary area of military interest is archipelagic in character, which is a confluence of the sea, land and air domains. Littoral operations require a force with cross-domain mobility.[12] The challenge for the cavalry is to optimise for manoeuvre in a littoral battlespace. This includes the ability to deploy by air and sea, manoeuvre across and between landmasses, manoeuvre using rivers, manoeuvre in complex physical terrain (such as jungles and cities), and manoeuvre in areas with poor infrastructure (such as ports, roads and bridges).

Distributed operations. A strategy of denial envisages multiple tailored force packages independently deploying over long ranges and operating in a dispersed way over large distances.[13] The cavalry, therefore, must be able to support multiple small elements operating independently, but to a common purpose, over large distances in an archipelagic environment. In this context, the challenge for the cavalry is to manoeuvre, sense and strike on both land and sea at longer ranges than has previously been required.

Cross-domain effects. Littoral manoeuvre requires land domain forces to project combat power into other domains, particularly the air and maritime domains.[14] This is necessary to achieve an asymmetric advantage and support the strategy of denial. The challenge for the cavalry is to be able to be able to achieve the combat functions of 'know, shield, shape and strike' in more than just the land domain.

Compression of operational and tactical levels of war. In the land domain, there has traditionally been a linear relationship between the level of command and the relative battlefield effects. For example, divisions and below have tactical effects, while corps-level formations and up have operational effects. In littoral manoeuvre, this distinction is generally compressed due to the non-linear and multi-domain nature of the operational environment. In this environment, lower echelons, such as combat teams and battlegroups, will frequently give effect to operational-level objectives. The challenge for the cavalry is to enable the achievement of these operational effects by lower tactical echelons.

The Cavalry Contribution to Littoral Manoeuvre

The core purpose of the cavalry is still relevant, and indeed necessary, in the context of littoral manoeuvre operations. However, the role of the cavalry needs to evolve. To borrow a phrase from Clausewitz, the nature of the cavalry is enduring, but its character is changing.[15] The need to change stems from Australia's evolving national strategy, outlined above, which necessarily modifies how the cavalry achieves its purpose. Specifically, the unification of the five domains of maritime, land, air, space and cyber, which is a characteristic of the integrated force, requires the Army to project combat power beyond the land domain in ways it has not previously had to achieve. To better understand how the cavalry needs to respond to this new operational context, it is first necessary to define the scope of the cavalry contribution to the other domains. In this regard, defining the scope of the cavalry's area of operations is a useful starting point.

Australian doctrine outlines the use of a deep, close and rear operational framework to enable coordination between levels of command and between force elements.[16] In an article published in the US Armor

magazine, Major Amos C Fox proposed an evolved operational framework to describe the cavalry contribution to modern multi-domain operations.[17] This framework includes an additional 'security zone'—between the deep and the close areas. This zone exists in four dimensions (including time) and across the physical domains (land, maritime and air). In addition, this zone is conceptualised as forming a physical transition point between the tactical fight and the operational fight. In this framework, the security zone is the cavalry's area of operations. For the purposes of this article, this zone is described as the 'disruption zone' to better express its purpose and to avoid confusion with security operations.

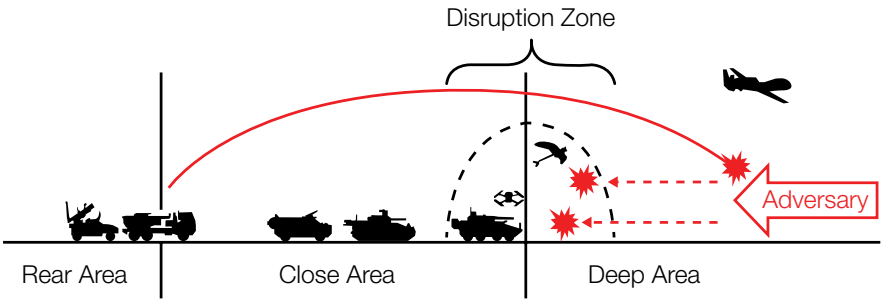

Figure 1. Evolved operational framework

This framework provides a doctrinal basis for defining the cavalry's contribution to the integrated force and, in particular, to littoral manoeuvre. The cavalry manages the transition between the close area and the deep area, as well as the transition between the operational-level and the tactical-level fights. It establishes a disruption zone to enable friendly critical capabilities that can influence the adversary in the deep area. At the same time, the cavalry disrupts the adversary's forces as they transition into the disruption zone in an effort to defeat friendly critical capabilities. The dispersed and non-linear nature of littoral operations increases the scale and number of these transitions. The disruption zone, and therefore the cavalry contribution, is thus more important in littoral operations than in continental operations.

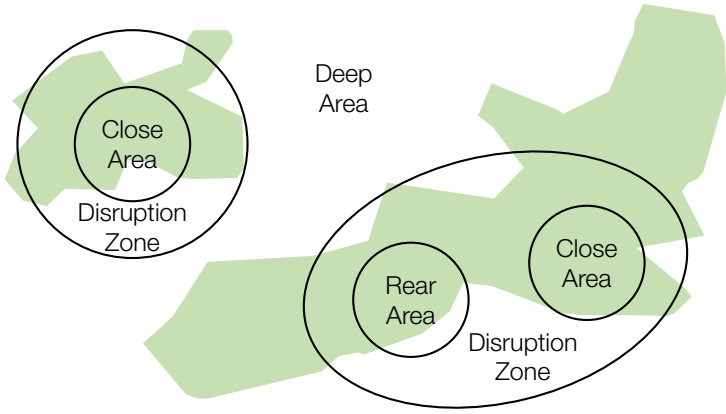

Figure 2. Non-linear nature of littoral operations

Importantly, this disruption zone is not only protective in nature, within which the cavalry conducts screen or guard tasks. Rather, the cavalry conducts both reconnaissance and security operations in the disruption zone, in support of both offensive and defensive actions by the supported force. For example, the cavalry might first conduct reconnaissance to set conditions for the arrival of the main body, followed by a raid to neutralise adversary critical capabilities, before establishing a guard to protect friendly critical capabilities—all within the disruption zone.

The size of the disruption zone limits the scope of operations for the cavalry in the different domains. Affecting both land and maritime domains, the depth of the disruption zone is likely to be in the order of tens of kilometres. To achieve its purpose, the cavalry must be able to sense and strike surface targets (on land and sea) out to this range. In the air domain, the altitude of the disruption zone is likely to be in the order of hundreds of metres. While the cavalry must be able to sense and shield from low-flying aircraft such as helicopters, small uncrewed aerial systems (sUAS) and loitering munitions, it does not need to provide protection against higher-flying aircraft or missiles. The 'time' dimension is likely to be in the order of 24–72 hours. This means the cavalry must be able to support the operations of the supported force up to three days ahead of time, as well as being able to gain information on the adversary up to three days before it can influence the supported force. In effect, the cavalry operates one operational phase ahead of the main body. The cavalry contribution to the cyber and space domains is limited to self-protection and deception; the adversary does not manoeuvre through the disruption zone in these domains.

Historical Example

The Battle of Milne Bay provides an historical example of the value of a disruption zone in littoral operations. In 1942 Australian forces, supported by the US Army, constructed an airstrip at Milne Bay in Papua New Guinea to operate fighter and attack aircraft. The purpose of the airstrip was to enable the projection of combat power in the maritime and air domains, to achieve local air and sea control. This level of control would protect Port Moresby from Japanese air and naval forces, protect the sea lines of communication to Australia, and threaten the Japanese forward support base at Rabaul. The airstrip at Milne Bay was protected by a security force consisting of the 7th and 18th Brigades, eventually under the command of Major General Cyril Clowes.

The presence of the Allied airstrip was an unacceptable threat to the Japanese military's campaign plan in the South-West Pacific. The Japanese military was unable to defeat the Allied force at Milne Bay with air or naval forces alone and was instead forced to commit land forces. Japanese troops conducted an unopposed landing with a brigade-sized force under cover of darkness 15 kilometres from the airstrip. This force then conducted an overland march with the intent of defeating the Australian security force and capturing the airfield for its own use.

General Clowes's 'Milne Force' significantly outnumbered the Japanese contingent. However, Milne Force lacked the capabilities necessary to establish an effective disruption zone and was unable to learn the strength and location of the advancing main body. As a result, the general was unable to mass his strength against the smaller Japanese force, and instead spread his forces wide to avoid envelopment and surprise. Japanese troops were thus able to approach to within a couple of kilometres of the airstrip, close enough that the P-40 Kittyhawks of 75 and 76 Squadron Royal Australian Air Force were forced to withdraw to Port Moresby.[18] It was only through the courage and skill of the 7th and 18th Brigades in a desperate night fight that the Japanese attack was eventually defeated.[19]

To gauge the potential utility of the disruption zone concept, it is instructive to consider a repeat of the Battle of Milne Bay, but this time with Milne Force effectively supported by a cavalry force operating within the zone. To begin, the mere presence of this disruption zone would influence the adversary's decision-making. Specifically, the adversary would be forced to allocate

more resources to the attack to have an acceptable chance of success. The prospect of having to commit additional combat power may deter the adversary from attacking at all, or at least prevent it from redirecting critical capabilities elsewhere to a battle more threatening to Australia's national interests. In the event that the adversary elected to attack, it would be forced to commit to a more cautious landing outside the disruption zone, with a slower approach that would allow more time for counter-offensive measures by the defenders. Further, the adversary would be compelled to commit its critical capabilities in the disruption zone, rather than preserve them for use in the close or rear areas. Importantly, the adversary would not be able to gain sufficient information on the defenders to cue long-range fires of its own. Instead, the cavalry would learn the adversary's strengths and weakness and thereby enable the supported commander to mass the close-combat forces against the adversary at the time and place of maximum relative advantage. Indeed, the commander would need fewer close-combat forces to defend the airfield in the first place. The forces not needed could be apportioned elsewhere, which would raise further operational dilemmas for the adversary.

Here we see the enduring role of the cavalry. It exploits asymmetry to gain a relative advantage for the supported commander. It manages the transition between the close area and the deep area, and between the operational fight and the tactical fight. It gains information on the adversary to prevent surprise, gain time for effective decision-making and enable the supported commander to mass their strengths against the adversary's weaknesses. It influences adversary decision-making and pre-empts the employment of the adversary's critical capabilities. It compels the adversary to expend strength at the wrong place and time. In short, it enables the supported force, and by extension the nation, to achieve victory at lowest cost and least risk.

This example illustrates the value proposition of the cavalry in support of littoral manoeuvre. Without an effective cavalry force able to establish a robust disruption zone, littoral manoeuvre force packages of the future may find themselves in the position of General Clowes's Milne Force—that is, unaware of adversary strengths and locations, and unable to influence the fight beyond the range of direct-fire weapons in the close area. This may result in the situation experienced by Milne Force on the night of 28 August 1942—unable to protect long-range strike and air and missile defence capabilities, risking the success of Australia's operational plans.

Optimisation for Littoral Manoeuvre

Before discussing how the cavalry can be optimised for littoral manoeuvre, there is value in discussing relevant constraints. The DSR makes clear that the aim of capability acquisition is achieving a 'minimum viable capability in the shortest possible time'.[20] The NDS adds that minimum viable capability is underpinned by minimum viable product, which 'achieves or enables the lowest acceptable mission performance in the required time'.[21] Importantly, the NDS and accompanying Integrated Investment Plan specify resourcing constraints and affirm that available resources are to be allocated to the highest priorities. Put bluntly, the cavalry can expect no additional resources.

This significantly constrains capability options. For example, obtaining a new cavalry platform, or even making significant changes to the current or planned platforms, is not viable. Instead, capabilities with a high technological readiness level (preferably capabilities already in service or about to enter service) must be favoured over developmental solutions. Further, any new capabilities acquired by the ADF must work alongside and enable the cavalry platforms, but not be integrated into them.

While the resourcing constraints are significant, they do not preclude the cavalry adapting to the changing strategic circumstances. The divisional cavalry regiments in World War II provide an example of the sort of pragmatic approach to capability development that is required. During their campaigning in the Middle East, these regiments were equipped with whatever vehicles were available.[22] This included British light and cruiser tanks, British carriers and trucks, captured Italian tanks and captured French tanks. Despite their obvious limitations, these vehicles represented a minimum viable product, underpinning the minimum viable capability of the cavalry regiments to successfully support the operations of their parent divisions. Today's cavalry must emulate this pragmatic approach to capability.

Distributed operations. Littoral operations will be conducted over large distances within an archipelago. In this operational environment, the challenge for the cavalry is to establish the large disruption zone required by littoral operations, without creating gaps that an adversary can exploit. Given the resource limitations on new major systems and workforce, and the associated constraints on deploying and sustaining them, it is simply

not possible to deploy *more* cavalry to achieve a dense disruption zone. The only viable answer is to have the small number of existing cavalry force elements dispersed throughout the disruption zone and to exploit technology to cover the gaps. This approach requires the cavalry to be enabled with capabilities to sense and strike targets at longer ranges. The ability to sense at long ranges enables warning of adversary threats early enough to allow the main force to react and to provide targeting data for organic strike capabilities. By conducting limited strike at long range, the cavalry can neutralise the adversary's critical capabilities as they transition the disruption zone and before they can threaten the supported force. Such actions raise the cost of aggression, thus influencing the adversary's decision-making.[23]

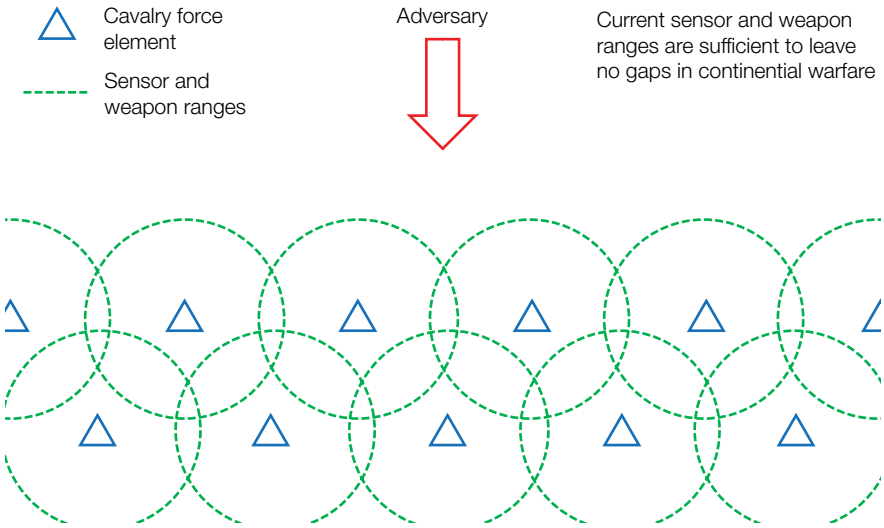

Figure 3. Current sensor and weapon ranges in continental disruption zone

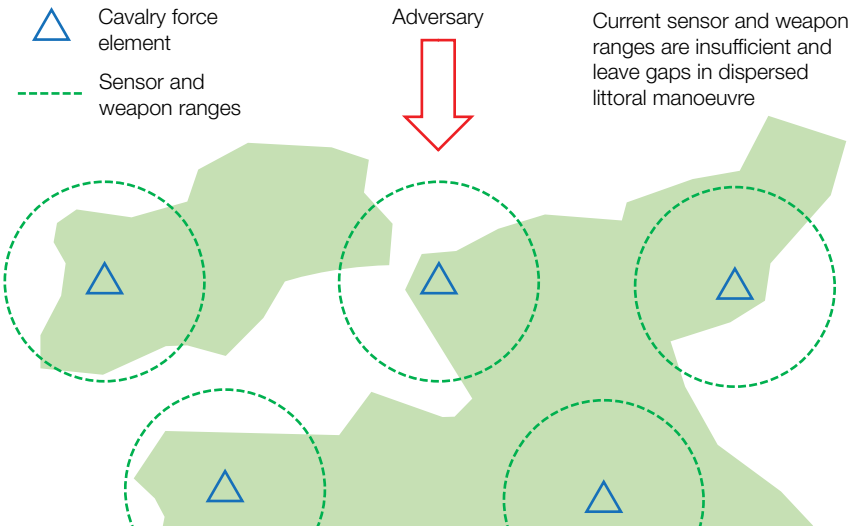

Figure 4. Current sensor and weapon ranges in littoral manoeuvre disruption zone

Sense. A mixture of reconnaissance and surveillance capabilities is required to sense targets out to the full depth of the disruption zone. Surveillance capabilities allow observation of large areas for extended periods. Reconnaissance capabilities allow investigation of any detections and for contact to be maintained as adversaries transit through the disruption zone. The Boxer CRV is introducing a potent surveillance capability in the form of the VINGTAQS 2.[24] This mast-mounted multi-sensor system includes a ground surveillance radar, thermal imager and laser target designator, with a large detection range. This system is particularly effective at surveillance over the sea; however, it is less effective on land, due to the shadowing effects of terrain and vegetation. To prevent gaps in surveillance on land, long-endurance autonomous ground sensors can be employed.[25] A minimum viable capability would require enough systems for each troop to have a remote surveillance capability.

The requirement to conduct reconnaissance at long range, on both land and sea, can only be met by greater proliferation of sUAS. This is particularly the case when conducting reconnaissance over water or from one island to another, where cavalry platforms cannot go. Each level of command should have its own sUAS, enabling a layered reconnaissance network through the depth of the disruption zone. The longest-range

systems, held at higher levels of command, can conduct reconnaissance of any detections at the forward edge of the disruption zone. As they transit through the disruption zone, these contacts can then be handed off to shorter-range systems. Given the greater dispersion of cavalry force elements in littoral operations, these capabilities must be held at lower levels of command than has previously been the case. For example, troops will require capabilities that were formerly held at squadron level, and squadrons will require capabilities that were previously held at regimental level. In practice, this change would see Army's sUAS issued one level of command lower for the cavalry than for the close-combat force—that is, the longer-range RQ-20 Puma at squadron level; [26] the shorter-range Vector at troop level;[27] and small, cheap, and expendable sUAS at the lowest level.

To account for the high level of attrition expected in modern operations, tactically deployed low-level systems must be cheap and as numerous as possible. Experience from Ukraine has shown that the average lifespan of a typical 'quad-copter' sUAS is only three flights.[28] Therefore sUAS should be regarded not as weapon systems in themselves but as rounds of ammunition to be expended.[29] In this regard, sUAS can be manufactured for less than the cost of the advanced 30 mm ammunition being procured for the Boxer CRV, and should be issued and expended at the same scale.

Strike. The Boxer CRV will introduce the potent Spike LR2 Anti-Tank Guided Missile into the Australian Army inventory. This direct-fire weapon can engage a variety of targets at a range of more than 5 kilometres.[30] However, even this long-range direct-fire weapon does not enable Army to conduct limited strike through the depth of the disruption zone on both land and sea. This effect can only be achieved by an indirect-fire weapon system. As the cavalry will usually be operating outside the range of tube artillery, and with rocket artillery unlikely to be committed in support of the disruption zone, the cavalry must have its own indirect-fire weapon system to meet this requirement.

The cavalry must be able to provide targeting data for its own fires capability. This is because the other targeting capabilities within the integrated force will inevitably be employed in the deep area and not the disruption zone. The cavalry's organic sUAS, cued by surveillance systems, is the best solution to provide the necessary targeting data. To form a cohesive targeting system, the range of the fires system should match the

range of the sUAS available to the cavalry. Such a targeting system would enable the cavalry to independently detect, discriminate and neutralise adversary critical capabilities without committing soldiers to close combat. Delivering such a system would support the Chief of Army's direction to avoid 'trading blood on first contact'.[31]

The most suitable indirect fires system for the cavalry is likely to be a loitering munition. Loitering munitions have particular utility as they are generally cheap, precise, highly mobile, and able to effectively engage a wide variety of targets on land and sea; do not require integration into vehicles; can quickly be upgraded by replacement as technology progresses; and are soon to enter service with other elements of the integrated force.[32] The Switchblade series of loitering munitions, with a range in the tens of kilometres and an endurance in the tens of minutes, is an exemplar of the type of system required.[33] A minimum viable capability would likely be one mission system, including multiple munitions and a fire control station for each troop, per squadron. This would enable loitering munitions to be launched from depth, with control handed off to a forward troop, which would then control the terminal engagement. The additional systems built into the joint fires and surveillance variant of the Boxer would facilitate the integration of this capability.

Cross-domain. Littoral operations require land domain forces to project combat power into the other domains. The cavalry, therefore, must be able to sense, shield, shape and strike in more than just the land domain. While at face value this is a very demanding requirement, the operational framework of the disruption zone bounds the problem and provides guidance as to the capabilities required. The previous section outlined the cavalry's contribution to the maritime domain. In the air domain, the cavalry must be able to sense and shield from sUAS and loitering munitions transiting through the disruption zone. In this regard, the Boxer CRV is introducing some incidental counter-sUAS (C-sUAS) capabilities. Specifically, the Boxer CRV's sensor suite, active protection systems, and force protection electronic countermeasures may all have some ability to detect sUAS. The Boxer CRV's main gun, firing kinetic energy timed fuse rounds, has the proven ability to destroy sUAS.[34] However, this incidental capability will not meet the threshold of a minimum viable capability for C-sUAS.

The Army has a project to procure a C-sUAS capability. The cavalry should be enabled by the systems procured by this project. In line with the framework of minimum viable capability, integration of standalone C-sUAS systems into the Boxer CRV (or any other platform) should be avoided due to the cost, schedule and technical risk. It would, however, be feasible to upgrade existing sub-systems such as the remote weapon station, active protection system or force protection electronic countermeasures system. Dismounted sensors and effectors, common to the rest of the close-combat force, are preferred. A minimum viable capability would require enough systems for each troop to have an active C-sUAS capability.

The cavalry's contribution in the cyber and space domains is limited—noting that the adversary does not manoeuvre through the disruption zone in these domains. However, the cavalry must have the ability to conduct reconnaissance and surveillance in the electromagnetic spectrum. Historically, this has been conducted by specialist light electronic warfare teams. However, there is unlikely to be enough of this scarce asset to distribute through the disruption zone with cavalry force elements. A minimum viable capability, however, does not require all the capabilities that a light electronic warfare team provides. Arguably, the only essential capability is direction finding—that is, surveillance of the electromagnetic spectrum with the ability to detect threat emissions and cue a reconnaissance asset (likely sUAS) to investigate. It would be feasible to include such a capability within cavalry units without the need for scarce specialist enablers.[35] A minimum viable capability would require enough systems for each troop to have its own direction-finding capability.

Workforce. This article advocates for additional systems such as sUAS, loitering munitions, autonomous sensors, C-sUAS and direction finding. Clearly, these systems require soldiers to operate them, in addition to the crews of the mobility assets on which the systems are mounted. With the cavalry being a low priority within the Army for the provision of additional workforce, there will be inevitable tensions between the need to maximise the number of vehicles that can be crewed and appropriately manning their enabling systems. To optimise the cavalry for littoral manoeuvre, it is likely that some cavalry soldiers currently allocated to crew vehicles will have to be reallocated to become systems operators.

This will likely require amendments to the cavalry trade structure. This could include the creation of additional category skills for armoured cavalry specialists supported by professional training in relevant enabling systems. For example, soldiers would gain the qualification of ECN 060-2X Armoured Cavalry Specialist—Aerial Systems Operator, making them able to employ and manage all sUAS and loitering munitions. It may also be possible to create an additional technical specialisation for non-commissioned officers. For example, corporals would be trained as instructors in enabling systems during the Subject 2 Sergeant course. This development would complement the existing instructional courses in gunnery, communications, driving and servicing.[36]

Operational mobility. To achieve its purpose, the cavalry must have greater operational mobility than the force it supports. This, for example, is why current cavalry vehicles are wheeled while the main body is tracked. Everything else being equal, wheeled vehicles provide better operational mobility than tracked vehicles—on land.[37] However, the DSR changes this dynamic by directing that Army is to be 'transformed and optimised for littoral manoeuvre operations by *sea, land and air* from Australia'. The reality is that cavalry platforms cannot manoeuvre on the sea or in the air. This limitation gives rise to the greatest challenge facing the cavalry in efforts to support the integrated force in an archipelagic environment: it must be able to manoeuvre separately from the main body even if it is operating outside the land domain.

ADF operational plans foresee the need for rapid deployment of ADF assets into the littoral environment to deny key terrain and to pre-empt an adversary. To achieve this, it is most likely that ADF force packages would be deployed (and redeployed) by maritime littoral manoeuvre vessels (LMVs). To this end, two types of the vessels are being procured, the medium (LMV-M) and the heavy (LMV-H).[38] The main body (including long-range strike and ground-based air and missile defence capabilities) would almost certainly be deployed on the LMV-H, with its larger capacity. Therefore, in order to manoeuvre separately from the main body, the cavalry needs to be optimised to travel by LMV-M. This is a significant challenge, as the LMV-M is likely to be able to carry only a single Boxer CRV.[39] Considering proposed LMV-M numbers and availability, it is unlikely that even a troop of Boxer CRVs could be manoeuvred separately from the

main body in this way. Equally, while the Boxer CRV could be deployed by air assets such as the C-17A Globemaster,[40] it is unlikely that enough aircraft would be available for this to be a feasible option.

The difficulty in deploying the Boxer CRV quickly into the littoral environment is a significant issue. One solution would be to ensure that the cavalry capability is not tied *only* to the Boxer CRV platform. Instead, the cavalry should develop alternative mobility options optimised for rapid deployment and littoral mobility. This alternative mobility platform may be a protected platform like the Hawkei, or an unprotected platform like the Mercedes G-Wagon or surveillance reconnaissance vehicle. These platforms are already in service in a 'light cavalry' role with the 2nd Australian Division. Another cheap and available option is an all-terrain vehicle similar to the ultra-light tactical vehicle being introduced by the United States Marine Corps.[41] A troop of these mobility platforms could be deployed by a single LMV-M or C-17. In extremis, commercial four-wheel drive vehicles could be bought, leased or seized in location on arrival in an area of operations. This would provide the supported commander with an agile cavalry force element able to pre-empt an adversary by quickly seizing key terrain and establishing a disruption zone, to set conditions for the arrival of conventionally mounted forces.

By optimising its mobile platforms—for combat weight at one end of the spectrum and rapid deployment at the other—the cavalry would mirror and complement the capabilities already used by the close-combat force (infantry and tanks).[42] Indeed, the cavalry would be positioned to match or even exceed the operational mobility of any force it may be tasked to support. Due to the common platforms, this approach would also provide synergy between the cavalry units of the 1st and 2nd Australian Divisions, enabling mutual support and reinforcement. The cavalry's need to utilise a range of mobile platforms reinforces the importance of not integrating the enabling capabilities directly into the Boxer CRV (or any other platform).

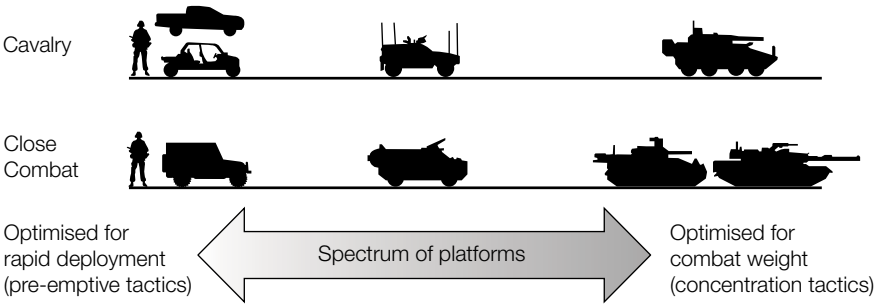

Figure 5. Spectrum of platform capabilities

Adapting the cavalry to utilise a range of mobile platforms has its challenges. However, there are examples in which it has been successfully achieved. For example, cavalry soldiers of 2nd/14th Light Horse Regiment successfully crewed up-armoured four-wheel drive vehicles while operating in Baghdad in 2010. Similarly, the 1st Armoured Regiment successfully experimented with Hawkei in a cavalry role in 2021. While demonstrating the level of flexibility inherent in the cavalry, these examples were based on unusual circumstances and had the benefit of extended warning times. The same approach will not enable the reduced readiness required for a force tasked to pre-empt an adversary's actions through rapid deployment. What is required instead is a full-time cavalry force permanently mounted in smaller mobile platforms, able to deploy or redeploy at the short warning times demanded of the ADF's emerging operational plans.

Not all cavalry formations need to be trained to operate across a spectrum of mobile platforms. The career model employed when B Squadron 3rd/4th Cavalry Regiment was equipped with the Bushmaster Protected Mobility Vehicle remains suitable for this force. For that period, the training and career progression of cavalry soldiers was based on the primary cavalry platform (then the ASLAV). These soldiers then trained on the (much less complex) Bushmaster to enable them to serve temporarily with B Squadron 3rd/4th Cavalry Regiment, before returning to an ASLAV mounted unit for career progression. As with ASLAV in the past, the careers of future cavalry soldiers will be based on the Boxer CRV. However, they will be able to serve for periods on alternative mobility platforms without change to the full-time cavalry career model.

Further optimisation for littoral manoeuvre would see watercraft incorporated into cavalry force elements. These watercraft would move dismounted and autonomous force elements (with enabling systems like sUAS and loitering munitions) between land masses, as well as patrolling waterways in the disruption zone. This would not fill the role of or compete with the joint pre-landing force.[43] Rather, it would ensure the cavalry could establish a robust disruption zone in the littoral without tasking other elements of the integrated force. The integration of watercraft, however, likely exceeds the threshold of a minimum viable capability for littoral manoeuvre. It would require the procurement of new major systems, and significant change to unit structures and career models. Experimentation regarding the integration of watercraft should occur, for consideration after a baseline competency in littoral manoeuvre has been achieved.

Priorities

To optimise the cavalry for littoral manoeuvre, the Army should prioritise acquisition of 'offensive' systems able to sense and strike at longer ranges on both land and sea. It is these capabilities that will most raise the costs of aggression for the adversary, influence the adversary's decision-making, and support the ends of deterrence and national defence. Capabilities that have the highest technological readiness level and are able to be introduced quickly should also be prioritised. Based on the considerations outlined in this article, it is proposed that the cavalry must be able to deliver the following effects if it is to achieve a minimum viable capability for littoral manoeuvre:

1. A layered sUAS network, with each level of command enabled with sUAS, able to detect an adversary at the forward edge of the disruption zone and maintain contact through its depth, on both land and sea.
2. A loitering munition system able to conduct limited strike on land and sea through the full depth of the disruption zone.
3. Additional mobility options to enable pre-emptive tactics, with a more agile force element able to set conditions for the arrival of the cavalry main body in Boxer CRVs.
4. A C-sUAS capability able to sense and shield from adversary sUAS and loitering munitions, with both soft and hard kill options.

5. A system able to conduct surveillance in the electromagnetic spectrum, particularly a direction-finding capability to cue a reconnaissance asset to the location of any threat emissions.
6. Autonomous sensors able to cover gaps in surveillance in complex terrain on land.

Conclusion

The enduring purpose of the cavalry is to enable the supported commander to achieve their mission. This article has argued that in littoral operations, this mission is most effectively achieved through the establishment of a disruption zone to manage the transition between the close area and the deep area, and the operational fight and the tactical fight. The cavalry sets conditions for friendly forces in the close area to influence the adversary in the deep, as well as disrupting adversary forces crossing from the deep into the close to influence the supported force. Given the dispersed nature of littoral operations, the cavalry requires an organic ability to sense and strike at longer ranges on both land and sea. It needs the ability to sense and shield from an adversary's sUAS and loitering munitions, and the ability to conduct surveillance in the electromagnetic spectrum. To set conditions for the arrival of the main body, the cavalry needs alternative mobility options optimised for rapid deployment. It also needs a force structure optimised for littoral manoeuvre and capabilities necessary for Army to achieve an asymmetrical advantage, and enable the integrated force to execute a strategy of denial.

About the Author

Major Mark Sargent is currently the Staff Officer Grade 2—Cavalry at Army Headquarters. He is a cavalry officer, with regimental service in the 2nd Cavalry Regiment and B Squadron 3rd/4th Cavalry Regiment, in addition to numerous training and staff appointments in Australia and the United States. He has operational experience in Iraq and Afghanistan.

Endnotes

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3 Ibid., p. 58.

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41 Johannes Schmidt, 'Marine Corps Systems Command Begins Fielding Cutting-Edge Ultra-Light Tactical Vehicle', *Marine Corps Systems Command* (website), 7 June 2023, at: https://www.marcorsyscom.marines.mil/News/News-Article-Display/Article/3419880/marine-corps-systems-command-begins-fielding-cutting-edge-ultra-light-tactical/.

42 This spectrum of platforms facilitates both pre-emptive and concentration tactics, as outlined by Robert Leonhard. Robert R Leonhard, *Fighting by Minutes: Time and the Art of War* (independently published, 2017), p. 197.

43 While not advocated here, a possible course of action is the merging of a cavalry unit with the joint pre-landing force (currently the 2nd Battalion, Royal Australian Regiment). Such a unit would be optimised for the full suite of reconnaissance and security tasks in support of littoral manoeuvre.

