Australian Army
Research Centre

Designing the Future: Thinking About Joint Operations

Prepared by the Australian Army Research Centre

Future Land Warfare Essay Collection

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Foreword

Change is hard. As Army's Future Land Warfare, we contest ideas, encourage discourse and propose concepts that are often not to the satisfaction of every faction, agenda, or interest-group focused on the generation of land power as part of the Australian Defence Force. It is for this reason that the selected essays, written by members of the Australian Army Research Centre, the Australian Army History Unit, the Robotics and Integrated Technologies Coordination Office, and the Land Force Design and Force Structure Directorates serve as an example of the institutional approach that Army needs to apply in terms of leading change and debating the future of the Australian Army.

For Army, the sheer scale of what its future capability investment truly means to the current and future force remains somewhat unrealised. In order to bring these capability challenges into focus, Army needs its best minds to form an argument, state it in written form, and then defend it. The authors within these pages represent some of these important thinkers. Originally written for the 2020 Chief of Joint Operations Essay competition, these papers span some of the important priorities of an Army that is firmly focused on its transformation. Issues of strategic narratives, force design, emerging technologies, future workforce and intelligence systems are all important topics fundamental for its future modernisation. In introducing these articles, I am reminded of our Chief of Army's stated intent from his 2019 'Army's contribution to Defence Strategy': '…this document is designed to create a shared understanding of how Army contributes to Defence in a time of accelerating change. This understanding sets the foundation for Army's next iteration of thinking to enhance future design'.

The same could be said for this publication. A special mention to Lieutenant Colonel Yvette Pavlis, who was awarded first prize for her contribution. A worthy winner.

Good Soldiering.

Brigadier Ian Langford
Director General Future Land Warfare

1. Creating the Joint ISR Enterprise that was Needed Yesterday

Yvette Pavlis

> *The acquisition of information about the enemy has always been considered one of the most important elements in war. A commander without information is like a man blindfolded, he knows neither where to strike nor what quarter to expect attack; he is unable to make a plan for himself, or guard against the plan of his enemy.*[1]

Intelligence is fundamental to decision-making. Intelligence is derived through the analysis of unprocessed data generated through collection activities, generally referred to as intelligence, reconnaissance and surveillance (ISR). ISR serves as both a process and a product, with the aim to generate decision superiority.[2] The above three sentences summarise a process that presents as wonderfully simple, yet powerful in execution. While stating this is simple, it is equally true that a failure to effectively implement ISR can significantly degrade operational decision-making, incurring all of the costs of the process with none of the upsides. For this reason, the one thing that can make the joint force stronger is to redesign how ISR enables decision-making.

This essay argues that the operational ISR enterprise should be reformed. As will be detailed, the solution is to reimagine the ISR enterprise through the creation of ISR 'precincts', supported by a joint ISR training program. Each ISR precinct comprises a joint ISR training section; a processing, exploitation and dissemination (PED) hub; and an attached dedicated all-source cell. The amalgam of ISR precincts with collocated all-source cells will enhance support to the decision-maker. A more effective ISR enterprise generates the tempo needed in decision-making to more efficiently respond to the challenges of the contemporary operating environment.

The Problem—'Service First', Technological Change, Inefficiency

The Australian Defence Force (ADF) ISR enterprise is not sufficiently prepared or postured to meet the challenges of the current or future operating environment. The 2020 Defence Strategic Update (DSU) highlighted that Australia faces 'the most consequential strategic alignment in our region since the Second World War'.[3] This is due to the confluence of increased strategic competition, more capable weapon systems enabled by technological change, and the increasingly aggressive use of diverse grey-zone tactics for inter-state coercion that remains under the threshold for a conventional military response. The ADF must simultaneously shape, deter and, if required, respond in this rapidly shifting environment.[4]

For the ADF to meet these demands, the key is situational awareness. The ISR process, which informs intelligence, enables the supported decision-maker to understand *how*, *where* and *what* the ADF can shape; *who* and *how* they need to deter; and the *effect* of response. The limitation on the ISR enterprise is that it lacks joint integration. First, joint ISR training hardly exists. Second, PED capabilities are separate from the integral all-source analysts who turn the outputs of collection into usable intelligence. Third, the systems or databases that support the current decentralised and disaggregated ADF approach are inadequate and insufficient.

There is an integration problem. The ADF's capability acquisition relies on the three Services to generate capability focused on their own domains which the Chief of Joint Operations (CJOPS) and the Chief of Defence Force employ in the joint environment. Change is underway. The First Principles Review has been a driving force, shifting organisational structures to better enable integration, design and management of joint capabilities. Refinement of these structures continues, with greater clarity now provided in the roles of the Joint Force Authority, the Joint Force Training Authority, and the Joint Force Integrator. Joint culture is also slowly evolving through revised Service missions and common defence values.[5] Joint ISR and joint ISR multi-domain programs have been established for the purposes of some capability development and domain de-confliction.

Service ISR programs are, nevertheless, independent of the joint ISR capability program architecture. The ADF's approach relies on the Services to grow before contributing to the centre. The rationale is that if capabilities were to grow from the joint centre, they would be ineffective in achieving their full potential in their respective domains.[6]

The effect of these arrangements is a competition for funding and resources, and a propensity to enable the Services' capability needs rather than prioritise a joint ADF approach. This is particularly the case with ISR. Insufficient ability to process, exploit and disseminate collected ISR data, fuse intelligence or coordinate collection capabilities compromises the system. The result is ISR costs without potential benefits. One needs only to read the first two sentences of the 2020 Defence Intelligence Enterprise Review executive summary to see how stove piped and inefficient the ADF's approach to ISR is.[7] Almost all of the targets that Distributed Ground Station—Australia (Interim) (DGS-AUS (I)) will process, exploit and disseminate on behalf of the ADF using RAAF or linkages to coalition airborne platforms are on the earth's surface. Yet there are no Army or Navy PED professionals allocated within DGS-AUS's sizeable PED workforce growth (Squadron-plus). The lack of joint integration misses a significant opportunity to apply expert knowledge to enhance the information being disseminated. It also misses an invaluable inter-Service training opportunity to learn how ISR assets are employed and their capabilities.

The absence of joint ISR training only exacerbates the stove piped ISR problem. The synchronisation of ISR capabilities to support a joint effect is neither specially trained nor routinely practised outside of three situations. Understanding is only achieved experientially when one is posted in Headquarters Joint Operations Command (HQ JOC), employed in Headquarters 1st Division for joint collective training, or force concentrated for deployment. In an environment of accelerated change, the ADF cannot afford for joint ISR practitioners to lack depth in their knowledge and application of collection capabilities and be unprepared for employment.

Technological advancements and the changing character of war will only increase the demand of the ADF ISR enterprise. Emerging sensor technologies are generating large, complex mission datasets which require massive data repositories and computing power. Improved imagery collection capabilities are capable of collecting 400 gigabytes of data per second. The time to process information and determine the relevance to a commander will only reduce in future, necessitating measures to improve the latency across multiple domains and command nodes. The speed of decision-making rapidly increases, and arguments are made that command-directed, automated response is the only effective treatment.[8]

The Australian Government recognises the need for the ISR enterprise to be enabled to meet the challenges of the contemporary operating environment. The DSU highlights the complexity of the contemporary environment and the requirement to *shape*, *respond* and *deter* in an environment of *cooperation*, *competition* and *conflict*. Indeed, the DSU's companion resourcing statement,

the Force Structure Plan 2020, recognises the challenge of simultaneity for joint ISR generally. Future investment is focused towards the provision of training and joint skilling, along with the enhancement of joint PED capabilities to achieve greater coordination and integration of ISR across the joint force.[9] Yet single-Service capabilities continue to maintain prevalence. In fact only the measures for enhancement of Army ISR capabilities refer to the joint force, with those of the Navy and Air Force focused on their respective domains.[10] If the Service-first mindset regarding capability development continues, the opportunity presented by the Force Structure Plan will be wasted, with the ADF still ineffectively postured to meet the challenges of both the current and future operating environments. This sentiment is supported by Australian Strategic Policy Institute senior analyst Malcolm Davis:

> *… '[a] fifth-generation force has to be capable of operating across, land, sea, air, cyber, EM and space, and that is a core component of the transition to the joint force. We have to systems of systems, not just stovepipe platforms that are capable of connecting across a network' …*[11]

Wing Commander Phil Hay, in a piece advocating for ISR centralisation, reinforces the point:

> *On the contemporary multi-domain battlefield, combining disparate sources and platforms for information gathering serves to overcome some of the challenges emerging from the increased proliferation of counter-ISR, EW and integrated A2/AD systems in the Indo-Pacific and more broadly throughout the Middle East and Europe.*[12]

In addition, the current intelligence architecture to support operational decision-making is at odds with the principles of intelligence. A lack of clear command and control, task delineation and clear authorities for all-source support to operational priorities results in duplication and inefficiency and dilutes output quality. For example, there are currently no fewer than five 'all source cells', 'fusion cells' or reinforced unit-level intelligence teams conducting analysis on specific ADF operational missions. This number compounds across the National Intelligence Community.[13] None of these cells are enabled with an all-source PED capability; nor are any of the teams using the same data sources or systems to conduct their analysis. The reporting chains are also largely stove piped, with four of these intelligence teams supporting Australia-based commanders, largely for situational awareness, with ad hoc dissemination of the analytical reporting. These structures encourage duplication and are inefficient. In some cases, individual units are conducting 'network analysis' to support unit or formation situation awareness, ignoring the fact that their analysis is stymied by the absence of a single common database or shared systems across the enterprise. Granted, the process of analysis aids in individual training for the staff, but there are more effective ways of leveraging highly technical finite resources and assets across the enterprise.

The Solution—Training, Centralisation and Authorities

A more effective way of leveraging our workforce is to reform the joint ISR enterprise. This reform requires a whole-of-enterprise recognition that 'Joint All Domain Operations is the new reality in modern warfare requiring simultaneous effect within and across every operating domain'.[14] Traditional boundaries of single-Service ISR no longer exist, and capabilities in the maritime, air, information/cyber and space domains are just as important in supporting decision-making in the land domain, and vice versa. HQ JOC's establishment of the Joint Domain Awareness Centre and efforts towards agile command and control go some way to addressing this. But more than just structural change within HQ JOC is required. An enterprise approach to how intelligence supports decision-making can better posture the ADF to manage accelerating technological change.

The establishment of all-source ISR precincts or PED hubs enabled with dedicated all-source analysis is a re-imagined approach to achieving decision advantage. The intent is for greater investment using reapportioned Service and agency assets to support up to three ISR precincts. These precincts comprise at least three elements: an ISR training section, a PED node and a dedicated joint all-source cell. Each precinct must be federated and enabled by the same data sources; a solution may in time be the expansion or federation of DGS-AUS supported by Joint Project 2289. Each precinct should be interchangeable and enabled with ISR professionals to support prescribed missions. However, the federated approach also means they are capable of mutual support, can conduct seamless transitions as platforms transit over areas of interest, or can work together in the case of any threat associated with the defence of Australia. Critically, the ISR precinct must be centred on supporting decision-making. Therefore collocation with the supported commander is imperative.

Understanding of joint capabilities must be a dedicated component of the training continuum. For intelligence personnel, a focused joint ISR training course for everyone at E6 level and above, sequenced immediately following promotion courses, should be mandatory. This course must extend beyond sensor capability update briefs. Instead, the minimum proficiency should be an understanding of process to task, de-confliction, debriefing and synchronising tri-Service, and National Intelligence Community and coalition collection capabilities to support complex joint warfighting scenarios. The training should require students to lead joint ISR inputs at all stages of the joint military appreciation process and in all battle rhythm events, and must include PED coordination. Biennial refresher training should be implemented, vectored around procedural or capability updates supported with either simulation or scenario activities in order to remain current. The creation of a joint ISR training system will professionalise the workforce and enable more effective consideration and employment of collection capabilities to support a commander's decision-making.

Increasing joint ISR training and investment in improving PED capabilities is only one component of redesigning the joint ISR enterprise. The other is to centralise PED with an optimised, dedicated joint all-source capability to support operational decision-making. The recommendation is to reapportion Service and agency assets to fully enable the existing HQ JOC Joint Operations Intelligence Fusion Cells (JOIFCs). Here, to illustrate the merits of the proposal, it may be useful to give the example of how a legacy HQ JOC organisation, the Insurgent Network Analysis Cell (INAC), was constructed.