Follow the Robot: Finding Gaps through Littoral Obstacles

Matthew Scott

Following the Second Marine Division's seizure of Tarawa in 1943, Colonel Merritt Edson (the divisional chief of staff) wrote that 'some solution has got to be found to eliminate underwater mines, which I think is the most dangerous thing we have to combat at the moment'.[1] Eighty years later, it remains equally (if not more) difficult to mitigate littoral obstacles.[2] This presents a significant challenge for the Australian Defence Force as it seeks to prepare forces capable of operating in areas defined by the intersection of land and sea. As obstacle technologies become progressively more networked and autonomous, existing obstacle breaching technologies are at risk of becoming at best inefficient and at worst ineffective. Emerging obstacle systems are employing complex sensors and the ability to engage targets at range from offset positions, making breaching a sufficiently wide safe lane ever more difficult. Advances in networked communications, power storage and artificial intelligence (AI) are making the materialisation of self-healing obstacles increasingly likely, further complicating obstacle breaching. To counter these developments, the employment of effective obstacle reconnaissance to find and exploit gaps is becoming ever more important.

While the US's strategic reconnaissance capabilities were able to find gaps through Japanese obstacles weeks prior to its attack on Tarawa atoll in 1943, emerging obstacle technologies are now decreasing the time available between obstacle reconnaissance and subsequent manoeuvre.[3]

Emerging obstacle technologies are increasing the speed, ease, range and accuracy of obstacle emplacement. As a result, although strategic intelligence, surveillance and reconnaissance systems (ISR) will continue to help mitigate littoral obstacle threats, future military forces will likely require effective tactical obstacle reconnaissance systems to achieve adequate timeliness, assurance and dispersion. Following Operation Galvanic,[4] an observer suggested that 'the employment of radio controlled demolition craft for the destruction of underwater obstacles and barbed wire might well prove valuable in preparing a beach for landing'.[5] Just as they did in 1943, modern uncrewed systems present an opportunity to overcome the challenge presented by littoral obstacles, particularly if employed as part of a tactical obstacle reconnaissance system that can find gaps immediately prior to manoeuvre.

Uncrewed platforms employed as part of a tactical obstacle reconnaissance system are only as effective as the sensors that they carry. Fortunately, sensor technologies are increasing in capability at least as quickly as obstacle systems are increasing in complexity. Magnetometers remain a versatile detection capability on land and underwater, but only against obstacles containing metal. Hyperspectral imagery (HSI) has the potential to be even more effective at detecting littoral obstacles, but only when the significant data storage, processing and communication needs can be met. Ground penetrating radar (GPR) and sonar systems are very effective, especially when they employ synthetic apertures, but are limited to land or underwater use respectively. Light detection and ranging (LiDAR) and thermal sensors are also increasing in utility, particularly when used to supplement other sensors. By combining multiple unmanned platforms, each employing multiple sensors, into a tactical obstacle reconnaissance system, military forces can effectively find and exploit gaps that undermine complex future littoral obstacles.

Evolving Obstacles in the Littorals

Technological advances are increasing the threat posed by both explosive and non-explosive obstacles while concurrently increasing opportunities to enhance obstacle effects through observation and fires. The Russo-Ukrainian War offers insights into the current state of landmine technologies and an indication of the growing threats to come. In early 2022, Russian

forces began employing ISDM Zemledeliye mine-laying systems to remotely emplace anti-tank (AT) and anti-personnel (AP) minefields.[6] By integrating programmable munitions, meteorological sensors, and fire control systems, the Zemledeliye rapidly emplaces mines while electronically recording and reporting the locations of minefields and lanes.[7] The accuracy and situational awareness delivered by modern systems such as the Zemledeliye allows forces to emplace mines with minimal restriction of their own manoeuvre, thereby reducing barriers to mine employment. Likewise, the increased certainty that minefields will deliver their planned effects allows emplacing forces to delay the establishment of obstacles until the last safe moment, potentially mitigating earlier obstacle reconnaissance. Modern emplacement systems make the establishment of minefields faster, easier, and more reliable—a trend that is likely to persist and that will increase the need for effective tactical-level obstacle reconnaissance.

In addition to demonstrating the growing complexity of mine emplacement systems, the Russo-Ukrainian War highlights the increasing capabilities of landmines themselves. Although many of the minefields emplaced in Ukraine have used traditional munitions (particularly TM-62 series mines), next-generation capabilities are also being employed.[8] Russian forces have emplaced POM-3 AP mines that use seismic sensors to match an approaching target's signature, then initiate a bounding fragmentation munition with a 16 metre effective range.[9] Modern AT mines have also been employed, including PTKM-1R top-attack mines that can engage targets at up to 100 metres.[10] By engaging targets from offset positions, modern landmines significantly increase the width required to be breached to establish a safe lane. Given the sensor suites, decision-making algorithms, and offset targeting capabilities already employed by these modern mines, it is likely that future minefields will have the kinds of networked self-organising capabilities that the Defense Advanced Research Projects Agency (DARPA) envisioned during its mid-2000s Self-Healing Minefield program.[11] Low metal content (LMC) mines will persist but are unlikely to gain significant 'smart' capabilities, as doing so would increase their metal content. The employment of modern AP and AT mines in Ukraine suggests that breaching obstacles in the future will be increasingly difficult and that effective obstacle reconnaissance to find bypass options will therefore be increasingly important.

Even though recent conflicts have not featured large-scale employment of sea mines, technological developments have continued to enhance these systems.[12] The increasing availability of unmanned autonomous vehicles will likely enable the emplacement of sea mines immediately before their effects are required, potentially after preliminary obstacle reconnaissance has occurred.[13] Uncrewed vehicle technologies also provide opportunities for low-cost self-deploying mines that could regularly reposition themselves to complicate mine countermeasures.[14] If self-deploying mines are networked, self-healing minefields could counter breaching efforts. In addition to closing gaps, networked autonomous minefields could combine the effects of multiple mines into swarms to destroy high-value targets or to mitigate mine countermeasure systems.[15] Emerging communication technologies, in particular blue-green laser-based optical mesh networks, have the potential to enable communication between mines to be maintained while submerged, limiting exposure to electronic warfare systems.[16] If emerging sea mine systems employ torpedoes or rockets rather than simple blast effects (building on systems such as the Russian PMK-2 and Chinese EM-55 mines), networked minefields will be capable of denying wide avenues of approach.[17] The threat these systems pose is particularly acute for Australia given the prevalence of narrow sea lines within Australia's primary area of military interest. Like their land-based equivalents, the emerging threats posed by modern sea mines make breaching significantly more difficult, and timely obstacle reconnaissance to find unobstructed routes correspondingly more important.

Technological advances led by the mining and construction industries will likely increase the complexity of future non-explosive obstacles. Intelligent unmanned excavation and earth-moving systems, which could readily be adapted to support military operations, are developing rapidly.[18] At the beginning of 2022, 'more than 300 intelligent coal mining working faces' were already operating in China.[19] Although the construction industry is adopting autonomous systems more slowly, 'many tasks associated with [that] industry fulfil the canonical "dirty, dangerous and dull" criteria of tasks ripe for automation, which leads economists and investors to expect an imminent robotics revolution'.[20] As this revolution occurs, autonomous plant equipment will become more widely available and lower in cost. Technologies that currently enable automated auger and plough systems to mine coal seams could be repurposed to autonomously establish anti-tank ditching. Automated plant equipment could likewise emplace rubble

and other non-explosive barriers in urban environments. By executing pre-programmed obstacle emplacement plans and maintaining continuous work, autonomous plant systems would establish obstacles quickly without risking personnel. The potential for non-explosive obstacles to be established at short notice further increases the need for future obstacle reconnaissance to be conducted immediately before planned manoeuvre.

In addition to making modern obstacles increasingly difficult to breach, technological evolution is making the integration of observation and fire with obstacles more pervasive and effective. The proliferation of low-cost uncrewed aerial vehicles (UAVs) and loitering munitions, as well as the digitisation of fire control systems, permits effective observation and fire to cover obstacles far beyond visual or direct fire range.[21] The integration of fires with obstacles can occur at increasing speeds:

> *[W]here decades ago it may have taken some time for an enemy to detect someone conducting a breach of their obstacles and even longer to bring them under fire, this is now a process that takes a minute or two.*[22]

The number of avenues of approach covered by modern land obstacle belts is no longer limited by the need to maintain ground forces in close proximity. Whereas sea mines have often been employed without persistent observation in the past, the ability of modern mines to also act as sensors permits long-range fires to reinforce their effectiveness. As persistent long-range ISR and fires increase the risk inherent in breaching modern obstacles, identifying opportunities to bypass will grow in importance.

Seeking and Sensing Future Obstacles

While the technologies that are likely to underpin future obstacle systems continue to increase in capability, so too do technologies that offer an opportunity to mitigate future littoral obstacles. Military, commercial and private investment in unmanned vehicle technologies provides significant opportunities to exploit these platforms as the foundation of tactical obstacle reconnaissance systems. Currently available platforms include UAVs, uncrewed underwater vehicles (UUVs) and uncrewed ground vehicles (UGVs). Of the available options, UAVs offer the greatest level of flexibility as platforms within a tactical obstacle reconnaissance system. Advancements

in AI, materials engineering, and battery technologies have allowed UAVs to become cheaper, smaller, more resilient and more autonomous, and to integrate larger numbers of sensors. UAVs provide opportunities to conduct rapid reconnaissance across large areas of interest. Nevertheless, these systems suffer from the greatest payload limitations, are vulnerable to both kinetic and non-kinetic active counter-UAV systems, and can be disrupted by collisions with vegetation or manmade obstacles. Despite these limitations, UAVs offer significant utility as part of a tactical obstacle reconnaissance system.

While UUVs lack the flexibility of aerial systems, their underwater persistence, low signature, and ability to carry large payloads offer distinct advantages during littoral obstacle reconnaissance. Existing UUV systems, including the General Dynamics Bluefin series and the SAAB Double Eagle, have demonstrated the utility of combining multiple sensors to detect underwater obstacles (although reliably detecting buried mines remains a challenge).[23] In comparison to airborne systems, underwater vehicles are less constrained by weight and are, therefore, capable of employing heavier sensor payloads and power systems. UUVs also offer reduced likelihood of detection by terrestrial or airborne sensors when reconnoitring underwater obstacles. The inability to effectively sense obstacles on land is a significant limitation for UUVs, although the impact of this limitation could be reduced by projecting other sensors from the UUV platform (for example, loitering airborne sensors). Although UUVs are less flexible than their airborne equivalents, their underwater persistence offers important opportunities for littoral obstacle reconnaissance.

Like UUVs, UGVs lack the flexibility of flying systems but make up for this shortfall through increased persistence when reconnoitring littoral obstacles on land. The extensive employment of UGVs (for example, the QinetiQ Dragon Runner and TALON systems) during counter-improvised explosive device operations demonstrates the broader potential for ground-based unmanned platforms to conduct obstacle reconnaissance.[24] While UGVs employed in Afghanistan and Iraq were largely tracked or wheeled, quadruped systems such as the Ghost Robotics Vision 60 are becoming increasingly prevalent.[25] In addition to having the potential for greater persistence than airborne platforms, ground-based systems are less susceptible to detection by electromagnetic sensors. The primary limitation of ground-based systems during littoral obstacle reconnaissance is their

inability to reconnoitre underwater obstacles. Additionally, UGVs are more susceptible to terrain limitations than UAVs, particularly when attempting to traverse rough or inundated areas. Despite their limitations, the utility of UGVs when reconnoitring land obstacles merits their consideration as part of a wider reconnaissance system. Combining different unmanned vehicle types offers the opportunity to offset their relative strengths and weaknesses to comprehensively reconnoitre littoral environments. The relative strengths and weaknesses of UAVs, UUVs and UGVs are summarised in Table 1.

Table 1. Strengths and weaknesses of different unmanned platforms during tactical obstacle reconnaissance

Platform	UAV	UUV	UGV
Strengths	1. Capable of rapid reconnaissance across large areas of interest. 2. Capable of operation above both land and maritime domains. 3. High degree of flexibility. 4. Able to transmit real-time data when not affected by electronic attack.	5. Persistence when reconnoitring underwater littoral obstacles. 6. Limited vulnerability to kinetic and non-kinetic attack while submerged. 7. Limited visual and electromagnetic signature while submerged. 8. Less constrained by weight due to buoyancy, and therefore capable of employing heavier sensor payloads and power systems.	1. Persistence when reconnoitring littoral obstacles on land. 2. Less susceptible to detection by electromagnetic sensors than airborne systems. 3. Able to conduct extended periods of surveillance while remaining stationary to conserve power. 4. Able to transmit real-time data when not affected by electronic attack.

Platform	UAV	UUV	UGV
Weaknesses	1. Persistence limited by the power required to stay airborne. 2. Systems prone to catastrophic failure following collisions with vegetation or manmade obstacles. 3. Systems vulnerable to kinetic and non-kinetic attacks, with non-kinetic attacks capable of causing catastrophic crashes. 4. Visual and electromagnetic signatures risk providing adversaries with early warning of planned avenues of approach. 5. Aerodynamic requirements result in a significant trade-off between sensor payloads, platform endurance, and platform size.	1. Slow rate of movement while submerged compared to airborne systems. 2. Very limited ability to reconnoitre land domain obstacles. 3. Limited ability to transmit real-time data while submerged.	1. Very limited ability to reconnoitre underwater obstacles. 2. Must be delivered to the beach by airborne or waterborne platforms. 3. Systems vulnerable to kinetic and non-kinetic attack. 4. Visual and electromagnetic signatures risk providing adversaries with early warning of planned avenues of approach. 5. Susceptible to terrain limitations, particularly when attempting to traverse rough or inundated areas.

While unmanned systems offer suitable platforms to support a future obstacle reconnaissance system, such a system is only as effective as the sensors it employs. Magnetometers, a mainstay of obstacle reconnaissance systems since the Second World War, continue to increase in capability and are likely to remain key sensors regardless of whether UAV, UUV or UGV platforms are employed. By employing transmitting coils to generate eddy currents in metallic substances, these sensors can reliably detect obstacles that contain metal, particularly when paired with AI to interpret collected data.[26] Advancements in atomic magnetometer technology are enabling the development of systems that are smaller, are cheaper, and require less power.[27] Importantly, magnetometers 'are not significantly affected by soil permittivity' and can, therefore, detect targets 'even in high-dielectric moist sand environments'.[28] The primary limitation of magnetometers is their inability to detect non-metallic obstacles.[29] Additionally, magnetometers are susceptible to magnetic interference from the environment, other sensors, and their associated platforms' structure and power systems.[30] Magnetometers are a proven obstacle detection technology that will remain

relevant for tactical obstacle reconnaissance, given that emerging obstacle technologies rely on metal components to enable their 'smart' functionality.

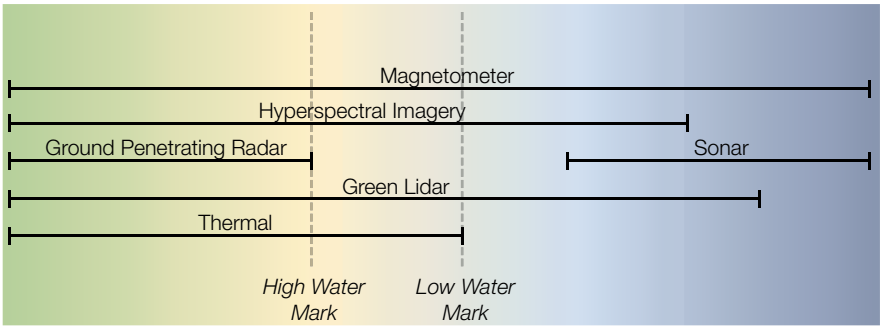

Figure 1. Indicative coverage of the littoral environment achieved by potential tactical obstacle reconnaissance sensors

Compared to magnetometers, HSI sensors are a much more recent technology that offers opportunities to detect obstacles both on land and underwater when the significant data storage and processing requirements of this technology can be met. HSI systems compare a large number of visible and infrared light wavelength bands 'with known, uniquely referenced spectral fingerprints' to detect targets.[31] HSI can detect the spectral signature of LMC mines, as well as the disturbed soil and vegetation caused by burying mines or emplacing non-explosive obstacles.[32] HSI is well suited to UAV employment within the littoral employment given that 'optical methods are the only means even theoretically capable of [mine] detection through the air-water interface at tactically-useful search rates'.[33] HSI systems can see 'through the glint and foam clutter on the sea surface'; however, detecting underwater obstacles is only possible 'where backscattered light from the seafloor has a higher intensity than backscatter from the water column'.[34] Water transparency declines towards the shore due to 'increased sediment and greater phytoplankton biomass... especially in northern seas between Australia and Indonesia'.[35] The critical disadvantage of HSI systems, however, is the requirement to store and analyse very large amounts of data.[36] HSI can detect a wider range of littoral obstacles than any other type of sensor; however, it can do so only when the captured data can be stored, processed, and communicated.

GPR is another proven obstacle detection technology that offers increasing detection capabilities; however, it can do so only on land. GPR-based systems transmit and receive electromagnetic radiation to detect reflections from metals or from transitions between different dielectric materials.[37] Advancements in synthetic aperture radar (SAR) offer increased detection resolution, exploiting the Doppler frequency shift that results from movement of the sensor over a target to increase the effective size of the radar aperture.[38] SAR-based systems 'can detect both metallic and dielectric targets' and can 'obtain high-resolution underground images', including during poor weather.[39] GPR can detect buried mines, including 'plastic landmines down to the smallest size'.[40] GPR is not, however, suitable for detecting obstacles underwater; the microwave band wavelengths employed by radar systems fail to effectively penetrate water. Further, the effectiveness of GPR is limited 'in soils with high conductivity or high dielectric losses, such as clayey or wet soils, [where] the penetration depth of GPR signals can be significantly reduced'.[41] SAR-based GPR offers significant value as part of a littoral obstacle reconnaissance system; however, it must be paired with other sensors to mitigate threats below the high-water mark.

Sonar systems have a long history of detecting underwater obstacles and will remain a key sensor technology for future obstacle reconnaissance. Sonar systems use underwater sound waves to determine the direction and distance to a target.[42] Advances in synthetic aperture sonar technology are increasing the available resolution of these systems while also enabling smaller arrays to achieve effective detection levels.[43] Sonar can reinforce the effectiveness of other sensors, providing an initial survey of a wide area that allows confirmatory identification by other sensors.[44] Currently, available sonar systems are too heavy to employ from UAVs; however, the development of lightweight dipping sonar systems building on existing sonobuoy technology is underway.[45] Sonar systems are unable to detect obstacles on land and are of limited utility in shallow water, where waves and other environmental noise can generate interference.[46] Further, sonar systems are unable to effectively penetrate through sand and soil, and are therefore unlikely to detect buried underwater mines.[47] As sonar systems gain resolution and reduce in size, their versatility continues to grow; nevertheless, these capabilities must be supplemented with other sensors to complete the landward component of any littoral reconnaissance.

LiDAR presents an opportunity to detect obstacles based on their elevation relative to their surroundings, both on land and underwater. Red LiDAR, also known as terrestrial LiDAR, delivers high measurement accuracy over land and can penetrate through vegetation but cannot effectively penetrate water.[48] Green LiDAR, or bathymetric LiDAR, offers a less common but nevertheless proven alternative that can penetrate water, with 'recently developed sensors promis[ing] increased spatial resolution (point density) and water depth penetration'.[49] The key disadvantage of green LiDAR, in contrast to red laser systems, is the increased power and data processing demands, which translate into reduced detection resolution. Further, 'green LiDAR is a more complex and costly technology'.[50] The penetration depth of green lasers is dependent on water clarity; under perfect conditions, penetration to depths beyond 20 metres is possible.[51] By mapping elevation data, LiDAR can detect AT ditches, dragons' teeth, sea mines, and other obstacles. The key limitation of LiDAR is the risk of false positive detections resulting from relying on elevation data alone. As the resolution available to green LiDAR systems increases, the utility of LiDAR as part of littoral obstacle reconnaissance systems will grow.

Finally, thermal sensors offer a low-cost and small form factor technology that can detect obstacles on land. Thermal sensors achieve detection by analysing a target's 'distinct thermal anomaly relative to the surrounding host environment'.[52] Trials employing UAV-mounted thermal cameras have successfully demonstrated an ability to detect surface-laid PFM-1 plastic AP mines.[53] Detection of shallow buried objects is also possible based on 'the difference of the thermal characteristics between the soil and the buried objects'; however, 'it is extremely difficult to have a thermal model which is valid under different soil and weather conditions'.[54] Thermal sensors are, however, ineffective against deeply buried obstacles where thermal signatures are 'masked by the overlaying soil, sediment or vegetation, making thermal differences insignificant'.[55] Nevertheless, thermal sensors remain useful given that most remotely emplaced minefields remain on or near the surface. The key disadvantages of thermal sensors are their very limited ability to detect underwater obstacles and their dependence on weather conditions that generate a sufficient contrast between targets and their surroundings. The relative strengths and weaknesses of available obstacle reconnaissance sensors, including thermal sensors,

are summarised in Table 2. Even though thermal sensors can only identify a limited range of obstacles when employed independently, they offer a useful additional data point when used alongside other means of obstacle reconnaissance.

Table 2. Summary of the strengths and weaknesses of different sensors available for employment during tactical obstacle reconnaissance

Sensor	Strengths	Weaknesses
Magnetometer	1. Capable of detecting obstacles with metal components both on land and underwater. 2. Not significantly affected by soil permittivity, including wet soil. 3. Capable of detecting buried mines. 4. Miniaturisation of atomic magnetometers allows for small form factor.	1. Unable to detect obstacles with no metal components. 2. Must be paired with other sensors to continuously adjust for variations in the distance between the sensor and the target to maintain accuracy. 3. Susceptible to environmental interference from nearby ferrous materials and variations in the earth's magnetic fields. 4. Susceptible to interference from other sensors. 5. Susceptible to interference from platform structures and power systems. 6. Limited detection range. 7. Limited ability to image detected objects.
HSI	1. Capable of detecting the unique spectral signature of obstacles on land and in shallow water. 2. Capable of detecting obstacles with no metal components. 3. Capable of detecting buried mines by identifying disturbed earth and vegetation. 4. Capable of detecting underwater obstacles in shallow water. 5. Capable of detecting non-explosive obstacles such as AT ditches. 6. Can detect obstacles covered by limited flora and fauna.	1. Requires access to existing spectral data library to effectively classify detected obstacles. 2. Requires significant data processing. 3. Requires significant data storage. 4. Effectiveness is reduced when targets are obscured by terrain or vegetation. 5. Susceptible to deception when relying on disturbed earth and vegetation to detect buried obstacles. 6. Limited ability to identify underwater obstacles in turbid water (for example, near river mouths). 7. Limited detection capability during poor weather.

Sensor	Strengths	Weaknesses
GPR	1. Capable of detecting obstacles with no metal components. 2. Capable of detecting buried mines. 3. Greater detection range than magnetometers. 4. SAR capable of generating high-resolution underground images. 5. SAR capable of detection during poor weather conditions.	1. Unable to effectively penetrate water due to microwave band wavelengths. 2. Very limited penetration of wet soil. 3. Susceptible to interference from variations in soil composition and density. 4. Requires a higher level of navigation accuracy than can be provided by global navigation satellite systems (GNSS) alone to compile SAR images.
Sonar	1. Capable of detecting underwater obstacles in deep water. 2. Able to detect non-metal obstacles. 3. Capable of detecting non-explosive obstacles such as underwater barriers. 4. Capable of efficiently searching underwater areas to cue other sensors.	1. Unable to detect obstacles on land. 2. Limited ability to detect obstacles in shallow water. 3. Unable to detect buried obstacles. 4. Susceptible to interference from other nearby platforms and sonar systems. 5. Synthetic aperture sonar generates large volumes of data that cannot be transmitted while underwater.
LiDAR	1. Capable of detecting the elevation of obstacles relative to their surroundings on land and in shallow water if using green lasers (within the constraints of resolution and penetration depth). 2. Improves the accuracy of other sensors by providing accurate distance to target data. 3. Red LiDAR is capable of penetrating vegetation. 4. Capable of detecting non-explosive obstacles such as AT ditches.	1. Very limited ability to detect buried mines. 2. Risk of false positive detections resulting from relying on elevation data alone. 3. Requires significant data processing to generate 3D models. 4. Green LiDAR required to penetrate water, which increases power and processing demands. 5. Green LiDAR water penetration depth depends on water clarity at the time of collection. 6. Detection of smaller obstacles requires increased resolution, with corresponding increases in data processing requirements.
Thermal	1. Able to rapidly detect surface laid mines. 2. Capable of detecting non-metallic obstacles. 3. Small form factor.	1. Negligible ability to detect underwater obstacles. 2. Very limited ability to detect buried mines. 3. Dependent on weather conditions that generate a sufficient temperature differential between targets and their surroundings. 4. Risk of false positive detections resulting from relying on thermal data alone.

Finding the Gaps

Mitigating the threat of future littoral obstacles requires unmanned platforms and sensors to be combined into a system that can effectively detect all potential obstacles both on land and underwater in a timely manner. Obstacle reconnaissance systems will only be timely and effective if they are employed at a sufficient scale to support subsequent manoeuvre, can move throughout littoral environments, and are capable of processing and communicating the data that their sensors collect. A wide range of platform and sensor combinations could form the basis of an effective system; however, examining a discrete hypothetical scenario allows the broad characteristics of a tactical obstacle reconnaissance system that could overcome future obstacles to be identified. Given the importance of obstacle reconnaissance during the attack on Tarawa in 1943, using that historical case as the basis for a demonstration scenario set in 2043 allows future requirements to be analysed. This demonstration scenario is described in Annex A. The key change to the defences at 'Future Tarawa' is that the obstacle systems being employed are networked, can act autonomously, and will be emplaced at the last safe moment. The key capabilities considered during the analysis of the 'Future Tarawa' scenario are described in Table 3. Despite the complexity of the threats considered in the 2043 scenario, employing a tactical obstacle reconnaissance system would allow the ability to manoeuvre to be retained.

Table 3. Summary of the possible future obstacle capabilities considered during the modelling of the 'Future Tarawa' scenario

	LMC landmines	HMC landmines	Sea mines	AT ditches
Tarawa 1943 capabilities	• No LMC landmines.	• Japanese AP and AT landmines were employed at Tarawa, including Model 93 pressure mines.	• Japanese contact sea mines (including Model 96 antiboat mines) were moored to coral on the fringing reefs around Tarawa or emplaced in shallow water.	• Japanese forces dug AT ditches by hand.
Baseline current capabilities	• Russian TM-62P AT mines. • Russian PMN-4 AP mines.	• Russian PTKM-1R AT mines. • Russian POM-3 AP mines.	• Chinese EM-54 sea mines. • Chinese EM-55 sea mines.	• John Deere 850J bulldozer.

	LMC landmines	HMC landmines	Sea mines	AT ditches
Projected 2043 capabilities	• 1,575 x LMC AT mines with magnetic influence fuses capable of engaging targets within a 2 m2 area. • 525 x LMC AP mines capable of engaging targets within 0.05 m2.	• 150 x networked AT mines capable of engaging targets within a 100 m radius. • 150 x networked AP mines capable of engaging targets within a 16 m radius.	• 600 x miniaturised and networked torpedo mines capable of engaging targets within a 250 m radius.	• 6 x networked and autonomous dozers, with each pair capable of establishing 120 m of 3.5 m wide AT ditch per hour.

Modelling the potential effectiveness of different platform and sensor combinations against the obstacles employed on 'Future Tarawa' suggests that a series of paired UUV and UAV teams would offer a tactical obstacle reconnaissance system that could find the necessary gaps. For the purpose of the 'Future Tarawa' scenario, the probability of any platform and sensor combination finding a suitable lane can be estimated by multiplying the probability that a randomly selected lane is clear of obstacles by the probability that the selected platform and sensor combination does not return a false positive or negative report and the probability that the platform will survive the kinetic and non-kinetic threats during the task.

Applying this model through a Monte Carlo simulation as part of a United States Marine Corps School of Advanced Warfighting Future War Project resulted in the outcomes summarised in Table 4. These results suggest that UUV and UAV pairs offer the most efficient obstacle reconnaissance system. Based on the initial modelling, a minimum of 37 pairs of UUV and UAV platforms would be required to find nine lanes for the assault force, equating to 12 pairs per battalion landing team (BLT). Applying a further +/- 25 per cent assumption sensitivity analysis to the UUV and UAV model suggests that between 28 and 60 pairs would be required to find nine suitable lanes, or between nine and 20 pairs per BLT. Despite a wide range of variables determining the real-world placement of different obstacles and the effectiveness of different platforms and sensors, the model's outcomes reinforce the intuitive value of UUV and UAV combinations for littoral reconnaissance.

Table 4. Outcomes from the Monte Carlo simulation of tactical obstacle reconnaissance at 'Future Tarawa'

	UAV	UAV with dipping sonar	UUV	UUV and UAV	UUV and UGV
Available sensors	• Electro-optical • Magnetometer • GPR • Green LiDAR • Thermal	• Electro-optical • Magnetometer • GPR • Green LiDAR • Thermal • Dipping sonar	• Electro-optical • Magnetometer • Sonar • Periscope HSI	UUV: • Electro-optical • Magnetometer • Sonar • Periscope HIS UAV: • Electro-optical • Magnetometer • GPR • Green LiDAR • Thermal	UUV: • Electro-optical • Magnetometer • Sonar • Periscope HIS UGV: • Electro-optical • Magnetometer • GPR • Thermal
Probability of finding a suitable lane	1.3%	12.4%	0.06%	24.6%	7.4%
Platforms required for nine lanes	703	72	15,329 \ unworkable	37	122

Despite the model employed for the 'Future Tarawa' scenario simplifying a wide range of variables that would impact the effectiveness of tactical obstacle reconnaissance systems, the outcomes of the simulation align with qualitative analysis. UUVs are both the most effective platform for reconnoitring underwater obstacles and the platform most efficiently able to carry large data storage and processing payloads. UAVs provide the greatest level of flexibility and can close the gap between the limits of a UUV's sensors and the land component of the littoral environment. Between the two platforms, magnetometers, sonar, HSI, GPR, green LiDAR, and thermal sensors combine to offer a high probability of detecting obstacles both on land and underwater. Importantly, the overlapping sensor capabilities of UUV and UAV pairs increases the probability of finding obstacles in the challenging space between the high and low water marks. A potential battle network illustrating a system employing both UUV and UAV capabilities is shown in Figure 2. Combining the strengths of UUV- and UAV-based systems offers the most efficient and effective approach to littoral obstacle reconnaissance.

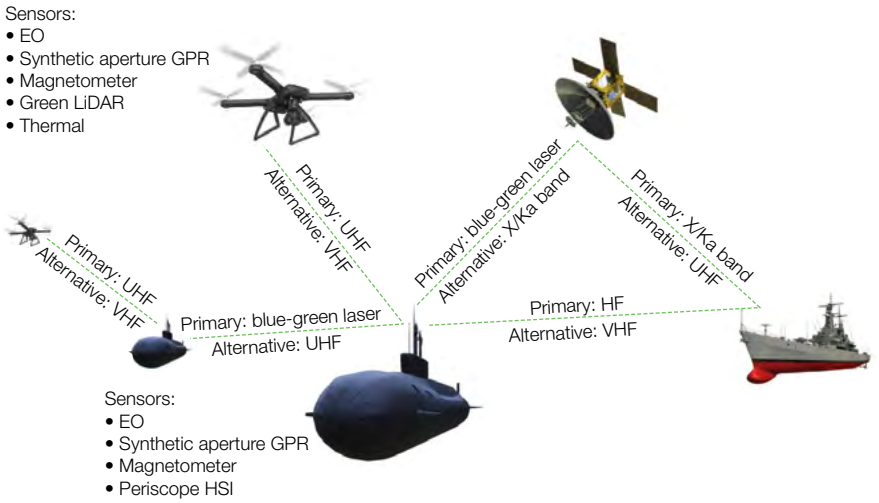

Figure 2. A potential tactical obstacle reconnaissance system battle network employing combinations of UUV and UAV

In addition to the sensors and platforms described in the 'Future Tarawa' model, other current and emerging technologies should be integrated as part of a littoral obstacle reconnaissance system. First, AI should be employed to make the reconnaissance system autonomous, thereby mitigating the risk of communication links being disrupted. Second, machine-learning methods such as neural networks should be employed to analyse fused sensor data.[56] Third, navigation data from gyroscopes, Doppler velocity logs, and inertial navigation systems should be shared across networked platforms to increase positioning accuracy, enable the use of synthetic aperture sensors, and mitigate the risks of GNSS disruption.[57] Finally, emerging data transfer technologies such as blue-green laser networks should be employed to ensure that collected data can be shared in an assured and timely manner. When these technologies are employed, the full potential of unmanned platforms and modern sensors can be exploited to undermine the threat of emerging obstacles.

Treating Residual Risk

While effective tactical obstacle systems will be essential to overcome future littoral obstacles, they are only part of the solution. Strategic ISR capabilities (including space, cyber, and electronic warfare systems) are likely to continue to contribute. Advances in machine learning will likely increase the speed and accuracy with which space-based SAR, LiDAR and HSI can be employed to identify obstacles and emplacement systems. Decreasing satellite costs enabled by the global space economy will also likely increase the coverage provided by space-based ISR. Nevertheless, it is unlikely that sufficient satellite persistence will be achieved to prevent an adversary from emplacing obstacles in areas that satellites have previously observed to be clear, particularly when strategic assets are supporting multiple dispersed tactical actions. Instead of finding lanes, remote sensing may cue the employment of tactical reconnaissance systems and enable the suppression of obstacle emplacement systems. While space-based strategic ISR is unlikely to be able to independently mitigate modern obstacle threats, it can increase the efficiency and effectiveness of UUV- and UAV-based systems.

Much like space-based strategic ISR, cyber and electronic warfare capabilities will continue to contribute to future obstacle reconnaissance without being able to offer a standalone solution. Offensive cyber operations and signals intelligence (SIGINT) may identify plans to employ obstacles or may intercept reports of obstacle employment; however, access to this information cannot be assured and therefore cannot provide an independent basis for enabling manoeuvre.[58] Electronic warfare systems may detect communication between components of networked obstacle systems; however, again, the detection of such transmissions cannot be assured. Even if the electronic signatures of future obstacle systems are detected, it remains unlikely that the detailed disposition of obstacle belts would be revealed. Identifying obstacle components in one area does not confirm the absence of obstacles in another; therefore additional obstacle reconnaissance would still be required to find gaps that can be exploited. Like space-based systems, cyber operations and electronic warfare capabilities offer an opportunity to inform the subsequent employment of tactical obstacle reconnaissance capabilities.

Despite the significant detection capabilities that are made possible by combining multiple platforms and sensors, reconnaissance systems cannot find gaps that do not exist. The ability to breach obstacles therefore remains essential. Likewise, the ability to breach obstacles reduces adversary opportunities to deliberately offer gaps that shape a force into preferred engagement areas. Given the complexity presented by future obstacle systems, breaching operations will require significant and likely disproportionate resource expenditure. Large numbers of remotely delivered munitions are likely to be necessary to achieve sufficiently wide lanes. The procurement and sustainment challenges presented by this munition requirement can be reduced by repurposing general-purpose ordnance, an approach reflected in the US decision to shift from bespoke dart-based munitions to existing MK-80 series bombs as part of the Joint Direct Attack Munition (JDAM) Assault Breaching System (JABS).[59] Unmanned systems, including loitering munitions, offer further alternatives; however, the size of required breaching munitions will remain inversely related to the accuracy with which they can be delivered. When breaching becomes the only option, tactical obstacle reconnaissance systems still have a role to play, providing targeting data to support breaching fires. Tactical reconnaissance systems also have a role on post-breaching surveillance—monitoring avenues of approach to ensure that further obstacles are not emplaced. Nevertheless, breaching should remain an option of last resort.

Conclusion

When the Second Marine Division landed at Tarawa in 1943, strategic reconnaissance was sufficient to find gaps through the Japanese obstacles. Submarines, long-range aircraft, signals intelligence, and former residents of the target islands were able to provide sufficient information about obstacle dispositions before the Fifth Amphibious Force closed with its objectives. Minesweepers and dismounted combat engineers were able to reduce the residual risks. While effective at the time, the approach taken by the US in World War II would be unlikely to succeed today and is even less likely to be effective in the future. Instead, commanders must execute tactical obstacle reconnaissance immediately prior to manoeuvre. As littoral obstacles become increasingly networked, autonomous and able to engage targets at extended ranges, breaching lanes will become progressively more difficult. Finding lanes to bypass obstacles is, therefore, critical to tactical success.

Teams of UUVs and UAVs will likely offer the most effective and efficient means of conducting tactical obstacle reconnaissance during the next two decades. Using these platforms to employ a combination of magnetometers, HSI, GPR, sonar, LiDAR, and thermal sensors would enable obstacles to be found with a high degree of assurance. Other emerging sensor technologies—for example, those employing nuclear quadrupole resonance—may further increase accuracy in the long term but are not necessary to begin developing and fielding workable systems.[60] Likewise, improved data storage and processing technologies will eventually enable HSI to be processed on board small UAVs; however, effective obstacle reconnaissance is achievable without waiting for those capabilities to become available. While reconnaissance technologies are likely to continue improving, so are the technologies employed by obstacle systems. Ongoing investment in obstacle reconnaissance is therefore necessary not only to meet the future challenge but to stay ahead of it. Breaching should remain an option of last resort; however, tactical obstacle reconnaissance systems offer opportunities to enhance breaching efficiency when required. Employing teams of multi-sensor unmanned platforms to find and exploit gaps remains the best way to mitigate future littoral obstacles.

Annex A—'Future Tarawa' Demonstration Scenario[61]

The 'Battle for Future Tarawa' is a hypothetical scenario that unfolds in 2043 amid a global conflict between the United States and Olvana,[62] a culmination of escalating tensions over several decades. The roots of this conflict trace back to the early 21st century, marked by competitive advancements in technology, economic rivalry, and geopolitical posturing. The South China Sea disputes, trade wars and cyber espionage had laid the groundwork for this confrontation. As Olvana expanded its influence across the Asia-Pacific region, the US sought to counterbalance this through strategic partnerships and military presence, leading to an inevitable clash of interests. The conflict was further fuelled by a race for technological supremacy, particularly in AI and autonomous systems, setting the stage for a new era of warfare. As the global order frayed under the strain of these tensions, smaller nations were drawn into the vortex, with key strategic locations becoming flashpoints, one of which was the island of Tarawa.

In the context of the global war, Tarawa emerged as a critical strategic point. For Olvana, it serves as a forward outpost in the Pacific, enabling projection of power and control over crucial sea lanes. Its transformation into a technologically fortified stronghold was a clear demonstration of Olvana's military capabilities and resolve. From the US perspective, Tarawa represents a significant obstacle to maintaining freedom of navigation and influence in the Pacific. Its recapture is vital for the US to assert its presence and to counter Olvana's expansion. For both nations, Tarawa is not just a piece of land; it is a symbol of power and control in a region that has become the centre of global strategic competition. The US aims to dismantle the Olvanan stronghold, while Olvana aims to showcase its technological and military prowess, making Tarawa a pivotal battleground in the wider conflict.

Olvana's defence strategy for Tarawa is shaped by several key trends. Technologically, advancements in AI, machine learning and autonomous systems are at the forefront. Politically, Olvana's assertiveness in the Pacific is part of its broader strategy to challenge US dominance and establish itself as a global power. The use of autonomous defence systems at Tarawa is a testament to Olvana's commitment to leveraging cutting-edge technology in warfare. The Olvanan military doctrine has evolved to integrate these technologies, focusing on creating impenetrable defences using AI-driven assets. This approach is also influenced by a desire to minimise personnel on the frontline, thereby reducing human casualties while maximising defensive capabilities. Economically, Olvana's investment in these technologies is seen as a means to showcase its industrial and technological advancement on the global stage, furthering its strategic interests.

Olvana's defensive fortifications on Tarawa centre around an advanced network of smart mines and autonomous equipment. The smart mines, both on land and in the surrounding sea, are equipped with AI and machine-learning capabilities, enabling them to communicate and coordinate responses to perceived threats. This network can adapt its strategy in real time, repositioning mines and altering tactics based on the evolving battlefield situation. The mines are designed to be highly effective against both personnel and vehicles, posing a significant challenge to any invading force. On the island itself, Olvana deployed autonomous excavation

equipment, which can continuously fortify defences, repair damage and create new strategic positions. This machinery operates under the guidance of the central AI network, ensuring a relentless and adaptive defensive posture, making Tarawa a formidable fortress against any assault.

The US forces face multifaceted challenges in their attempt to overcome the Olvanan defences at Tarawa. First, the technological prowess of the AI-driven mine network presents a unique and unprecedented obstacle. The mines' ability to communicate and adapt makes a conventional assault highly risky. Second, electronic and cyber warfare capabilities are critical to disrupting the Olvanan AI network, requiring advanced technological tools and expertise. The efficacy of these operations is uncertain against a sophisticated and potentially self-healing AI system. Third, the political implications of a direct assault are complex, with the risk of escalation and wider regional consequences. This requires careful strategic planning and consideration of international diplomatic repercussions. Last, the US must balance the need for a decisive victory with the ethical considerations of engaging in a battlefield dominated by autonomous systems, navigating the moral complexities of modern warfare.

Recognising that the risks posed by Olvana's occupation of Tarawa could no longer be tolerated, not least the risk of long-range fires striking critical platforms in Guam and Hawaii, the US decides to again seize Tarawa. Given that the Olvanan fortifications at Tarawa would likely mitigate the effects of long-range fires, the US accepts that ground forces will need to secure the island following a joint forcible entry operation. Strategic ISR assets reveal valuable details about the Olvanan obstacle plan that support detailed planning for the assault. Offensive cyber operations reveal Olvanan logistical preparations for the defence of Tarawa, indicating that 3,000 mines have been delivered to the atoll. This includes networked sea and landmines that are capable of 'self-healing', as well as difficult-to-detect low metal content mines. Space-based IMINT identifies the locations of a number of sea mines; however these randomly reposition between satellite passes. Landmine locations are not detected, suggesting that these munitions are not yet emplaced. Finally, submarine-based SIGINT identifies that unmanned plant equipment is communicating with a control station on the island. While strategic ISR had proven invaluable, it has been unable to confirm or deny the location of safe lanes on Tarawa.

As the landing force approaches Tarawa, fires from air, surface and subsurface platforms begin kinetically and electronically suppressing the Olvanan defences. Importantly, this suppression includes efforts to suppress obstacle emplacement systems and to disrupt communication between already emplaced obstacles. Concurrently, offensive cyber operations degrade the ability of Olvanan satellites to communicate with submerged mines. Nevertheless, many of the landmines are successfully emplaced while most of the sea mines remain active. Plant equipment establishing anti-tank ditches is destroyed, but not before a number of planned ditches are completed. While suppression continues, the assault force deploys pairs of UUVs and UAVs, which together commence tactical obstacle reconnaissance. Together, the paired UUV and UAV systems carry sufficient sensors to effectively detect obstacles throughout the littoral environment. Although Olvanan electronic attack periodically disrupts UAV communication, sufficient data is transmitted from UAV to UUV platforms to enable the reconnaissance tasks to be completed. In turn, the UUVs compile and process the available data, transmitting the locations of both obstacles and identified safe lanes back to the assault force.

While the assault force aspired to find nine safe lanes on Tarawa, the combined effects of obstacle density and reconnaissance platform attrition resulted in only six lanes being found. Nevertheless, the data transmitted by the tactical reconnaissance enables the assault force to breach the remaining lanes. Breaching munitions fired from airborne and seaborne platforms target mines on land and in shallow water while collapsing ditches and other non-explosive obstacles. Sea mines in deeper water are breached by dedicated unmanned underwater vessels. While the breaching munitions were fused to minimise cratering, broken ground was inevitable. Nevertheless, the tracked amphibious vehicles employed by the assault force maintained the necessary mobility. As the assault force passes through its assigned lanes, mechanical breaching and active protection systems shield the vehicles from residual protective obstacles. As the assault force moves underground through the Olvanan fortifications, dismounted manual and explosive assault breaching techniques are employed to reduce the final defences and secure Tarawa. While strategic ISR and obstacle breaching capabilities contributed to the success of the operation, tactical obstacle reconnaissance proved essential to overcoming the Olvanan defence.

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Supporting the Government's Efforts in the Indo-Pacific's Grey Zone: Opportunities and Strategies for the Australian Army

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Introduction

Grey zone activities present a significant threat to regional stability and prosperity in the Indo-Pacific region, which constitutes Australia's primary area of military interest. While such activities are escalating in prevalence and complexity on a global scale, Beijing's grey zone activities, particularly within its primary sphere of influence—the Indo-Pacific region—constitute the most immediate threat to Australia's national security. The Australian Government's 2024 National Defence Strategy[1] (NDS) underscores the complexities inherent in Australia's strategic environment, particularly marked by the interplay of strategic competition between the United States and China, especially within the Indo-Pacific region.[2] Further, it also acknowledges that this environment is complicated by additional security risks, notably grey zone activities.[3]

To tackle Australia's most significant strategic risks, the NDS's 'strategy of denial' serves as the cornerstone for defence planning.[4] This strategy aims to pre-empt conflict, thwart any attempts by potential adversaries to coerce Australia through force, bolster regional security and prosperity, and maintain a favourable strategic balance in the Indo-Pacific region.[5] It also emphasises that the Australian Defence Force (ADF) must transition from its current role as a balanced force capable of responding to various contingencies to one that is more integrated and focused.[6] In essence, the NDS directs the strategic realignment of the ADF to recognise Australia's most significant strategic risks, including grey zone activities within its primary area of military interest—the Indo-Pacific.[7]

Since the NDS was unveiled, accompanied by the 2024 Integrated Investment Program (IIP), concerns have been raised about the perceived 'brutalisation' of the Army's land-based programs.[8] The NDS and IIP propose alterations to Australia's defence priorities and budget, driven by shifts in the strategic environment that necessitate recalibration of military capabilities to tackle emerging threats effectively.[9] Some argue that the effect of this reprioritisation is to marginalise the Army in preference to the Navy, a notion refuted by Minister for Defence Richard Marles.[10] Nonetheless, concerns regarding the Army's perceived marginalisation are not new. The debate about the Army's role and its ability to adapt to Australia's changing strategic environment seemingly began with the release of the government's 2020 Defence Strategic Update, reaching a fever pitch following the 2023 Defence Strategic Review.[11]

Rather than fuelling concerns around the strategic sidelining of the Australian Army, this article argues that the NDS's 'strategy of denial' presents the Australian Army with a unique opportunity to master not only land but also other domains of warfare.[12] This is because, as a principal force among the Indo-Pacific's land forces, the Australian Army has the potential to play a vital role in recognising and responding to grey zone activities in the region. By effectively addressing, deterring and responding to grey zone activities, the Army can pivot strategically, thereby playing a crucial role in the national defence strategy.[13] Given this potential, the Army has yet to clearly articulate its role in supporting the Australian Government's efforts to compete in the grey zone. This is despite its evident capability to project military force using, for example, its developing long-range missile capability and special forces. In view of this deficiency, this article aims to enhance the Australian Army's comprehension of its capacity in shaping, deterring and responding to grey zone activities within the Indo-Pacific region.

Literature Review

The Grey Zone

Academic literature offers diverse perspectives on the concept of the 'grey zone'. This is due partly to the fact that the grey zone concept challenges the conventional war–peace dichotomy ingrained in Western political and strategic thinking; grey zone activities defy easy categorisation within this binary framework.[14] However, amid the diversity of definitions, the grey zone is consistently characterised by volatility, uncertainty, complexity and ambiguity, leading to indistinct, opaque and innovative activities.[15] As discussed by various scholars and analysts, the grey zone essentially involves coercive statecraft activities that blur the line between peace and war, or fall short of war.[16] For example, Morris et al. define the grey zone as:

> *an operational space between peace and war, involving coercive actions to change the status quo below a threshold that, in most cases, would prompt a conventional military response, often blurring the line between military and nonmilitary actions and the attribution for events.*[17]

Furthermore, Sanyal contends:

> *[T]he term grey zone is used to describe extreme, competitive state behaviour that is below the threshold of war but distant from peace. Grey zone activities are characterised by 'aggression' and 'coercion' without a corresponding escalation to war.*[18]

Some scholars also emphasise the prolonged nature and ambiguous outcomes of grey zone activities. Additionally, commentators argue that these actions entail the use of coercive tactics by both state and non-state actors, operating to advantage below the threshold of conflict and disrupting other entities. In this regard, Sanyal observes that '[s]trategically, the grey zone is closer to war than to peace as it involves coercive behaviour and simmering conflict under the guise of competition'.[19] Examples of grey zone activities are the deployment of paramilitary forces, interference operations, and the coercive manipulation of trade and economics.

For consistency with Australian strategic policy, this article adopts the definitions of the 'grey zone' and 'grey zone activities' provided by the Australian Government's 2020 Defence Strategic Update:

> *Grey zone is one of a range of terms used to describe activities to coerce countries in ways that seek to avoid military conflict. Examples include using para-military forces, militarisation of disputed features, exploring influence, interference operations and the coercive use of trade and economic levers. These tactics are not new. But they are now being used in our immediate region against shared interests in security and stability. They are facilitated by technological developments including cyber warfare.*[20]
>
> *... Grey-zone activities are being adopted and integrated into statecraft and are being applied in ways that challenge sovereignty and habits of cooperation. This includes challenges to the long established and mutually beneficial security partnerships Australia has with many countries, including in the Indo-Pacific.*[21]

In defining the scope of the term 'grey zone' it is appropriate to distinguish disinformation from misinformation. Disinformation is a fundamental grey zone activity that entails the deliberate dissemination of false, misleading, biased and/or manipulated information, narratives and propaganda by hostile state and non-state actors.[22] While misinformation also involves the spread of false or misleading information, unlike disinformation it typically stems from unintentional errors or misunderstandings not intended to cause harm. As misinformation is not deliberately orchestrated by any particular state or non-state entity,[23] this article excludes it from the categories of grey zone activity.

The Indo-Pacific Challenge

A characteristic of grey zone activities is that they are predominantly associated with the activities of revisionist states.[24] For instance, on a broader global scale, countries such as China, Russia, Iran and North Korea are all identified as revisionist states involved in grey zone activities. However, in the Indo-Pacific region, evidence suggests that China is currently the most prominent state engaged in such activities.[25] The objective of revisionist states, such as China, is to gradually but

fundamentally reshape international norms and the global and regional systems—those systems often referred to as the 'global rules-based order' led by the US.[26] In contrast to the so-called revisionist states, Australia and its allies and key strategic partners (particularly the US) are committed to upholding the global rules-based order. In this regard, Australia places particular emphasis on maintaining order within the Indo-Pacific region.[27]

The Indo-Pacific strategic environment presents unique challenges to Australia in its efforts to deter grey zone activities, particularly in the cyber domain. The activities orchestrated by Chinese state and non-state actors in the region are the most pressing example. This is because the blurred lines between Chinese state and non-state entities are further obscured by the authoritarian nature of China's regime, as Chinese non-state actors often maintain affiliations with the government. For instance, i-Soon, a Chinese cybersecurity company linked to the Chinese Communist Party, has been implicated in facilitating government-backed cyber attacks, including espionage campaigns targeting various nation-states, including Australia.[28] This pattern extends beyond i-Soon, with numerous companies seemingly supporting the regime's cyber operations in the Indo-Pacific's grey zone.[29]

Research Gaps

Based on the literature review conducted for this article, there is an evident research gap concerning how land forces interpret the actions of state and non-state actors who use coercive tactics in the grey zone. The literature emphasises the need for proactive measures to address the challenges posed by ambiguous and non-traditional threats. The elusive nature of international warfare—in particular, that engaged in cyberspace—makes activities in the grey zone increasingly significant yet more challenging to comprehend.[30] In this regard, competitive intelligence is a crucial element in understanding and countering grey zone activities. It follows that, where information dissemination capabilities are strategically significant, monitoring and analysis tools can be pivotal in navigating the complexities of grey zone activities.

The integration of grey zone activities with land forces is also discussed in the literature, emphasising the need for a more comprehensive approach. However, there appears to be a limited understanding of the function of land forces within the grey zone. This gap is a particular concern considering the growing interdependence and convergence between land forces and other military capabilities. In reality, land forces have the potential to play significant roles in grey zone activities. In this regard, research conducted by the RAND Corporation provides a useful framework to conceptualise the nature of such involvement.

The RAND Corporation has classified grey zone activities into nine distinct categories: (1) military measures (which include war by proxy and military intimidation); (2) information operations; (3) cyber attacks; (4) legal and diplomatic measures; (5) economic coercion; (6) political influence; (7) paramilitary activities; (8) co-opting of state-affiliated businesses; and (9) manipulation of borders.[31] While land forces may be involved in these activities to varying degrees, the three most likely roles for the Army are information operations (e.g., mass influence activities), military intimidation (e.g., large-scale exercises and provocative actions against allied military assets) and paramilitary activities (e.g., use of militia). The latter two roles have traditionally been adopted by the land forces of many nations. However, it is the integration of information operations into cyberspace that offers the highest potential for future opportunities. For instance, in Russia's operations in Crimea in 2014, the Ukrainian Army effectively used photographs posted on social media to capture the activities of separatists and the Russian equipment provided to them.[32]

Based on the identification of research gaps and their relevance to the roles of the Australian Army in the Indo-Pacific's grey zone, this article is informed by primary research conducted to (1) identify strategic concepts and/or roles that enable the Army to support the national strategy and (2) identify and evaluate specific response options.

Research Method

The data collection process undertaken to explore opportunities and to inform strategies for the Australian Army in the context of the grey zone involved sourcing publicly available social media content posted on Twitter (now X), between November 2021 and December 2022, utilising TalkWalker, a social media listening platform. This timeframe was deemed most relevant to this study as it encompassed relevant recent geopolitical developments. These events included the lead-up to and eventual Russian invasion of Ukraine, the ongoing security dilemma between China and Taiwan, and the China–Solomon Islands pact.

Social media monitoring and analysis tools play a crucial role in navigating the complexities of grey zone warfare, as demonstrated by several studies. Andreadis et al.[33] and Sufi[34] highlight the importance of these tools in tracking and analysing terrorist activities and cyber threats, respectively. Cárdenas et al. further emphasise their role in detecting radical behavioural traits for national security.[35] Aupetit underscores the significance of these tools in providing critical situational information during crisis situations.[36] These studies collectively emphasise the pivotal role of social media monitoring and analysis tools in addressing the challenges of grey zone warfare. The use of AI-assisted social listening tools provides deeper insights into the rapidly evolving and contentious social media landscape, which has become an important area of influence operations in the grey zone.

The data collection resulted in the creation of two main datasets. One had 6,549 entries (full dataset) and the other had 250 entries (engaged dataset) represented by the top 250 posts that received a reaction after viewing.

The data were analysed using Leximancer, a computer-assisted qualitative data analysis software program specialising in text mining and thematic analysis.[37] Thematic analysis involves systematically identifying and reporting textual meanings, consistencies and patterns in qualitative data. Leximancer detects key concepts and associations between them, forms themes, and visually presents the output in the form of a concept map.[38]

Results and Key Recommendations

Figure 1: Concept Map reveals six primary themes identified by the Leximancer analysis.

As shown in Figure 1, the concept map reveals six primary themes identified by the Leximancer analysis. These themes provide valuable insights that form the basis of the key recommendations presented in this article and are discussed below.

Unpreparedness

'Unpreparedness' emerged as an overarching theme within the dataset. In this context, unpreparedness denotes the lack of readiness on the part of the state when confronted with specific events. The data revealed a widespread lack of preparedness among states to effectively deal with grey zone activities. A representative finding illustrative of states' known inability to deal with ambiguous threats was shown in a post on X:

> *China is subjecting Indonesia to maritime grey zone tactics as competitive acts between states [fall] short of all-out warfare in the North Natuna Sea. China pursues these objectives in the knowledge that Indonesia will fail to respond properly.*

The heightened vulnerability associated with states' unpreparedness for grey zone activities can be illustrated by the Taiwanese military's lack of readiness to respond to Chinese jets entering their airspace. For instance, one tweet read, 'Taiwan scrambles fighters to warn off 29 Chinese aircraft', with the term 'scrambles' carrying particular significance.

Grey Zone Attacks

This theme emphasises the use of unconventional tactics, such as disinformation, to disrupt various domains, particularly the cyber domain. It also highlights the need for states to enhance their cyber readiness to respond to and prevent grey zone activities in this domain. Illustrating this theme, one tweet stated:

> *The so-called grey zone between war and peace in #cyberspace has been increasing for some time now, and this has some clear implications for organisations and their cyber-risk exposure.*

This theme highlights the perceived challenge of halting grey zone activities, a dynamic that is illustrated by this social media post:

> *China will never do a direct act, but who will stop it from doing grey zone warfare? It would start troubling Taiwan one way or the other … It's a given.*

Strategic Objectives

This theme centres on strategic factors considered essential for achieving particular objectives, such as anticipating the strategic aims of adversaries. This is reflected in the prominence and interconnectedness of concepts such as 'negotiations', 'escalation', 'presence', 'engineer', 'strategy', and 'adversary' evident in social media content. Notably, social media users have commented that the tensions can be reduced by aiming to enter negotiations between nations about nuclear weapons. Its relevance is illustrated in this tweet: 'India is witnessing trailers of future conflicts, and its adversaries will continue their efforts to achieve their strategic aims.'

Unresponsiveness to Activities

This theme highlights the persistent failures of states worldwide in addressing grey zone activities. It reflects the prominence and interconnectedness of concepts such as 'spike activity', 'renewed activities' and 'responding' within social media content. As identified by the NDS, the current global strategic environment is the most challenging since World War II.[39] Our research provides evidence to support this. For example, in the context of unresponsiveness to activities, social media users mentioned the Trellix Advanced Research Center predicting an increase in cyber attacks that would 'renew' geopolitical tensions in the year 2023: 'Trellix anticipate spikes in geopolitically motivated attacks across Asia and Europe, hacktivism fuelled by tensions.'

Repeated Security Breaches

This theme highlights the recurring nature of grey zone activities. It suggests that security breaches that have occurred will continue occurring, as they are repetitive in nature and are not one-off, further enhancing the escalation or spike in grey zone activities. It was shown in social media users' comments about China's use of grey zone tactics against Taiwan on a 'repeated', recurring basis—for example, 'Taiwan calls China's repeated nearby military activities "grey zone" warfare'.

Readiness Failure

This theme highlights the inability of states to adequately protect their national security against grey zone activities. This theme suggests that despite a nation's readiness plans, unforeseen readiness failures do occur in the process of strategising and planning, exposing vulnerabilities in a nation's security. This is reflected in the prominence and interconnectedness of concepts such as 'anticipation', 'monitoring' and 'failure'. Notably, the number of social media user-generated content items about China's grey zone activities towards Taiwan have also increased in the recent past—for example, 'Renewed spike in Chinese air force activity'.

Key Recommendations

Unlike its approach to projecting military forces (e.g., developing capabilities such as long-range missiles and special forces), the Army has not clearly defined what role it can play to best support the Australian Government to compete in the grey zone. This is largely because action in the information domain, where most grey zone activities have been focused, is largely driven by joint (e.g. Defence's Cyber Command) or even national strategic or national intelligence strategy and actions. Even in the non-information domain, many of the initial actions may be undertaken by other government agencies such as the Department of Home Affairs, the Australian Security Intelligence Organisation, the Department of Foreign Affairs and Trade and the Australian Signals Directorate. However, we suggest that there are important particular and appropriate roles that the Army can play.

Informed by a literature review, examination of relevant defence policy guidance, and insights gained from social media data analysis, the following recommendations inform the Australian Army decision-makers of the potential for a land force capability to play a pivotal role in effectively shaping, deterring and responding to grey zone activities within the Indo-Pacific region.

Recommendation 1

The Australian Army can play a leading role in relevant contexts to deter disinformation in the Indo-Pacific's grey zone. This strategic pivot is supported by the fundamental shift in Australia's defence strategy outlined in the Australian Government's 2024 NDS, which identifies deterrence as

the primary strategic defence objective[40] and emphasises the increasing challenges posed by grey zone activities, such as disinformation and cyber attacks.[41] The results of the social media content analysis—particularly as they relate to the key themes 'Unpreparedness' and 'Grey Zone Attacks'—highlight the urgent need for this strategic shift to occur. As outlined above, an overarching theme is the widespread unpreparedness of states to respond to grey zone activities despite the prevalence of such disruptive activities across various security spheres, including the cyber domain. The outcomes of the literature review support the proposition that the Australian Army can play a critical role in addressing grey zone activities, particularly through information operations and the integration of cyber capabilities.

One possible option to bolster the Army's role in countering disinformation is to capitalise on the capabilities of the Australian Army Intelligence Corps (AAIC). Specifically, there is scope to enhance close collaboration between the AAIC and Australia's regional military partners to focus more actively on reconnaissance, intelligence and surveillance to combat disinformation in the Indo-Pacific region.[42] The Army is an appropriate organisation to foster such connections because it remains the dominant branch in the defence forces of less developed Indo-Pacific nations like Indonesia.[43] The fact that such collaboration is warranted is supported by strategic analysts such as Dobbs et al., who suggest that the ADF should enhance its ability to counter grey zone activities through investments in personnel, doctrine and training.[44] Furthermore, Dobbs et al. argue that the ADF should contribute to niche capabilities by training covert and military forces and conducting joint training with partner nation forces.[45] The Army's suitability to lead this initiative is underscored by its philosophy of 'Good Soldiering', which emphasises key values such as people, preparedness, profession, potential and partnerships.

To give effect to this recommendation, the Army could consider deploying a dedicated permanent force of AAIC personnel to work with close regional partners in order to enhance intelligence sharing and to facilitate joint training exercises. Such a partnership would take the form of an ongoing security presence rather than being centred around participation in biennial events such as Exercise Talisman Sabre. A partnership of this nature would have the added benefit of serving as a component of the Army's forward presence structure, thus signalling Australia's commitment to strategic deterrence.[46] Importantly, this approach aligns with the NDS imperative

that the ADF contribute to the collective security of the Indo-Pacific region through collaboration with partners.[47]

In terms of partnerships, besides the initial priority accorded to alliance members like the US and New Zealand, the Army can build on its strong longstanding relationships such as those with the Five Power Defence Arrangements members (Singapore, Malaysia, UK) and Pacific island nations, before moving on to relationships with more recent partners from newer security arrangements like the Quad (India, Japan) and then moving on to newer partners in the Indo-Pacific region (e.g. Vietnam).[48]

The primary focus of the collaborative effort would be to field an Australian military capability that continuously deters disinformation and prevents recurrent security breaches. In this regard, the Army may wish to consider the establishment of a rapid response team. Such a team would focus on promptly addressing the surge in disinformation during periods of heightened grey zone activities, such as when maritime disputes arise between countries—for example, China and Indonesia in the North Natuna Sea. Once the partnership has been successfully established among Australia's closest regional partners, it could be expanded to include a broader range of nation-states from within the Indo-Pacific. Building on this initiative, the Army could consider adapting the training and development programs for all regional land forces to help address the growing challenge posed by the full-spectrum nature of grey zone activities in modern warfare.

Recommendation 2

The NDS emphasises that technology has diminished Australia's traditional geographical advantage, leaving the nation susceptible to cyber attacks.[49] Additionally, the NDS reinforces the significance of the cyber domain, placing it on par with Australia's traditional domains—maritime, land and air.[50] The results of the social media content analysis mirror the priority placed on the cyber domain by Australia's defence strategy. Specifically, the cyber threat recurs within the themes 'Strategic Objectives', 'Unresponsiveness to Activities', 'Repeated Security Breaches' and 'Readiness Failure'. Furthermore, themes such as 'Unresponsiveness to Activities', 'Repeated Security Breaches' and 'Readiness Failure' highlight shortcomings in Australia's capacity to effectively safeguard against grey zone activities.

In response to the rapidly evolving threat environment within the Asia-Pacific, this article recommends that the Australian Army assume a more dominant role in the cyber domain. Given that the Army has the highest reliance on human capital in terms of capability development among the three services, it arguably has the most at stake. Further, the Australian Army faces unique challenges in deterring grey zone activities conducted by both state and non-state actors in the cyber domain. This is partly due to the Australian Army's current role in cyber, which involves (among other things) the secondment of personnel to external government security agencies. Additionally, the Army faces command and control difficulties in the cyber domain, particularly when integrating cyber operations with land capabilities.

There are inherent complexities in effectively tackling grey zone activities, but given the increasingly complex and opaque nature of Australia's strategic environment, there is no better time than the present to address these issues. While integrating cyber capabilities into the role of a land force is inherently challenging, through debate, innovation and commitment to change, Army can navigate this inflection point effectively and optimise its capabilities in the grey zone.[51] In achieving this objective, the Army must be prepared to invest more in intelligence systems capable of detecting cyber operations conducted by both state and non-state actors. Such investment would enable the Army to better monitor, analyse and respond to these threats.