The INAC's mission was to provide operational-level analysis in support of CJOPS and deployed ADF elements. The INAC comprised between 16 and 24 staff from the (then) Australian Intelligence Community (AIC), the Australian Federal Police and the Australian Public Service, and repurposed tri-Service Defence Intelligence Organisation (DIO) and HQ JOC J2 analysts. The analysts worked within the DIO, using their systems with unrestricted access to all operational reporting. The INAC became the ADF experts on the threat, environment and culture affecting personnel deployed to Afghanistan. This tangibly aided ADF units through regular reporting on Afghanistan, pre-deployment briefings, immersion training and a routine four-week deployment which spanned the extraction and insertion of new joint task forces into theatre to provide context and support for new intelligence staff.

Testament to the INAC's effectiveness was its success in leading whole-of-government efforts to apprehend the perpetrator of an insider attack in 2012. Most importantly, the INAC was empowered with authority as the Defence lead for apprehension efforts, but critically, there was a clear understanding across the senior leadership group of INAC's expertise. This meant that

it was a central point of trusted data to inform senior commanders' decision-making. While this was tangibly demonstrated with the apprehension of the insider attacker, the INAC's reputation was formally recognised through two AIC medallions of excellence. This is significant in itself, considering that the INAC, as a Defence organisation, was not part of the AIC.

Enabling the JOIFCs to achieve the same level of deep subject matter expertise is critical to providing the level of analysis that technology alone is unable to achieve. To do this, each JOIFC needs analytical mass (i.e. squadron/company size (around 30 personnel)) and relevant agency liaison offices. Its remit must be driven by the leadership, aligned either to CJOPS geographic focal areas[15] or to a blend of geographic focus and themes aligned to ADF operational force constructs. Critically, the JOIFCs are not just about enabling CJOPS. They are a function of operational preparedness. They must be resourced to provide analytical reach-back, thereby enabling small, more discrete teams to deploy forward. They will be required to support J35/J5 planning and act as the central authority and expertise for tactical and operational intelligence assessments on their assigned remit. Targeting missions should inherently be supported by each JOIFC; therefore the current target systems analysis cell within the J2 targeting should be repurposed into the JOIFC. Each fusion cell should be led by an O5, who answers to the JOC J22, which should become a tri-Service competitively selected appointment. To reduce duplication across the organisation these fusion cells should be designated as the sole producers of intelligence on their respective topics.

The ISR process is critical to how intelligence supports decision-making; therefore it is necessary for each JOIFC to be collocated or have a habitual link to and share systems with each ISR precinct in the location of the supported decision-maker, as mentioned above. This construct is aligned to how ADF force elements are employed in operations and as practised during joint exercises. A combined facility also enables the ISR enterprise to be 'always on'. The other efficiency resides in resources and timeliness. An approach which forms an enabled ISR enterprise, through collocation (or habitual relationship) with ISR collection asset and all-source capability avoids the duplication associated with intelligence analysts separately assigned to the product dissemination of ISR serials. Instead, a combined approach delivers all-source analysis for consideration better aligned to the Commander's Critical Information Requirements. This construct realises the timely and fused analytical enterprise required in the era of accelerated warfare which is specified in the 2020 DSU.

An example of how these proposals can be realistically applied is through an ISR enterprise approach to support the remit of the Deployable Joint Force Headquarters (DJFHQ) South-West Pacific remit. One ISR precinct can be created in direct support of DJFHQ. The Force Structure Plan's joint PED funding can purchase one all-source PED node through federating an instance of DGS-AUS, applying a Defence Science and Technology Group ISR concept demonstrator, or acquiring a US PED system such as the Distributed Common Ground Station. The existing 1 Intelligence Battalion Fusion Cell is renamed as a JOIFC, and reinforced with agencies' liaison officers currently working to DJFHQ's J2 team and air/maritime analysts. All elements of this joint workforce are collocated within the precinct, assigned permanently to DJFHQ. This example demonstrates that there are existing resources which can be leveraged to achieve an ISR enterprise approach permanently in support of operational decision-making.

Conclusion

The joint force can be made stronger through the restructure of our operational ISR enterprise. From a collection perspective, the establishment of up to three ISR precincts increases our ability to synchronise and prioritise ISR assets in a way that complements capabilities in support of prescribed mission sets. These precincts provide a level of redundancy and control for ADF collection capabilities while also allowing for mature ISR handover procedures, thereby ensuring maximal employment of collection capabilities. Critical to supporting the joint ISR enterprise must be joint ISR training. The above steps will help change ADF culture and mindset from a 'Services first' approach to a targeted system where Services complement and integrate into one joint force.

To complement the establishment of ISR precincts, the JOIFCs should be fully resourced and become prescribed all-source fusion cells. Leadership is critical. To reallocate Service personnel and authorities and enable the JOIFCs to be the sole producers of intelligence for tactical and operational support will require strong support from the senior leadership group. Finally, collocation of (or habitual relationships between) the JOIFCs and the ISR precinct is integral to achieving the decision superiority necessary for the accelerating warfare to which the Australian Government expects the ADF to be able to respond.

Endnotes

1 David Henderson, 1911, *The Art of Reconnaissance* (London: John Murray), 1.

2 Department of Defence, 2015, *Australian Defence Doctrine Publication 2.0—Intelligence* (Canberra: Defence Publishing Service), para. 1.10.

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8 RA Vagg, 2020, 'Data Analytics and Decision Superiority', Defence Innovation Hub Conference, 25 September.

9 Department of Defence, 2020, *Force Structure Plan 2020* (Canberra: Commonwealth of Australia), 29.

10 Department of Defence, 2020, *2020 Force Structure Plan* (Canberra: Commonwealth of Australia), 42, 52, 76.

11 S Kuper, 2019, 'Maximising 'Defence in Depth': Linking JORN, AIR 6500 and A2AD', *Defence Connect*, 3 May, at https://www.defenceconnect.com.au/key-enablers/3986-maximising-defence-in-depth-linking-jorn-air-6500-and-a2ad, accessed 15 September 2020.

12 P Hay, 2017, 'An ISR Force by Design', The Central Blue—The Sir Richard Williams Foundation, available at http://centralblue.williamsfoundation.org.au/an-isr-force-by-design-wing-commander-paul-hay/ (accessed 29 September 2020).

13 This does not include all the individual intelligence cells which are not all source, but are still writing individual assessments to support their own commanders' requirements. Notably, there is no single system that all of these organisations can access to inform their analysis.

14 Australian Defence Force, 2020, *Joint Operations Command Business Plan 2019–20* (Canberra: Commonwealth of Australia).

15 Ibid.

2. Three into Five Doesn't Go: New Domains Demand More than Just a 'Joint' Force

Tim Gellel

The mid 20th century definition of 'jointery' used by the Australian Defence Force (ADF) is increasingly anachronistic. It no longer matches the ADF's recent operational experience or its anticipated future requirements. Warfare in the 21st century demands that Australia's defence capabilities—and therefore the joint force—expand to cover two relatively new domains: information and cyber, and space. Much of Australia's core expertise and capability in these new domains lies outside the ADF. This challenges the orthodoxy of the ADF's concept of the joint force as based upon three uniformed Services—Navy, Army, Air Force—each operating in a distinct domain.

Australian defence planners faced similar challenges a century ago. The emergence of a new combat domain led in 1921 to the formation of an independent Air Force. Thereafter, the boundaries of inter-Service responsibility shifted regularly as the ADF adjusted to ensure the joint force's whole exceeded the sum of its parts.

Applying those lessons to the present, the ADF needs to evolve a broader concept of jointery if it is to operate successfully across these newer domains. As with the introduction of air power, the ability to conduct defence operations across the information and cyber and space domains are likely to test the boundaries of inter-Service responsibilities, particularly because of the head start that civilian and other government agencies already enjoy in these specialised fields.

Three into Five Doesn't Go

The 2020 Defence Strategic Update and the 2020 Force Structure Plan articulate more clearly than before that Defence's capability streams must span five operational domains: information and cyber, maritime, air, space, and land.[1] In the United States, the emergence of space as a discrete operational domain saw the formation in 2019 of the US Space Force as a separate Service.[2] For the moment, issues related to the ADF's smaller size, and the absence of an immediate prospect of physical combat in either of the newer domains, mean Australia has not yet seriously contemplated a similar option.[3] Moreover, such capability and subject matter expertise as exists in Australia is concentrated across the Australian Public Service (APS), industry and academia.

Recognition of the new domains exposes the growing obsolescence of the longstanding view of the joint force's near total primacy as the instrument for operations. Moreover, the commitment of almost 10 per cent of Defence's future capability investment to these domains—equivalent to around half that dedicated to the land domain—demonstrates their growing prominence.[4]

Those shifts also further blur the boundaries between the Services, which engage in direct combat, and the supporting elements of Defence, which do not. Over the past 20 years, the joint force has seen increased reliance on APS employees and defence contractors embedded at far lower levels and much further 'forward' than was the case at the end of the 20th century.[5] The absence of either a distinct physical 'front line' or the prospect of direct interpersonal conflict in the space and information and cyber domains makes it more difficult to identify the primacy of one Service's responsibility over the others'.

Extrapolating those trends suggests that a key future challenge for the joint force is that it needs to be more than just joint. To be successful, the integration of civilian personnel—whether APS or contractor—and civilian-led agencies in direct combat-support roles is increasingly crucial to the joint force, if only because of their existing predominance in the space and information and cyber domains. For the ADF to successfully adapt to these changes, a broader mindset than traditional jointery will be required.

What's in a Name?

The concept of the joint force has evolved over the course of the ADF's history. The Australian Naval and Military Expeditionary Force that deployed to 'take speedy action against the German colonies' in the New Guinea in 1914 was not a joint force, if only because the term 'jointery' was not in use at the time.[6] Instead, the underlying British—and by default Australian—doctrinal concept at that time was termed 'combined operations'.[7] Arguably Australia's first deployment of a joint force with an Australian joint command structure came 50 years later with the 1966 appointment of the Commander Australian Force Vietnam.[8]

By the end of the Second World War, the Australian Army uncomfortably attempted to straddle both British and US views of what they respectively referred to as combined or joint operations when describing Army–Navy–Air Force operations.[9] Unsurprisingly this dilemma was most apparent as the Army increasingly undertook amphibious operations—at the boundary where the air, sea and land domains overlap and intertwine—with US forces towards the end of the Second World War.[10] As the British quietly dropped the term 'combined operations',[11] the Australian Services increasingly adopted the US term 'joint operations' in its place.

Today, ADF doctrine defines the term 'joint' as describing 'activities, operations and organisations in which elements of at least two Services participate'.[12] While that definition has served well for seven decades, it no longer adequately describes how current, let alone future, operations are conducted. Not only does it fail to reflect the growing role of APS employees and defence contractors but also it does not reflect the implications of the newer information and cyber and space domains. Incorporating the capabilities those different partners bring requires the ADF to think beyond its current definition of the joint force with its traditional focus on three domains—air, land and sea.

Accommodating a New Domain

As the case studies in this section will demonstrate, the ADF's history shows how allocating responsibility for a new domain is not as straightforward a proposition as it might first appear. Indeed, the emergence of the air domain over a century ago created much friction and role conflict that continued to reverberate for generations after.

The 'Third Brother'

At Federation, Australia's defence requirements were defined by two domains, land and sea. These were respectively the responsibility of the Commonwealth Military Forces (later the Australian Army) and the Commonwealth Naval Forces (from 1911, the Royal Australian Navy—RAN). By 1912 an air arm, the Army Flying Corps (AFC), had been created. By 1921 the demands of this new domain were such that a distinct new force was created—the Royal Australian Air Force (RAAF).