The establishment of an army cyber school has benefited the US military and could be similarly advantageous to Australia. The United States Army Cyber School was established in 2015 within the Cyber Center of Excellence at Fort Gordon, Georgia.[52] Since then, the US Army has successfully attracted some of the world's leading cyber professionals to serve, either in uniform or as Department of the Army civilians.[53] A related approach in Australia could complement current joint initiatives such as the ADF Cyber Gap Program, a 12-month online initiative that enhances participants' skills and employability in the cybersecurity field.[54] It would also dovetail with existing service-specific initiatives like the Australian Army's cybersecurity pathways introduced through ADF recruitment programs. Once recruited as cyber analysts, personnel could undertake further training at an Army-led cyber school to provide the professional training necessary to operate effectively as cyber specialists within the ADF.[55]

As a precursor to establishing an army cyber school, the Army should consider further targeted collaboration with academia and industry. Institutions such as universities have unique perspectives on how to identify, address and train to meet grey zone threats. Leveraging this expertise, the Army has the opportunity to develop collaborative training with universities that have extensive cybersecurity expertise in both offensive and defensive operations in cyberspace. Focal areas of study could include protecting data and networks, utilising net-centric capabilities, detecting threats, responding to cyber attacks, and deploying tools or techniques—whether software, firmware or hardware—that generate cyber effects across all domains.[56]

Alternatively, if other government agencies and military services have already initiated these efforts, the Army could plug into these initiatives, thereby enhancing the interdependence and convergence between land forces and other forms of military power. The Army has described this convergence of change as 'Accelerated Warfare' whereby land forces need to be ready to do more tasks, fight at all ranges, and enable the joint force in every domain. However, this also needs to apply to responding to state and non-state actors that are using coercive means, below the threshold of conflict, to gain an advantage and disrupt other actors as part of grey zone competition.

Conclusion

The evolving landscape of grey zone activities indicates that states are by no means the sole source of security threats. Both state and non-state actors employ offensive cyber operations in grey zone activities such as espionage and disinformation.[57] Consequently, military forces and their personnel must gain a deeper understanding of the actions and developments of non-state actors involved in these activities within the cyber domain.[58]

This article firmly establishes that grey zone activities in Australia's primary area of military interest, the Indo-Pacific region, pose significant threats to both Australia's national security and the region's prosperity and stability. However, the Army has not clearly articulated its role in supporting the Australian Government's efforts to compete in the grey zone. The purpose of this article is to enhance the Army's understanding of its pivotal role

in shaping, deterring and responding to grey zone activities in the Indo-Pacific region. Specifically, it has identified strategic concepts and roles that could enable the Army to better support the national strategy; and it has presented and evaluated specific response options.

By investing in intelligence systems capable of detecting cyber operations conducted by both state and non-state actors, and by enhancing the role of the AAIC, the Army can enhance its capabilities in detecting, understanding and responding to the latest developments in digital influence activities. By collaborating further with academia and industry, the opportunity exists to gain a deeper understanding of how state and non-state actors operate in cyberspace and how to effectively respond to and deter these activities. Thus, the insights and recommendations provided in this research paper can guide decision-makers in the Australian Army, inform policies, and contribute to shaping the Australian Government's strategies to deter grey zone activities in the interconnected and technology-driven Indo-Pacific region.

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Examining Efficacy of Administrative Sanctions in Army

Lincoln Sudholz

Introduction

Systems of people management are one mechanism of retaining and developing an effective workforce. The administrative sanctions system of the Australian Defence Force (ADF) plays an important role in the career management of military personnel. While primarily intended to protect the 'efficiency, reputation or operational effectiveness of the ADF',[1] it also provides an opportunity for individual behaviour change. The effectiveness of this rehabilitation and its real-world impact on an individual's career is debated.

With many negative personal anecdotes about the system, it is crucial to understand the effects of the administrative sanctions system on individuals' behaviour and attitudes. Further, as outlined in the Defence Strategic Review,[2] the ADF is striving to increase retention to meet the government's mandated increase in personnel levels. To accomplish these objectives, Defence must ensure that individuals who are rehabilitated through sanctions opt to remain in the ADF, while effectively separating those who are no longer fit for service.

What Is the Sanctions System?

The administrative sanctions system is designed to balance service interests (those of the organisation) and the interests of the individual when misconduct occurs,[3] with a particular focus on upholding the 'interests of the Defence Force'.[4] This includes retaining members who have exhibited behaviour contrary to Defence values but demonstrate the capacity for improvement. To function optimally in conjunction with career management, sanctions should actively encourage and promote such behavioural change.

The use of sanctions can encourage service members to modify their behaviour, with the goal of retaining them within the organisation, or terminating their service if they cannot. However, in cases where misconduct is particularly egregious, even if there is potential for rehabilitation, continued service may not align with the interests of Defence. The system comprises various measures that may be imposed when a member's conduct or performance falls below the expected standard for their designated role, including when their continued retention is deemed to be not in the best interests of the ADF.[5]

The administrative sanctions system complements the *Defence Force Discipline Act 1982* (Cth) (DFDA). The DFDA addresses violations of military rules and regulations and provides for the imposition of penalties through a process of charge, trial and conviction. The primary aim of the military discipline system is to punish and deter future misconduct. The administrative sanctions system can sometimes be used for misconduct that may also be dealt with by the DFDA. Rather than a strict disciplinary measure that deters, the administrative sanctions system focuses on organisational risk management. It is a key component of the overall personnel management system and can be a means of motivating and supporting personnel to achieve optimal performance. Specifically for sanctions that are outlined in the Defence Regulation 2016 (Cth), Part 1, regulation 3 describes its purpose as to 'provide personnel management that supports the appointment, enlistment, promotion and retention of appropriate persons for service in the Defence Force'. Focusing on retention, most sanctions are intended to act as a powerful motivator to achieve compliance with desired standards, or alternatively serve as grounds for dismissal in the most severe cases.

Does this hold true? On paper, the intention of an administrative sanction is to encourage better performance by reducing the risk of adverse impact of the past misconduct and the risk of its recurrence. If the individual improves their conduct, they will not be at a disadvantage after the sanction period has expired. The temporary nature of time-based sanctions reflects an agreement that if a member recalibrates their behaviour, they will return to normal career management. However, while the system of administrative sanctions is intended to 'reward' behaviour changes by supporting the member's continued service, it can still be perceived as having a lasting negative impact on an individual's career. For instance, expired formal warnings can be taken into consideration when assessing a member's suitability for promotion within a reporting period. Considering these aspects, although the administrative sanctions system is designed to promote fairness and encourage behavioural change where appropriate, the perception of its long-term impact on an individual's career and the potential for variation in decision-making can raise questions about its overall effectiveness and fairness.

What Is a Good and Fair Decision?

Trying to quantify fairness and good decision-making is difficult and often subjective. When it comes to sanctioning misconduct or poor performance it can be hard to determine whether individuals are being treated fairly. While the administrative sanctions system generally adheres to procedural justice, there is still potential for decision-makers to introduce personal biases[6] or values or inconsistencies into their decision-making, which can create a perception that the system is unfair. This is a problem because military organisations regard consistency as a core value of administrative decision-making—and military members expect to be treated fairly and reasonably consistently under military processes. As a result, it is important to carefully consider the impact of ADF administrative sanctions and to explore ways to promote greater fairness and consistency in the process of sanctioning service members. To support such analysis, this article uses the ideas of organisational justice and 'noise' in decision-making as a point of reference.

Organisational Justice

'Organisational justice' refers to the fairness and equity of decision-making processes within organisations. Jason Colquitt[7] introduces the idea of procedural justice in relation to the four dimensions of organisational justice. According to Colquitt, there is procedural justice when (1) there is application of the same process, (2) the individual has a voice within the process, (3) there is a lack of bias, and (4) there is consistency (i.e., the fairness of 'means' rather than 'ends'[8]).

The legal requirement for procedural fairness can be seen within the administrative sanctions process when members have the right to reply when a sanction is to be imposed on them, and the decision-maker is not personally biased. Procedural justice is a different framework for analysis. While the military's administrative sanctions process adheres to Colquitt's principles of organisational procedural justice, as outlined above, consistency will be compromised when decision-makers fail to make impartial decisions, and this can lead to unfairness. This, in turn, affects the individual's willingness to accept the sanction, and their motivation to engage in rehabilitation. This further impacts their long-term career progression, competitiveness for promotion, and training opportunities, potentially increasing their likelihood of separation.

While assessments of fairness generally focus on the impact on the individual sanctioned, there are organisational factors that can influence a decision-maker's ability to make consistently fair decisions. Decision-makers must follow certain rules and procedures to ensure that their decisions are fair and just. Following a fair process means having a transparent, consistent and unbiased decision-making journey. Achieving a fair outcome means having a just, reasonable and proportionate result that takes into account the organisational needs and individual circumstances. However, research has shown that the continual application of a strict process can sometimes lead to decision fatigue where the decision-maker starts to lose their capacity for self-regulation.[9] This makes it harder for them to block out personal biases and other distractions, leading to fewer fair decisions.

The same research showed that interpersonal justice could offset this fatigue.[10] Interpersonal justice is about treating people with respect and fairness when making decisions and involving all parties in the resolution. This includes measures such as informal counselling or trying to find a solution that works for everyone involved. For example, if someone has been accused of not putting in enough effort at work, the supervisor might talk to them and the person who made the complaint to try to find a way to make things better. The use of interpersonal justice can be rewarding and restorative for a decision-maker. Promoting interpersonal justice is important because it helps decision-makers stay focused and make better decisions. Research suggests that decision-makers who rely solely on rules and procedures become more fatigued in the decision-making process, as they strive to suppress more decision influences and adhere strictly to the process instead of assessing the case and making a good decision. This can lead to fewer fair decisions and make people feel that the system is unfair. For example, if someone receives a punishment that seems too harsh or does not make sense, or did not have the opportunity for interpersonal justice, they might start to lose trust in the system.

Noise

The book *Noise*[11] discusses the phenomenon of noise in decision-making within organisations. In the authors' view, noise is essentially inconsistency: random variability across individuals in decision-making. It differs from bias as it can be measured without knowing about the decision to be made. Noise has no pattern; if the same average-quality service member would be rated 'excellent' by one supervisor and 'terrible' by another, the rating process is noisy—even though on average the ratings are accurate.

A good example is a 1970s study that sought to measure noise in decision-making. The study was undertaken to examine the fairness of the judicial system. The starting proposition was that one would expect judges to impose relatively similar punishments for the same criminal offences. Reviewing judgements made by 208 judges in the US criminal system, however, the study found a mean absolute difference of 3.8 years on an average sentence of seven years.[12] This meant that the same crime could attract vastly different sentences depending on the presiding judge. To reduce this variability, 'guardrails' were subsequently introduced.

This involved the introduction of narrower guidelines on sentencing that preserved judges' discretion on what sentences could be given, while reducing variability.

While noise can diminish the quality of decision-making, there are circumstances in which it is warranted. Variation in decision-making would be desirable, for instance, when there are many solutions to a problem. The Australian military applies the principle of 'mission command' decision-making—simply put, it directs members on 'how to think', not 'what to think'. This is an example of embracing noise in decision-making where random variability has the potential to provide a unique way to solve a problem. While appropriate in warfare, uncertainty does not assist the quality of administrative decision-making. In this setting, noise can cause a wide variation in procedural decisions, which can result in injustice.

There are reasons to think that noise is especially pronounced in military decision-making. First, the military often uses joint (ergo, group) processes for decision-making, which can be affected by noise. Noise can be amplified by groups depending on what should be irrelevant factors, such as doing what is thought to be popular. Kahneman et al.[13] emphasise that 'ideas about politics and economics are a lot like movie stars. If people think that other people like them, such ideas can go far'. Second, the military expects members to demonstrate certain behaviours and values through their decisions. This can cause variability in decisions made by military members who believe that a certain type of decision will be looked on positively (e.g., an Army infantry senior enlisted handing out a harsher sanction than a non-combat senior enlisted would). This can also come from objective ignorance, the idea that you think your personal instinct is better than analysis. Third, the military inculcates a 'bias for action', thus imbuing an overconfidence that creates noise from objective ignorance. Within the administrative management system, the military does not use significant matching or scales to guide decision-making, which introduces noise as everyone must apply their own judgement on each decision they make.

While it may be difficult to achieve, consistent and objective decision-making is a key factor in organisational fairness within a performance management system. When there is a lack of perceived fairness and transparency in decision-making, it can lead to a negative perception of the organisation, as 'duty and drive do not march in lockstep with discontent'.[14]

Negative perceptions of organisational fairness can be a driver of undesirable behaviours such as voluntary discharge or continued poor performance. Ensuring that decisions concerning administrative sanctions are consistently sound is therefore key to maintaining the perception of fairness.

In the context of administering sanctions, decision-makers typically do not have access to previous outcomes from similar situations, making each decision a unique challenge. Each time a member conducts himself or herself poorly, the situation is treated in isolation, and the decision-maker is tasked to apply individual judgement in order to determine the appropriate outcome. In these circumstances, it is important that the decision-maker has a frame of reference—either guidelines or another form of anchor[15]—to support efficient and fair decision-making.

Studying the Army

To analyse the administrative sanctions system, research conducted for this article covered full-time Australian Army personnel who served between 2011 and 2021, creating a sample size of 57,230 unique individuals. This used a combination of HR Data Warehouse and sanction steps data from Defence's Personnel Management Key Solution (PMKeyS) system. This research looked at the collective body of sanctions that were both bound to a timeframe and enduring. Fifty-eight per cent of sanctions recorded in the data were formal warnings, followed by formal counselling at 22 per cent. Notably, a total of 1,536 individuals received one or more administrative sanctions during the observation period. The only sanction excluded from the study was termination of service.

There were some limitations to the study, such as the lack of detail on the reasons for each sanction, which made it difficult to consider the severity of the circumstances. There was limited supervisor and imposing authority data to track decision-makers. It was assumed that each sanction code was applied in isolation, to simplify the modelling—i.e., a member could have received a formal warning after a civil offence was recorded. The study was limited to the Army data; the Navy and Air Force apply the system of administrative sanctions differently. This means that it is not possible

draw ADF-wide conclusions based on the study findings. Nevertheless, by leveraging this rich and extensive data, the study aimed to gain insights into the factors associated with administrative sanctions and their impact on the career outcomes of Australian Army personnel.

What Does the Data Say?

The raw data provided useful insights into the administrative sanctions system. The analysis found that there was, on average, a 1.1 per cent chance of anyone getting a sanction each year, indicating that only a small section of the Army population were found to have committed violations. However, over the 10-year period to 2021 there was a substantial increase in the number of sanctions, as illustrated by Figure 1. Across this period, the population size of the Army stayed relatively stable between 29,000 and 30,000 people.

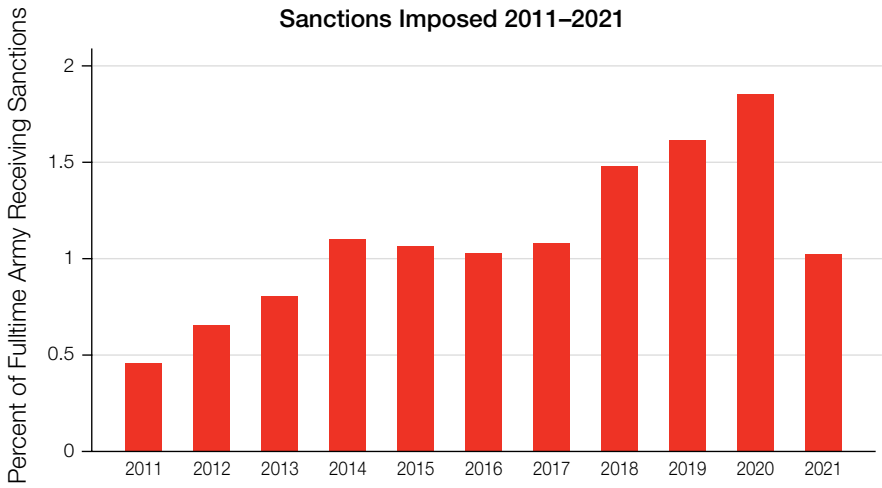

Figure 1. Percentage of full-time Army personnel receiving sanctions: 2011–2021

In 2014, the year after the withdrawal of Australian troops from Tarin Kot, Afghanistan, there was a significant jump in the number of sanctions. With fewer overseas deployments, the Army refocused on the 'raise, train, sustain' cycle of domestic operations and placed more emphasis on training and performance management than on operational preparedness. This factor may account for the rise in sanctions. Further, this article contends that increased media scrutiny[16] and cultural reviews from 2012 onwards[17] may have led to a change in focus on discipline over the period 2018–2020, potentially contributing to a significant rise in sanctions over the period. By contrast, in 2021 there was an almost 30 per cent drop in sanctions. This reduction could be attributed to the impact of COVID-19 lockdowns and responses. The lockdowns may have led to less focus on workforce performance management, particularly in New South Wales and Victoria, where many people were working from home for extended periods. In this environment, there may have been less opportunity and desire to conduct performance management.[18]

Another interesting insight was around the most common durations of sanctions (that had a timeframe), as presented in Figure 2.

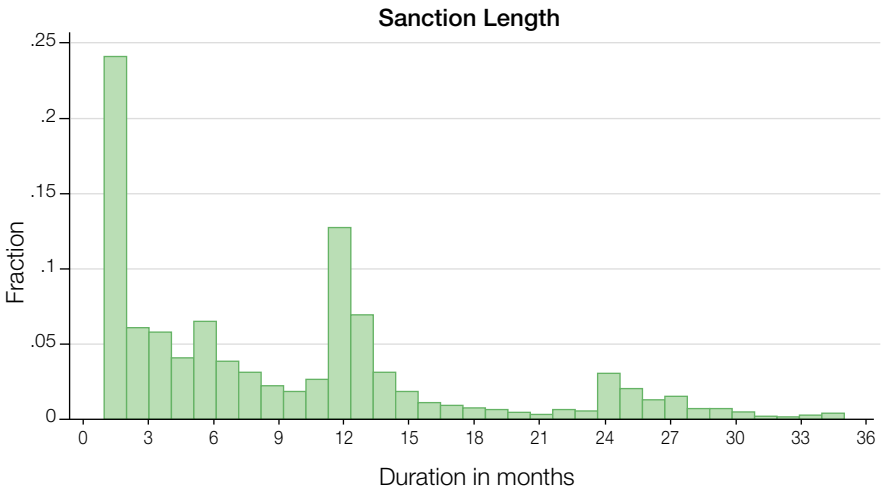

Figure 2. Fraction of sanctions by duration

Formal warnings make up the majority of the sanctions that have timeframes. Commanders exercise complete discretion in determining the duration of these administrative sanctions, but they tend to cluster around similar timeframes. Notably, while most sanctions are for a one-month to three-month period, there are also relatively high percentages of sanctions imposed for six to 12 months and for 24 months. These clusters may be associated with the Army's standard 12-month performance reporting period (which includes a six-month review). Specifically, commanders may be determining the appropriate sanction length with reference to the member's reporting period. Such an outcome may be representative of 'anchor bias', a situation that can result an unfair appraisal of a member's culpability.[19] The concept of 'anchor bias' refers to a reference point that a person uses when making a decision but can be irrelevant. For example, a decision-maker could impose a sanction of six or 12 months' duration based on a reporting cycle, even though they have the option of any length in between. While such a decision may fit best with the reporting cycle, it does not necessarily provide a suitable duration for the member to demonstrate rehabilitation.

Are We Making Noisy Decisions?

As discussed by Kahneman et al., a prerequisite for identifying strong noise is the detection of a wide variation of sanction durations across reason types by supervisor. To test this factor, the dataset was collapsed so that each observation was delineated by supervisor and sanction reason. For each unique combination of supervisor and sanction reason, a calculation was made of the average duration. This enables analysis of supervisor-level averages across reasons.

Table 1 illustrates the variation in sanction lengths among supervisors for different types of violations. The top row shows that for alcohol-related violations, 114 supervisors issued sanctions with an average duration of 11 months. A quarter of the sample received sanctions of less than seven months, while another quarter received sanctions of more than 13 months for the same violation. The middle 50 per cent of sanctions for alcohol-related violations had durations between seven and 13 months, indicating that some supervisors were more lenient while others were stricter. The second to last row shows that unsatisfactory conduct had a similar mean

duration but a greater range of variation, nine months, between the 25th percentile (P25) and 75th percentile (P75). This result indicates a higher degree of variation in the length of sanctions among supervisors for this type of violation. In contrast, physical fitness failures had the narrowest variation, four months, likely due to the presence of policy-mandated guidelines for this type of violation.

Table 1. Average supervisor-level sanction length (in months) by reason

	Average Months	P25	P75	Total
Alcohol	11.11	7.00	13.00	114
Civil conviction	12.34	6.00	15.00	179
Civil offence	13.20	7.50	16.00	70
Non-medical use drugs	9.57	2.75	15.00	72
Personal qualities	12.68	6.00	18.00	62
Physical fitness failure	5.74	2.00	6.00	331
Police report	15.00	6.00	29.00	5
Security violation	7.00	1.00	13.00	2
Unsatisfactory conduct	11.14	5.00	14.00	605
Total	10.14	3.73	13.00	1,440

It is unclear whether the wide range of sanction durations for alcohol-related violations and unsatisfactory conduct is justified. Without additional information about the specific circumstances of each case, it is difficult to determine whether supervisors are giving longer sanctions for more severe violations, or if there is a lack of consistency in the decision-making process. For example, a supervisor may give longer sanctions for cases of long-term alcohol abuse, but he or she may give shorter sanctions for a one-off violation. Similarly, there may be a wide range of circumstances that could lead to a sanction for unsatisfactory conduct, which could justify varying durations. However, if alcohol-related misbehaviour tends to be similar across cases, this variance could indicate inconsistency or noise in the system.

Is Service Length Reduced by Sanctions?

Receiving a sanction in the first two years of service can have a materially negative effect on a military member's career. This conclusion is based on survival analysis[20] and regression analysis.[21] The survival curves were plotted against years of service for those who had (and had not) received a sanction in their first two years of service. Relevantly, when calculating the curve there was no distinction made between separation types. Ultimately, the data did not provide sufficient detail to indicate how voluntary separations relate to sanctions (and we could not interview members to ask why they chose to discharge). Various reasons for a voluntary separation may be directly or indirectly influenced by a sanction. Additionally, if a member has a sanction and his or her service is separately terminated, it may indicate that the sanction did not change the member's behaviour as intended. Figure 3 shows the survival for the entire population.

This figure suggests that those who did not receive a sanction had a consistently higher survival rate than those who did. After three years, only 84 per cent of those who received a sanction remained in the service, compared to 93 per cent of those who did not, representing a 9.7 per cent lower survival rate. One factor affecting these findings is Army's imposition of an initial minimum period of service (IMPS) obligation for other ranks. IMPS is the contractual obligation for other ranks to remain in Army before they can voluntarily separate. This obligation would incentivise individuals not to separate earlier even if they had received a sanction.

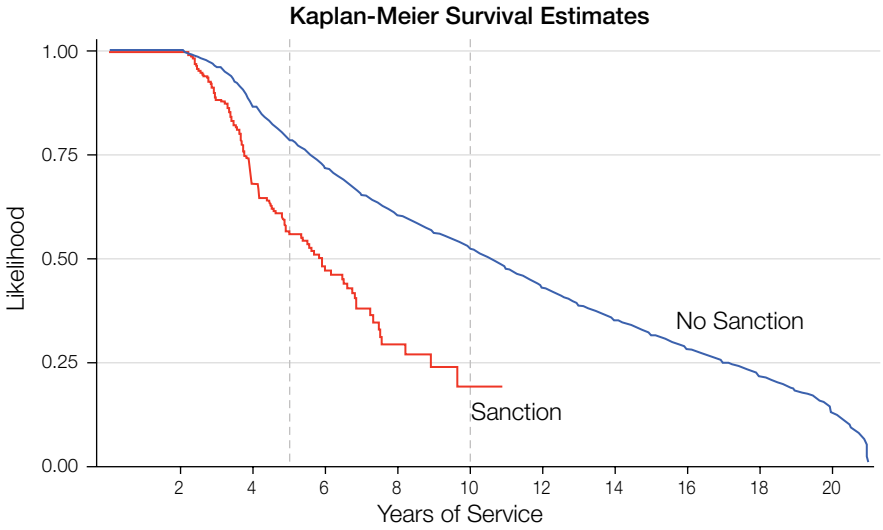

Figure 3. Kaplan-Meier survival curve—sanction received in first two years of service

The gap between early sanction and no sanction becomes more pronounced as years of service increase. At five years, there is a 25.5 per cent gap between the survival rates of non-sanctioned and sanctioned members, and this gap grows to 53 per cent for 10 years of service. For years of service, this difference applies to both voluntary and involuntary separations and indicates that a sanction is a significant disadvantage for a long-term career. It is also worth noting that the survival estimates stop at 10 years for those who received a sanction in their first two years of service, indicating that all members who met this criterion did not have a career lasting longer than 10 years. This suggests that receiving a sanction early in one's service could be a barrier to long-term service.

While the data may show a correlation between sanctions and shorter army careers, it may simply be the case that those receiving sanctions are fundamentally unsuited to long-term military service. An early sanction could be a marker of those who have slipped through the screening mechanisms of recruit training and initial employment training. If someone has such poor performance early in their career that they require a sanction, they may not have achieved a longer career, regardless. Further investigation of the career performance of those who are subjected to early sanctions could shed some light on this.

To further test the correlation between sanctions and career longevity, this study used linear regression analysis. Linear probability models (LPMs) are a statistical tool used to investigate the relationship between two variables, such as the effect of receiving a sanction on the likelihood of leaving the ADF. LPMs are a straightforward way to estimate the probability of an event occurring based on changes in the values of other variables. Three models were constructed to examine the relationship between separation and sanction reasons, with increasingly strict controls. This analysis aimed to highlight factors that could be the actual reason why a member separated and to ascertain the true probability that a sanction is the reason for separation.

Applying LPM analysis methods, this study found a positive relationship between members receiving a sanction within the first two years of being enlisted or appointed, and the likelihood of their leaving the Army. The significance level of this finding was 95 per cent or higher, which means that there is a high level of confidence that the result is not due to chance. Once all available factors were taken into consideration, the models showed that those with a sanction at two years have a 10.4 per cent increased likelihood of separation.

In addition to the already negative long-term career prospects indicated by the survival-curve analysis, the findings of the linear regression analysis serve to compound the issue. Specifically, the results suggest a significant positive association between the occurrence of a sanction during the first two years of service and the likelihood of separation from the Army. This finding strongly suggests that an early sanction can act as a hindrance to long-term service regardless of whether the member's behaviour is changed.

Proposed Changes

The study's finding that a sanction can have long-lasting effects on an individual's career trajectory indicates that the administrative sanctions system does not encourage long-term retention. However, this does not mean that the system is failing to achieve its objectives. It is possible that administrative sanctions serve to indicate those who do not belong in the organisation. After all, administrative sanctions are typically imposed for a significant violation of the standards required by Army. By regularly monitoring the sanctions system, the Army can gain insights into its fairness and effectiveness, such as the number and types of sanctions issued, the reasons behind them, and their impact on the personnel who receive them. This monitoring can also help identify potential biases or inconsistencies, allowing corrective action to be taken.

Training and Education

Army officers and non-commissioned officers are trained in performance management during their all-corps training continuum. Using sanitised vignettes of previous cases, students could be provided such case studies and given a short period within which to assess whether a circumstance warrants an administrative sanction and, if so, for what duration. This data could be collected and presented back to the class to show how their decisions varied (with a comparison to previous years). This information could be used to teach the principles of organisational justice and noise. To support such learning, the ADF (and particularly the Army, through *The Cove*[22]) has a large body of professional development material around bias in decision-making. It is fair to say, however, that the concept of 'noise' is less well understood. Exposure to data on student's own decisions would help expose how severe (or lenient) they tend to be in their application of sanctions, and the variability that can inadvertently occur in determinations around sanction timeframes. This information would be particularly useful in the pre-command course for commanding officers who often perform the function of imposing authority for administrative sanctions.

Another way to improve consistency in decision-making would be to publish something similar to the US military's annual 'Status of Justice' report.[23] This report provides statistics on both discipline and non-judicial punishment

issued across all services. Because the ADF system of administrative sanctions operates separately to the DFDA, the Australian version would need to separate the two categories of reporting. Such a reference could be published by the career management agencies and folded into performance appraisal information provided to the whole workforce.[24]

Decision Support Tools

Although the military discloses the results of DFDA action by courts martial and Defence Force Magistrates, there is no readily accessible database of administrative sanction outcomes. A decision support tool could be developed to provide decision-makers with basic information about similar cases and outcomes to facilitate more consistent decision-making. This would reduce the unnecessary variability in sanction durations while still enabling commanders to apply nuance in their decision-making. There is a risk that this measure could unduly influence decisions—a time-poor decision-maker could just copy the existing determinations to reduce their deliberation time. Such an outcome would have the detrimental effect of reinforcing someone else's decision instead of providing a bank of clustered decisions with some variation. For example, if the average duration of sanction was particularly harsh in regard to a particular category of violation, then this circumstance would be reinforced over time. This could be mitigated with spot-check reviews by an independent organisation to ensure the system is being used correctly.

Calibration of the Individual

The Army should provide targeted support for personnel who have been subject to administrative sanction. The ultimate objective of the system of sanctions is to protect the organisation and risk-manage the individuals who have been retained despite their misconduct. This creates a situation that imposes an obligation on the organisation to provide the optimal conditions for a member to rehabilitate. Support measures could include specific calibration and training opportunities to enhance a member's performance and to reduce the likelihood of future sanctions. The achievement of rehabilitation milestones could be recorded as a part of the performance appraisal system or built into the PMKeyS system under the sanction reporting.

The provision of targeted support would demonstrate the Army's commitment to its personnel and thereby encourage retention. Leaving someone to his or her own devices, or even making the journey harder, will inevitably disincentivise better behaviour. By contrast, incorporating defined goals and incentives into the sanctions process would promote transparency and accountability. While increased management and reporting creates a personnel management overhead, it is warranted when the issue at stake is whether an individual is worth the effort of rehabilitation.

Conclusion

The ADF's administrative sanctions system plays a critical role in the Army's management of its personnel's careers. However, to encourage retention, the system must be fair and effective. If the Army is to maximise retention of its workforce, a more comprehensive rehabilitation approach is required. The measures outlined above could assist the Army in achieving its workforce goals by improving its understanding of the system of administrative sanctions and integrating it more effectively into the military's performance management frameworks. With widespread concerns around a decline in ADF workforce numbers and shorter careers, the ultimate goal should be to minimise the likelihood of personnel separating from the service who have the potential for long and rewarding careers.

About the Author

Major Lincoln Sudholz is a Military Police Officer in the Australian Army. He has served in various law enforcement and policing roles domestically and on operations. He has a Bachelor of Science and a Master of Business from the University of New South Wales and a Master of Management Science, Manpower Systems Analysis from the Naval Postgraduate School in Monterey, California. He is currently a Workforce Modeller with Modelling & Simulation, Military Workforce Design Division.

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19 P Bystranowski, B Janik, M Próchnicki and P Skórska, 'Anchoring Effect in Legal Decision-Making: A Meta-Analysis', *Law and Human Behavior* 45, no. 1 (2021): 1–23, at: https://doi.org/10.1037/lhb0000438; Lieder et al., 'The Anchoring Bias Reflects Rational Use of Cognitive Resources'.

20 Survival analysis is a statistical method for analysing the expected duration of time until an event occurs. In this analysis, this is how long someone remains in service until their discharge.

21 Regression analysis examines the relationship between two or more variables. In this analysis, this is the relationship between separation and sanctions.

22 *The Cove*, at: https://cove.army.gov.au/.

23 'Annual Reports', *Joint Service Committee on Military Justice* (website), at: https://jsc.defense.gov/Annual-Reports/.

24 The Inspector-General of the Australian Defence Force does provide an annual report on the military justice system but this has not been updated since 2022–23.

Operational AI Integration and Governance in the Australian Army: Overcoming Challenges for Strategic Advantage

Benjamin J. Wood

Introduction

Contemporary technological advancements in the field of artificial intelligence (AI) bring to the forefront of global discussion the possibility of increasingly integrating adaptive AI technologies into battlefield operations. This discussion frequently takes the position that AI and autonomous technologies may revolutionise warfare and deliver asymmetric advantage to nations that utilise them effectively.[1] The often-proposed benefits of military AI and autonomy are numerous, including decision advantage, the safer and more efficient utilisation of personnel, the ability to generate mass and scalable effects, and enhanced force projection.[2] However, the greatest advantage of AI and autonomy for states and their militaries may be to unlock capabilities that can continually adapt to evolving operational and tactical problems, using innovation to seize the initiative and disrupt adversaries with transient technological advantages.[3]

There are unique complexities in the land domain that mitigate against the introduction of novel technological warfighting systems. This is because, unlike in the domains of maritime, air, space and cyberspace, non-AI-

enabled software struggles to scale to the unbounded number of possible terrain-based and human variables in the land domain. AI and AI-enabled autonomous systems have particular utility in land operations because they can 'learn' how to navigate uncertainty, a characteristic which adversaries will struggle to overcome.[4] AI technology therefore presents significant potential for nations that are able to create and capitalise upon technological progress to deploy effective land-domain AI-enabled systems at scale. The possibility for these capabilities to contribute to Australia's strategic priorities prompts the question; how can the Australian Army effectively operationalise AI in the land domain, in order to maximise the strategic advantage it will provide in a future conflict?

This article explains the unique benefits and challenges to the Australian Defence Force (ADF) in its efforts to develop and use operational AI in the land domain. It argues that these unique factors are significant enough to warrant domain-specific governance considerations to ensure consistency with the broader Australian defence landscape. However, for the ADF to gain and maintain asymmetric advantage in the land domain using AI and AI-enabled autonomy, the technology needs to be reliable.[5] Armies, including the Australian Army (Army), risk operating at reduced effectiveness if the governance processes that influence land domain AI's development and use are ill-suited to the operational context. After all, a commander will not use an AI-enabled system unless confident that its use will support achievement of the mission.