Superficially the RAAF's formation established a clear delineation of responsibilities across these three domains: the RAN would operate at sea, the Army on land, and the RAAF in the air. However, closer examination demonstrates that those boundaries were not so distinctly observed. As the historian of the RAAF's first two decades points out:

> *… the decision to form the nation's air defence resources as a single new service, separate from either the Army or the Navy, but serving their needs, was both the product and the further cause of inter-service rivalry.*[13]

When the end of the First World War saw the AFC's disestablishment in 1919, a government-appointed committee recommended the establishment of a single Australian Air Corps (AAC) in its place. The AAC would 'be administered by an Air Board (comprised of members of the Naval and Military Boards), but with the wings of the Corps allotted to the … RAN and the Army'.[14] This simple division of responsibility was quickly challenged by the then Chief of the General Staff, Major General James Legge. He argued that '"unified control of naval and military aviation was unsuitable for Australia" … and that Australia should have two separate air branches, one each under the control of the Army and RAN'.[15]

The Navy's Air Force

While Legge's views did not prevail, the question of responsibility for the air domain did not end with the RAAF's formation in 1921. In 1925, arguments for a second air force emerged when:

> *… the Naval Board promulgated an order for the formation of a Fleet Air Arm, a development which the Air Force strenuously opposed because this was seen as the first step towards eventual disbanding of the RAAF as a separate service.*[16]

A further surprise came with the purchase of the seaplane carrier HMAS *Albatross*. It was only 'when the contract [for the ship] was placed' in 1926 that the Air Board learned the RAAF 'was to provide the aircraft to go in this new ship, although there had been no prior discussion'.[17] Moreover, it took until a 'Cabinet decision in January 1928 not to persist with the Fleet Air Arm concept'.[18] As an early compromise, the RAAF provided HMAS *Albatross*'s aircraft, pilots and maintenance personnel, while the RAN provided the observer and radio telegraphist crews. Following the decommissioning of *Albatross* in 1933, the RAAF continued to operate seaplanes from the Navy's ships until 1948, when the RAN gained approval to form a Fleet Air Arm 'to operate the fixed-wing aircraft aboard its recently acquired aircraft carrier HMAS *Sydney*'. This was a significant change:

> *[The] RAN employed ex-Royal Naval aircrews and began training its own navy pilots, rejecting an offer from the RAAF to provide the aircrew. Meanwhile, RAAF arguments concerning the benefits of centralisation of air assets, maintenance facilities and training were rejected in favour of naval aviation being wholly staffed and controlled by 'navy men'. By the time [1955] the RAN took delivery of a second carrier (HMAS Melbourne), Australia was operating two air forces.*[19]

The Army's Air Force

As the RAAF historian has described, 'the establishment of Australia's third air force was a more incremental process'.[20] Arrangements initially mirrored those employed aboard HMAS *Albatross*. In 1944, two air observation post flights were raised with RAAF pilots and Army observers to

support operations in New Guinea.[21] 'Frustrated by what it saw as the RAAF's lack of attention to its requirements', the Army soon followed the RAN's lead to establish its own air arm, 'albeit with continued support from the RAAF'.[22] As another historian, Wing Commander Martin Sharp, observes:

> *[While] it may have suited the RAAF to be relieved of the responsibility of providing this type of support … the real issue should have been whether the duplication of air effort … ran contrary to the Air Force doctrinal principles of 'unity' and 'centralisation'.*[23]

A joint Army–RAAF Army Light Aircraft Squadron, equipped with light fixed-wing aircraft and helicopters, was established in 1960. In 1966, this unit was increased to regiment size (it became the 1st Aviation Regiment). This was followed two years later by the establishment of the Australian Army Aviation Corps.[24]

Army–RAAF tensions surfaced during the Vietnam War when 'the RAAF appear to have been reluctant to deploy its helicopters … which were ill prepared for the task'.[25] Although the RAAF (and also RAN) helicopters 'established a high reputation for their operations in Vietnam', it is notable that 'these achievements may have been overshadowed by shortcomings in command and control' and that 'the failure of the RAAF to deal with Army requirements for close air support … added to friction between the services'.[26]

The watershed moment came when the 1987 Defence White Paper confirmed that the government had 'decided to transfer full command and ownership of battlefield helicopters from the Air Force to the Army' because they were 'an important element of the Army's combat team'.[27] However, that decision 'ran counter to earlier studies into the transfer of ownership, which found that the costs of moving the helicopters from one Service to another could not be justified' and, Sharp notes, 'it is hard to see how the move might have been expected to improve inter-Service relations and Joint cooperation'.[28] As one Chief of Air Staff later publicly surmised, 'unfortunately professionalism and sound judgement are often stifled by single Service prejudices and a take-over mentality'.[29]

In November 1987, the RAAF's two main helicopter squadrons transferred personnel and most of their equipment to form the Army's 5th Aviation Regiment. In 1995 they were joined by the CH-47 Chinook helicopters, which the RAAF had earlier argued to retain.[30]

Thus, within five decades after the RAAF's formation, the unthinkable had occurred: by the late 1960s, both the RAN and the Army operated their own air forces. Today the Australian Army Aviation Corps is the ADF's second largest 'air force', with approximately 100 aircraft, to which can be added a growing fleet of Army-operated unmanned aerial vehicles, while the Fleet Air Arm numbers around 50 aircraft. Were he alive today, Major General Legge might recognise similarities to the model he had proposed in the 1920s.

Shifting Boundaries

As the following case studies demonstrate, setting aside the difficulties posed by the emergence of a new domain, just managing the boundaries between existing ones has proven complex, with many shifts of responsibilities between the Services.

The Air Force's Army

Much as the Army has its own 'air force', the RAAF has operated its own 'army'. In 1942, the RAAF followed Britain's wartime precedent to establish Security Guards Units for airfield protection. RAAF Airfield Defence Guards, as they were later known, participated in the mid-1945 OBOE landings in Borneo, and by the end of the war were organised into Airfield Defence Squadrons (AFDS), with capabilities broadly analogous to an infantry company. Although the AFDS were disbanded shortly after the Second World War, No.1 AFDS was briefly re-raised between 1950 to 1953, before being again reformed in 1992. No.2 AFDS was re-established in 1983, followed by a third AFDS (now Security Forces Squadron) in the early 2000s.

Air Defence

The RAAF did not follow the Royal Air Force's lead to operate ground-based air defence weapons until 1958, when it selected the Bloodhound Mark I surface-to-air missile (SAM) to equip RAAF No.30 Squadron.[31] By 1968 the Bloodhound Mark 1 was obsolete, No.30 Squadron was disbanded, and responsibility for all ground-based air defence systems passed back to the Army.

Army already had a long-established history of air defence. Establishing its first dedicated anti-aircraft unit in 1926, within 20 years Army employed 20,000 anti-aircraft gunners in batteries across northern Australia and New Guinea alone.[32] SAMs were first introduced in 1973, when the 16th Light Anti-Aircraft Regiment (now the 16th Regiment, Royal Australian Artillery) received the FIM-43 Redeye, followed five years later by the Rapier and from 1987 the RBS-70.[33] In coming years, 16 Regiment will be equipped with the National Advanced SAM System, able to reach targets at distances similar to the Bloodhound's maximum range of around 35,000 metres.

The Army's Navy

These shifts in inter-Service responsibilities are not limited to the boundaries of the air and land domains. Since 1943 the responsibility for operating a seagoing green-water amphibious capability has shifted between the RAN and Army four times.[34] Army operated a large watercraft fleet, including landing craft, during the latter half of the Second World War, but relied upon the US Navy for a tank amphibious lift capability in operational areas. In the immediate post Second World War period, this responsibility passed to the RAN, which acquired six Landing Ships Tank (LST). However, the RAN LST were quickly placed in reserve, and all were paid off by September 1951. For most of the next decade, neither the RAN nor Army maintained a seagoing, tank-capable amphibious capability. A 1952 review of responsibilities for amphibious operations proved largely a 'theoretical division, as the Navy had no policy for acquiring an amphibious capability'.[35]

The 52-ton Centurion tank's introduction into service provided a catalyst for Army to acquire an amphibious tank-lift capability.[36] From 1959 onwards, the Royal Australian Engineers operated four landing ship medium in support of operations in Borneo and Vietnam.[37] By 1969, the RAN had argued that an Army proposal to acquire a much larger LST[38] exceeded Army's responsibilities.[39] Army reluctantly accepted this decision and instead ordered eight new Landing Craft Heavy (LCH) in 1969, but resisted a subsequent Chiefs of Staff Committee decision that the LCH should also be RAN operated.[40] The matter was decided in 1973 when the defence minister directed the transfer of the LCH to the RAN.[41]

Conclusion

This essay started by positing that the allocation of considerable resources to the space and information and cyber domains challenges the ADF's traditional view of the joint force, which is based on the three traditional domains. Against that background, it argues that, as the term 'joint' has been used in the ADF's history to describe the interaction between *three* different Services as they cooperate across domains and within domains, it no longer adequately describes the desired whole-of-Defence capability effect needed to embrace the role of APS employees and defence contractors. It has shown how the emergence of a new third (air) domain in 1921 posed significant role-definition challenges for the two existing Services. The decision to raise a single force dedicated to that domain was contested and ultimately overturned, but not without generations of shifting positions. This essay has also demonstrated how responsibility for boundaries between the traditional air, land and sea domains has seesawed repeatedly between the Services.

The ADF's history demonstrates that the introduction of new domains, and delineating the boundaries between them, generates frictions and inefficiencies that undermine the generation of a force with capabilities that exceed the sum of its parts. To avoid those traps, the future joint force needs to be more than just joint. A new conceptual framework, broader than just 'jointery' is needed to recognise that the emerging capabilities held and resourced in APS and contractor-led organisations might make those organisations equal partners of, and not just potential rivals to, the future 'joint force'.

To achieve that, further research is required into inter-Service, inter-government, and government–industry boundaries in these new domains is needed if solutions are to be designed rather than being left to simply evolve. Such research should include determining the extent of capability that needs to be undertaken by a uniformed force, as well as the raise, train and sustain capabilities needed to underpin them. Application of such research could enhance the design of the 'joint force', avoiding some of the inevitable inefficiencies that have resulted from a reliance on evolutionary methods based upon survival of the fittest.

Endnotes

1 Department of Defence, 2020, *2020 Australian Defence Strategic Update* (Canberra: Commonwealth of Australia), 35; Department of Defence, 2020, *2020 Force Structure Plan* (Canberra: Commonwealth of Australia), 17. It should be noted that the first Defence Planning Guidance 'provided direction for improving capabilities "in response to emerging challenges in space, missile defence and cyber security"' in 2010 (Tim McKenna and Tim McKay, 2015, *Australia's Joint Approach* (Canberra: Department of Defence), at https://apps.dtic.mil/dtic/tr/fulltext/u2/1003115.pdf, accessed 24 August 2020.

2 It should be noted that the US Space Force has yet to fully separate from its US Air Force origins. For example, US Space Force officers receive their *ab initio* training at the US Air Force Academy.

3 It should also be acknowledged that, while close-combat remains the *raison d'être* of any defence force, the adoption of remote and stand-off weapons, and increasingly autonomous systems, has contributed to a general decline in combat casualties throughout 20th and 21st century warfare.

4 Space is at 3 per cent and information and cyber is at 6 per cent (Department of Defence, *2020 Defence Strategic Update*), 35.

5 While the official histories of most of the ADF's 21st century operations have yet to be published, the author has witnessed the increased deployment at deeper levels of APS employees across policy, science and technology, intelligence and even finance roles over the past two decades.

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18 Ibid.

19 Sharp, 79.

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21 No.16 and No.17 air observation post flights.

22 Sharp, 96.

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24 Australian Army Aviation Association, 'Army Aviation Units at 1 Aviation Regiment', Fourays, at http://www.fourays.org/aviation_units/1_avn_regt/1_avn_regt.htm, accessed 13 June 2020.

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26 Ibid., 96.

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28 Sharp, 97.

29 David Evans, 1990, *A Fatal Rivalry: Australia's Defence at Risk* (Melbourne: Macmillan), 48.

30 Sharp, 97.

31 Royal Australian Air Force, 'The Bloodhound Missile and Launcher', at https://www.airforce.gov.au/sites/default/files/minisite/static/7522/RAAFmuseum/exhibitions/external/bloodhound.htm, accessed 13 June 2020.

32 David Horner, 1995, *The Gunners: A History of Australian Artillery* (Sydney: Allen & Unwin), 197, 391.

33 Ibid., 506–507.

34 The term 'green water' describes operations in a nation's littoral zones but with the ability to operate in the open oceans of its surrounding region.

35 PJ Greville, 2002, *The Royal Australian Engineers 1945 to 1972: Paving the Way* (Melbourne: Australian Military History Publishing, Loftus), 372.

36 Ibid., 378.

37 J.C. Laughlin, 'Brief History of Army Small Ships' in Australian Army Journal, No.118, March 1959 (Canberra: Australian Army, 1959) (100t, 8 x 30-ton tanks; 13 x 3-ton trucks; or 350 tons of cargo). See also Greville, 378.

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39 Greville, 397.

40 Albert Palazzo, 2001, *The Australian Army: A History of Its Organisation 1901–2001* (Melbourne: Oxford University Press), 305, referring to COSC Min 56/1971—LCH to RAN.