This article defines AI as 'a collection of techniques and technologies that demonstrate behaviour and automate functions that are typically associated with, or exceed the capacity of, human intelligence'.[6] AI technologies, and their integration with human command and control, will be the primary driver of robotics and autonomous systems (RAS), enabling systems to reliably perform tasks or functions without (or with limited) direct human control, while continually adapting in highly dynamic environments.[7]

This article seeks to inform future efforts to apply and use AI technologies in the land domain, as well as related policy and governance frameworks. While significant progress has already been made in the research, development and demonstration of AI technologies, attention must now shift to the challenge of integrating AI within command and control architectures and developing governance mechanisms to enable its use in land domain operations.

Methodology

Much of the existing literature on AI across industries and academic fields has focused on its emergent properties and underlying technological advancements. There is typically less focus on the effective integration of AI and other emerging technologies into practical application.[8] This is despite the importance of such considerations to military success. Specifically, recent conflicts in Syria, Ukraine, Libya, and Nagorno-Karabakh have demonstrated that the ability to integrate novel technologies (such as unmanned systems) within unique operational contexts is critical to the generation of asymmetric advantage.[9]

This article expands on previous Army research on military use of AI. Notably, Dr Austin Wyatt et al. identified six distinct contextual barriers to mass and scalable adoption of these warfighting technologies across various nation states, including cultural aversion and resource limitations.[10] While past research has identified these barriers, it has involved comparatively little consideration of the specific challenges that the land domain poses to the development and use of operational AI systems. This omission is particularly evident in the lack of available policy, governance, strategic and technical considerations to inform operational decision-makers such as commanders. This article analyses the potential for AI to contribute to Army's future operations in the land domain and offers some recommendations and opportunities to bridge the gap in existing governance frameworks.

This article synthesises information and explores both the potential advantages and consequences of Army's adoption of AI in the land domain. The research method involved a comprehensive review of open-source literature at the unclassified level. The research focused on AI technology and its particular relevance to Army operations within the land domain. A literature review was conducted across a variety of qualitative and quantitative research, involving a rigorous process of searching, review and analysis. Among other material, this review examined defence policy, governance, strategy and regulation relevant to the use of AI. Further, the research benefitted from many conversations with policy, operational, and technical subject matter experts in the Defence environment and within academia to assist in contextualising the research for an Australian, ADF and Army audience. Research for this article was completed in late 2024.

Findings from this research are consolidated into the *Considerations for AI Governance within Land Operations* included after the main body of the article. It provides suggestions to Army personnel at varying levels of command that, if applied, may improve decisions concerning the application and use of land domain AI. Specifically, it elicits potential assumptions about the operational application and use of AI. In doing so, it provides one potential means for commanders to develop an understanding of the system and to make decisions about its use. These considerations are suggestions from the author, and are not official policy or guidance on this matter.

This article, and the included *Considerations for AI Governance*, is intended to provide a springboard for further consideration of contextual factors constraining the effective development and deployment of land domain AI systems. In this regard, the findings presented here are not intended to be exhaustive. Future research will need to focus on the interaction between the land domain, AI development and deployment processes, and Defence's test and evaluation processes. It will also need to consider factors relating to data governance and management, accountability mechanisms, international and national law and policy, as well as the priorities and policies of AUKUS partners.

This article provides the foundation for the further research that is needed to generate a clear picture of how best to establish and govern land domain AI in order to deploy effective, trustworthy, reliable and legally compliant land AI systems.

Harnessing the Responsible and Effective Use of Land Domain AI in Defence and Army

Developing and implementing an effective land domain AI governance framework will require significant upfront investment. However, it is critical to enhancing the land power of those militaries capable of strategically appropriate and responsible development and exploitation of this rapidly advancing technology. The integration of AI into Australia's land forces would deliver several advantages if executed effectively.

The Force Multiplier Effect

If realised, AI-enabled land systems have the potential to increase Army's efficiency and effectiveness without requiring a commensurate expansion in personnel numbers.[11] Small and inexpensive AI-enabled capabilities can generate mass and scalable effects[12] when numerous systems operate as a swarm in pursuit of a shared objective. Importantly, one human operator can oversee the function of many autonomous systems, thereby reducing the number of Army staff that must be deployed in potentially dangerous operational conditions to achieve positive results at scale. [13] This process of integrating soldiers and remote autonomous systems leverages the relative strengths of people and AI-enabled machines to bolster the effectiveness of both.[14] The term used to refer to such systems is human-machine teaming (HMT).

The force multiplier benefit of HMT is particularly significant given Army's modest size of under 45,000, in comparison to the much larger armies of many regional powers.[15] AI capabilities therefore have the potential to enable Army to contend with numerically larger threats.[16] One area in which AI shows particular potential is in generating appropriate responses to unchanging, repetitive tasks that align closely with training data.[17] For example, Army recently demonstrated leader-follower vehicle technologies that enable a single driver to transport a convoy of autonomous trucks.[18] Utilising this type of technology at scale could allow Army to redirect its workforce from simple, repetitive tasks to fill more complex roles. Such a personnel redistribution may help combat recruitment and retention challenges.[19]

Reduced Physical Threat to Personnel

By combining AI with advanced manufacturing in contested environments, Army could achieve more effective and humanitarian operational results by incorporating a strategy of 'robotic first contact'. This method refers to using consumable or single-use AI-enabled systems to make first contact with a potential adversary. Such an approach opens up new courses of action that would be unavailable to a commander if the threat posed were to personnel. In this regard, a commander could send a disposable robotic system (that lacks self-preservation instincts) into situations of ambiguous hostility, and risk it being destroyed by delaying kinetic action until a foe takes hostile action first. This 'shoot-second' approach to initial

engagement is a uniquely potent capability in the land domain and may improve both military and humanitarian outcomes, particularly when operations are conducted within close proximity to civilian populations.[20] Equally, a commander could choose to intentionally delay contact with the enemy or slow the operational tempo until adversaries reveals themselves and their combatant status can be confirmed. These characteristics of AI-enabled systems may be particularly beneficial in close-quarter combat or during urban operations where there are greater risks to civilians.

Beyond increasing tactical options for military commanders, AI-enabled systems have the potential to change the battlefield landscape as a whole. They offer new ways for militaries to manage dangerous battlefields, even when the threat is not directly related to enemy engagement. For example, AI-enabled capabilities can create distance from an adversary to enable safer Army engagement with dangerous or potentially dangerous scenarios. They can also conduct explosive ordnance disposal or operations within radioactive environments far more safely than humans. As a corollary, the proliferation of AI-enabled land systems may foreshadow the expansion of battlefields by enabling operations in territory that human soldiers cannot access safely. Because the risk of losing robotic systems is more tolerable than losing people, the technology delivers greater strategic and operational flexibility in military decision-making.[21]

Given that the force protection considerations are so much lower for AI-enabled systems than for conventional capabilities, they offer novel potential design and functional possibilities. For example, an autonomous system does not have to carry and protect an internal crew. It could therefore be designed to be smaller with less armour, enabling easier transport and deployment across theatres at speed and scale, and reducing its signature. AI and autonomy also present the opportunity to enhance or augment existing platforms or roboticised capabilities. This could possibly extend the life of a capability system, or create other unique advantages, compared to non-AI-enabled platforms.[22]

Operating at Machine Speed to Own Time and Gain Decision Advantage

AI-enabled systems are also likely to increase the tempo of land warfare. AI has the potential to enable the rapid collection, analysis, and sharing of significant quantities of battlefield data. This reduces the cognitive burden

and data overload faced by personnel which can give a commander decision advantage over an opponent. The ability presented by AI to enable faster and more efficient data processing, exploitation, and dissemination could significantly enhance military preparedness, operations, advanced targeting capabilities and more besides.[23] These factors, combined with changes to the battlefield landscape, the ability for one operator to command many AI-enabled systems, and options for automating simpler tasks, are all expected to increase the tempo of operations.

The environmental complexity of the land domain already presents a high-tempo operational environment. AI systems therefore present a potent means of capitalising on the pace of the battlefield, enhancing Army's ability to seize initiative, increasing the speed of kill chains, and enabling more effective responses to (or pre-empting of) the adversary's decision-making.[24] Those who leverage these technologies to accelerate the tempo of warfare in their favour ('owning time') are positioned to achieve advantage against adversaries without the technological capacity or preparedness to keep up.[25]

Continual Adaptation through AI and Machine Learning

Land domain AI systems require an inherent level of flexibility and adaptability in their logic algorithms to effectively respond to the complexity and variability of the land domain. It is impractical to program software with a specific response to each of the practically infinite variations of input within the land domain. Therefore, traditional software approaches, where each input is explicitly coded for, do not offer this required flexibility.[26] However, developments in machine learning (ML) algorithms that recognise, analyse, and generalise patterns and correlations from input data have realised the required level of adaptability and flexibility.[27] ML enables AI to respond effectively to a broader range of inputs by applying previously observed common features and patterns to new scenarios, rather than humans having to code responses to each possible input.[28]

Despite the potential operational flexibility created by AI technology, many commentators nevertheless contend that various technical, organisational, institutional and cultural limitations curtail the capacity of AI to revolutionise or even enhance current means of warfighting. Among the most prominent causes for cynicism is the tension between the desire of militaries to understand and predict the tools of warfare they command,

and an incapacity of humans to easily explain the chain of ML-generated logic responsible for AI outputs.[29] This tension is further exacerbated by modern AI models, the outputs of which may vary depending on contextual minutia or their own self-adjusted ML algorithms.[30] The ability to train ML algorithms to produce reliable and predictable outputs for military applications depends on access to operational datasets of substantial size. Critics contend that such datasets 'often do not exist in the military realm'.[31] Further, sharing such outputs with industry will often be restricted by information security policies.[32]

Similarly, analysis of contemporary military operations suggests that AI technology must be incorporated within the organisational structure if it is to play a significant role in military operations. As demonstrated by the modern conflicts in Ukraine, Libya, Syria, and the Caucasus region, warfighting systems that utilise novel technologies are, by themselves, insufficient to change how militaries operate. Rather, these novel systems are most effective when implemented well within the existing cultural and organisational contexts of the militaries that use them.[33] This requires commanders to carefully consider the effects that they need to create in the operational environment, and how AI or autonomy can enhance these effects or create means of producing them.

Resistance towards the concept of an AI-led warfighting revolution is relevant in guiding expectations regarding the possibilities and challenges posed by operational AI. However, it does not diminish the importance of developing warfighting AI applications and governance systems. While commentators may argue that AI is incapable of significantly affecting the conduct and effectiveness of military operations, the basis for such doubts is generally the lack of existing command and organisational structures to accommodate this technology.[34] Addressing these concerns requires a broad and effects-focused understanding, among commentators and military commanders alike, of the human decision points and authorities that must be present within the capability lifecycle to safely and responsibly exploit AI and autonomy. Deep consideration of these human decision points facilitates the development of AI and autonomous systems that align with ADF doctrine and policy, and provide assurance around the responsible use of these systems by commanders and operators, including their abilities and limitations.

The Bigger Picture for Land Domain AI

Directing attention to the effects that commanders aim to generate in the land domain also provides valuable opportunities to consider potential asymmetric advantages and countermeasures against similarly capable adversaries. The development and use of military AI is a current and continuing international focus. Consequently, Australia's security interests may be at risk within a potential future conflict scenario should it fail to develop operational AI capabilities, along with the organisational policies and frameworks that enable its effective development and management. The post-Cold War military technological advantage enjoyed by US-aligned nations is waning as contemporary revisionist states develop similarly advanced technologies. In the emerging security environment, Australia faces a military landscape of increased power projection costs and fewer strategic options. With AI and autonomy as a technology of significant global interest with major potential benefits, Australia's pursuit of military automation represents a means to ensure advantage and protect strategic interests in a landscape of enhanced strategic competition.[35]

Defence's strategic response to challenges to international stability, and to the accelerated development of edge technological capabilities, should inform Army's outlook for land domain AI-enabled and autonomous systems. The 2024 National Defence Strategy emphasises that 'the greatest gains in military effectiveness in the coming decade will be generated by better integrating existing and emerging technologies' [36]. Further, it prioritises the rapid translation of disruptive edge technologies such as AI into ADF capability.[37] In alignment with this broader Defence direction, Army seeks to build and deploy mechanisms that effectively harness AI and autonomy.[38] Army intends for these AI-enabled capabilities to provide Australia's land forces with asymmetric warfighting advantage, or to offset potential adversary advantages by contributing to five key capability offset areas that will enhance Army effectiveness. These include maximising soldier performance, improving decision-making, generating mass and scalable effects, protecting the force, and increasing efficiency.[39] These AI-enabled benefits would enhance Army's ability to achieve its national priorities, such as expanding its deployable strike capability and improving its ability to secure and control strategic land positions.[40]

As with all military capabilities, the effective development and deployment of land domain AI is dependent on the establishment of sufficient underlying systems of control and governance. These systems ensure that these technologies are developed and used efficiently and in line with broader Defence priorities. Simultaneously, they ensure accountability, safety, and adherence to legal obligations across their lifecycles. These processes increase the effectiveness of technologies and capabilities, both by themselves and within larger warfighting systems. By ensuring that they will perform to the expected standard, stakeholders – from end users to Defence and government decision-makers – will more willingly develop appropriate trust in the systems.[41] By contrast, the absence of trust in a technology's ability to operate as anticipated will severely limit end users' willingness to use the technology. Decision-makers will also be less willing to approve the technology's acquisition and use, regardless of its value in instances when it works correctly.[42]

Governance of AI in the Land Domain – Recommendations and Opportunities

In the previous section, this article contended that the effective development and use of AI and autonomy necessitates the implementation of AI management and governance schemes. Defence is aware of this need and has gone some way towards implementing appropriate systems at the enterprise level. Among these efforts, Defence has established a Defence-wide AI governance work area, conducted various responsible AI workshops, and initiated development of cross-domain AI-governing policies.[43] These efforts represent an attempt to approach military AI governance from a largely domain-agnostic, whole-of-Defence position. Specifically, they do not substantially differentiate between operational (warfighting) and enterprise (commercial), or domain-specific applications of AI. This is despite substantial differences in use cases, intended effects and outputs, and risk profiles. As will be discussed, this approach to AI governance may be inappropriate when applied to AI used in operations within the land domain.[44]

Distinguishing Between Use Cases and Risks of Operational and Non-Operational AI Applications

It is impractical to perform governance and management of AI intended for both operational and non-operational use under the same policy frameworks. The key reason for this is the relative disparity between their use cases and their risk profiles. For example, common enterprise applications (such as large language models and enterprise data processing) are unlikely to directly cause injury or death should they operate in a way that is unintended. As such, AI governance in enterprise settings – including outside of Defence – generally prioritise the protection of civil liberties and workplace health and safety concerns rather than focussing on potential risks to life. By comparison, military operational AI is intended for use in competition and conflict, where it is probable that the safety and lives of Australian personnel will be under direct threat from hostile entities. Should an AI or autonomous system fail within these high-risk situations, it is likely to result in unintentional injury or death, whether among the friendly force or the civilian population present within the battlespace.[45] These safety concerns also extend to civilian populations and objects in the operational environment, which may be harmed should operational capabilities produce an unintended output.[46]

AI technology and governance that is intended for operational use by/for the ADF must align with ADF doctrine and relevant land-specific doctrine. While doctrine is not legally binding, failure to align with it risks placing potential technologies and their bespoke governance processes outside of well-established military planning, conduct and evaluation frameworks. This situation may compromise the ADF's ability to integrate these systems into existing warfighting processes and procedures.[47]

Recommendation 1: Given the different risk thresholds applied to enterprise compared to operational uses of AI, Defence should generate distinct governance frameworks for each, or ensure their distinct treatment within a shared governance framework.

Managing the Unique Physical Characteristics of the Land Environment

The highly variable physical aspects of terrain within the land domain creates unique complexities and uncertainties for the development and use of AI and autonomous systems. Compared to the land domain, the physical features of the air and maritime domains remain relatively homogenous across different theatres and over time.[48] As such, an AI or autonomous system operating within these domains needs to adapt to only a comparatively small quantity of physical features. Further, when traversing from one point to another, the operator of an air or maritime platform does not require moment-to-moment consideration of obstacles within its environment.[49] In contrast, land forces must be prepared to operate across the topographic environments of jungles, mountains, deserts, tundra, littorals, swamps, forests and manmade settlements, often with several different topographies located in close proximity of one another.[50] The land domain is uniquely cluttered, with a density of physical obstacles that is not present in the air or on the sea surface. Obstacles, such as trees, mountains, buildings and general variations in topographical elevation create particular complexity when navigating and interacting with the environment.[51] This element of variability necessitates a high degree of adaptation by land forces, as different terrains present different challenges. Similarly, land domain AI must be able to adapt to and function across these highly variable topographies if they are to be used effectively by commanders in Army operations.[52] This situation generates a substantially greater burden on an autonomous system's AI than an equivalent system operating in the air or sea domain.

The challenges for AI capabilities that are generated by the varied physical complexity of the land domain relate both to hardware (designing the right platforms to accommodate AI and autonomous capability) and to software (to train algorithms on a dataset representative of the diversity in the land domain). To illustrate this point, consider autonomous systems that interact with their environment, such as by moving or shooting. Their capacity to collect, analyse and make decisions based on information within their environmental context enables them to act with minimal human involvement within their operational decision-making loop. However, a complex physical environment means that there is a greater risk that this decision-making will fail or be subject to miscalculation. This problem extends to how the AI interacts with the autonomous system's sensors, which are often

unsuited to managing the land domain's environmental complexity. For example, autonomous ground robots currently struggle to visually perceive and interpret 'negative obstacles' such as ditches, holes, and puddles. In an operational environment, these robots may not treat these 'negative obstacles' as obstacles at all, and may instead unintentionally move into them.[53] To overcome such deficiencies, land domain AI systems will require considerable land application-specific training data and ML systems in order to make accurate and representative generalisations.[54] At present, Army has only a limited capacity and responsibility to generate such representative land-domain-specific datasets.

Recommendation 2: Frameworks governing the development and use of land domain AI should specifically consider the impact of the physical environment on AI-enabled systems' operational functionality.

Recommendation 3: Opportunities to increase the generation of land-domain-specific datasets should be examined, including the identification of service-level ownership and resourcing.

Managing the Interactions of AI Systems and Civilians

The increased levels of human – and particularly civilian – interaction inherent to land theatres further complicates the operational use of land AI and autonomous systems. The land domain is 'the domain where humans live, and operating there almost certainly results in human interaction'.[55] An AI-enabled autonomous system intended for deployment in the land domain must therefore be developed and used with a consideration of the complexities and risks associated with AI-human interaction.

One such challenge is the increased risk of a military operation resulting in collateral damage to civilians and civilian objects. This risk is higher in the land domain, where civilians are predominantly located, than in the air or sea, where they are not. The application of international humanitarian law (IHL), as relates to requirements of proportional application of military force and the protection of civilian individuals and objects, is particularly relevant here. The involvement of operational AI in the potentially lethal application of force is a use case that is beyond an enterprise scope, but is fundamental to military operations. This significant difference in use cases and their consequences necessitates consideration under a different governance system than enterprise applications, in the same manner that systems of control apply to the use of force in operational contexts more broadly.

Performing military operations in the land domain that contains a significant number of civilians necessitates unique considerations of risk. In the sea or air domain, military personnel can have greater confidence that a person within their operating environment is a combatant, particularly if they are using military platforms. The situation is different for land operations, particularly when armies are dealing with irregular adversaries capable of concealing themselves within the civilian population and operating within civilian-dense areas, in order to limit the use of kinetic force against them.[56] In these environments in particular, armies need suitably thorough risk management and governance protocols regarding the use of technology (that has the capacity to cause or contribute to a harmful action, including AI) in order to ensure their compliance with the laws of armed conflict and to protect the perceived legitimacy of military operations in the eyes of the international community.

Recommendation 4: Land domain-specific AI governance frameworks should directly address the complexities entailed in AI operations conducted within civilian-dense environments.

Managing the Interactions of AI Systems, and Combatant Users and Adversaries

AI applications generally struggle to respond appropriately to unpredictable stimuli that are not adequately represented in training datasets. It is therefore difficult for AI to effectively detect, analyse and respond to human behaviour, which is highly heterogeneous and unpredictable in nature.[57] This applies both to interactions with civilians and enemy combatants in the land environment and to interactions with friendly forces, including AI system operators.

The spectrum of behaviours a human can perform is limited in instances when their interaction with the outside world occurs via a platform that they control, and is constrained by the capabilities of that platform. For example, a fighter jet is specifically designed to include the features necessary to enable its function of flying and shooting. In this context, little attention is given by fighter jet designers to developing capability features that do not assist the performance of this function. As such, a fighter jet can move and shoot unpredictably, but those instances are unpredictable uses of the predictable behaviours of moving and shooting. It is therefore logical to predict that a platform designed to fly and shoot (and do little else) will

fly and shoot. In response, an AI capability can be trained to recognise instances of the fighter jet flying and shooting, and to respond accordingly. This characteristic is similarly relevant in the maritime domain.[58]

In comparison, humans (who are fundamentally unpredictable entities with a suite of capabilities not designed specifically for warfighting functions) have the capacity to exhibit entirely unpredictable behaviours. For example, we can expect an enemy combatant to run and shoot, as capabilities that serve their 'function'. However, it is also entirely possible for the combatant to throw something, or lie down, or fake surrender, or make any number of culturally specific threatening statements or gestures, or perform any other action that can be performed with human faculties. Equally, non-combatants may also exhibit unpredictable behaviours, with nuances that may confound the capacity of an AI to detect, determine intent, and respond appropriately. Therefore, developing AI systems capable of responding appropriately to the wide variety of potentially unpredictable human behaviours is a uniquely challenging endeavour within the human-centric land domain. For example, an AI operating amongst civilians will not have the intuitive ability to distinguish a civilian throwing a ball from a combatant throwing a grenade, or a combatant holding a firearm from a civilian holding a toy firearm. Further, adversaries seeking operational advantage will take every opportunity to disrupt Army's ability to understand and operate in a deployed environment. There is legitimate concern, therefore, that an AI presented with behavioural ambiguity may produce unintended behaviours or outputs that are inappropriate to the situation. Such outputs risk compromising its intended mission or causing unintended harm to civilians.[59]

Human unpredictability also complicates the involvement of AI in HMT. HMT is not unique to the land domain. However, the context of the land domain does create a unique level of challenge due to individual Army personnel taking primacy over platforms as the smallest unit of force. This informs the intention of Army to 'equip the operator' over 'operating the equipment'.[60] There consequently exists interest in performing HMT at the lowest level, involving relatively junior Army personnel using AI systems at the tactical edge. This creates the potential scenario in which thousands of AIs must struggle to predict and adapt to the continuous unpredictable and heterogeneous behaviours and decisions of thousands of individual personnel. In this scenario, an individual failure or miscalculation has the potential to both threaten life as well as compromise the operation as a whole.[61]

There are methods available to reduce the behavioural unpredictability of Army personnel. For example, training, doctrine and accountability assist in this regard by encouraging specific favourable actions and responses, and discouraging unfavourable actions and responses. Further, the fact that AI can provide instructions and suggestions to its operator may assist in further limiting the unpredictability of the individual Army personnel.[62] More broadly, however, as a key input to AI and a determinant of AI outputs, Army must treat human behaviour as an inherent part of AI systems. Recognising the personnel-focused operations of the land domain, the RAS Strategy 2.0 reinforces the importance of developing AI and autonomous technology to maximise the performance of the individual. As one example, it suggests that AI systems 'will seamlessly fuse different sources of data and intelligence to alert, communicate, and suggest courses of action to dismounted soldiers'.[63] Achieving this outcome will be a complex endeavour. It will require Army to both govern and assure human interaction with AI in tandem with managing the technology itself. While the possibility of discord between the soldier and their AI can be managed, the heterogeneity of human behaviour means that it cannot be eliminated.

Recommendation 5: Frameworks governing the development and use of land domain AI should specifically consider the impact of human unpredictability on AI-enabled systems' operational functionality.

Recommendation 6: Army should invest in testing and simulating a broad spectrum of possible human inputs in order to minimise the residual risks of using AI-enabled capabilities on operations.

Managing the Intersection of Physical and Human Terrain Complexities within the Land Domain

The urban operational environment exemplifies the most challenging aspects of the land domain. Its physical, human, and informational terrain are inherently highly complex. For example, the high density of buildings and other manmade obstacles within an urban theatre significantly limits the sensor range and navigational freedom of land forces operating within it. Further, the physical terrain of urban environments is constructed by populations with highly diverse cultures and levels of development. This population influence results in a significant diversity of physical characteristics between different urban environments that may influence military operations. Equally, the high density of civilians within urbanised

areas creates complexities regarding the form and extent of kinetic force available to land forces, and the manner in which ethnic, religious, political, and ideological populations within the broader urban population will interact with land forces and one another.[64]

The urban environment is increasingly the centre of gravity for land warfare; this presents further complications for the use of AI and autonomous systems within a potential future land conflict.[65] Modern trends of population growth and urbanisation have caused urban populations to expand significantly. Within Army's *Contribution to the National Defence Strategy* document, the global urban population is predicted to double between 2024 and 2044.[66] This trend is particularly noticeable in many Oceanic nations in Australia's near region, in which a majority of the population reside in coastal cities.[67] This trend motivates both conventional and unconventional forces to fight in, and establish control of, urban areas. For unconventional forces, the large urban population centres provide proximity to potential support bases, an environment within which to obscure themselves, and a form of 'normative shield' that limits the kinetic options of a conventional opponent military concerned with human rights and international law.[68] Conventional state land forces, on the other hand, have interest in taking or holding territory with the greatest strategic benefit to either side, as well as controlling and protecting relevant populations. The infrastructure, facilities, and high population of urban centres make them particularly advantageous for state forces to control.[69]

The density of these physical and human factors mean that land forces within urban environments are forced to interact with, and make decisions related to, the contents of the physical and human terrain more frequently and in less time.[70] This places greater demands on AI and autonomous systems in comparison to operations conducted in the low-density domains of air and sea. By necessitating a greater number of time-sensitive decisions, urban operations expose AI systems to a greater number of instances where they may fail. This risk is particularly relevant when considered alongside the challenges AI faces in analysing and responding to the complex and unpredictable behaviours of humans, who comprise the high-density human terrain of urban environments.

Electromagnetic interference is a challenge to AI technology in both urban and non-urban environments. For example, in megacities, the density, complex and sprawling urban terrain, tall vertical structures such as

skyscrapers and high-rise buildings, and underground structures such as concrete tunnels create significant interference in the electromagnetic spectrum (EMS) environment of land operations. This is because the infrastructure increasing distances and obstacle density between communication senders and receivers. Equally, electro-magnetic interference will occur in non-urban environments too. For example, mountainous terrain, dense forests and foliage, and cave systems may also physically interfere with EMS communication.[71] It is therefore necessary for the frameworks governing the development and use of land domain AI to account for AI behavioural risk regarding potential instances in which a system's connection to its operator or network is environmentally compromised. While increased autonomy presents a possible redundancy for a loss of direct control, thorough assurance is required to validate that autonomous AI systems can continuously fulfil command intent and produce responsible behaviours and outputs across the deployment lifecycle.

The consequences of AI failures within an urban environment have the potential to be significantly damaging to the local population, Army's strategic objectives, and Australia's global reputation.[72] As of 2023, approximately 57% of the global population are connected to the internet. Of this 57%, approximately 86% possess internet-capable smartphones.[73] Consequently, land forces operating in civilian-dense urban environments will struggle to control or limit the rapid dissemination of information by civilians via digital avenues such as social media.[74] This would include information regarding operational AI system failure. The substantial presence of digitally connected civilians consequently amplifies the reputational consequences if land forces in urban environments cause collateral damage.[75]

Recommendation 7: The frameworks developed to govern the performance of AI and autonomous systems must account for the unique challenges and risks of operating within high-density, high-complexity land environments.

Challenges of Autonomous System Persistence within the Land Domain

Land forces are particularly capable of acquiring and maintaining control over territories and populations in a persistent manner in a way that operations conducted in other domains are not.[76] Therefore, during a hypothetical future large-scale conflict occurring in Australia's near region, AI-enabled systems may allow broader dispersal of the land force to achieve greater control and presence across a wider operating area. This includes assisting in persistent regional surveillance to support the detection and disruption of an adversary's movements in, and ability to access or control, a region of interest.[77] Commanders may also expect AI-enabled systems to persist within contested physical territory, significant distances from an Australian or allied army base, for extended periods.

Questions arise, however, regarding the maintenance of AI and autonomous systems during extended operations within the field. Army's access to the electromagnetic spectrum (EMS) within an active land conflict zone will inevitably be contested, degraded, or denied; both deliberately by adversarial actors, and incidentally by complex physical terrain.[78] Land domain AI and autonomous systems must be able to operate within such an unreliable EMS environment. In some cases, deployed AI and autonomous systems in remote locations will be unable to reliably receive regular updates or maintenance from bases of operations over a digital network. Should an AI platform suffer from a critical vulnerability or serious technical problem, the inability to resolve such issues within the field may cause the AI to operate in a manner that compromises operations or causes unintended damage.

Further, as ML systems evolve over time, they are liable to deteriorate in performance and accuracy. This is commonly known as *model degradation*. This degradation may be caused by a mismatch between training data and the problem space of the system's operation. A model may also degrade should the operational environment increase in variance and complexity over time. In such a scenario, a single model will be unable to accurately respond to all possible environmental inputs. An ML model that is unaffected by model degradation will typically receive a specific set of inputs, and then process them using an algorithm that translates those specific inputs into desirable outputs. Should the distribution of inputs to an ML model change overtime – a process referred to as

concept drift – the ML model may begin producing incorrect outputs by applying previously applicable calculations to inapplicable new data. In such instances, ML models may need manual adjustment to remain effective.[79]

Without regular and reliable re-baselining and maintenance within the field, ML-enabled land capabilities will be vulnerable to model degradation and concept drift. This risks compromising command and control, and weakening the operational effectiveness and safety of land domain AI systems within remote locations or contested environments. The dynamic nature of the land domain exacerbates this issue; the changes in input that accelerate model degradation are likely to occur more frequently in a domain dense with dynamic human and terrain factors. Further, the comparatively high likelihood of civilian presence near a potentially compromised AI system elevates the risk of deploying AI-enabled capabilities without reliable means of maintenance and update.[80] One potential method of managing the challenge of autonomous systems persistence in the land domain would be to ensure that such in-field land AI systems are regularly maintained and updated. However, the previously discussed degradation and unreliability of EMS communications by physical terrain and human actors within the land domain limits the practicality of this solution.[81]

Recommendation 8: Army would benefit from governing land domain AI systems in a manner appropriate to their potential value; this would necessarily require that consideration is given to the unique challenges and opportunities in achieving AI persistence within theatre.

Achieving Continuous, Agile Governance and Innovation at the Speed of Relevance

Land AI systems will be deployed in operational contexts that are highly dynamic – where the environments, capabilities, and adversaries to which they must respond change over time. To respond appropriately to operational events in the field, AI systems developed using ML techniques will rely on the quality of the training datasets embedded within them. If the AI's training data does not reflect environmental changes on the battlefield, it will respond to novel inputs with suboptimal outputs.[82] Case studies from corporate use of AI technology have shown that the quality of training data is compromised if it is outdated, biased, lacking in quantity, poorly labelled, etc. For example, a lack of representation of certain subgroups

within AI training data has previously resulted in corporate job recruitment AIs developing biases against female candidates, and facial recognition software failing to accurately recognise certain underrepresented races.[83]

To address changes in operational contexts as they arise, and to avoid the degradation of AI training data, Army needs the ability to continually adapt AI models and training datasets. By closely aligning AI training with likely operational conditions, the operational effectiveness and reliability of AI-enabled capabilities would be enhanced.[84] Below is a simplified representation of a suggested cyclical approach to operational AI development, deployment and assurance.

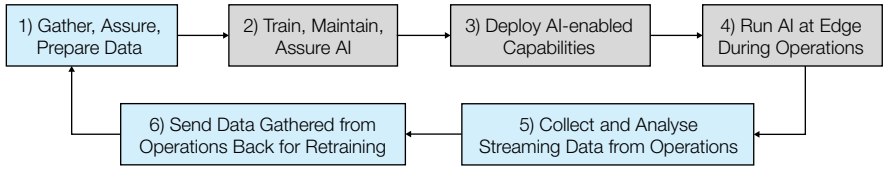

Figure 1: Simplified representation of cyclical approach to operational AI development, deployment and assurance.[85]

While this model would be equally applicable across the sea and air domains, there are several reasons why it is particularly relevant to land operations. For one, the physical characteristics of the land domain, and the relative human density, presents a more expansive suite of potential data inputs. This fact, combined with the dynamic nature of the land domain, also creates high potential for rapid changes to context over time. This situation necessitates a significantly greater quantity of training data to ensure ML training represents the likely contexts in which the AI-enabled capability will operate.[86] For example, an autonomous vehicle may navigate an urban environment by collecting environmental data and orienting itself based on the detection of certain landmarks. However, should the physical environment be disrupted, the autonomous system will struggle to navigate using training data that has become inconsistent with the contemporary reality. Adversaries could therefore readily disrupt AI systems using methods as simple as removing street name signs, or as dramatic as launching a series of missile strikes that demolishes buildings and landmarks.