41 Royal Australian Navy, 2010, *Australian Maritime Doctrine* (Sea Power Centre, Royal Australian Navy), at http://www.navy.gov.au/media-room/publications/australian-maritime-doctrine-2010

3. Data to Decisions: Enabling Military Decision-Making Through Operations Research and Systems Analysis

Mark Tutton, Adam J Hepworth & Jan Lim

> *The commander must work in a medium which his eyes cannot see, which his best deductive powers cannot always fathom; and with which, because of constant changes, he can rarely become familiar.*[1]
>
> *Carl von Clausewitz (1780–1831)*

In early June 2020, the Australian Strategic Policy Institute published an article titled 'Australia's Navy needs operations research to navigate the future'.[2] The authors' central argument posits that operations research (OR) is the critical capability required to enable the Royal Australian Navy (RAN) to adopt a data-driven analytical approach to decision-making.[3] Their position is that OR is essential for identifying, achieving and sustaining critical capabilities as economically as possible in a post-COVID-19 resource-constrained environment.[4] This situation is neither unique to the RAN nor confined to the area of capability development and management. It is a common situation that spans the entire Australian Defence Force (ADF) system of systems—strategic, operational, tactical, capability development, preparedness, and people.

> *Data-driven, analysis-based decision-making is the standard today in most successful businesses. Chief data officers and analytic staff with data scientists or operations analysts are increasingly a part of their structure.*[5]

The Australian Government's Force Structure Plan 2020 outlined a total package of capability investment in land forces of approximately $55 billion over the next decade, representing 20 per cent of government's total capability investment in Defence over this period.[6] This will enable land forces to meet challenges into the future, with new investments in long-range strike weapons, watercraft, helicopters, information effects, logistics resilience, and emerging robotics and autonomous systems. Traditionally, professional military judgement has been a primary method to answer questions regarding the acquisition, associated force design, and operational employment of new capability. However, military commanders are increasingly seeking scientific answers to these problems that fuse quantitative analysis and qualitative insights to improve operational effectiveness and capability decision outcomes.[7]

The future operating environment is likely to be characterised by previously unimagined levels of convergence, data saturation and speed. Military commanders must be able to efficiently and effectively leverage large volumes of quantitative data to make informed, timely decisions to achieve successful mission outcomes. The military that can best capture, process, and analyse data effectively is likely to have a marked advantage over strategic competitors.[8] OR cells across the entire ADF, not just within the RAN, that provide quantitative (modelling and data analysis) and qualitative (operationally relevant insights) decision support will be the critical capability that enables this. This essay explores the origins and operational significance of military OR, discusses the application of OR in a broader ADF context, and addresses some general considerations for the growth of an increased ADF OR workforce.

What is Operations Research?

OR within Defence is defined as '[t]he analytical study of military problems undertaken to provide responsible commanders and staff agencies with a scientific basis for decision on action to improve military operations'[9]—the application of the scientific method to decision-making[10] or, more succinctly, data to decisions. The formal discipline of OR grew from the efforts of military planners, mathematicians, and statisticians working in multidisciplinary teams during World War II.[11] In the years since, OR has grown into an active field of academic research, with methods, models and tools permeating from the military enterprise into business, government, and society more broadly.[12]

Employing a range of techniques from across many fields, OR is inherently multidisciplinary and leverages mathematical and computer sciences such as probability-based modelling, statistical analysis, optimisation, large-scale simulation, machine learning and data science. It fuses these fields to optimise solutions, helping organisations and decision-makers understand themselves better and operate better.

OR practitioners are commonly known as operations research analysts, operations analysts, industrial engineers or, within the ADF, operations research systems analysts (ORSAs). These professional analysts are master problem-solvers. They decompose problems into their essential elements, determining the right permutation of methods, models and tools to identify and analyse the causal issues of complex applied problems.[13]

The key value proposition for Army's continued investment in a uniformed ORSA workforce is the organisational control and enhanced flexibility options it offers. Beyond support to force design and capability development, ORSAs offer a unique ability to support operational decision-making. The ORSA workforce is a persistent uniformed analytic capability capable of providing real-time quantitative decision support to operational commanders. Army's ORSAs provide analysis not only for seeing what exists and what has happened (descriptive analytics) but also for reliably predicting what is likely to happen (predictive analytics), as well as the intelligent generation of reliable courses of action (prescriptive analytics). Examples of the value of this to Defence include the design and analysis of the 2020 Force Structure Plan experimentation, COVID-19 modelling and forecasts, Army Operational Force Structure supply and demand analysis, and operational optimisation studies.

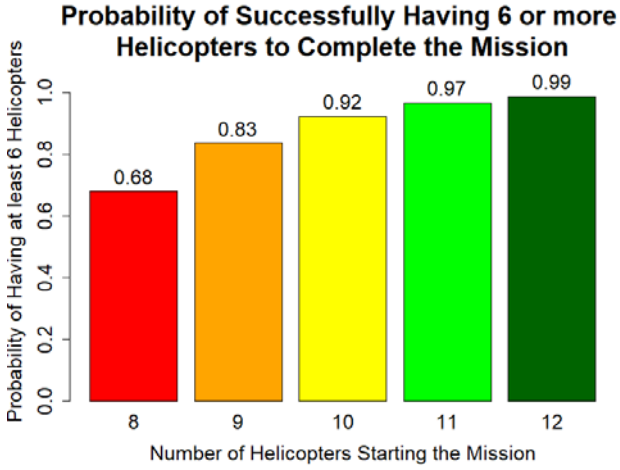
History illuminates many cases where the use of OR could have avoided disaster. A case in point is Operation Eagle Claw, where the use of OR may have led to a vastly different outcome. In November 1979, Iranian revolutionaries breached the American Embassy in Tehran, capturing 52 embassy staff. Five months into their captivity, the United States attempted a rescue operation, codenamed Operation Eagle Claw. The after-action review[14] uncovered several planning challenges with the mission design. It found that a major factor contributing to mission failure was the insufficient number of helicopters used.

Military planners had determined that they would need a minimum of six helicopters to evacuate the hostages. The planners used a simple form of average-based decision-making to determine the number of helicopters required. They did not apply probabilistic assessment to understand the likelihood of platform failure, particularly that arising from helicopter reliability. As a minimum of six helicopters was required to complete the mission, planners identified the need for eight helicopters to start the mission. They determined this by using an average platform availability percentage, approximately 75 per cent for this particular helicopter.

Figure 1: The aftermath on the ground of the failed hostage rescue[15]

Average-based decision methods do not take into account the range of possible outcomes or their associated likelihoods, offering only a single point to represent something far more nuanced. In this instance, an OR analyst may have suggested a technique such as Monte Carlo simulation, or provided insight on possible mission outcomes using a model such as binomial distribution. Based on the insights from either of these methods, an OR analyst would have advised that there was only a 68 per cent likelihood of completing the mission with at least six helicopters when starting with eight. To ensure a 95 per cent mission success likelihood based on helicopters alone, the OR analyst would have advised starting the mission with at least 11 helicopters, as described in Figure 2.

Figure 2: Probability of successfully having six or more helicopters to complete the mission[16]



This example highlights what having an ORSA in the planning team could provide, helping to ensure that decision-makers have access to better methods than average-based calculations. ORSAs use analytical methods and mathematically based procedures to enable leadership decisions in a continually changing environment. They introduce rigorous quantitative and qualitative analysis to support military decision-making processes. They work in diverse disciplines that include personnel management, doctrine and force development, training management, system testing, system acquisition, decision analysis, and resource management, as well as tactical, operational and strategic planning from brigade level through to the highest levels of the Department of Defence.

How Could Operations Research be Applied to ADF Operations in the Future?

The ADF's uniformed OR capability is less formalised than that of some of our partners, such as the US Department of Defense (US DoD), where professional communities exist as a part of specialist career stream models. Presently the ADF has nine qualified analysts across the enterprise; only two have contemporary experience and are employed in that role.[17] This difference manifests for the US DoD in the way in which senior leaders are supported, with ORSAs embedded in cells across their highest-level commands. The ADF presently has a single cell in an equivalent structure with uniformed analysts: the Land Warfare Laboratory in Future Land Warfare, supporting the Head of Land Capability in Army. Access to similar types of analysis by other senior leaders within Defence comes from a mix of Defence Science and Technology Group, academia and industry, all of which offer a range of different employment profiles to uniformed analysts.

An ever-increasing number of Defence's senior leaders have had exposure to the US system. The integration of Australian officers in coalition headquarters has consistently demonstrated the value of embedded OR analyst cells, not only for enterprise functions but also to deliver time-sensitive, resource-constrained analysis in support of operations. Uniformed ORSAs provide essential decision support to senior leadership decision-making. Their deep technical expertise and operationally relevant experience are the basis for this.

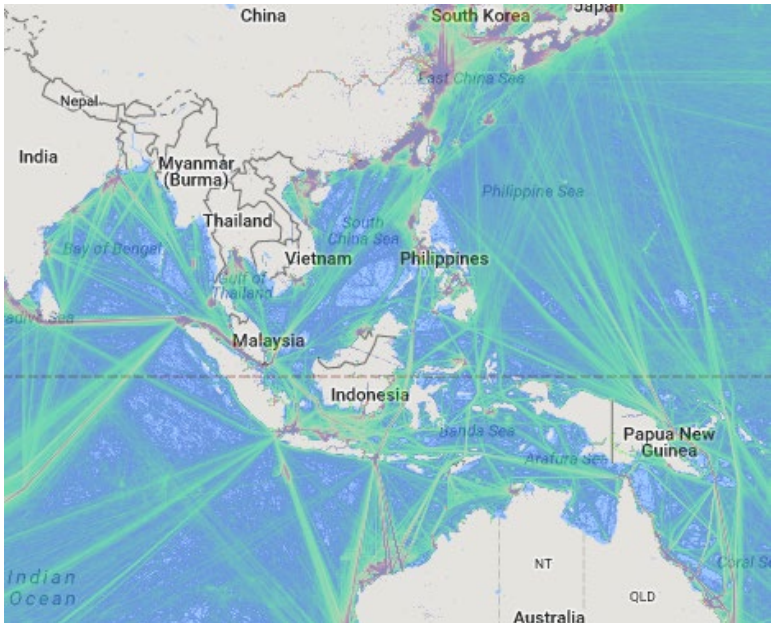
Defence has a range of positions across the enterprise codified[18] broadly for OR, operations analysis, and operational assessments. However, sufficiently qualified or experienced personnel are rarely employed in these roles. Moreover, a critical mass of professional uniformed ORSAs does not exist within Defence. The requisite skills in advanced OR, applied mathematics and computer science are not invested in by Defence to the degree necessary to address these known workforce gaps or increase the Defence OR workforce.

The Defence Science and Technology Group maintains an OR capability within the Joint and Operations Analysis Division. However, it is resource constrained to meet the full spectrum of roles and tasks that the ADF requires. To fill this identified gap, Defence requires uniformed ORSAs to complement and collaborate with those in the Defence Science and Technology Group, focusing on a nuanced spectrum of capability, preparedness, operations and strategic analysis.

The following vignette demonstrates the value of an OR cell to an operational organisation such as Joint Operations Command. In early 2017, a three-person OR cell comprising a United States Navy officer, a United States Marine Corps officer and an Australian Army officer completed a short-term study for the Commander of the United States Pacific Fleet.[19] The team investigated how strategy and tactics could assist de-escalation in the South China Sea while maintaining coalition strategic influence and ensuring that essential trade flows remain uninterrupted.

This team conducted the study with five key considerations: tactical, logistical, geographical, diplomatic and political feasibility. They designed an analysis framework using an advanced network optimisation model to confirm the strategic constraints and identify tactical employment locations of land-based weapon systems. The cell modelled critical chokepoints to determine the optimal placement, constrained by the number of weapon systems available to forces in the region. The analysis informed understanding and enhanced the decision-making process for principal military commanders. It directly informed concept of operations development, as well as theatre strategy for military integration with other government agencies.

Figure 3: A visualisation of shipping data which informed the quantitative analysis



Concept development and operational problem-solving through quantitative analysis are not only possible but also realistic now to support ADF joint operations. Applied OR such as this acts as a catalyst for conversations to evolve how joint operations are planned and executed to meet the challenges of the future together.

How Could the ADF Generate the Right Operations Research Capability?

The employment of ORSAs across the ADF necessitates a teaming approach. ORSAs must be paired with an experienced military planner and augmented with subject matter experts as required and determined by the field of analysis. The main advantage of this approach is the blending of the quantitative (ORSA) and qualitative (military planner), addressing complex problems from multiple perspectives. This pairing forms the core group that must be augmented with domain expertise relevant to the field of inquiry.

Presently the ADF educates its uniformed OR analysts only at the Naval Postgraduate School (NPS), a first-class graduate research institution and home to one of the world's leading OR programs.[20] Australia has no advanced education program delivered within a military context that could produce an equivalent ORSA as the NPS program does. Australia does have world-class

universities with programs that can replicate the range of skills required, albeit across several independent graduate-level programs. Currently there are no single multidisciplinary programs, even outside a military context, for the ADF to qualify ORSAs in Australia.

OR analyst workforce development[21] is a problem that is systemic throughout our coalition partners; however, the ADF does face two unique challenges. First, the ADF does not currently have sufficient throughput of suitable candidates to qualify as OR analysts. Second, the ADF does not currently have the institutional academic organisations, with residential experience, capable of replicating a full military OR program similar to those of our coalition partners. Notwithstanding this, the ADF could generate sufficient OR analyst effect through a mixture of multidisciplinary quantitative skill sets, created in partnership with our domestic academic institutions.

Coalition senior executive the late Kevin E Williams, formerly Director U.S. Air Force Studies, Analyses and Assessments (AF/A9), defines three key areas for address increasing complexity and uncertainty in strategy and operations:[22] inform leaders; strengthen analytic communities to meet the challenges of tomorrow; and improve (decision) clarity. He asserts that we are at an inflection point for OR. Accordingly, the US Air Force has designed a five-part strategy to address this, consisting of intentional, tailored education, training, and professional experience; accessible, referenced data; collaborative, interdisciplinary methods; simple, modular, and scalable models and tools; and a dynamic, collaborative community of analysts and partners. Williams describes the output of this approach as the *hyper-enabled analyst*. The purpose of this new approach is to optimise the scarce analyst resource to better support senior leader decision-making.

The ADF could adopt a model similar to that of the US Air Force to grow the OR workforce, particularly the education model. Evolving the current approach of qualifying all ORSAs at NPS, the ADF could generate complementary quantitative analysts across a range of STEM fields, such as computer science, applied mathematics, statistics, and engineering. This change would require dedicated organisational investment in both cultural change and foundational education, recognising the value of technical qualifications to the future ADF workforce, as identified in the Defence STEM Vision Strategy.[23]

OR is an essential element of the STEM Vision Strategy and must be prominently featured. The strategy document lays out the vital elements to promote and retain an advanced STEM workforce, explicitly noting the requirement for STEM tailored career pipelines, talent management, sustainable workforce growth, and understanding the key attributes required for a STEM career. The foundational requirement to realise this capability is a centrally managed career model, which is systemic across groups and Services in Defence.

Conclusion

Dedicated and planned investment in the future of Army's ORSAs is important as, given the ever-increasing demand for analytic skills across Defence, the ADF will necessarily need to 'raise, train and sustain Operations Research / Operations Analysis skills and gain practical experience applying analytical approaches to military problems'.[24] The military that can best capture, process and analyse data effectively is likely to have a marked advantage over strategic competitors. Uniformed ORSA cells across the entire ADF to provide quantitative (data analysis) and qualitative (operationally relevant insights) decision support will be the critical capability that enables this.

A critical short-term priority for OR development should be support to operations. Uniformed ORSA cells organic to Joint Operations Command and all joint task force headquarters should be considered the minimum requirement to support principal commanders' decision-making adequately.

In the longer term, all functional commanders across the ADF should have access to uniformed ORSA cells to support decision-making.

Any investment to increase the ADF's uniformed ORSA capability will significantly improve the quality of support to senior leader decision-making. While we have outlined some broad considerations for ORSA workforce development, these represent just a few of many potential options. Further analysis and planning are required to develop a mature understanding of the demand and approach needed to fulfil this.

The authors wish to thank Jeffrey E Kline, Mary Hill and Arthur H (Trip) Barber for their review, commentary and insights for this essay. This paper was first written in August 2020.

Endnotes

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3 Tim Barrett is a former chief of the Royal Australian Navy and a one-time head of the naval aviation test and evaluation organisation. He now provides strategic advice to Systems Planning and Analysis Inc., a Washington-based company advising US and Australian government organisations, and is a senior fellow at the Australian Strategic Policy Institute. Arthur H 'Trip' Barber III is a retired US Navy captain and civilian senior executive who was the navy's senior analyst. He is now the chief analyst at Systems Planning and Analysis Inc.

4 Ibid.

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12 Institute for Operations Research and the Management Sciences, 2020, 'What Is O.R.?', at https://www.informs.org/Explore/What-is-O.R.-Analytics/What-is-O.R.

13 Former Chairman of the Joint Chiefs, Admiral Mike Mullen, a graduate of the Naval Postgraduate School operations research program states: 'I was in Operations Research and the reason I enjoyed that in particular was because of its application of real-world problems' (Amanda D Stein, 'Admiral Mike Mullen, Chairman of the Joint Chiefs of Staff, Addresses NPS Community', Naval Postgraduate School, 12 August 2020, at https://nps.edu/-/admiral-mike-mullen-chairman-of-the-joint-chiefs-of-staff-addresses-nps-community).

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15 Richard Lamb, 'This Is What Special Ops Learned 40 Years Ago from Operation Eagle Claw', *Military Times*, 24 April 2020, at https://www.militarytimes.com/opinion/commentary/2020/04/24/this-is-what-special-ops-learned-40-years-ago-from-operation-eagle-claw/, accessed 23 July 2020.

16 The binomial distribution would have enabled planners to conduct a sensitivity analysis, ascertaining the level of mission failure risk associated with the various numbers of helicopters available to start the mission. For further detail and analysis, see 'Models', Probability Management, at https://www.probabilitymanagement.org/models?rq=eagle%20claw

17 Qualified ADF operations research analysts range from O4 to O9 in rank, with wide-ranging levels of experience in role.

18 Ranging in rank from O3 to O5, across primarily joint and Army positions.

19 MC2 Brian H Abel, 'PACFLT Commander Introduced to Student Research During Campus Visit', Naval Postgraduate School, at https://nps.edu/-/pacflt-commander-introduced-to-student-research-during-campus-visit

20 Naval Postgraduate School Master of Science in Operations Research Program, at https://nps.smartcatalogiq.com/Current/Academic-Catalog/Graduate-School-of-Operational-and-Information-Sciences-GSOIS/Department-of-Operations-Research/Operations-Analysis-Curriculum-360)

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4. Joint Logistics Through Robotic and Autonomous Systems—Opportunities and Risks

Robin Smith

> *The question is not whether the future of warfare will be filled with autonomous, AI-driven robots, but when and in what form.*[1]

Robotic and autonomous systems, colloquially known as RAS, offer significant potential in the joint force logistic effort that extends from the national support base along lines of communication to frontline use. Industry has been employing automation and autonomy for some time, yet Australian Defence Force (ADF) adoption of such technologies has been evolutionary and somewhat halting. The recently announced Force Structure Plan and Defence Strategic Update highlight the increased prominence of RAS, with Army being allocated up to $11 billion for future autonomous vehicles, Air Force investment in teaming air vehicles of up to $4 billion, and Navy committing to an uncrewed suite of capabilities, particularly for sub-surface warfare. As further demonstration of its commitment, Army requested and received funding and workforce to establish a coordination office for the implementation of RAS.[2] This is recognition of the rate of change of technology, as articulated in the Australian Army's Accelerated Warfare statement:

> *… we must prepare for an accelerating environment. Future warfare, in certain parts, will be fought at the speed of machines with success belonging to the side who can adapt the fastest.*[3]

Army released its Robotic and Autonomous Systems Strategy in late 2018 to outline the value it seeks to gain from the adoption of this range of technologies. The Australian Defence Force Headquarters (ADF HQ) has yet to issue its RAS concept, although it has been crowdsourcing ideas and thoughts under the ADF—Concept for Robotics and Autonomous Systems 2040 (ADF-CRAS 2040) banner. A low-risk area of significant potential for RAS is joint logistics, especially in the deployed environment.

This essay outlines the opportunity that RAS offers in joint logistics and some of the challenges that may ensue, and finally offers some suggestions for a way forward. Overall, the ADF is at risk of not realising many of the benefits of automation and autonomous systems because of conservatism, process rigidity, a lack of cooperation and, particularly, the want of a coordinated joint approach.

Definition of RAS

Before exploring this topic, it is valuable to consider what is meant by RAS. The Army RAS Strategy describes it as 'the application of software, artificial intelligence and advanced robotics to perform tasks as directed by humans'.[4] Likewise, it has also been described by Paul Scharre as 'a machine, whether hardware or software, that, once activated, performs some task or function on its own'.[5] The key is that a RAS can be physical or non-physical and that it fulfils a function without requiring human input. Levels of autonomy and functionality are variable, with graduated levels of human input or supervision. This ranges from remote control, which is how the military traditionally

uses Uncrewed Air Systems (UAS), to semi-autonomous systems where relatively simple inputs enable control, to full autonomy. Full autonomy is currently employed in some manufacturing processes and in the mining sector, where humans merely supervise autonomous dump trucks from thousands of kilometres away.

The absence of an internationally agreed scale of autonomy confuses discussion and complicates analysis. This labelling problem is compounded in the military, as capabilities are often seen as a 'system of systems'—where labelling a system as autonomous when not all subsystems have autonomy can be especially misleading. This definitional challenge is worthy of a study in its own right, but for the purposes of this essay, RAS will be considered broadly as systems (both hardware and software) with variable degrees of self-determination and, in some cases, robotic manifestation.

Opportunities Provided by RAS

The potential for RAS to benefit logistics has been highlighted in the UK, where it has been identified that '[s]ustainment will be improved ... by improved stock and platform monitoring and anticipation; but also by automated logistic delivery'.[6] It is helpful to note that logistic systems are configured to overcome two key problems—time and volume. The requirement to have the correct commodity, in the right quantity, at the right place and in a timely manner drives the logistic structure to support an operation.

In the Army context, the time and volume problem has been resolved through the echelon system. Logistic elements to support the fighting echelon (F echelon) are arranged through increasingly large elements the further one moves away from the F echelon, where it is considered that risk is lower. The echelon system holds essential combat supplies[7] very close to the point of need so that the F echelon can be replenished rapidly, highlighting the criticality of time. Addressing the problem of volume, the echelon system holds increasingly large quantities and large physical items away from the point of need. This means they may be more secure and also reduces the requirement to relocate this larger stockpile as a result of the ebbs and flow of battle. It does, however, make timely delivery more difficult.

This echelon system has been in place for over a century, has served Army well and is akin to the approach of Navy and Air Force, albeit on a different scale. Similarly, high-value but low-population items such as aircraft engines or missiles are held away from threat where they can be safely stored, maintained or assembled. This is due to the complexities involved in relocating them, sensitivities with transportation, and the requirement to carefully manage the commodity. This approach does, however, pose a challenge of time, as the item often is not readily available at the point of need, or a receiving element has to be moved to a specific loading point—for example, to reload missiles or torpedoes. These challenges of time and volume could be mitigated, to a degree, by RAS.

There is an opportunity to address time and volumetric limitations through significantly enhanced logistic situation awareness, monitoring and artificial intelligence (AI) assisted decision-making. This would require more than simply an enhanced recognised logistic picture; rather, it would require a system that fuses logistic information, real-time usage monitoring and an understanding of future intentions. Such a system would be able to not only identify what is needed and where but also recommend, plan, and deliver the commodity in a timely manner. This would reduce stock waste and avoid unnecessary logistic movement.

There are already nascent systems available, and many airlines and commercial haulage companies use an automated approach to pre-position parts to manage engineering demand and fault resolution and to maximise the availability of assets. Indeed, the F-35 comes 'bundled' with an autonomous logistic information system, although reportedly the system suffers from lack of performance and user confidence. As a result, the US military is changing to an operational data integrated network (ODIN) system—highlighting that the concept is sound. Yet the potential for such approaches extends beyond engineering and into high-volume and urgent combat supplies. A synthesis of monitoring usage, predicting the point of need and arranging delivery could enable a more agile and targeted system. In the land domain this could allow Army to reimagine the echelon system.

To address the logistic challenge of time requires examination of the rapidly changing range options for distribution. In Army's case, delivery of combat supplies to the F echelon requires the commodity to reach the force on land through a network of surface (motor transport or watercraft) or air (rotary wing, air delivery or aeroplane) means. The environment, distance, threat and weather all constrain options for where those supplies can be positioned. Given that the planning norm for A1 echelon[8] (immediate stocks) is to provide replenishment within 15 minutes, a ground transport solution has to be within 5 kilometres to meet such a requirement, exposing it to both direct and indirect fire attack. RAS offers some new opportunities here. For example, aviation is often a scarce resource for logistics, given other priorities such as casualty evacuation or troop movement. However, a 'heavy lift' UAS could provide a viable tactical resupply alternative. An air delivery solution able to fly at 150 kilometres per hour could still meet the response time while placed almost 40 kilometres away, well out of the range of most artillery. Furthermore, this approach means that the individual A1 echelon stockpiles could be significantly reduced, addressing some volume concerns by reducing what has to be held 'just in case'.