Further, as mentioned previously, humans are capable of exhibiting a broader range of unpredictable behaviours when not bound by the designed functions of crewed capabilities, which dominate the air and maritime domains.[87] This unpredictability creates the potential for rapid change in operating procedures and behaviours within the land domain, as there is a larger quantity of potential behaviours that soldiers can perform when dismounted. The land domain's reliance on the soldier as the smallest warfighting unit, rather than a smaller number of large and expensive air or sea vessels, enables these evolutions to occur on the level of the individual soldier or section. This could take forms as simple as modifying one's uniform to differentiate it from typical adversary uniforms, or painting a combat vehicle an unconventional colour to avoid recognition by an AI system.[88]

Instances in which AI has been confounded at the individual level have already occurred within non-war contexts. For example, during the 2019 Hong Kong protests, many protesters wore masks in a deliberate effort to confound state facial recognition software. The state government tacitly acknowledged this weakness of their AI in its efforts to ban the use of face masks by protesters.[89]

Recommendation 9: Governance frameworks must be sufficiently flexible to enable training and datasets to evolve.

Conclusion

The unique challenges entailed in using AI-enabled technology in the land domain requires unique responses. There is an inextricable relationship between the AI systems, and the environments in which they must operate. This necessitates the generation of governance processes that maximise the effectiveness of their development and that involve domain-specific considerations. That is not to deny the importance of whole-of-Defence AI governance and strategic direction; such guidance provides an important foundation for the development of domain-specific solutions while ensuring their broad alignment with the AI strategic priorities of the integrated force. However, this article contends that Army will benefit from the development of further governance mechanisms that apply Defence-wide direction to the specific characteristics of the land warfare context. Doing so has the potential to considerably improve operational AI outcomes across Army.

As operational AI systems are introduced and proliferate, commanders will be expected to determine the suitability of deploying these systems within various contexts. They will also have to make the final judgement whether to use or not to use these systems, and to take accountability for the consequences of their decisions.[90] As such, commanders play an important and uniquely challenging role in land domain AI governance, making time-sensitive and high-risk decisions regarding the use of highly technical systems, generally without access to relevant technical subject matter expertise to inform these decisions. In response to this challenge, and based on the findings of this article, this Journal also includes *Considerations for AI Governance within Land Operations*, which the author suggests for use by those tasked with analysing the operational use of land domain AI systems.

While the *Considerations for AI Governance* are one potential means of adding contextual depth and consideration to commanders' decision-making processes, more can and should be done to improve land domain AI governance across all stages of the capability lifecycle. The intention of this article is to help build a foundation for future research focused on land domain AI and/or military AI governance. By establishing the need for domain-specific operational AI governance, this article informs the deeper analysis that will be needed generate these new AI governance systems. Such analysis will need to further clarify the features of operational AI that will support the governance processes that exist separately to existing Defence-wide processes for traditional capabilities. Similarly, further work is needed to fully appreciate the national and international contexts in which AI capabilities will need to operate. The time to start this work is now. As global interest and investment in AI-enabled military applications increases, the relative effectiveness of Australia's land AI systems, and their enabling systems of governance, will play a strong role in determining whether Army's next operational engagement results in victory or defeat. It will also shape how much time, money, and human life will be saved or lost in the process.

Considerations for AI Governance within Land Operations

Purpose

This section poses questions that highlight factors that may constrain the effective use of AI-enabled capabilities by Army. The questions are intended to challenge commanders' assumptions and prompt consideration of the AI's operational suitability as influenced by the numerous relevant contextual and environmental factors.

The author suggests that incorporation of these considerations within commanders' thought processes may help improve the quality of decisions concerning land AI deployment. It may also assist commanders to calibrate the level of trust that can be placed in the abilities of operational AI systems.

These considerations are intended to possess relevance for all levels of command.

These *Considerations* are suggestions from the author as informed by the research of the broader article. This section and its contents are not official policy and guidance.

Considerations

Before deciding to use/deploy a land domain AI system, ensure that you have considered the following questions. If unsure of the answer to any of these questions, consult further with a relevant subject matter expert (i.e. capability manager, designer, super user, operational legal adviser etc.).

Questions

1. Role of AI within Operation

    - What is its specific function within the operation? What is the environment of operation? What is the operational outcome that you intend for the use of this AI to achieve?

2. Alignment to Broader Army and Defence Priorities

   - Does its operational use support Army's role in the National Defence Strategy?
   - What are the advantages of using it rather than conventional capabilities or personnel (i.e. robotic first contact, personnel safety, maintaining parity with adversary's operational tempo, etc.)?

3. Managing Scale and Speed

   - Is the system adaptable in alignment with the established battle rhythm? Should battle rhythm change, is there an effective means of bringing its performance back into alignment during deployment?
   - Is its use likely to increase operational tempo? If so, what is Army's capacity to operate effectively at this increased tempo?

4. Interaction with other Operation Components

   - How will it interact with any other operational AI-enabled capabilities? Is there a precedent for the results of their interaction?
   - How might its use effect the decision-making process of involved human parties?
   - What are the likely outcomes of HMT? Are the operators appropriately trained to utilise this AI effectively? How might differences in operator behaviour translate to variance in AI behaviour?

5. Awareness of Limitations and Weaknesses

   - Are you and potential operators aware of the environments and contexts within which the AI is optimised to perform well, and those within which the AI is more likely to produce an undesirable output?
   - If the AI features onboard ML, when was the last time it was re-baselined to a version for which its strengths and weaknesses have been formally assessed and understood?

6. Understanding of Uncertainty and Environmental Complexity

- Regarding point 5, what is the likelihood of the AI being required to operate in these undesirable environments and contexts? What are the potential sources of uncertainty the AI is likely to interact with (i.e. adversaries, civilians, friendly forces, dynamic physical terrain, etc.)?

7. Humanitarian and Use-of-Force Considerations

- Is it involved in the use of force? If so, what role does it play in the human decision to use force (i.e. targeting, information, manoeuvre, application of kinetic force, etc.)?
- Do features of the application support a collateral damage estimate or battlefield damage assessment?
- Are civilians present, or likely to be present, within its area of operations? If so, what control parameters are in place to limit the likelihood of actions resulting in harm to the civilian population?

8. Redundancy

- If the AI-enabled capability fails to achieve its intended outcome, what are the potential consequences? Are other means of achieving the outcome available should this occur?
- How will it behave if communication is lost between the system and its operator?

9. Performance Monitoring and Traceability

- Is there an effective means of tracing the AI's performance outputs?
- Is there an effective means of identifying, and addressing, instances in which the AI is functioning incorrectly while in use?
- How could the potential outcomes of this operation shape the AI itself, or its use in future operations, to enhance the effectiveness of both?

10. Risk Tolerance Alignment

- To what extent does the risk profile presented by the above factors align with the risk tolerance associated with the broader operation and its objectives?

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Climate Change and Army Personnel: The Career Disruptor

Phillip Hoglin

Introduction

In a 2024 article in the *Australian Army Journal*, Dr Albert Palazzo was necessarily blunt in his assessment of the impact of climate change on the future characteristics of war, stating that 'Australia and the ADF will have to adapt if the nation is to meet the demands of operating in a more violent and decisive climate change era'.[1] Unfortunately, Palazzo stands with just a handful of others in articulating the extent to which climate change will affect the Australian Defence Force (ADF). As has been the case for much of the last century, the understandable default of military academics and strategists seems to be authorship on topics perceived to have a greater appeal to the usual military audience, such as those focusing on military operations, acquisitions, technology, and national security.

In this article, defence policy and the discussions of several security analysts will be extended to consider the practical impacts of climate change on the members of the Australian Army. In particular, the article will focus on the effects of climate change on individual soldiers, their families, and the training and career systems. Importantly, in line with advice from the Department of Climate Change, Energy, the Environment and Water, this article considers climate change to be inevitable.[2] Therefore, the discussion does not speculate about whether there *may* be impacts on

Army, but takes the perspective that there *will* be impacts—with the only variable being *when* those impacts will occur.

Summary of the Strategic Literature

The Defence Strategic Review (DSR) dedicates just five brief paragraphs (about half a page) to the topic of climate change; three of them lament the concurrency of the ADF's contribution to disaster relief against the provision of military capability. In this context, the issue of climate change itself is not directly addressed. Further, while the DSR states that '[c]limate change is now a national security issue',[3] it is noncommittal as to the degree to which this is the case. Using speculative language, it states: 'If climate change accelerates over the coming decades it has the potential to significantly increase risk in our region'. At least one commentator has noted that the language of the DSR is not useful given that it is a broadly accepted fact that climate change will accelerate and it will increase risk; speculative language serves to diminish the immediacy of the threat[4] and its moral implications.[5]

Among security commentators, there is broad consensus that climate change poses 'a national security threat to Australia through the stability of the region and national capacity to respond'.[6] There is a consistent theme recognising the climate/security nexus: 'climate change effects lead to environmental impacts, and environmental impacts create social impacts, which lead to security implications'. Influential authors including those affiliated with the Australian Strategic Policy Institute[7] and the Australian Security Leaders Climate Group (ASLCG),[8] the United Nations Framework Convention on Climate Change,[9] the United Nations Security Council[10] and a Senate standing committee[11] take this view. Indeed, the Senate Standing Committee on Foreign Affairs, Defence and Trade concluded that there is 'consensus from the evidence that climate change is exacerbating threats and risks to Australia's national security'.[12]

While the national security threat posed by climate change is acknowledged, some writers lament that 'the ADF has only limited awareness of the extent of the disruption and military challenges that climate change may create'.[13] Indeed, there remains 'a refusal to accept the size and immediacy of climate risk in 2024',[14] an observation that extends to the impact of climate change on ADF members themselves. In an effort to redress this situation, Palazzo

explains the implications of climate change in practical terms for warfighting strategy. This includes the need for a larger ADF, emphasis on self-reliance, participation of the entire Australian citizenry, and consumption of national wealth. Palazzo has ominously surmised that 'war will resume its place as one of the great forces for human decision-making'.[15]

Overall, security and climate change are rarely written about by Australian security specialists. It is significant that Palazzo's contribution on climate is unique among the numerous articles in the *Australian Army Journal*. Notable too is Michael Evans's nuanced opposing view in the *Australian Journal of Defence and Strategic Studies*; he argues that there is no direct causal link between climate change and conflict.[16] Among the dozens of other defence and security advocacy groups and think tanks, only one is focused specifically on climate change and national security in the Australian context—the ASLCG, whose members include a former Chief of the Defence Force and a former Vice Chief of the Air Force.[17] Others provide a regional focus, as the Australian Strategic Policy Institute does through its Climate and Security Policy Centre.[18] Despite the dozens (or hundreds) of articles written every year by Australia's military strategists, the paucity of discussion on a change that is inevitable, in favour of speculation on hypothetical strategic scenarios that may never occur, is both disappointing and alarming.

Significantly, to the degree that Australian-focused articles and reports exist, they are written without the benefit of the classified 2022 Office of National Intelligence climate and security risk assessment, which would greatly add to national debate and understanding (and of which the ASLCG has called for the release of an unclassified version).[19]

Australia's Changing Climate

It is inevitable that there will be more extreme weather events in Australia. However, Army has not yet considered how the regions affected by these events will overlap areas of large Army populations. For example, modelling[20] shows that in military locations in the north of Australia there will be a significant increase in the number of days when the wet bulb temperature exceeds 30°C (Figure 1).[21] The ASLCG points to the resulting extreme living difficulties that will confront members and their families posted to these locations in their efforts to conduct normal, everyday

activities.[22] It is predicted that by 2050 some urban locations such as Darwin will experience between 66 and 129 more days over 35°C each year, as global average warming reaches between 2°C and 4°C (113 to 176 days per year in total).[23]

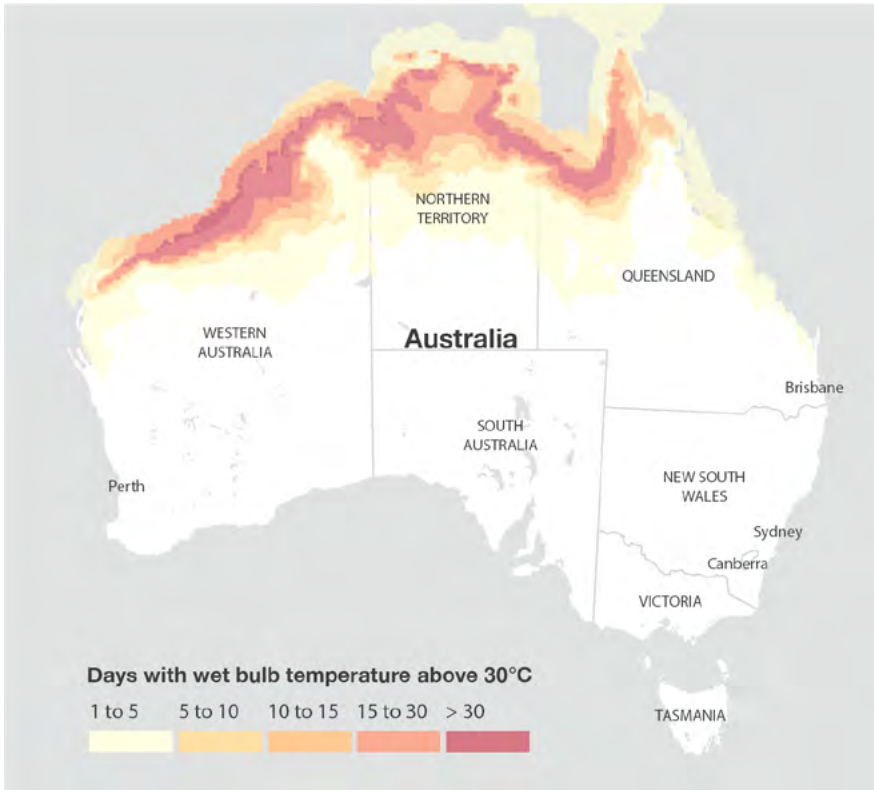

Figure 1. Days with wet bulb temperature above 30°C[24]
Image credit: Peter Aldhous, based on data from Probable Futures[25]

Extreme heat events are not the only problematic consequence of climate change. Modelling also predicts an increase in the annual likelihood of drought, exceeding 50 per cent in many geographic areas of Australia (Figure 2).[26] This situation will increase the impact of dust and exposure on equipment, decrease foliage and its stability, increase the likelihood of irreparable environmental damage to training areas, and threaten the viability of some training areas for continued heavy vehicle use, including manoeuvre-based activities. As identified by Palazzo, 'platforms optimised

for environmental conditions that no longer exist may have to be modified or scrapped'.[27] Finally, the same modelling indicates that almost all of Australia can expect increased rainfall should there be the one in 100 years storm in a world warmed by 3°C. Such an outcome would disrupt all ADF training activities in proximity.

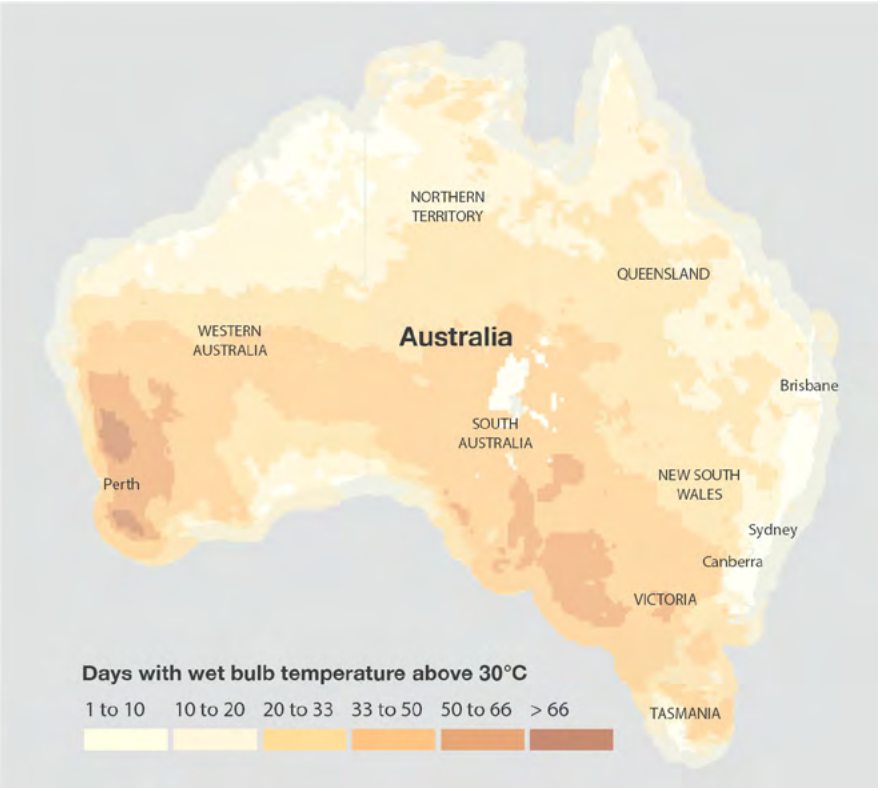

Figure 2. Annual likelihood of extreme drought[28]
Image credit: Peter Aldhous, based on data from Probable Futures

Climate Change and Army

So far, aside from a few localised extreme weather events, Army has been lucky to avoid much of the worst of climate change; most has occurred away from Army's major bases. However, already this century there have been two major floods affecting members posted to RAAF Base Amberley (and nine floods in the greater Ipswich area);[29] Townsville was flooded in 2019;[30] and road access between the Northern Territory and South Australian elements of 1 Brigade were cut during flooding in January 2022.[31] Between February and April 2022, Defence Housing Australia reported 565 flood-damaged properties in south-east Queensland and parts of coastal New South Wales,[32] and in April 2024 Holsworthy experienced extreme rainfall that closed training areas. Luck will soon run out. In the next decade (and beyond) Army can expect an increased frequency and severity of extreme weather events in major unit locations and training areas. Drought, floods fires and prologued heatwaves will have a direct impact on training, training outcomes, families and ultimately capability.

Training Area Availability

One of the more obvious consequences of climate change will be its effect on Army's training areas and facilities. Major training areas including Mount Bundy, Bradshaw and High Range will be unavailable for longer periods due to inaccessibility, infrastructure damage, terrain alteration, or more frequent occasions where the temperature exceeds wet bulb globe restrictions.[33] Remediation of damaged infrastructure and terrain will close specific areas for lengthy periods. Live-fire ranges will face more frequent heat-related closure due to fire risk, resulting in increasing demand for the limited days available and prioritisation of use. Not only will there be constraints on a unit's ability to train; an unstable planning and training environment will also emerge—one that that will be at the mercy of weather that is extreme, unpredictable and dangerous.

Adverse environmental effects will not be limited to the ADF's better-known training areas. Bare bases, including Curtin and Scherger, and training areas near Katherine, will also be unusable for substantial periods. Joint and combined exercises conducted from these locations will face the prospect of cancellation or rescheduling, while exercises using the

Shoalwater Bay Training Area will experience the immediate devastation of adverse weather and may also suffer disruption through coastal erosion, with obvious effects on capability and mobilisation readiness. The resultant diminution in individual and collective skills and proficiency will compromise Army's capability until the deficiency can be remediated under more favourable weather conditions. These effects will be felt across almost all capabilities—for example, infantry minor tactics will be constrained to benign and controlled barracks environments, and drivers will be unable to exercise on varying and complex terrain. In addition, flying opportunities for drone operators will be impaired and limited; the range of locations and opportunities for amphibious landing will narrow; Army will experience dust exposure during equipment maintenance and repair, including technical equipment; there will be adverse flying conditions for rotary-wing medical evacuation; and there will be increased risk to field supplies, including fuel. The list goes on.

Training System Disruption

With training areas less available, there will be inevitable consequences for the individual training system and the training continuum itself. Progressive training with substantial outdoor-based training objectives (such as officer training at the Royal Military College, Duntroon; and combat corps initial employment training) will require suspension and rescheduling. If this cannot be achieved before the notional graduation/march-out date, then Army will face the prospect of graduating officers and soldiers who have not completed the full suite of training outcomes. This will raise the spectre of Army having to deal with increased training deficiencies and backlogs. Shorter courses, such as some skills and promotion courses, will not be immune from the disruption and may face cancellation and rescheduling.

In the local unit environment, basic fitness assessments, combat fitness assessments, physical employment specification assessments and other readiness requirements will all face scheduling disruption. While these events require less planning and are simpler to reschedule than career and promotion courses, the condensed nature of many unit training programs will limit alternative opportunities for their conduct. The effects will be felt acutely in units with large proportions of service category 5 members,[34] who have limited parading opportunities. Additionally, members requiring

reassessment, those returning from injury, or those who are unavailable on a scheduled event due to any of the myriad of life events, may not be able to achieve specific mandatory training outcomes in the timeframes normally specified. This situation may put at risk individual preparedness and eligibility for courses or promotion, and again, may compromise capability.

Career System Disruption

While climate-induced disruption to the conduct of courses and training will be problematic in itself, career managers will be confronted with the likely prospect of individuals not being fully qualified for posting or promotion when Army plans to post or promote them. While this issue is not foreign to career managers (who regularly face training deficiencies in their portfolios at an individual level), climate change disruption will result in entire cohorts who have not achieved the required criteria for posting or promotion.

Posting activities themselves will be disrupted by extreme weather events. Floods and extreme heat during the usual posting period of December/January, especially in locations such as Townsville, Ipswich or Darwin, are probable. This will have an obvious effect on those posting into and out of these locations, with a domino effect through the entire posting plot across the nation. Assuming that housing is not heavily affected by an extreme weather event (a large assumption), it could nevertheless take months for the posting plot and removals planning to recover, negatively influencing family schooling and spousal employment. If housing *is* affected, then the impact on individuals and their families, belongings and possessions will be substantial and may endure for lengthy periods. In these circumstances, the potential exists for negative mental health and wellbeing consequences to emerge for members and families. This topic is discussed further below.

With large portions of Army facing posting and promotion disruption, there will be a delay in the commencement of unit training programs, which will have an immediate effect on unit capability. This will include disruption to mission rehearsal exercises and certification. Further, where there is an ongoing overseas operation, disruption to force preparation, force generation, and rotation and redeployment cycles will occur. In some instances, unpopular short-notice extensions to deployments may be imposed, with the possibility that members will return to unit locations and to families dealing with the aftermath of a natural disaster in their absence.

Finally, not completing training, or not being promoted within an expected timeframe, will affect the placement of members on their respective trade pay scales. If courses are not conducted, or if specific training objectives cannot be met, individuals will not achieve the career progression milestones specified in the Manual of Army Employments for tier and grade advancement.[35] The consequences of being held back in training, promotion and salary are self-evident: not only would a member receive less salary, but also the impact on families, morale, and motivation may be irreconcilable for individuals who seek stability and career progression. Unless Army is able to develop some creative contingencies for climate change disruption, it will face pressure to reach a compromise on rigid longstanding progression policies. Measures in response may need to include climate-based retention contingencies.

Disruption to Families

It is not difficult to envisage the devastation that an extreme weather event will cause for families of military members, such as damage to homes and belongings. What are less obvious are the second-order effects. Suspension of schooling, damage to education facilities, or delays in arriving at a new schooling location will have an inevitable detrimental impact on children. Partners may experience greater difficulties in finding employment in an area affected by a weather event, or when they seek to transfer employment to a new location that has been affected. Housing availability will be reduced, which will result in limited options, increases in rental prices and/or dissatisfaction with defence housing. The Defence Member and Family Support agency and the Department of Veterans' Affairs will need to provide more counselling and support services. Meanwhile, Defence will face increasing demand for services including access to emergency relief. While Defence has already demonstrated that it is able to respond and provide support in a limited capacity following isolated weather events, these services will need to be provided regularly, and at times concurrently, in different locations across Australia.

Retention Issues

So far this article has presented a bleak picture of the influence of climate change on training, career and family. For Army, perhaps the worst outcome is the potential repercussion regarding retention. Delayed or cancelled training opportunities, disrupted promotion and posting, and impacts on family may all culminate in negative sentiments towards Army, and members may respond by voluntarily separating from the military. Underlining all of these issues is the ongoing likelihood that Army will still be called on to support national disaster recovery efforts, despite recommendations in the DSR that this requirement is reduced or removed.[36] Individuals may find themselves serving in an Army that is struggling to adapt to climate change, and consumed by its consequences, rather than achieving the professional and personal outcomes they envisaged when they first joined.

Recommendations

In the face of inevitable climate change, Army must retain its ability to properly train its people in order to provide capability in support of national security objectives. To deal with the repercussions of climate change, Army will need to make its training, career and promotion systems more responsive and agile by developing contingency plans across a spectrum of climate risk. There may be little notice to activate contingency plans, so they must be resourced and current so that they can be implemented at a moment's notice. At present, these plans do not exist and there is limited appreciation within Army of the complexities entailed in developing them.

There are some conceptually simple approaches Army could apply to mitigate the threat of climate change disruption. While some of the suggestions below are more difficult to operationalise than others, it is worth returning to the fact that climate change is not speculation, and its impact on Army is inevitable. In this regard, developing contingency plans is not an option for Army. It is a mandatory obligation for the preservation of capability and to assure the wellbeing of Army's members and families. Extreme weather events will have a direct and immediate consequence for capability, but failure to plan for them will prolong recovery and delay the restoration of capability.

Based on the considerations raised in this article, the following recommendations are made for consideration by Army decision-makers and associated agencies responsible for personnel and capability management:

- Army should disengage, as much as is practicable, from national disaster recovery efforts. Army locations will be affected by extreme weather events and therefore Army members and their families will have their own problems to deal with in their efforts to recover and re-establish critical capabilities.
- Army should consider innovative climate-resilient approaches to the delivery of training, emphasising flexibility around timing and location of courses, in order to maintain the training continuum and capacity throughout a range of weather events.
- Training establishments should prioritise training objectives when weather events result in disruption to courses and access to training areas. Outdoor objectives and assessments should be flexible and responsive. Alternative plans and methods should be available to assess completion and competency.
- Career management agencies and supporting contractors involved in the posting and relocations process should develop systems that support inherent flexibility and responsiveness in the posting cycle to cater for mass disruption and/or short-notice delay in posting processes and relocations.
- Career management agencies should develop intrinsic flexibility in the application of promotion criteria to ensure individuals are not unnecessarily disadvantaged in career progression as a result of a weather event.
- The Manual of Army Employment should be amended to include mechanisms that allow career progression in instances where the attainment of individual proficiencies has been prevented due to climate change impacts on training, course conduct or achievement of any other mandatory requirement for progression.
- Support organisations such as Defence Member and Family Support should generate well-developed and well-resourced mechanisms to provide emergency family relief and support.
- Defence People Group, through Chief of Personnel, should develop well-considered retention plans to address the risk of climate-induced separation.

Conclusion

The Australian Army often prides itself on its agility and responsiveness. While this trait can be demonstrated in its capacity to deploy brigade assets in preparation for war, Army does not yet have the ability to adjust its training and career systems in response to climate change. Army has a developing appreciation of the strategic implications of climate change, but it has underestimated the disruptive effects of extreme weather events on its own people systems. For the most part, climate change has been treated either as a fringe issue that Army will adapt to organically or (as some still believe) a problem that will go away on its own. However, the effects of climate change will be far more wide reaching than has been appreciated so far. Climate change will impact training, posting cycles, career management, promotion, families and perhaps even recruiting and retention. It will outlast Army's reorientation towards littoral manoeuvre and acquisition of drones, combat fighting vehicles, reconnaissance vehicles, self-propelled artillery, breaching vehicles, assault bridges, and other temporal technological advances in the years ahead.[37]

To maintain capability and prepare for conflict, Army will need to embed in its people systems mechanisms that support inherent responsiveness to climate disruption. Cancellations and delays of courses, promotions and postings are certain; therefore, rather than waiting for an extreme weather event to occur before response plans are developed, Army should proactively prepare for the inevitable. Concurrently, Army members need to become more aware of their individual vulnerability to climate-induced career disruption and the consequences of climate change for their lifestyle and that of their family. Ultimately and inevitably, regardless of the strategic impacts of climate change on national security, climate change will affect every Army member personally and in ways that have not been comprehensively explored in strategic musings; the repercussions are imminent.

About the Author

Colonel Phillip Hoglin graduated from the Royal Military College, Duntroon, in 1994, having completed a Bachelor of Science (Honours) majoring in statistics. He completed a Master of Science in Management through the United States Naval Postgraduate School in 2004, graduated from the Command and General Staff College of the Armed Forces of the Philippines in 2006, and was awarded a Master of Philosophy (Statistics) through the University of New South Wales in 2012. He has been involved in workforce analysis since 2004, was the Director of Military People Policy from 2014 to 2017 and the Director of Military Recruiting from 2018 to mid-2020, and is currently a researcher in Workforce Strategy Branch, Defence People Group.

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The Human Face of Battle

Jack Watling

Speech to the Australian Army Land Forces 2024, Melbourne Convention Centre, 12 September 2024

'People. Ideas. Hardware. In that order.' That was John Boyd's direction for how militaries should deliberately transform to remain competitive. And when armies have successfully transformed, they have usually followed that process. In the US Army's case, the formation of TRADOC (Training and Doctrine Command), and the empowering of a team under General Donn A Starry, enabled the emergence of ideas which started with the extended battlefield and moved into what became Air Land Battle, which the US Army started to adopt and train and execute long before it received the outputs of its five modernisation priorities in terms of equipment.

But when that equipment arrived, the US Army knew how to employ it and was ready to execute that concept, and the effects were made evident in 1991. And yet the way that we approach the future of war within militaries, bureaucratically, usually follows the opposite course. An interesting technology emerges. Someone discovers something. People think it might have military potential. They start tinkering with the ideas around how it might be employed. That becomes a conceptual force, then a future force; then it becomes a funded force. And that's usually the point at which we start looking at how we train and what doctrine might be involved. And very

often we go down the bureaucratically easiest route in determining who's going to receive that equipment, rather than thinking about how it might transform our structures or how we operate.

The reason I highlight that is that it's a real privilege to have been invited by General Stuart to discuss the future of the profession, and to discuss the future of war in the context of its practitioners, because that is where we need to begin.

It is foundational, as we just heard. Now I'm going to try to cover four things. Firstly, I'm going to try to address what is the relationship between technology and professionalism. Secondly, I'm going to suggest some aspects of the human face of battle which are changing and which we need to confront and be prepared for. Thirdly, I want to address what that means for professionalism. And fourthly, I want to put that in the context of great power war, which is very different from the kinds of conflicts that the professional community has faced in the current generation so far.

I'll begin with the relationship between technology and professionalism. Between, I would say, around 1100 and 1600 AD in Europe, there was a fairly consistent dynamic. There was a professional military cadre who conducted most war fighting, and the characteristics of that profession were grounded in a moral code defined by chivalry, in their bravery, in their personal willingness to face danger and in their mastery of their arms. And they were followed and respected by their colleagues through the mastery of their arms. Now, from about 1600 onwards, those professional qualities changed in terms of what people thought made a good soldier.

I would say there's not one reason for that. There are several. One of them was the maturation of firearms. Firearms had been around for a while, but they were becoming much more effective, much more reliable. The other was the emergence of printing and a progressive increase in literacy, because those two things meant that you could impart professional knowledge beyond your own experience.

You could discuss concepts in a way that was accessible to people about how they could conduct military operations and movements, how you could train people. So a steady rollout of concepts and ideas about command and control—the coordination of formations—became accessible across Europe. And because of that ability to coordinate large bodies of people

and the fact that the muskets did not require the same level of mastery to be able to apply lethal effect, the definition of a military professional became somebody who understood logistics, who could command and coordinate and direct others.

In fact, by the end of the 19th century, this had reached such a point that it was seen as something of a failing if an officer actually had to use their weapon. Officers in some cases didn't even carry them. Most weren't quite that confident in their skills, and carried a sidearm or a sword, often a small sword. A duelling weapon may be appropriate for self-defence, but certainly not for offensive action. And so the definition of professionalism was transformed.

There's a really interesting and important point about this, which is to take the longbow as an example. The longbow arguably remained a more effective weapon than the musket right up to about 1840. If you had a unit of long bowmen, you could shoot faster with more accuracy, it had similar lethal effect and it had more effective range—and you didn't blind yourself when everyone fired. So then why was it superseded? The simple answer is that it took years to even be able to draw the weapon at the 120 to 180 pounds draw weight of a full war bow. The loss of the individual who could do that was the loss of a hard-to-replace resource, whereas you could train a pikeman or you could train a musketeer in a few weeks. Now, why is it that I'm talking about the medieval era and the Renaissance, when we're supposed to be talking about the future? Partly it's an act of cowardice.