A heavy-lift UAS therefore allows the Army to reconsider the echelon system in its current guise and provides opportunity for fundamental change. Furthermore, the capability to lift and move meaningful volumes of freight autonomously by air is also a joint opportunity. A heavy-lift UAS could be especially effective in addressing the critical ship-to-shore connector role for a landed amphibious force ashore and so enable sea basing. Such platforms could also be an effective naval ship-to-ship connector managing commodities across a naval task group. Finally, on a deployed air base a heavy-lift UAS might enable better linkage between flight line and storage sites. In this case, commodities like ammunition that impose significant safety constraints, or electronics that require climate control and have a significant electrical footprint, can be stored away from habited work space or aircraft and be rapidly brought forward as needed.

In addressing combined time and volume challenges, autonomous vehicles also offer potential, especially for the land environment. One of the limiting factors in the logistic system is the ability to keep delivery assets moving. Trucks are often crewed by two personnel in order to maximise how long the truck can operate and survive in the environment. Many nations do not crew beyond that; therefore there is a limitation on the time for which a delivery asset can be moving freight.[9] Of course in times of crisis, truck operators could be required to continue well beyond what might be deemed safe in peacetime. However, assuming a two-person crew, it can be concluded that a truck is only operating at 75 per cent capacity as it is immobile for six hours a day.[10] The corollary is that is that Army needs 25 per cent more trucks in the fleet to mitigate this downtime.

A RAS leader-follower capability offers very significant logistic opportunity, since it requires only the lead platform to be crewed, while the followers are uncrewed and autonomous. If the lead vehicle can carry multiple passengers—for example, a Bushmaster—this enables continuous crew rotation. Consequently, apart from refuelling, the platforms can operate constantly for as long

as the maintenance allows—conceivably up to 10 days. This approach offers at least a 25 per cent increase in the volumetrics of what can be moved without growing the workforce. Furthermore, future cargo vehicles designed as followers do not require a cab for the crew—further increasing the load carriage capability by between 1,000 and 5,000 kilograms depending on truck type. The Australian Army has begun to experiment with a sovereign leader-follower capability through a research agreement with Deakin University and will test this hypothesis over the next few years, including on civilian roads.[11]

Autonomous ground transport also addresses some of the risk associated with operating in the land domain by automating delivery. Resupply is a critical vulnerability of a deployed force, and reliance on land lines of communication has been a vulnerability since ancient times. It has been reported that a little over half of US military casualties in Iraq occurred from attacks on land transport.[12] The US Army has an ambitious autonomous truck program and intends to have 300 deployed by 2025[13] that will operate in high-threat environments. The UK is also participating in the program[14] but has a different concept of employment. Based on experiences in Helmand province in Afghanistan, the UK is less convinced about the capability of autonomous trucks to deal with the uncertainty associated with complex environments. Instead it sees autonomous trucks being employed on longer duration, less demanding resupply roles, thus freeing human workforce for the tactically complex. This divergence of views highlights one of the challenges of RAS: sensors and processing still struggle to deal with the unusual and complex, especially on the ground in populated areas, and thus there is gap between aspiration and reality. In contrast, for the Air Force, operating in an environment devoid of the local population, such as within a deployed air base, autonomous ground platforms afford efficiency gains, as Project Kelpie has demonstrated, delivering spares without needing the technician to leave their station. An added bonus is that autonomous ground transport reduces the risk posed through fatigue and the incidence of humans falling asleep on long drives—highly apposite for Australia.

Challenges to Adoption of RAS

A number of challenges are associated with the military adopting RAS technologies. There are risks such as networking, vulnerabilities to cyber-attack, and uncertainties about the ability of delivery systems to perform in all weathers, day and night and against a range of threats. A bigger challenge is cultural inertia. Theo Farrell states that 'military organizations, as socially conservative and closed communities (not unlike religious orders), are especially disinclined to innovate.[15] This is to be expected, as often technology is disruptive; it challenges our worldview and therefore potentially destabilises the status quo internally. It also poses a risk that, if realised, could mean a military fails in the next war. Cultural inertia reflects the historical paradox that in peacetime militaries laud caution, accountability and a deliberate approach, whereas in conflict they require risk-takers, mavericks and disruptive thinkers to drive adaptation and create operational opportunity.

To reconcile these conflicting cultural needs, visionary and empowered leaders are needed to drive innovation from within; it cannot be imposed from the outside.[16] Innovation driven by threat is the most powerful form, whether prompted by past defeat, as for the Reichswehr in the 1930s, or by looming challenge as Britain faced in the same period. The Defence Strategic Update 2020 highlights a number of increasing threats. These include a reduction in stability of the rules-based order, increased coercive activity in the region, accelerating military modernisation of other Indo-Pacific players, more assertive major powers, and the proliferation of emerging and disruptive technologies. By explicitly highlighting these threats, the Strategic Update offers reasons for change which can empower visionary leaders and provide the spur to increased innovation.

Trust in RAS is a particular challenge, given low risk tolerance and how heuristic biases distort assessments of probability. Humans have developed an expectation that machines will operate flawlessly; human nature is such that machine failure is not tolerated. A system that is able to not only understand but also act requires a new interpretation of that expectation. For example, there have been five fatalities involving autonomous cars worldwide since 2016 and consequently the adoption of this technology has slowed markedly. Compare this to the fact that in Australia in 2020 there have been over 730 fatalities on the roads with human drivers;[17] yet humans continue to operate cars. This highlights the relative acceptance that humans have of human judgements. Addressing the issue of trust of AI, autonomy and learning machines is a crucial undertaking. The recent issues around the Boeing 737 Max anti-stall functionality also highlight why automation must be approached cautiously. Trust is key to enabling to the realisation of RAS technology both in Defence and more widely.

The force design impacts and concepts of operations changes are naturally key areas for exploring the role of RAS. This was the topic of Army's Future Land Warfare Branch experimentation program in 2018. This examination, including modelling with the Defence Science and Technology Group Joint Operational Analysis Division, focused on the value of RAS at the unit level. The experiment showed clear potential, not only for combat capabilities but also in the logistic and enabling elements. What was missing, however, was the next steps, the 'so what' and the 'now what' from both joint and single-service perspectives. Furthermore, the experiments tended to focus on RAS replacing humans in a like-for-like role. If RAS is approached purely through a 'like today but better' methodology then an important opportunity will be missed to perhaps do things differently. How this new technology informs our concept of joint warfighting in the future, and thus capability investment, is a key outcome. Force Design Division is currently authoring the ADF RAS Concept, which, while pre-decisional, is nevertheless being completed without an overall future joint warfighting concept. Force Design Division has also issued its Future Joint Logistic Concept. The absence of a guiding future joint operational concept means that, at best, subordinate documents represent exquisite shelf wear or, worse, simply a waste of effort. Both RAS and logistics are means rather than ends in their own right and should be approached as such, supporting the overarching concept.

In addressing how Defence seizes the opportunity provided by RAS, there is a need for clear guidance from the Joint Force Authority on a RAS electronic architecture. This is key to enable ADF-wide integrated performance of RAS systems that capability managers will develop within their domains. This is needed as a matter of urgency, and preferably should be aligned and coherent with our key security partners' systems so that interoperability is assured by design. This would nest within the overarching vision of future joint warfighting, which is already using such integrated baselines.

A willingness to innovate is also stymied by process. The capability life cycle is optimised for the deliberate—read slow—procurement of large major systems. It is incompatible with the model of ownership of most technology in 2020: in the vernacular, a throwaway society. While self-evidently, Defence must remain a responsible government department and expend its budget effectively and with the utmost integrity, there is risk that norms of iterative caution will stymie prototyping and experimentation. In turn, capability opportunity or transient advantage may be lost.

The British Army is approaching the procurement problem through a notion it refers to as 'Prototype Warfare', defined 'as a new approach to routine military activity that seeks to mimic the pace and intensity of wartime transformation by prioritising experimentation and adaptation to rapidly inform doctrine and practice'.[18] The Chief of the General Staff, General Sir Mark Carleton-Smith,

has often mentioned that he wants to 'invert the pyramid and empower the most junior in the Army to lend intellectual energy into the debate as to how warfare is changing in the Information Age'.[19] We must also take the opportunity to innovate and rapidly. It is heartening that Army is heading in this direction with the creation of the RAS Implementation and Coordination Office (RICO). The RICO has been undertaking exploration activities and prototyping to help Army understand and codify its RAS needs and wants and to gain insights to inform its future designs and user requirements. Navy has also initiated ongoing RAS exploration activities, including Autonomous Warrior in 2018.

Conclusion

This essay highlights that there are high payoff opportunities for RAS in the realm of joint logistics. It argues that the ADF might reimagine how it overcomes the challenges of both time and volume. One promising element is a vastly enhanced logistic decision-making system which exploits automation and artificial intelligence to distribute only what is needed, quickly and with precision. The system would deliver through the use of novel air vehicles and autonomous ground transport, which would dramatically improve efficiency and redundancy. However, these opportunities might be stymied by cultural challenges, both inside and external to the organisation. Feeding cultural resistance are real issues of trust in and of RAS, and, while the adoption of new technology has always presented challenges, some of the unique problems associated with RAS can be expected to require significant effort to overcome. Clearly articulated direction is needed to reinforce the intent already expressed by the Secretary of the Department of Defence and the Chief of the Defence Force. Force design and future concepts need to guide how RAS technology nests in an overall vision of how the joint force will fight and win in the future. The model should enable a capability life cycle that has the agility and flexibility needed to seize transient advantage. Finally, the joint enterprise needs a clear willingness to invest in prototyping and experiment in order to identify and seize the game-changing opportunities that RAS offers.

> *The future masters of technology will have to be light-hearted and intelligent. The machine easily masters the grim and the dumb.*
>
> *Marshall McLuhan*

Endnotes

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7 Ammunition, rations, water, fuel, and chemical, biological, radiological and nuclear (CBRN) protection supplies.

8 The A1 echelon has the vehicles and equipment readily available at sub-unit level to provide immediate support to sustain the F echelon.

9 The National Heavy Vehicle Regulator specifies that operators of double-crewed vehicles need a minimum of five hours continuous rest in a 24-hour period outside of the vehicle (see www.nhvr.gov.au).

10 This assumes two operators driving for 9 hours per day each.

11 This is through the Institute for Intelligent Systems Research and Innovation at Deakin University. See Minister for Defence, 'Morrison Government Boosts Investment in Army's Autonomous Fleet' [media release], 7 August 2020, at https://www.minister.defence.gov.au/minister/lreynolds/media-releases/morrison-government-boosts-investment-armys-autonomous-vehicle

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5. A Grey Zone—or Just Irregular Warfare? A Convergence in Strategic Approach

Andrew Maher

The 2020 Defence Strategic Update normalised 'grey-zone activities' in the lexicon, introducing them as a strategic driver shaping Australia's strategic environment[1] and noting that Defence will expand its capability to respond to such threats.[2] This task will prove difficult without a clear understanding of what is meant by the term 'grey zone'.

To address that question, I will start with an unusual analytic perspective. Professor Theo Farrell argued that Western militaries confronting insurgency in Afghanistan encountered Taliban military adaptation, interaction and integration that could be best understood through the business process re-engineering model of 'organisational convergence'.[3] Farrell claimed that 'competition and normative pressures leads over time to convergence within particular business and policy sectors, as optimal ways of organising and operating are learned and emulated'.[4]

I contend that a similar dynamic is becoming evident within what is currently described as the 'grey zone'. It appears that a singular strategic model is emergent[5] and that, furthermore, this follows a well-trodden path of irregular warfare theory. Within this essay, I will chart a hundred years of strategic competition, demonstrating that different adversaries of the West engaged, observed, learned and adapted and, over time, arrived at a similar strategic model. This convergence underpins what we can discern in 'grey-zone' activities as an element of competition.

The approach that adversaries evolved, and successfully applied, contrasts starkly with the sequential, apolitical, firepower-focused and impatient American way of war.[6] The opponent's method was, as we shall see, cumulative—that is, each phase builds upon the previous actions. This model is most neatly encapsulated by Mao Zedong's theory of revolutionary war. This is a three-phased operational concept. Phase 1 is 'organisation, consolidation, and preservation'; Phase 2 is progressive expansion; and Phase 3 is decision, or destruction of the enemy'.[7] Understanding historical convergence around a common model and applying it to contemporary challenges offers a basis for new thinking about the challenges facing today's military strategists and joint force commanders.

The Russian Revolution and its Aftermath

In one of Lenin's papers, *Partisanskaya Voina* (Partisan Warfare), published on 13 October 1906 in his newspaper *Proletari*,[8] insights into preceding 'armed struggle' activities are described in the context of weakening the state. 'Armed struggle' was differentiated from 'armed uprising'. The former phase involved assassinations of 'high officials and lower-ranking members of the police and army', and 'expropriations' that sourced money for the purposes of the latter phase: uprising. In September 1906, the Moscow Bolshevik Party Committee issued a resolution in favour of partisan war 'to liquidate the most active representatives of the government and to seize money and arms'.

Lenin evolved this doctrine into two key contributions to Marxist theories of revolutionary war against capitalism. The first was to conceive a 'vanguard party', composed of intellectual elites, which would set the conditions for and lead the revolution. When the Russian Revolution occurred in 1917, the Communists duly took the van, ruthlessly seized the existing power centres in the cities and then prevailed in the resultant civil war.

The second contribution was the notion of a 'popular front'—a pragmatic coalition with other opponents of the capitalist regime. A popular front was about alliances and co-opting interests: 'integrating "little wars" of the partisans with "big wars" of the regulars'.[9] The organisation created to fight capitalism worldwide, the Communist International (Comintern), operated as a 'long arm' of the Kremlin. Initially its focus was defensive as it infiltrated the White Russian émigré circles of Europe to discredit, disinform and disrupt remaining resistance to Bolshevik rule. Before long, however, the Comintern became an offensive foreign policy tool, in which the establishment of Community Party cells became a source of leverage:

> *In countries possessing few Russian speakers, they would encourage a revolt of the working classes and generate dissension within the ruling government. In countries containing significant Russian-speaking or multi-ethnic populations, they would foster a 'fifth column' to operate in support of Russia's interests within the society. They actively exploited the gap between what the capitalist societies called 'war' and what they called 'peace'.*[10]

Crucially, calculation was the byword of the popular front strategy. While the ultimate aim was worldwide revolution, they would not foment it prematurely or risk provoking effective counter-revolutionary actions. Significantly, during the Spanish Civil War the Soviet Communists infiltrated Spanish Loyalist elements to effect control over the anti-Fascist armed forces.[11] Throughout the Cold War, such support was likewise carefully maintained at a low level that would support intelligence operations and enable 'active measures' of propaganda—while in contrast it was ramped up in the Third World.

German Blitzkrieg and the Birth of the British 'Detonator' Concept

German operational art had evolved during the interwar period, responding to the constraints imposed by the Treaty of Versailles and embracing unconventional approaches. During the Spanish Civil War assault on Madrid by four army columns, the concept of 'fifth columnists', working within the city, entered the military vernacular. The idea of such psychological disruption by unconventional forces was seemingly well incorporated into German operational concepts and was refined during military exercises with the Soviets over the 1930s. William Donovan, head of America's Office of Strategic Services (OSS), quoted Hitler describing these lessons:

> *'We need armies. But we shall not use them as in 1914. The place of artillery will in future be taken by revolutionary propaganda, to break down the enemy psychologically before the armies begin to function at all … Mental confusion, indecisiveness, panic, these are our weapons.'*[12]

These concepts were then expertly employed to seize Austria and the Sudetenland[13] without fighting, and then integrated with Blitzkrieg in Poland,[14] Norway,[15] Belgium and France[16] in a manner that resonates with today's view of 'hybrid warfare'.

British perceptions of this German operational art would prove crucial. This understanding is best articulated in a letter from Dr Hugh Dalton, the Minister of Economic Warfare, to Lord Halifax of the Foreign Office on 2 July 1940:

> *We have got to organise movements in enemy-occupied territory comparable to the Sinn Fein movement in Ireland, to the Chinese Guerrillas now operating against Japan, to the Spanish Irregulars who played a notable part in Wellington's campaign or—one might as well admit it—to the organisations which the Nazis themselves have developed so remarkably in almost every country in the world. This 'democratic international' must use many different methods …*[17]

This conception had an impact beyond its manifestation in the British Special Operations Executive (SOE) and was quickly adopted by Donovan and the US OSS. Donovan saw this model as forging 'a new instrument of war' in which:

> *the first stage would be 'intelligence penetration' … The next phase would be special operations, in the form of sabotage and subversion, followed by commando-like raids, guerrilla actions, and behind-the-lines resistance movements. All of this represented the softening-up process prior to invasion by friendly armed forces.*[18]

In the SOE, this was termed the 'detonator' concept; where agents would form centres of resistance to 'initiate' popular uprisings across occupied Europe to resist German occupation.[19] In 1942, however, as the Operation Torch landings into North Africa took place, Allied strategy pivoted toward the employment of overwhelming force leveraging American industrial output. Nonetheless, support to guerrillas in centres of resistance in the Balkans, Italy, France and Denmark (among others) continued to tie down and disrupt Axis fighting power.

The Chinese Communist Party and the Rise of Maoist Doctrine

Mao Zedong was by 1921 a member of the Shanghai Soviet, but failed miserably in the application of Russian theory towards an uprising by the industrial proletariat.[20] Influenced by Russian advisors,[21] his contribution to advance Communist strategic thinking was to flip the focus on the industrialised cities (which was ill-suited to China's development at that time) to focus on the rural peasant. His concept is poignant and thus deserves quoting at length.

> *[In Phase 1] In effect, there is thus woven about each base a protective belt of sympathizers willing to supply food, recruits, and information, and to the extent possible, deny these to the enemy … In the second phase, acts of sabotage and terrorism multiply; collaborationist and 'reactionary elements' are liquidated. Attacks are made on vulnerable military and police outposts; weak columns are ambushed. The primary purpose of these operations is to procure arms, ammunition, and other essential material, particularly medical supplies and radios. As the growing guerrilla force becomes better equipped and its capabilities improve, attention is focused on rail and road communications.*[22]

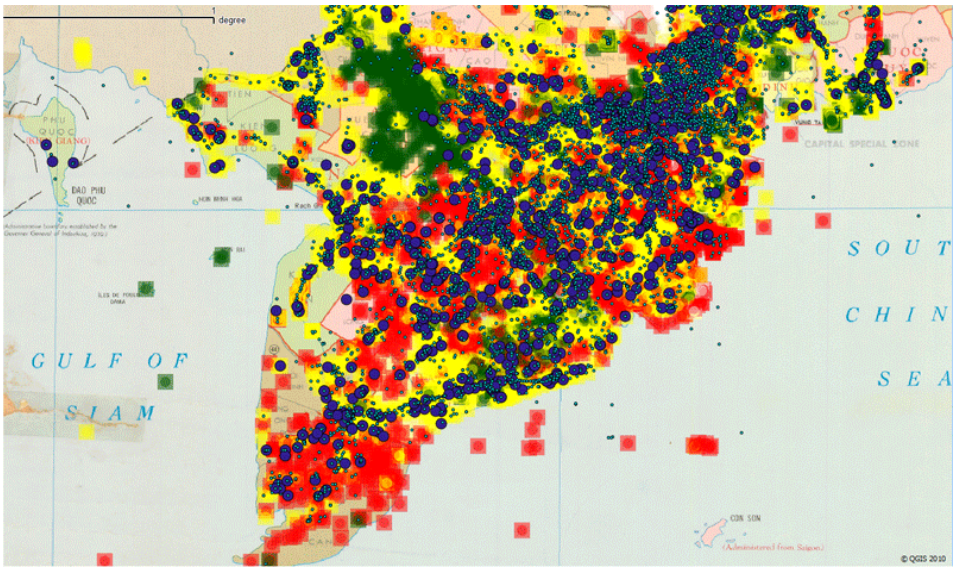
Mao described nuance in this model, arguing that these were 'merging phases' without a clear beginning or end.[23] Similarly, it was unequivocally political, emphasising building support and therefore never mistreating the peasants. Like the Soviets he was pragmatic in in this, making the initial rallying cry land reform rather than revolution. He also learned through adversity, not only during his prolonged conquest of China but also through his subsequent intervention in Korea.

What emerged has been a Communist Party of China (CPC) characteristic of pragmatism with regard to mitigating the risk of armed conflict. A lesson taken from Chinese engagement in the Korean War, and the mass casualties incurred, was to avoid escalating into open conflict, but rather to achieve CPC objectives below the threshold of violence wherever possible. This was reinforced by the costs of China's brief war with Vietnam in 1979 and is reflected in China's emulation of Russia's rapid de-escalation tactics in the years since.[24]

Giáp's Evolution to 'Revolutionary Warfare Doctrine'

In Vietnam, Võ Nguyên Giáp retained the three military stages of Maoist thinking. He built upon them, on advice provided by Chinese and Soviet military advisors, by adding three discrete political elements.[25] Action was required 'among your own people', 'among the enemy military' and, above all, 'among the enemy's people'. Arguably, victory came through persuading the latter, the US electorate, that they could not prevail. This doctrine devolved to the village level as a contest for control, where conventional warfare, guerrilla warfare and terrorism all coexisted. Resistance to analysis, or 'complexity', is inherent in the struggle for human allegiance and compliance within what we now call political or hybrid warfare. The conventional US military were left doctrinally challenged by their failure to understand the nature of the struggle for control—as shown visually in Figure 1.[26]

Figure 1: Government control at a point of time within the Vietnam War. Green means full government control, yellow means mixed control, and red means full rebel control. Large blue dots are for government officials assassinated, and small dots are for citizen assassinations.[27]



The American military response to Giáp's strategy was to pivot away from the complexities inherent in this hybrid war and to instead orientate to the technological 'Second Offset Strategy', manifest in air-land battle.[28] As the American military again returned to leveraging its technological-industrial advantage, journalist Robert Taber reflected upon the American challenge in *The War of the Flea*.[29] The analogy is that the flea is too fast and small and can avoid the response of a slowly maddened dog that is frustrated in its attempts to counter the flea. Taber uniquely applied this imagery to explaining how in Maoist Phase 1 the subversive environment can generate a 'climate of collapse'. When this environment is created, fragility results, which may lead to unexpected conflagration of

discontent into protests, *foco*ist rebellion or even revolution. Taber describes numerous cases of Cold War Communist adversaries escalating through Maoist Phase 2 or Phase 3, including China, Cyprus, Cuba and Indochina.

Vietnamese success was also noted in Latin America, spawning 'the near-explosive growth of "new" insurgencies after 1970 in Nicaragua, El Salvador, Guatemala, and Peru, and also the persistence and expansion of the Colombian insurgencies'.[30] Taber's text describing this model is notable as it formed the basis of al-Qaeda instruction on guerrilla warfare in the 1980s and 1990s.

Salafi-Jihadist Strategic Theory

In 2013, Michael Ryan encouraged the academic community to look beyond Salafist vocabulary and symbology and to examine the strategy underneath. In *Decoding Al-Qaeda's Strategy*, he presented the argument that al-Qaeda strategists subscribed to classic irregular warfare theory, which they termed, 'Revolutionary Guerrilla Warfare'.[31]

The evidence of al-Qaeda absorbing lessons from operations against the West is strong. David Kilcullen in 2007 argued:

> *… the primary threat is terrorism-linked subversion … Islamic theology is a strictly secondary factor … the present threat is from a political ideology that cloaks itself in religion—cynically exploiting religious tolerance to prevent democracies acting against it.*[32]

Kilcullen quotes *The Method to Re-establish the Khilafah* (2000) by members of Hizb ut-Tahrir in Britain, which calls for 'a protracted revolutionary struggle developing from agitation/propaganda, through building a vanguard party, subversion and eventually armed insurrection against the state'. Kilcullen notes that this narrative argues:

> *… a classic insurrectionist approach to gaining power—initially through subversive means short of force, but eventually resulting in an armed revolutionary takeover of the state ... Indeed, passages in this booklet bear a more than passing resemblance to V.I. Lenin's seminal pamphlet Chto Delat [What is to be done?].*[33]

Al-Qaeda strategist Abd al-Aziz al-Muqrin assumed command of al-Qaeda's Saudi Arabian insurgency until his death in 2004. Muqrin's legacy is a manual of military doctrine, *Dawrah al-Tanfidh Wa Harb al-'Asabat* (*A Practical Course for Guerrilla War*), which advances a three-phase model:[34]

- Attrition (strategic defence)
- Relative strategic equilibrium (policy of 1,000 cuts)
- Military decision (final attack).