I'm talking about bows and arrows and muskets because I presume that no one in this audience is professionally threatened by the idea that a bow and arrow might be obsolete on the modern battlefield, though they do go through sandbags, which is quite interesting. However, hopefully, having convinced you that your skills as professional soldiers do change in relation to technology, I'm now going to turn to the modern period and look perhaps forward into the future.

I'll give you one example of why it's really important that we consider what skills and characteristics we train and develop in the next generation of soldiers. For the last arguably 30 years the military has been controlling the battlespace and bounding it. You have set the tempo of operations, and you have been facing adversaries who cannot overmatch you with firepower. So being a good soldier has, to a large extent, been about perfecting the

execution of very clearly defined battle drills. It has been about personal bravery and the willingness to go through the door first, and mastery of your arms. And we've seen that in how special forces, for example, have arguably shifted from being the unconventional forces that they were in the Cold War to being hyper-conventional forces.

We get obsessed about tier one, tier two, tier three and so on, which is largely based on range time, the amount of experience, the ability to execute complex military tasks. And yet, if you think about the years it would take to train a proficient sniper, for example, I can assure you that I can take somebody who has never handled a weapon before, and with three weeks' training I can enable that person to apply lethal effect with more accuracy at four times the range, with much greater consistency than the best sniper in any of your armies.

Now, you will probably argue that the first-person view (FPV) drone has lots of weaknesses and vulnerabilities. There are limitations to it, and I've written about them extensively. I would agree with you. But just as the bow and arrow remained a more effective weapon technically, that did not mean that when scaled and used operationally, it was an operationally effective way of fighting. And so the ability to fly unmanned aerial vehicles (UAVs) precisely, through electronic warfare—which can be done, although it's difficult—is a skill set which is easy to learn and delivers precision at range in a way that is transforming how you apply lethal effects and the disposition of your forces on the battlefield. So there is a clear relationship between technology and professionalism and the skills you need. And we need to identify what those new skills are if we are to remain competitive.

I'm going to suggest that there are three really important changes to the face of battle that we need to be prepared for, that emerge from the changes in technology. The first is driven by those characteristics that General Stuart highlighted: increased ability to detect, to communicate those detections, to strike those detections at reach and to do battle damage assessment; and the ability to do so rapidly and precisely.

Those changes mean that a modern force is much more dispersed across the battlefield. And what that means for the individual—you know John Keegan in *The Face of Battle*: the reason why it's such a powerful book is that it drills down from the descriptions of mass movements of formations into the experience of the individual soldier and the challenges that that soldier has to overcome.

On the modern battlefield, a company is often spread across up to 3 kilometres of frontage. And in that context, what has held together Western armies, from the Second World War, in terms of how we've understood unit cohesion, has been the bond with the person next to you—small-squad dynamics; the relationships between individuals; your determination to do the best you can in order to preserve the person that you care about that's serving alongside you.

But as forces are dispersed more and more, you might have somebody next to you. You often don't. Your friends might be in line of sight. They often aren't—because you can't actually concentrate large numbers of people in one place. And if you do, they won't be alive for very long.

And so that fundamentally changes the moral challenge that the individual confronts. It is not uncommon. Think about engagements in the First World War. Generally speaking, the enemy was difficult to see. You caught glimpses of them. They were at maybe 100 metres, maybe 40 metres. Occasionally you got into very close combat, but very often engagements were out to 300 metres.

In Afghanistan it was going up to 600 metres very often. The point is that the soldier could probably see more friends than enemies, whereas on the modern battlefield it is entirely plausible that you might be looking up and there might be UAVs rather than enemy soldiers, but that very often you can see more enemies than friends.

That is a very isolating experience that we need to prepare soldiers for—the ability to think and to overcome fear, to help others. What they do as individuals will determine the effectiveness of the unit, but help others when they can't necessarily see the person they're helping. That requires a different kind of preparation, I would suggest.

There is another element to modern warfare that I think we have to confront, and it's ugly and it's visceral, which is its personalisation. Now, one of the things we do is take large bodies of video from conflict, and we observe them to try to identify lessons. I've spent a lot of time going through footage from Ukraine, and you see some pretty ugly things. You see soldiers confronting an enemy reconnaissance vehicle or strike UAV pointing out someone else's position.

They say, 'Go and strike them, not me', because they are looking death in the face. You see soldiers commit suicide, kill themselves rather than continue. Now, that has happened historically; that's not a new phenomenon. But it is new that the person killing them (a) induced it through fear and (b) watches it happen. And there's another aspect to this, which is that the pervasive element of intelligence, surveillance and reconnaissance (ISR) with high-definition video scraping the battlefield continually means that the faces of the dead are not anonymous. They are people with names and families. And very, very quickly, when you take that video and you plug it into facial recognition, because people have large digital footprints, that person comes alive again to a certain extent for the killer.

There have been interesting psychological studies done on the impact on drone operators of essentially the removal of fairness from the fights: the fact that they are killing from a distance, and what that does to their mental resilience. That's something that was being dealt with in specialised units, flying UAVs over hundreds of kilometres; it's now something that is being confronted at tactical echelons. A lot of people are deliberately killed rather than incidentally killed. It's not returning fire in the direction; it's picking out enemy positions. And very often they will find out exactly who they killed and what they left behind.

That's another consideration when it comes to professionalism and identity. How do you prepare someone to be able to do that without sustained moral injury? There is a third element to this. General Rainey is in the room, and he's talked before about the idea of constant contact. I think that's a really interesting idea, and it encapsulates something that has changed about the face of battle. A platoon now can engage in lethal effects against moving targets up to 8 kilometres, against static targets out to 20 kilometres. But they can call for effects that even at brigade level you could generate, though you probably won't hold them there—it's more likely a divisional asset; nevertheless, it's cheap and can have 450 to 600 to 1,000 kilometre range. Of course, soldiers rotate and they leave the front.

When it comes to the definition of professionalism and the following of battle drills and good discipline, I'm pretty confident that lots of you have one of these—a mobile phone. And I'm also fairly confident that as professionals, you know how to use it safely. You want to buy them locally

in cash. You want to put an operating system on them that detaches the activity from the identifying features of the device. You want to use a prepaid card, which you load with cash to pay for a SIM, which you acquire locally. It doesn't attach to your name or your banking information. You keep it off most of the time. You only turn it on in crowded places, in places where there's not an inherent geographic relationship with anything that you particularly do or anyone you particularly know. And otherwise, you keep it well away. That is the professional tradecraft of how to safely operate a mobile phone.

I also have really high confidence that if we did an advertising identification (ID) scrape of this building right now, pretty much all of you would get captured by it, including me. And within a week, the adversary would know where you live, what time you wake up, which route you take to work. And within a month, they'd probably know exactly who your family is, where your children go to school, who their friends are and where they hang out. And they would know that using commercially available data. There's no sensitive collection required to do that. You just need to buy the advertising information and do some analysis.

And so the interesting point there is that the result of constant contact is that drills that work for a limited period of time, when you are in a specific context and will keep you safe, can't be kept up continuously when you are in constant contact and in conflict, constantly targetable.

You know, most Western militaries are struggling with recruitment. If we imposed that comms discipline throughout our operational depths in peace and war, I think we'd struggle a lot more with recruitment, noting connectivity's role in being a functional member of modern society. And what does that mean? Even in Ukraine, where people are very aware of the threat, only two weeks ago the military signal school in Poltava was struck in operational depth and a large number of its new personnel and some experienced personnel were killed and many more were wounded, precisely because people didn't follow discipline even though they understood the threat. And that changes how we think about professionalism, because you can't keep up your best efforts all the time.

I'm going to briefly outline some of the characteristics of the professional that I think are relevant and then what that means in the context of great power war.

The first is, as I highlighted, you're not able to solve the problem with the best drills available, for two reasons: firstly, because you can't keep it up continuously; secondly, because the battlefield has just become an awful lot more complex and there are too many variables that you don't know, and therefore it is extremely hard to understand what the best thing to do is.

But what professionals have is a body of historical knowledge. They have had the time as professionals to think about emerging capabilities and to test them. And they have experience, and through that experience, professionals are able to make contextual judgements about risk—much better contextual judgements than those individuals who have not had the time to think through these problems. Because while theoretically, as I just highlighted, you could pick out the entire laydown of the Australian Army through mobile phones, through sustained ISR, it's actually very difficult to translate that into something that is operationally useful—but especially if you are dealing with a professional body that knows when to apply the procedures and when not, and can make its contextual judgement about where it does and does not adopt the control measures.

The other thing that experience gives you, and being a professional organisation gives you—a profession of people with a shared mission—is that even though warfare is becoming drastically more complicated, you are exposed to the other members of that profession on a routine basis. An infanteer may not be an expert signaller or electronic warfare operator. They might not understand the mechanics of the quantum technology, the quantum sensing that was being demonstrated in the foyer here yesterday, but they've probably had conversations with people who do, and they can probably learn, and force themselves to learn, the principles of what that offers and what it doesn't: what those fellow professionals need in order to be able to do their jobs. And therefore, through that knowledge, you are able to effectively make contextual judgements. That's really important.

It's not about following the drill. It is about being able to work with a diverse team who can draw on skills that you don't understand in detail, but you have the experience and the relationships to be able to make that team as effective as it can be.

I'll give you an example from an applied military context. If I am going to conduct a company attack, there will be a point on the modern battlefield where my electronic protection will run out. I will move beyond the range

at which the jammers are disrupting the enemy kill chain, and that will be an invisible line. And as an infanteer, or a company commander, I probably have no idea where that line is, but someone in my organisation will be responsible for telling me. And so I will prioritise maintaining communication with that person so that they can tell me to stop when I need to stop. And if I fail to maintain that relationship, I will be potentially very successful in my company attack and then catastrophically unsuccessful very, very quickly, because the level of precision effects against my formation will go through the roof.

So that is a shift in professionalism in terms of how we think about combined arms capability and how you draw that team together.

There are other aspects of professionalism that I would like to highlight. This actually builds on what General Stuart highlighted in terms of adaptation. There are a huge number of bright ideas that you can generate when you're confronted with a problem. Making bright ideas practically executable requires the ability to think through all of their dependencies and their tactical applications, and the permutations of how they will interact with an adversary. In low-intensity conflict you can make a lot of mistakes. In-high intensity conflict you can't—you can't because you will suffer the consequences. And so a critical element in adaptation is using that professional experience, using your contacts with your colleagues to be able to look at proposed adaptations, to judge which ones will work and which ones will not, and then to take the bet on scaling them—because it's not just about being fast; it's about whether you apply it at the scale of relevance to deliver an operational effect.

And that is something that comes from your professional expertise: the ability to make the right bets. If you make the wrong bets, you will waste resources, you will waste time, and ultimately you will waste people—which is the one thing you can't afford to lose.

I'm going to transition to the relationship between great power war and professionalism, and the role of professionals in great power war. I think there are four things that are most important. There are more, but there are four I am going to highlight.

The first is that when war breaks out, you are the ones who have the highest level of readiness and capability, and you have a plan. After war, what we observe is that the people who start wars think they're going to be short. It is the professionals on the defending side who set the conditions for the terms that develop in that conflict. If they fail, the war may well end short. If they succeed, the war will likely be long. But the question is: on what terms? What are the dynamics? What's the terrain that's actually being contested and fought over? That will be determined by the fighting power and capacity of the professional cadre of a force. That's task number one.

The problem is you will be heavily attrited in that fight, because you're also facing an adversary who probably has first-mover advantage, when their magazine depths are greatest, when they are executing their plan and you are facing their professionals who have trained and prepared. And so it's an extremely bloody fight. Not everyone will be killed, but most of your units will be broken up largely from wounded. And therefore with the need to replace personnel—very, very quickly—when we think about a longer conflict, the role of personnel changes and the role of your experience and professionalism changes.

In Ukraine, I observed three things. Firstly, the rate of casualties meant that the Ukrainians did not have enough time to train replacements. They still don't. The result is there is a qualitative decline in the capacity of the fighting force over time. Now it will get to a floor and it hopefully won't drop below that. But the point is that you have less time to train. Because you have less time to train, you have to focus on the key things that are most relevant. Who determines what is most relevant? You do. And so your experience enables the generation of the next echelon.

But the next echelon is not a static target. You're not trying to replicate what you were—both because the adaptation cycles mean that the skills and the tools at the front are changing and because the reduction in time for generating new forces means that what you were is an impossible aiming mark. So you then need to manage that adaptation cycle so that the forces being generated have the skills that are relevant to the next stage of the fight. That adaptation needs to work back through the training system.

The third element—and this is an area that experience can enable even as you take casualties, because most people will be wounded rather than killed and can still contribute to this—is that your expertise in logistics and command and control and planning will enable the force to continue to operate at scale.

What new recruits will have is a lot of enthusiasm. They may be pretty confident and up for a fight, and they may have aptitude for the task that they've been given. In fact there are a huge number of extremely talented professionals in the civilian world who will really quickly master things that you took a long time to work out, because you will have PhDs and you will have engineers surging into the force from the civilian fields, and they will learn quickly because there will be similarities with their civilian jobs. But what they will not have done is try to coordinate at scale in a contested environment. And scale really matters in terms of your ability to appreciate what is operationally significant and which plays are worth making and which are not. Also, the scale at which you operate will determine your competitiveness against the adversary—how much combat power you can bring to bear in an operation.

The fourth element is your leadership. What happens when a military grows to many times its original size is that its culture dilutes. You have a clear professional culture; if we go through mobilisation, your culture will be the minority in the force. But many of you will know what you're doing and others won't, and therefore they will look up to you. How you exercise command—which may be being exercised a couple of ranks higher than you are currently, by virtue of the need to fill out the positions in those new units—will determine how effective those units are and what the culture is.

The interesting thing about that is that because they will be less capable and because they will not have been indoctrinated into the military profession, they're probably going to be quite disobedient. I've seen this in quite a lot of levied troops. They're quite good at consent and evade, quite good at slow-rolling orders if they do not trust the commander. And so your ability to exercise control will likely diminish and the importance of your ability to inspire through command will increase. And those people, when we think about a long fight, will want to trust that you are trying to preserve the force, that you are trying to keep them alive and get them home, because they're not professional soldiers and, first and foremost, they want to return to what was.

I'm going to conclude, noting that I've been speaking for some time, with a final point, which is that you are the guardian of ethics within that mobilised structure. War is brutal and traumatic, and it imparts moral injury on those who conduct it. And when people are scared and fearful, they are not their best in terms of their decision-making and in terms of their moral judgement. To give you an example, I know of plenty of instances in which conscript or mobilised forces have executed prisoners. And usually they do it because they are terrified of those individuals and the threat that is still beyond them. They do it because they are extremely angry at what those prisoners had done prior to surrendering, and they do it because they don't have a procedure that they understand to deal with the situation. The presence of professionals who do know what the procedure is, who can hold them to a moral standard and can imbue, through command and leadership, that organisation with the sense of purpose to retain that ethical standard is critical, I would suggest, not only to making sure that the force upholds its values and that the force is not just fighting but is fighting for something that's worth defending, but also so that when the non-professional community goes home at the end of that conflict they can look at themselves in the mirror and be proud—and that's an extremely important thing.

I think the study of professionalism and its role as you adopt new technologies and new capabilities and prepare for a new period of great power competition is foundational, is critical, and is a conversation that is worth your time and energy. And I'm very grateful for the opportunity to have spoken with you today.

Thank you.

About the Speaker

Dr Jack Watling is Senior Research Fellow for Land Warfare at the Royal United Services Institute. Jack works closely with the British military on the development of concepts of operation, assessments of the future operating environment, and conducts operational analysis of contemporary conflicts. Jack's doctoral thesis examined the evolution of Britain's policy responses to civil war in the early twentieth century. He has worked extensively on Ukraine, Iraq, Yemen, Mali, Rwanda, and further afield. Jack is a Global Fellow at the Wilson Center in Washington DC.

Book Review

From Far East to Asia Pacific: Great Powers and Grand Strategy 1900–1954

Edited by: Brian P Farrell, SR Joey Long and David J Ulbrich

De Gruyter Oldenbourg, Berlin/Boston, 2022, ISBN 9783110718713, 436 pp

Reviewed by: Andrew Carr

In his concluding reflections, Brian Farrell observes that this edited book is best thought of as 'a jazz score, not a symphony—one that combines a steady and discernible rhythm section with connected, but strikingly diverse, individual riffs'. In the hands of these capable editors and a few stand-out soloists, this is a work that hits many of the right notes and justifies the audience's time.

That clever metaphor is symbolic of the thoughtful yet direct approach of the editors. Their touches can be seen regularly, yet lightly, across the text. Rather than a lengthy opening chapter, the editors provide six shorter contributions distributed throughout the book. This enables them to offer breadth in setting up the big ideas of each section, as well as depth, interrogating the contribution of the various chapters and their relationship to the theme of the book.

Their theme, the bass line of this historical composition, is the difficulty of constructing a regional order in Asia from 1900 to the early 1950s, with China's weakness as the pivotal factor. As Farrell explains early on, 'China's weakness was the cardinal fact around which geopolitics and regional order revolved'; however, 'neither China nor the Great Powers could reorder anything on their own. They needed each other'.[1] Establishing order was a complex dance, one which involved grand schemes and sure-footed adaptations on the fly. It was a political construct built from military, diplomatic, intellectual and economic foundations—hence the theme of 'Grand Strategy'.

Grand strategy is a useful way to examine broad, interconnected questions of national approach. How did the big ideas and personal inclinations of the various leaders shape a broad direction for the state? What other fields of national life were pulling in a similar direction? How well did these common concerns accord with the central strategic problems of their time? For instance, Shannon A Brown details the way US private industry led to a quite distinct approach in Asia, of a 'community of interest' seeking peace, as opposed to the 'chauvinistic set of fantasies' which defined America's approach in the Pacific.[2] Karl Hack examines Britain's approach to South-East Asia following the Second World War, while Jeremy A Yellen starkly details the incoherence and confusion of elite Japanese policymaking prior to and during the war, along with the efforts to overcome it.

When searching for coherence, the chapters which focus on a single person are among the strongest. Yamamoto Fumihito elegantly shows how Japan transitioned from a democracy to a militant society by the mid-1930s by exploring the role of Takahashi Korekiyo, the Japanese foreign minister from 1931 to 1936. Similarly, Andrea Benvenuti reveals a Jawaharlal Nehru as Prime Minister of India who navigated between the rival blocs of the early Cold War not merely as a pragmatic realist but as one who fundamentally did not accept the Cold War framing of bipolarity.

The challenge with this work—and, to be clear, most of the literature on 'grand strategy'—is to signify what this concept meaningfully contributes to our analysis. Grand strategy is a category of state practice which policymakers endlessly aspire to achieve, and which analysts compete to bestow on favoured practitioners. Yet, having anointed those with the requisite coordination of 'all' elements of national power with this

most prestigious of labels, what then? What additional insights does this judgement contribute? The stronger chapters analytically sidestep this issue by viewing grand strategy as a spectrum, with more coherence generally treated as a good thing. To go beyond that, absent specific historical strategic problems and contexts, can be troublesome.

It is often thought easier for great powers to do grand strategy than for smaller nations. In a useful coda, Peter J Dean's chapter on Australia demonstrates how a smaller nation regularly improvised while staying in tune with its larger partners. Dean provides a direct and authoritative account of the emergence of Australian strategic policy from British settlement through to the early Cold War era. He argues that Australia's unique:

> *combination of location at the bottom of Asia combined with a reliance on a great and powerful ally located on the other side of the globe resulted in a relatively high degree of continuity in national security strategy.*[3]

Dean labels this a grand strategy based on six key themes:

> *An alliance with a Great Power … The promotion of a local defence capability … a state-based focus for national security policymaking … a 'realist' (pragmatic) tradition in foreign policy … an active bilateral and multilateral approach to diplomacy … [and] a liberal internationalist approach.*[4]

For military audiences in Australia and across the Indo-Pacific, the value of sitting down to read *From Far East to Asia Pacific* is threefold. First, it is a reminder that China's centrality to Asia's regional order is neither recent nor primarily tied to economic or demographic trends. A situation of 'China weak' is as significant for Asia as 'China strong'. Second, this book offers a number of less commonly found historical case studies. Our capacity for strategic imagination depends upon the richness of our historical memory. Those who have a deeper well of events, metaphors and past experiences to draw on will be better placed for making a useful contribution today.

Finally, the book offers a way of thinking through what the 'right approach' to strategy should be. Should a grand strategy always be our aim? What kinds of strategic problems does it help us to serve, and what ones might it impede? Given the turmoil of events in the first half of the 20th century, many chapters reveal that adaptation, and breaking problems down into manageable chunks, is just as much a part of the strategist's toolkit as building up frameworks for coherence and coordination. David Ulbrich's chapter on the US Marine Corps' development of amphibious capabilities from 1900 to 1941 is a particularly useful account. He shows that for the Marines to be an effective fighting force, they needed to understand the evolving direction of national policy settings. Yet the political level could not give them a central authoritative document and set of objectives to guide their actions. Instead they had to innovate, adapt and remain flexible to keep in line with the evolving political level as well. Ulbrich quotes the great American military historian Russel F Weigley on the value of breaking issues down into the specific problems that could be solved:

> *[S]imply by defining the specific problems into which amphibious operations divided themselves, the Marine Corps made it evident that the problems likely were not insoluble; and the Corps went on to delineate many of the solutions.*[5]

Symphonies, like grand strategies, may look elegant and impressive, but the flexibility and improvisation of jazz is often the surer path to pleasing outcomes in discordant times.

About the Reviewer

Dr Andrew Carr is a Senior Lecturer in the Strategic and Defence Studies Centre at the Australian National University. His research focuses on strategy and Australian defence policy. He has published in outlets such as *Survival, Parameters, Journal of Strategic Studies, Australian Foreign Affairs, International Theory, The Washington Quarterly and Comparative Strategy*. He has a sole-authored book with Melbourne University Press and has edited books with Oxford University Press and Georgetown University Press. He is currently a member of the ANU-Defence Strategic Policy History Project, writing a history of Australian Defence White Papers from 1976 to 2020.

Endnotes

1 Brian P Farrell, 'From Far East to Asia Pacific: Great Powers and Grand Strategy, 1900–1954', in Brian P Farrell, SR Joey Long and David J Ulbrich (eds), *From Far East to Asia Pacific: Great Powers and Grand Strategy 1900–1954* (Berlin, Boston: De Gruyter Oldenbourg, 2022), p. 2.

2 Shannon A Brown, 'Grand Strategy by Other Means: US Foreign Policy, Public-Private Collaboration, and "Employing all Proper Methods in China," 1895–1914', in Brian P Farrell, SR Joey Long and David J Ulbrich (eds), *From Far East to Asia Pacific: Great Powers and Grand Strategy 1900–1954* (Berlin, Boston: De Gruyter Oldenbourg, 2022), p. 42.

3 Peter Dean, 'Managing Great Power Allies: Australian Grand Strategy in Asia, 1900–1954', in Brian P Farrell, SR Joey Long and David J Ulbrich (eds), *From Far East to Asia Pacific: Great Powers and Grand Strategy 1900–1954* (Berlin, Boston: De Gruyter Oldenbourg, 2022), p. 390.

4 Ibid., p. 390.

5 Russel F Weigley quoted in Brian P Farrell, SR Joey Long and David J Ulbrich (eds), *From Far East to Asia Pacific: Great Powers and Grand Strategy 1900–1954* (Berlin, Boston: De Gruyter Oldenbourg, 2022), pp. 112–113.

Book Review

Warfare in the Robotics Age

Authors: Ash Rossiter and Peter Layton

Lynne Rienner Publishers Inc, Boulder CO, 2024, ISBN 9781685859817, 257 pp

Reviewed by: Callum Hamilton

Warfare in the Robotics Age examines the evolution of military robotics, how defence forces are adapting to increased autonomy in warfare, and the consequences this trend may have for international relations, statecraft, and deterrence. It advances the literature by linking the emergence of military robotic and autonomous systems (RAS) to Fourth Industrial Revolution (4IR) innovations. The authors' research provides practical insights that will help RAS practitioners, warfighters and national security policymakers alike to navigate challenges for militaries as they seek to employ RAS.

Given the hype that can surround the analysis of RAS, the authors make a clear point of balancing opportunities for capability advantage with discussion of the challenges and uncertainty that remain in the field. To this effect, *Warfare in the Robotics Age* begins with the history of robotics in warfare, which it traces back to the use of wire-guided, remote-controlled 'land torpedos' in World War I. Despite the surprisingly long history of military robotics, the authors note several challenges which have slowed

development. Until recently, robotics has struggled to find support within military services owing to a limited track record of success and an inability to translate technological development into manpower efficiencies.

Scepticism towards robotics is slowly fading as 4IR technologies build momentum in both civilian and military contexts, driven by interrelated advancements in artificial intelligence (AI), big data, cloud computing, and the internet of things. These technologies, as the authors describe, are bridging the physical and digital worlds by enabling robots to process unlabelled data, share information across systems, and self-optimise as they prompt action and change in the real world. Greater autonomy in robotics, or RAS, is disrupting military organisations, as the possible benefits for force scalability, survivability and efficiency come closer into view.

Today many forces around the world are experimenting with RAS—including Army's Robotic and Autonomous Systems Implementation & Coordination Office (RICO)—and contributing to the growing body of evidence for its value to future forces. The experience of RICO agrees with the authors' discussion:

> *Warfighters who can experiment with an operational prototype can more easily envisage the potential of the system than if the concept only remains intangible and theoretical … The prototypes provide opportunities to develop and refine new concepts of operation, … evolve operational requirements … and operate militarily useful quantities of prototype systems in realistic military demonstrations, and on that basis, to make an assessment of the military utility of the proposed capability.*[1]

Further, experimentation activities provide an opportunity to resolve the uncertainties of RAS that would otherwise risk or obstruct long-term capability development programs.

Warfare in the Robotics Age introduces the concept of 'prototype warfare' to help make sense of the quickly evolving RAS ecosystem. Prototype warfare emphasises the rapid fielding of a small quantity of prototypes with soldier end users for assessment in militarily realistic experimentation activities. It provides a valuable opportunity to explore different ways of generating effects with technology before committing to a particular system, helps determine technical requirements, and reduces uncertainty around future capability. By approaching design and development as an

evolving process rather than 'one and done', militaries might rapidly field a wide range of RAS platforms, placing additional resources behind those that provide an advantage in the strategic context of the day.

The authors contend that, in the future, prototype warfare may even enable continual innovation in military RAS, by extending the production process to the in-service phase. With warfighters at the centre of the production ecosystem, RAS platforms might be customised for specific missions or in response to changes at the operational and tactical levels. Importantly, RAS platforms that leverage AI and machine learning have a tendency for 'concept drift' as real-world data evolves over time in non-obvious ways. Performance monitoring and feedback, provided by soldier end users, will be key to enabling model refinement, retraining and domain adaptation to occur at the speed of relevance within operations. To seize the initiative in future conflicts, militaries will need the capability to continually adapt emerging technologies in disruptive ways and conduct assurance in significantly more compressed timeframes than has been necessary in the past.

While describing the potentially decisive advantages achievable by militaries that can continually innovate, *Warfare in the Robotics Age* always keeps sight of the challenges to RAS. In particular, it articulates the inherent tension between military bureaucracies (designed to provide uniformity) and the organisational agility needed to enable rapid prototyping and iteration. To explore competing RAS alternatives, militaries must accept enduring and substantial uncertainty. Not all concepts will realise the envisioned capability benefits. Some may only provide an advantage in certain operational and strategic contexts. Nevertheless, the authors argue that the potential capability and cost advantages of RAS create an imperative for states to accelerate concept development and avoid being on the wrong side of a capability asymmetry.

Warfare in the Robotics Age acknowledges that RAS may unlock mass and scalable effects for middle powers, such as Australia, that have previously not been able to compete against states with larger populations. Ukraine's ability to rapidly deploy many small, cheap RAS platforms to attrit a larger Russian invading force lends weight to this line of thought. Although the book goes into great detail about developments in the United States and China, as undisputed global leaders in RAS, it would have been interesting to more deeply explore the asymmetric advantages that may fall to smaller states.

One topic the authors tread carefully around is the law and ethics of militarily employing RAS. This is not a criticism of *Warfare in the Robotics Age*. Much of the existing literature in this area is prone to generalisations and vagueness. While writers commonly note that law and ethics are clear challenges, it is rare to find practical solutions beyond the need to simply program legal and ethical decision-making into RAS. To the authors' immense credit, *Warfare in the Robotics Age* proposes a different way forward based on the idea that only humans can 'do' responsibility and accountability. No level of human supervision will make a RAS concept acceptable if it cannot be reconciled with doctrine and responsible command. Only commanders (and operators) with an understanding of a RAS concept's limitations will have the confidence needed to employ it across a range of tactical situations, noting their accountability for forces under their control.

The authors describe the challenge that integrating RAS in human-machine teams presents to developing testing and evaluation mechanisms, as well as tactics, training and procedures that build confidence in RAS concepts' reliability. In particular, variable human interaction with RAS and AI-enabled machines will have a significant influence on the range of possible outputs that may need to be tested, evaluated and validated in training and operational environments. Answering how to build confidence in RAS, where unpredictability is a feature rather than a drawback, continues to be a key area for future research.

Warfare in the Robotics Age offers a compelling perspective on military robotics, with practical and easily digestible insights for RAS practitioners and subject matter enthusiasts alike. Crucially, *Warfare in the Robotics Age* addresses how and why military organisations (which are generally designed not to change) must embrace continual adaptation, and the uncertainty that comes with it, to realise the promise of RAS capability.

About the Reviewer

Callum Hamilton is the AI and Autonomy policy officer at the Army's Robotic and Autonomous Systems Implementation & Coordination Office (RICO) within Future Land Warfare Branch. His work aims to enable the safe and legal application of AI and autonomy in the land domain. He holds a Bachelor of Laws (Honours) and Bachelor of International Relations, having completed a thesis on the future of federal AI regulation in Australia following the European Union's Artificial Intelligence Act.

Endnotes

1 Ash Rossiter and Peter Layton, *Warfare in the Robotics Age* (Boulder CO: Lynne Rienner Publishers Inc, 2024), p. 94.

Book Review

The Ethics of Special Ops: Raids, Recoveries, Reconnaissance, and Rebels

Authors: Deane-Peter Baker, Roger Herbert and David Whetham

Cambridge University Press, Cambridge, 2023, ISBN 9781009292054, 233 pp

Reviewed by: Ian North

The ethical application of state-sponsored violence is a vexed and highly topical point of discussion for the countries (Australia, the United Kingdom and the United States) represented by the three authors of this recently released book. Even a casual observer of military and/or current affairs in Australia would be familiar with the contemporary court cases involving members of the Army's Special Operations Command, as well as the release of the *Inspector-General of the Australian Defence Force Afghanistan Inquiry Report* (commonly referred to as the Brereton Report).[1] Prior to reading a book with such an unambiguous title, it is prudent to highlight the credentials of the authors and reinforce the gravity of their important contribution at a time of profound global unrest. Both Baker and Whetham are ethicists, each with substantial involvement with the

Australian and British militaries. Herbert is a retired US Navy SEAL who now lectures on military ethics. The authors' combined expertise and practical experience make this book a highly relevant resource for those seeking to further their knowledge in the fields of military ethics and the employment of special operations forces (SOF).

The authors' intent for the book is clear: they seek to answer the question 'Is there something *ethically* special about special operations?'[2] Following the introduction, which briefly describes both the theory of special operations and the moral framework of conventional warfare, the proceeding four chapters cover the major mission sets (raids, recoveries, reconnaissance, and support to rebels) conducted by most SOF units around the world. Here, the authors examine each topic against the two main criteria that exist within 'just war' theory. These being *jus ad bellum*, which can be translated as the 'right to war', or 'the conditions under which states may resort to war or to the use of armed force in general'; and *jus in bello*, which is 'the law that governs the way in which warfare is conducted'.[3] The final two chapters examine the 'crowded space between peace and war' (i.e. special operations conducted outside a declared conflict), and 'ethical armouring for special operations forces' (enhancing the moral and psychological resilience of SOF).[4] Collectively, the seven chapters cover the majority of the spectrum of unconventional warfare that SOF engage in. Within each, there is a steady stream of observations and practical suggestions for a range of audiences.

The book is at its most accessible when using case studies from real life. The authors' referral to examples such as Operation Neptune Spear (the US Navy SEAL's raid to kill Osama Bin Laden in 2011), Operation Nimrod (the UK SAS's recovery of hostages in the Iranian embassy in London in 1980), and the Coast Watchers (the Royal Australian Navy's western Pacific observation program during the Second World War) makes the subsequent analysis and discussion easier to link to pragmatic outcomes. However, the book becomes more academic when dealing with concepts rather than case studies, and this is most obvious in the chapter dealing with rebels. This happens largely because surrogacy, or proxy warfare (operations conducted by, with or through rebel forces), is an element of unconventional warfare that remains shrouded in secrecy. Consequently, this limits the authors' ability to use examples to illustrate the theory being examined. This is not a criticism; however, casual readers should be aware of it. In any

case, the structure of the book easily allows for targeted reading without detracting from the overall narrative.

Notably, the authors do not set out to provide a definitive analysis of ethics as it relates to special operations. They state that 'our account is not intended to be exhaustive, we hope what we have considered here highlights the relevance of the core ethical principles underpinning the just war tradition'.[5] In the same vein, they routinely point to resources that offer additional detail on specific topics, and raise areas they consider require further development. The only criticism here is that both the discussion and the additional sources offer limited engagement linking ethical considerations for the employment of SOF in the context of broader military operations, or grand strategy (the application of all aspects of national power to purposefully change the relationship between two or more states).[6] While the focus on ethics is the *raison d'être* for the book, this omission is problematic because the authors have noted that governments see SOF capabilities as valuable in part because they provide the option to reduce risk, and the potential cost of both blood and treasure.[7] This could be read as an implied argument in favour of limited war, something Clausewitz warned against when he wrote: 'war is an act of force, and there is no logical limit to the application of that force'.[8]

Relatively short at just over 200 pages, *The Ethics of Special Ops* nevertheless covers a lot of detail. Those who constitute its primary audience—the officers and non-commissioned officers who conduct planning for and command SOF at the tactical and operational levels—should be comfortable with the balance of philosophical discussion and practical examples.[9] A case in point here is one of the last sections ('How and why things go wrong'), which draws on open-source reporting from three Western nations (Australia, the UK and the US) to provide practical examples of contributing factors to poor ethical decision-making. Tactical commanders and planners could easily adopt the material presented here as a list of 'what not to do'. Equally, the book's analysis will also engage a secondary audience: men and women who are, or seek to be, commanders of soldiers (or sailors or aviators) in the future. The detailed examination of *jus ad bellum* and *jus in bello* criteria across multiple scenarios reinforces the universal applicability of just war theory and, accordingly, the importance of educating future military leaders on it. Perhaps the most important target audience for this book is the senior

military leaders and politicians making strategic decisions to send SOF into harm's way. As the book reaches its finale, it turns repeatedly to the steps this last audience needs to take to protect the uniqueness of SOF. As the authors stress, SOF should not be the default option or 'easy button' for the achievement of strategic objectives, taken for the sake of expediency, military or political.[10]

In conclusion, this book is well researched, well written and hugely timely for Western militaries dealing with multiple instances of degraded ethical decision-making by SOF. For an Australian audience, the security and resource (in terms of both people and finances) challenges laid out in the National Defence Strategy[11] and the Defence Strategic Review[12] further contribute to its relevance. More important though is the unequivocal message that the 'lie, cheat or steal—we must win at any cost' mentality fostered by a small number of SOF (and accepted by some members of the public) must be discarded—not forgotten but consciously and deliberately set aside. As the authors stress, doing this will not only 'prevent unnecessary and illegitimate death and destruction … [but] also preserve the moral lives of the people we send out into conflict on our behalf'.[13]

About the Reviewer

Lieutenant Colonel Ian North is a logistics officer currently serving in Army Headquarters Operations Branch. He has undergraduate degrees from the University of New South Wales and the University of New England; and postgraduate degrees from the University of New South Wales and the Australian National University.

Endnotes

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2 Deane-Peter Baker, Roger Herbert and David Whetham, *The Ethics of Special Ops: Raids, Recoveries, Reconnaissance, and Rebels* (Cambridge: Cambridge University Press, 2023), p. 26.

3 'What Are Jus ad Bellum and Jus in Bello?', International Committee of the Red Cross website, 22 January 2015, at: https://www.icrc.org/en/document/what-are-jus-ad-bellum-and-jus-bello-0.

4 Baker et al., pp. 151, 178.

5 Ibid., pp. 116–117.

6 P Layton, 'Defining Grand Strategy', *The Strategy Bridge*, 17 August 2020, at: https://thestrategybridge.org/the-bridge/2020/8/17/defining-grand-strategy.

7 Baker et al., pp. 5, 145–151, 216–217.

8 Carl von Clausewitz, *On War*, Book One, Chapter I.

9 Baker et al., p. 26.

10 Ibid., pp. 213–214, 216.

11 Department of Defence, *National Defence Strategy* (Canberra: Commonwealth of Australia, 2024), at: https://www.defence.gov.au/about/strategic-planning/2024-national-defence-strategy-2024-integrated-investment-program.

12 Australian Government, *National Defence: Defence Strategic Review* (Canberra: Commonwealth of Australia, 2023), at: https://www.defence.gov.au/about/reviews-inquiries/defence-strategic-review.

13 Baker et al., p. 215.

Book Review

Commanding the Pacific: Marine Corps Generals in World War II

Author: Stephen R Taaffe

Naval Institute Press, Annapolis, 2021, ISBN 9781682477083, 232 pp

Reviewed by: Chris Roberts

Professor Stephen R Taaffe has written several books on groups of senior United States military and naval commanders, covering those in the Army of the Potomac and the US Navy in the American Civil War, the US Army during the Second World War, and General Douglas MacArthur's Korean War generals. He now presents a study of the US Marine Corps (USMC) generals who served as divisional and corps commanders during the war in the Pacific, seeking to bring them out of obscurity and examine their performance. Taaffe does this in chronological order through the 12 major engagements the marines fought in, from the hastily organised and under-resourced Guadalcanal campaign (August 1942 to February 1943) to their final effort under the command of the US 10th Army on Okinawa (April to June 1945). He rounds out his study with an excellent conclusion, which analyses the Marine Corps senior leadership during the war, and the difficulties they faced.

Commencing with a brief background of the prewar USMC, Taaffe highlights that it was a small, racist and insular force facing charges of being superfluous. To counter this, following the Great War the Marine Corps sought a mission to give it relevance by embracing amphibious warfare and developing a doctrine that supported such operations. The Second World War gave the marines the opportunity to employ this warfare, and in doing so they demonstrated their worth. From a force of 65,000 men in July 1941, with only five major generals, nine brigadier generals and 70 colonels, by January 1945 the USMC had grown to 421,000 troops organised into two amphibious corps and six marine divisions. It emerged from the war with highly publicised combat achievements, and having cemented its future in the US defence organisation.

This book focuses on the two Marine Corps commandants and the generals who led marine combat formations throughout the Pacific War. Both Major General Thomas Holcombe, 17th commandant of the Marine Corps from December 1936 to December 1943, and his successor, Lieutenant General Alexander Vandergrift, played leading roles in the USMC's expansion and were instrumental in selecting officers for key command appointments. The generals' personal friendships with their commandants, and both commandants' deep knowledge of the officer ranks, determined many of their choices. Set within a chronological overview of the marines' combat engagements, each divisional commander is introduced within the context of the operation in which they first assumed command. Following a résumé of their career to that date, Taaffe frankly discusses their persona, highlighting their strengths, any perceived weaknesses, and the manner in which they dealt with others. He then relates their performance in the ensuing and later campaigns. What emerges is that those who were successful were professional, forceful, decisive and hard-driving men who trained their units to a high standard, were ready to weed out officers who underperformed, and in combat fought tenaciously and aggressively.

During the war in the Pacific, a total of 16 officers commanded six marine divisions and two amphibious corps over three years of combat. While this may seem an excessive turnover, overall the commandants' selections proved to be successful. Of the 11 officers who were removed from their commands, four were promoted to more prestigious appointments and, with the episodic nature of marine operations, and a desire to rest divisional

commanders and transfer their combat knowledge to those training in the US, many were rotated home to assume important appointments. Of the remainder, two were relieved of their command before they were tested in combat, another's leadership and combat performance were highly questionable, and one was replaced because of doubts about his initiative and decisiveness.

In relating the various marine operations, and the generals' performance in each, Taaffe delivers a balanced and honest assessment. While he is largely laudatory about the marines' achievements, and rightly so, Taaffe readily addresses their mistakes, weaknesses and underperformance. Amphibious operations are extraordinarily difficult affairs, and the majority of these marine generals showed considerable skill in organising, equipping and training their formations, while leading them to victory on all occasions. This was marred somewhat by unnecessary inter-service rivalry with the army, affecting cooperation and the conduct of operations on occasions. It was a rivalry that seems to have been driven partly by the personalities of some marine generals and, more broadly, by the marines' desire to carve out a name for the Marine Corps and secure its future. While the marines overly criticised the army's perceived lack of aggressiveness and slowness in conducting operations (ignoring the instances when marine units became bogged down), the army commented on the marines' lack of tactical finesse and their readiness to accept heavy casualties. This atmosphere of competition reached its apogee with the heated 'Smith versus Smith controversy'. In this incident, the confrontational Lieutenant General Holland 'Howlin' Mad' Smith, commanding the V Amphibious Corps, relieved the 27th Infantry Division's Major General Ralph Smith without properly assessing the difficult situation the division faced on Saipan. While this event threatened to irrevocably damage relationships, it burst the boil, leading to cordial cooperation on Okinawa under Lieutenant General Roy Geiger, commanding the III Amphibious Corps.

This is a well-written, easily read book that hums along without getting into unnecessary detail. Taaffe's assessments are largely valid, although on occasion he contradicts himself. In his conclusion, Taaffe attributes the marines' superior tactics as one of the reasons for their success. Yet he writes that, due to the nature of the terrain they largely fought over, the marine generals had little opportunity to demonstrate any tactical or operational flair, having to resort mostly to brutal frontal attacks. In this

regard he highlights Major General Rupertus's and Colonel 'Chesty' Puller's unimaginative and costly tactics on Peleliu. Conversely, he cites the 'brilliant Japanese tactics' on Peleliu, Iwo Jima, and Okinawa. In these instances, the Japanese eschewed counterattacks and sought to force the marines to attack strongly defended positions, with the intention of drawing out the battle and inflicting heavy casualties—an aim they achieved. While Taaffe provides lessons learnt from the early operations, they are brief and very broad brush, simply stating the general elements; greater detail on the specifics at divisional and corps level would have enhanced the value of his study.

Overall, as a study of command, *Commanding the Pacific* is worthy of wide readership. It also provides a concise account of the USMC's operations in the Pacific, and of the nature of amphibious warfare at that time. Above all, it demonstrates that strong personalities, sound professionalism, decisiveness and forceful action drive success.

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.

Book Review

Bloody Buna: The Battle for the Beachhead, New Guinea 1942–43

Author: David W Cameron

Big Sky Publishing, Newport NSW, 2023, ISBN 9781923004702, 440 pp

Reviewed by: Phillip Bradley

The battle for Buna was one of the most important battles fought by Australia's armed forces in the Second World War. With the US Army at a standstill in its first battle in Papua, it was the Australian infantrymen of the 18th Brigade and the tankers of the 2/6th Armoured Regiment who made the critical breakthrough that led to the capture of the Japanese beachhead. That victory was vital to General Douglas MacArthur's South West Pacific Area command and its future. Buna is part of the bedrock on which the Australian–American alliance rests.

Buna was one of three Papuan beachheads held by the Japanese following their defeat along the Kokoda Track. The first of these, at Gona, fell to the Australian Army on 9 December 1942. The first American attack at Buna had taken place on 20 November 1942 but it would not be until the Australian 18th Brigade arrived, nearly a month later, that the stubborn Japanese defence began to crack. Buna fell on 2 January 1943. The third of the beachheads, at Sanananda, would not be captured until 22 January 1943.

There are many lessons to learn from the Papuan beachheads campaign. This fact is recognised by the regular battlefield studies conducted by current-serving Army personnel to understand the terrain, the climate, the people and the applicable battle strategy and tactics for operating therein. The current debate about the need for the direct fire capability of tanks and the protection of infantry fighting vehicles can easily be put to rest by a study of the beachhead battles. Rather than seeking control of mountainous jungle terrain similar to the Kokoda Track, it is more likely that any future conflict in the Pacific or in Asia will involve operations for the control of coastal airfields and anchorages like those established in wartime on Papua New Guinea's northern beaches.

Therefore, it is encouraging to see another book on this campaign. *Bloody Buna* certainly covers the Buna campaign in great detail, the author seemingly determined to include everything published or digitised on the subject. The book is organised chronologically, starting with the initial US 32nd Division operations and moving on to the arrival of the Australian 18th Brigade and part of the 2/6th Armoured Regiment, which broke the stalemate and led to the fall of Buna. As the author rightly points out, postwar claims (particularly from General Robert Eichelberger) that Buna was an American victory need to be set right. This book will help do that. Brigadier General George Wootten and the infantrymen of his 18th Brigade, backed by Australian armour and artillery, deserve the main credit for the victory at Buna.

Bloody Buna is more a compilation of secondary sources than a readable narrative, and that makes it hard going. At times while reading it, I felt like I was wading through those crocodile-infested swamps that the author writes about. If the book had brought new material to the table, that effort may have been worthwhile, but the lack of primary sources is stark. Most of the book is simply a retelling of the Australian and American official histories, with Dudley McCarthy's Australian history, South–West Pacific Area—First Year: Kokoda to Wau,[1] cited 338 times, and Samuel Milner's US official history, Victory in Papua,[2] referenced on 483 occasions. Australian war diaries, including map references to absent maps, are quoted verbatim throughout the text, putting the onus on the reader to distil such a mass of unnecessary detail into a coherent form. That should be the author's job.

Based on the bibliography and references, it is doubtful that the author has visited the Australian War Memorial (AWM) research centre for his research for this book, which would be an extraordinary omission. There

is no reference to the AWM54[3] operational reports, the AWM55[4] Allied Translator and Interpreter Section (ATIS) interrogation and captured material files, the AWM67[5] records of the Official Historian, or the AWM private records collection, all of which contain significant material on Buna. The ABC battlefield interviews at the National Archives are also an important resource, as are the National Library and state library collections. In the USA the unit war diaries and operational reports at the National Archives and Records Administration (NARA), plus the extensive records in the MacArthur Archive[6] at Norfolk and the US Army Heritage and Education Centre[7] at Carlisle are indispensable for any worthwhile study of the US Army at Buna. The best materials in the book are some extracts from Samuel Milner's records which the author acknowledges were obtained via another researcher, but this only highlights the paucity of such material throughout most of the book.

There were some peculiarities noted in the referencing, with inconsistencies across the 32 pages of footnotes. For example, a single sentence on page 13 has seven separate references in the footnotes. Although the author gives us as much detail as he can find, frustratingly there seem to be problems with attention to that detail, which could be the fault of the author or the copy editor; for example, on the back page are references to 'Japanese bill boxes' and a place called 'New Guina'. Elsewhere, the author's statement that the 39th and 2/14th battalions captured Gona would have had 2/16th and 2/27th Battalion veterans who I knew, and who were on the Gona perimeter on the final night, seething.

If the author has been to the Buna battlefield, that is not immediately recognisable from the text. The critical influence of the terrain on the campaign is never satisfactorily explained, and an appraisal of the Japanese defensive layout, much of which remains to this day, is lacking. It was not a continuous front but rather a series of interlocked defences covering those sectors where any attacks would be channelled by the terrain. The author's decision to cover the campaign day by day, going back and forth in the narrative between the two distinct Buna fronts, fails to give the reader a proper opportunity to understand either of them. The reader also gets some Japanese accounts pitched in at the ends of chapters without being consolidated into a more coherent text. The failure of the author to consult the AWM55 ATIS translations of captured Japanese documents is especially apparent here.

With so many people now getting their military history from podcasts and YouTube videos rather than books, any serious writer of narrative military history has to engage the reader with well-researched primary sources, a flowing narrative and a digestible word count. Unfortunately, this book comes up short on all these attributes. It is at least twice as long as is necessary; the 57 chapters could have been consolidated into about 20. Nonetheless, if you know little of the Buna campaign and have the time to spare, *Bloody Buna* will give you a solid understanding of the battle. However, for those looking for something new, it is unfortunate that this volume lacks originality from the title onwards.

About the Reviewer

Phillip Bradley is the author of 10 books on Australian military history, including eight on the campaigns in Papua New Guinea during the Second World War. These include *Hell's Battlefield, The Battle for Wau, To Salamaua, D-Day New Guinea* and *The Battle for Shaggy Ridge*. For the past three years he has acted as the battlefield historian for Army study tours to the Papuan beachheads. He is currently writing a narrative history of the Australian experience on the Western Front in World War I.

Endnotes

1 Dudley McCarthy, *Australia in the War of 1939–1945. Series One: Army. Volume V, South-West Pacific Area—First Year: Kokoda to Wau* (Canberra: Australian War Memorial, 1959) at: https://www.awm.gov.au/collection/C1417310.

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6 See 'Library & Archives', MacArthur Memorial website, at: https://www.macarthurmemorial.org/31/Library-Archives.

7 See 'U.S. Army Heritage and Information Centre', U.S. Army War College website, at: https://ahec.armywarcollege.edu/.

Book Review

Defence Planning for Small and Middle Powers: Rethinking Force Development in an Age of Disruption

Editors: Tim Sweijs, Saskia van Genugten and Frans Osinga

Routledge, London, 2024, ISBN 9781032503561, 280 pp

Reviewed by: Adam Lockyer

In a time of rapidly changing geopolitical landscapes and increasing complexity in global security dynamics, Tim Sweijs, Saskia van Genugten and Frans Osinga's edited volume *Defence Planning for Small and Middle Powers* emerges as an important contribution to the discourse on national security strategy. The editors have brought together a team of international scholars to contribute to this comparative work that includes cases from North America, Europe, the Middle East, Asia and Oceania.

The book provides a detailed, methodical analysis of countries that lack the extensive resources and global influence of great powers but that still face significant security challenges. The editors are on firm ground when pointing out that the literature on defence planning is currently skewed

towards great powers, which is a significant oversight considering the pivotal role that small and middle powers often play in international politics.[1] The book is both timely and relevant, offering a nuanced examination of how small and middle powers can navigate the intricacies of modern defence planning.

The book is both conceptual and empirical. The editors have chosen to pursue a structured, focused comparison for the cases. This was a wise choice and the book is much stronger for it. Often in these kinds of volumes, the different authors of the cases are given too little structure from the research leads, which results in cases that are interesting but resist comparison. By contrast, here the contributors have been provided with a clear, tight and logical structure for their case studies. The result is a valuable cross-sectional comparison of defence planning from cases that span the globe. Specifically, the editors identified three main themes for analysis: (1) alliances, dependencies and national ambition, (2) approaches, processes, methods and techniques; and (3) military innovation strategies and outcomes.[2] From these themes, subsequent questions were established, including the extent to which the small and middle powers have engaged with other states to increase their capabilities, and the extent to which they take a constrained approach to defence planning. This structure allowed for more valuable generalisable results than alternative approaches.

The book compares 11 different cases of small and middle powers' defence planning. From North America the book contains a chapter on Canada; from Europe there are the cases of Finland, the Netherlands and Slovakia; the Middle East is represented by Israel, Oman, Turkey and the United Arab Emirates; and Asia's and Oceania's cases are Australia, Indonesia and Singapore. The Australian case is provided by leading Australian strategic thinkers Dr Andrew Carr and Professor Stephan Frühling. Carr and Frühling's chapter faithfully follows the structure outlined above, and walks readers through the evolution of Australian defence planning. They argue that Australia's defence planning has been pragmatic but with some recurring core concepts. The chapter provides a condensed and clear overview of Australia's defence planning, which will be useful to scholars, students and non-experts alike.

The book concludes that small and middle powers have been adapting their defence postures in response to geopolitical, technological and climate change related national security challenges.[3] The book highlights the trade-

offs that confront all small and middle powers. Unlike great powers, they rarely can shape their own international environment. So they are forced to make decisions on, for example, how much diplomatic autonomy they trade away to a great power benefactor in the name of their national security.

Overall, *Defence Planning for Small and Middle Powers* is a significant contribution to the field of international security studies. It offers a detailed and pragmatic perspective on how smaller states plan and implement their defence strategies. The book will primarily be of interest to academics and students of defence policy, planning and strategy. It will also likely find an audience among public servants and members of the defence forces who would like to locate their enterprise within the larger enterprise of planning and force design. For those interested in understanding the unique challenges and opportunities faced by small and middle powers in the realm of defence, this book is an essential read.

About the Reviewer

Dr Adam Lockyer is an Associate Professor in Strategic Studies at Macquarie University. He is the author of three books, including *Australia's Defence Strategy: Evaluating Alternatives for a Contested Asia* (University of Melbourne Press, 2017).

Endnotes

1 The authors are on more contentious ground when arguing that defence planning is a separate field of study to strategic studies (which they define as the use current capabilities), but this is a minor point. See Tim Sweijs, Saskia van Genugten and Frans Osinga, 'Introduction', in Tim Sweijs, Saskia van Genugten and Frans Osinga (eds), *Defence Planning for Small and Middle Powers: Rethinking Force Development in an Age of Disruption* (London: Routledge, 2024), pp. 3 and 5.

2 Ibid., p. 7.

3 This is interesting because a recent book on geopolitics found that it was not a major driver of force structure and modernisation among small and middle powers in the Indo-Pacific. See, Bates Gill, Adam Lockyer, Yves-Heng Lim and Andrew TH Tan, *Geopolitics, Military Modernisation and the Future of the Indo-Pacific* (London: Routledge, 2024).

Book Review

Deterrence in the 21st Century: Statecraft in the Information Age

Editors: Eric Ouellet, Madeleine D'Agata and Keith Stewart

University of Calgary Press, 2024, ISSN 1716-2645 (Print) ISSN 1925-2919 (Online); 394 pp

Reviewed By: Cathy Maloney

One could be forgiven for thinking that this is just another book adapting the deterrence theory of old to a new buzzword-laden changing strategic environment. Yet *Deterrence in the 21st Century: Statecraft in the Information Age* is a significant contribution to the field of defence and security studies that steps away from conventional wisdom on deterrence and addresses the complex challenges posed by information warfare as 'a new front of adversarial statecraft' in the deterrence lexicon.

Responding to what the Canadian Armed Forces and the editors of the book identified as the concerning rise of disinformation, Eric Ouellet, Madeleine D'Agata and Keith Stewart have gathered leading scholars to answer a central question: how, if possible, can an enemy be deterred in the age of information warfare?

Structured into several sections, each delving into different aspects of deterrence in the information age, this book deftly draws the reader in, beginning with an overview of traditional deterrence concepts and how they have been adapted to address the unique threats of the 21st century. This is followed by themed sections examining evolving concepts, strategic contexts, Canadian context, and emerging tools and approaches.

Highlighting several key findings on modern deterrence strategies in the context of information warfare, each author demonstrates how traditional deterrence models, primarily focused on military might, are less effective in the information age. Instead, the authors emphasise the need for strategies that address cyber threats, disinformation, and the manipulation of public opinion.

At each turn we are presented with concepts, analysis, and solutions examining deterrence as an evolving concept—for example, whether classical or conventional deterrence methods such as denial and punishment can deter disinformation, by Christopher Ankersen; whether lessons from nuclear deterrence can be applied to challenges in other domains, by Adam Lowther; and what technological innovations are changing the reliability and stability of deterrence, by Sarah Jane Meharg.

While Rachel Lea Heide addresses major conflicts such as Russian approaches to information warfare in her chapter, and Ron Schleifer and Yair Ansbacher analyse Hamas in the Gaza conflict, an interesting section on radicalisation is presented which ordinarily would not be included in a book discussing deterrence. Anne Speckhard and Molly Ellenberg examine deterrence through the lens of online radicalisation and recruitment. This theme may seem at odds with the prevailing thinking on deterring kinetic force or coercion; however, if the aim of the book is to ask the audience to reconsider what we believe to be dangerous or a threat to national security, then having an understanding beyond the prevailing thinking is very important for a pathway to deter these threats.

Shining a spotlight on the role of information warfare as a focus in contemporary conflicts is one of the book's strengths. It examines the various tactics adversaries use in information warfare, like data theft, disinformation campaigns, and cyber attacks to achieve strategic objectives without direct military confrontation. The contributors analyse how these tactics can undermine national security, and propose strategies to

counteract them; each chapter challenges the reader and introduces new conceptual frameworks for understanding and implementing deterrence in the information age. These frameworks consider the psychological and social dimensions of deterrence, beyond just the technical aspects. The book considers the role of social, economic, and political factors in shaping deterrence strategies. This holistic approach is one of its key contributions, as it recognises that modern deterrence must be multifaceted to be effective and is of relevance in today's world, where information is both a weapon and a target.

Another notable aspect of the book is its emphasis on empirical research and case studies. The contributors use real-world examples to illustrate their points, making the theoretical concepts more tangible and relatable. This approach not only enhances the book's academic rigour but also makes it accessible to a broader audience, including policymakers and practitioners. Moreover, the authors offer policy recommendations for governments and institutions to enhance their deterrence capabilities. These include investing in cyber defence, improving public resilience to disinformation, and fostering international cooperation to counter information threats.

The editors have done an excellent job of ensuring that the book is cohesive, despite the diversity of its contributors. Each chapter builds on the previous ones, creating a logical progression of ideas. The writing is clear and engaging, making complex concepts understandable without oversimplifying them. Indeed, this book will cater to a broad audience, particularly those who enjoy challenging conventional thinking and/or find themselves drawn to trying to make sense of a world where information is weaponised, and of the challenges that this brings.

Deterrence in the 21st Century: Statecraft in the Information Age is a valuable resource for anyone interested in understanding the complexities of modern deterrence. It offers a thorough analysis of the challenges posed by information warfare and proposes practical strategies to address them. The book's combination of theoretical insights, empirical research and real-world examples makes it a must-read.

About the Reviewer

Dr Cathy Moloney is Australia Vice President at The Asia Group (TAG), a Washington based Geo-political Advisory firm with 13 offices across the Asia-Pacific. She is on the Executive Committee of Women in Nuclear (WiN) Australia and a member of the Asia Pacific Leadership Network for Non-Proliferation and Disarmament (APLN).

Cathy is a specialist in Australian foreign policy, defence and national security, including nuclear and strategic policy, forging a highly successful career spanning industry, government, and academia. Cathy's previous roles include Deputy Director of the Defence Strategy & National Security Program at the Australian Strategic Policy Institute (ASPI); Director and Senior Advisor at the Centre for Defence Research, Australian Department of Defence; SME to the ADF Joint Warfare Development Branch and Office of the Chief of Defence Force; and Editor of the Australian Journal of Defence and Strategic Studies. Cathy is also a Vice Chancellor Award winning lecturer and convenor in International Relations and Security.

Cathy holds a Doctor of Philosophy in Nuclear Policy and International Relations from Griffith University, a Master of International Politics (1st Class) from the University of Melbourne, and a Bachelor of International Relations from Griffith University.

Book Review

The Battle for Tinian: Vital Stepping Stone in America's War Against Japan

Author: Nathan N Prefer

Casemate, 2020, ISBN 978-1-63624-131-9, 240 pp

Reviewed By: John Nash

There is no shortage of amphibious operations to study from the Second World War, especially from the Pacific theatre. The battle for Tinian in July 1944 is one of the most overlooked, arguably because of how successful an operation it was. This is the argument put forward in the beginning of Nathan N Prefer's introduction to his study of the battle. The irony is that such a successful campaign is not widely studied. He quotes Admiral Raymond Spruance, who called Tinian 'the most brilliantly conceived and executed amphibious operation in World War II', and Marine Corps General Holland M Smith, who described Tinian as 'the perfect amphibious operation in the Pacific War'.[1] Such statements by two of the most prominent military commanders of the Pacific War merit attention, and Prefer does an excellent job of examining the battle in detail and making the case for its being given proper due as a key battle of World War II.

After a short introductory chapter, Chapters 2 and 3 deal, respectively, with the Japanese defenders of Tinian and the US decision to assault the island. Prefer explores the composition of the Japanese units defending their island, including the equipment available, as well as detailing some of the key assumptions made by the garrison commander that would allow the US Marines to gain a foothold on the island. He also explores some of the command and control issues the Japanese faced—namely, between the Imperial Army troops and the Imperial Navy contingent that was present. While it may seem odd to order the chapters this way, to the Japanese commander it was evident that the Americans would attack Tinian, so there was no doubt he would soon see action; the Marine Corps planning staff were not so sure. US planners in the interwar period did not give much thought to Tinian or the other Mariana Islands, and it was only with the advent of long-range bombers such as the B-17 and B-29 that airfield considerations for these platforms became a key issue guiding future operations.[2] Even more than geographic position, it became evident that the relatively flat terrain of Tinian made it an excellent candidate for the long airfields required by the B-29 bomber.[3]

Chapter 4 is the final pre-battle chapter, and is critical to understanding not only the course of the fighting but also why Tinian deserves to be studied as a campaign. Prefer says of the operations plan: 'So successful was the plan that it should have become required reading for all operations officers from that time forward.'[4] Prefer provides a good exploration of how plans for the attack on Tinian evolved, especially the critical choice of beaches to be used. Essentially the original plan was to land on the beaches near the town (codenamed Red and Green Beaches), seen as the only ones large enough, though naturally this is exactly what the Japanese assessed, so these somewhat obvious approaches were heavily defended. Some on the US side, however, thought it would be possible to land on the small beaches on the north end of the island (codenamed White Beaches 1 and 2). This caused tension between the Navy and the Marines, only resolved after some brilliant beach survey work.[5] Effective and accurate beach survey data made all the difference in proving that the two White Beaches were feasible landing spots, which in turn ensured a more effective lodgement than if the Marines had to go ashore into the teeth of Japanese defences at the more obvious landing beaches. Moreover, it demonstrated flexibility on the part of not just the planners but the decision-makers as well.

Chapters 5 to 11 deal with the campaign itself, from the landings, through Japanese counterattacks, to the final clearance of the island by the Marines. Prefer does well to move through strategic, operational and tactical narratives to build a solid, holistic account of the Tinian campaign. He ably deals with a number of topics that arose as the Marines moved inland, including issues of logistics over the beach—and how crucial weather is to such movements—as well as the provision of naval gunfire support and how important armour was in supporting Marine ground forces ashore. It is a solid narrative that allows the reader to follow along easily.

After the conclusion of the narrative of combat operations, Chapter 12 puts the battle into its strategic context. As noted in the beginning, the Mariana Islands were chosen as a base from which B-29s could hit mainland Japan, and Tinian in particular proved the most suitable land on which to build runways, which eventually totalled four. It was from these runways that the B-29s carrying the atomic bombs flew their sorties to Hiroshima and Nagasaki. In this way the capture of Tinian proved an important step on the road to defeating Japan.

The book is well served by a number of simple but very useful maps, as well as numerous photos of both key personnel and moments taken from the campaign itself. Another strength of the book is Prefer's interjection throughout the narrative of the other key events taking place in the wider war. For instance, at the end of Chapter 3 he reminds the reader that in late July of 1944 the Allies in Normandy were preparing to conduct their big breakout (Operation Cobra), that an attempted assassination of Hitler that month had put German high command and society into a spin, and that the Japanese suffered setbacks in New Guinea and Burma.[6] These short digressions are very useful in highlighting that Tinian was just one of many concurrent operations across multiple theatres, and that no campaign or battle was fought in isolation. It also puts into perspective the sheer scale of the war and how interlinked so many of these battles were. In the context of Tinian, this serves as a reminder that so much of World War II involved amphibious and littoral operations. Finally, there are a number of incredibly informative appendices that detail everything from notable personnel to orders of battle, ship histories, and even Congressional Medal of Honor citations.

Overall, it is an excellent book on an important operation. It highlights several lessons of enduring relevance to amphibious and littoral operations: planning, beach and environmental survey, reconnaissance, logistics, fire support and more. Prefer has produced a study that provides lessons from the strategic, operational, and tactical levels. In doing so, he promotes Tinian as worthy of examination and analysis not only as arguably 'the perfect amphibious operation in the Pacific War' but also as an example of how such a campaign can make a difference at the strategic level.

About the Reviewer

Dr John Nash is an Academic Research Officer at the Australian Army Research Centre. Previously he was a researcher at the Australian War Memorial for The Official History of Australian Operations in Iraq and Afghanistan, and Australian Peacekeeping Operations in East Timor. He was awarded a PhD from the Australian National University in July 2019. He is also a Lieutenant in the Royal Australian Naval Reserve, having completed nine years' fulltime and ten years' reserve service as a Maritime Warfare Officer. He was the inaugural winner of The McKenzie Prize for the Australian Naval Institute and Chief of Navy Essay Competition – Open Division, 2019. His most recent publication is Rulers of the Sea Maritime Strategy and Sea Power in Ancient Greece, 550–321 BCE, Volume 8 in the series 'De Gruyter Studies in Military History'. Other publications include articles in the Australian Army Journal, Journal of Advanced Military Studies (Spring 2024), the Journal of Indo-Pacific Affairs (March-April 2022) and the US Naval War College Review (Winter 2018, Vol.71). His areas of research focus include sea power and maritime strategy, littoral warfare, land power, and strategic studies.

Endnotes

1 Nathan N Prefer, *The Battle for Tinian: Vital Stepping Stone in America's War Against Japan* (Casemate, 2020), p. 11.
2 Ibid., pp. 29–31.
3 Ibid., 2020, p. 37.
4 Ibid., p. 41.
5 Ibid., pp. 50–56.
6 Ibid., p. 38.

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