In 2005, another al-Qaeda strategist, Abu Bakr Naji, posted his book *Idarah al-Tawahhush (The Administration of Savagery*) to an online forum. This book expands on al-Muqrin by advocating three phases of 'jihad in priority states' that bear more than a passing resemblance to the Maoist model:

- Causing 'damage and exhaustion' (*al-nikayah wa al-inhak*) to the 'apostate' country through terrorism and guerrilla warfare
- Establishing the 'administration of savagery' in areas from which the central government has withdrawn its forces
- Creating an Islamic state through a decisive battle or series of battles and transition from administration of savagery to a fully governed polity under al-Qaeda's version of sharia.[35]

Finally, al-Qaeda strategist Abu Mus'ab al-Suri drew from the failed uprisings in Syria 1979–1982 and in Algeria 1993–1997 to reinforce this three-phase model of contestation in *The Call to Global Islamic Resistance*.[36] The Islamic State drew lessons from al-Suri's writings, employing strategy invoking Maoist teachings after the American withdrawal of 2010.[37] Professor Craig Whiteside at the Naval Postgraduate School explicitly concludes that ISIS's strategy for seizing control over a target population is fundamentally the application of classic insurgency doctrine.[38]

Russian 'New Generation Warfare'

Russian military thinking has built upon lessons from the Comintern and the Spanish Civil War in the 1930s, support for Communist partisans in the 1940s, and proxy support for various groups throughout the Cold War era. Recent arguments based on Russian adoption of 'hybrid war' concepts echo the familiar cumulative model with three main operational phases.[39] Mark Galeotti's analysis of Russian political warfare draws attention to enduring aspects to this cumulative model of conflict, stating:

> *Russia's supposed 'new way of war' can be considered simply a recognition of the age-old truth that the political has primacy over the kinetic—and that if one side can disrupt the others' will and ability to resist, then the actual strength of their military forces becomes much less relevant, even if not necessarily redundant.*[40]

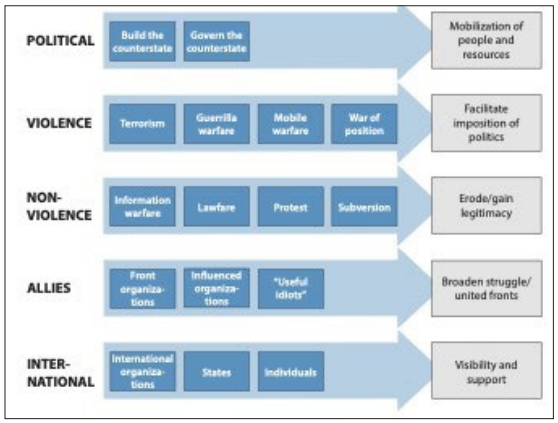
In presenting this argument, Galeotti quotes the writing of Evgenii Messner, a tsarist officer who fought against the Bolsheviks and fled Russia in 1920, in *Myatezh: imya tret'yey vsemirnoy* (*Subversion: The Name of the Third World War*):

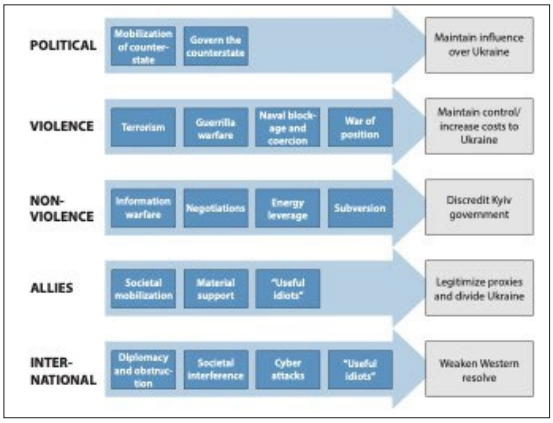
> *… '[f]uture war will not be fought on the front lines, but throughout the entire territories of both opponents, because behind the front lines, political, social, and economic fronts will appear; they will fight not on a two-dimensional plane, as in olden days, not in a three dimensional space, as has been the case since the birth of military aviation, but in a four-dimensional space, where the psyche of the combatant nations will serve as the fourth dimension.'*[41]

This recognition of an evolved Russian application of classic Communist revolutionary theory was most recently made by David Ucko and Thomas Marks of the National Defense University. Ucko and Marks lament the new jargon of 'hybrid war' and 'the grey zone', presenting the images reproduced here in Figure 2 as a demonstration of the enduring utility of understanding the Maoist strategic framework.

Figure 2 left: A standard people's war insurgency, mapped as lines of effort and campaigns

Figure 2 right: Russia's operational art in Ukraine, circa 2017, similarly mapped[42]





Convergence

The convergent picture is one of a cumulative strategy, and it is this, in contrast to Western sequential strategies, that confounds understanding. Professor Ross Babbage describes contemporary grey zone activities as echeloned offensives 'normally starting in places that are "empty", peripheral, or perceived to be of limited importance by … rivals'.[43] This description is that of a cumulative strategy, in which the decisive effect is the tipping point that is generally not foreseeable or predictable. Autocratic actors are today employing cumulative strategies that have a basis in classic Maoist strategy and might be rationalised to today's context as follows:

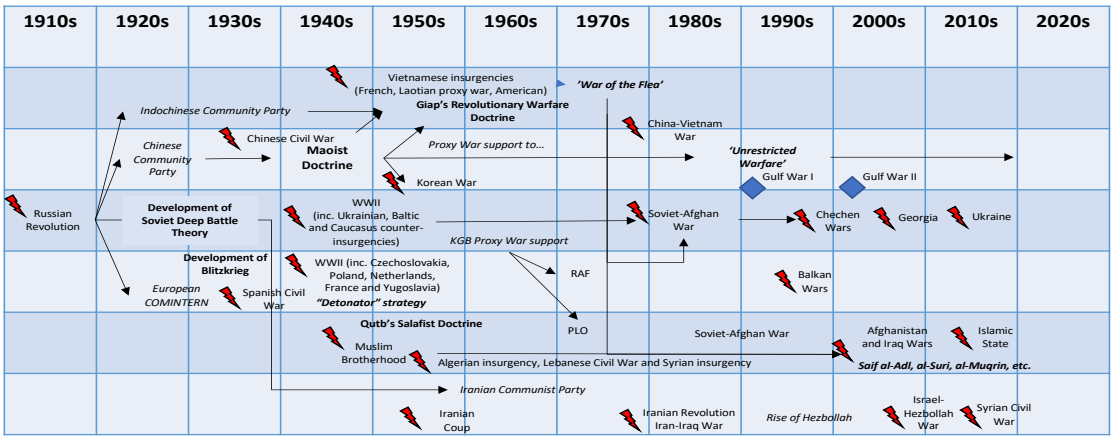
Phase 1: Organisation. The establishment of front organisations, coercion of rival actors, corruption of key officials, assassination of rival leaders—these actions are all typical of traditional Maoist warfare's subversive phase. In the Information Age, a greater number of tools are now available with which to undermine an adversary and to establish clandestine networks.[44]

Phase 2: Progression. Progression to this phase sees sabotage, terrorism and militia actions, gradually building mass that reinforces the themes communicated in earlier phases. Such actions are exemplified today by Russia's 'Little Green Men', China's 'Little Blue Men' and Iran's Shi'a militia groups.

Phase 3: Decision. It is only when an adversary is weakened, fractured, and distracted by subversive and proxy actions that conventional military forces pursue 'salami slices' of fait accompli seizures of objectives, before employing rapid de-escalatory tactics.

Western error lies in confusing the mechanism and the means. The means of asserting control over a population has changed over the past century, transitioning information effects from newspaper-based propaganda to radio, to television and now to internet-based social media. The mechanism remains the same.[45] This argument of convergent strategic thinking, demonstrated in this essay, is shown graphically in Figure 3.

Figure 3: Military strategic co-adaptation over the 20th century, marking major events from which respective parties learned from the military strategy of their adversaries



The implications of this convergence inform the framing of challenges posed in the 2020 Defence Strategic Update. The Communist Party of China remains ideologically anchored in Marxist ideology with continuity to Mao Zedong's conceptions of the employment of violence.[46] Professor Babbage reinforces this conclusion, noting: 'It is perhaps not surprising that Beijing's planning for a future major war resembles a 21st-century version of Maoist strategy.'[47]

Today, Phase 1 'Organisation' is evident in CPC activities that leverage 'state-owned enterprises (SOEs), Chinese technology companies and partnerships with foreign partners … [through which] the CPC is building a massive and global data-collection ecosystem'.[48] The Cold War Communist cadre can now be replaced (or expanded on) through the algorithmic controls employed by applications such as WeChat and TikTok.[49] Infiltration continues, as research by Alex Joske into the CPC's United Front highlights, with continuity from Lenin's international front efforts to today.[50]

Following Stalin's maxim, the CPC also demonstrate a willingness under a Phase 2 'Progression' environment, to probe with the bayonet. This is demonstrable in the contemporary CPC's coercive diplomacy[51] and its 'salami slicing' policy of employing militia elements with a suitable ambiguity of centralised control. Most prevalently, this is the case at sea, where elements of the People's Armed Forces Maritime Militia safeguard the CPC's maritime claims.[52] A state-owned fishing fleet further confuses the ability of the international community to ascribe state attribution—China's 'Little Blue Men'.

The primary implication of this convergence is that Western nations do not face either/or choices between responding to grey zone threats, terrorism, insurgency and major combat operations. These are points on the spectrum of conflict, through which adversaries of the West will escalate and de-escalate as required.

Conclusion

A year ago the Chief of the Defence Force, General Angus Campbell, delivered a speech to Australian Strategic Policy Institute's 'War in 2025' conference that brought to the fore the terminology of political warfare—what some might argue is the first phase of the cumulative Maoist model.[53] This speech was a call to arms, in much the same manner as George Kennan's famous telegram of 1946, the echoes of which resonate today:

> *Efforts will be made in such [Western] countries to disrupt national self-confidence, to hamstring measures of national defense, to increase social and industrial unrest, to stimulate all forms of disunity. All persons with grievances, whether economic or racial, will be urged to seek redress not in mediation and compromise, but in defiant violent struggle for destruction of other elements of society. Here poor will be set against rich, black against white, young against old, newcomers against established residents …*[54]

Political warfare can be understood as a prerequisite for any form of armed force in a cumulative strategy. Upon successful attainment of political infiltration and subversion of the target, irregular actors are then employed in what has been termed hybrid warfare. The use of the term 'grey zone' to describe operations prior to hostilities tends to obscure rather than enlighten when not anchored in a hundred years of evolved theory, as presented in this essay. Strategists must not confuse with unnecessary terminology. We must recognise that the *mechanism* of creating advantage (i.e. the mechanism of subversion) remains the same; it is the *means* that evolve (e.g. from newspaper articles to social media posts). The lessons that will enhance the ADF's ability to counter grey zone threats lie in history. We might therefore do well to pick up the dusty books of the Cold War era.

Endnotes

1 Department of Defence, 2020, *2020 Defence Strategic Update* (Canberra: Commonwealth of Australia), at https://defence.gov.au/StrategicUpdate-2020/

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8 Published in English in *Orbis* (Foreign Policy Research Institute), Summer 1958.

9 Walter D Jacobs, 1962, 'Irregular Warfare and the Soviets,' in Franklin Mark Osanka (ed), *Modern Guerrilla Warfare: Fighting Communist Guerrilla Movements, 1941–1961* (New York, NY: Free Press Ltd), 63.

10 Ross Babbage, 2020, 'Ten Questionable Assumptions about Future War in the Indo-Pacific,' *Australian Journal of Defence and Strategic Studies*, 2, no. 1, 28.

11 R Dan Richardson, 1982, *Comintern Army: The International Brigades and the Spanish Civil War* (Lexington, KY: University Press of Kentucky).

12 Col. William Donovan and Edgar Mowrer, 1941, *Fifth Column Lessons for America* (Washington, DC: American Council on Public Affairs), 6.

13 'Part of Hitler's strategy, through his Fifth Column, had been to encourage Slovak irredentists to stage demonstrations in favour of Slovakian independence from Czechoslovakia. When the Czechoslovakian government reacted, the Slovaks were pressurised into asking for German protection, and eventually, the Czechoslovakian government was bullied into accepting a German protectorate of their country. The German forces then rolled over the border in force and took possession of the Czech lands.' (Brian Lett, 2016, SOE's *Mastermind: An Authorised Biography of Major General Sir Colin Gubbins* (South Yorkshire: Pen and Sword Military), 98.)

14 In Poland, the eventual *casus belli* for the German invasion involved a 'false flag' attack on a wireless station at Gleiwitz, orchestrated by the Germans, using prisoners from concentration camps. See MRD Foot, 1976, *Resistance: European Resistance to the Nazis, 1940–1945* (London: Biteback Publishing Ltd), 3.

15 Vidkun Quisling's Fascist National Union party in Norway undermined the elected Norwegian government and informed German war preparations, before being rewarded with nominal control following the German occupation.

16 Edmond Taylor, 1940, *The Strategy of Terror—Europe's Inner Front* (Boston: Houghton Mifflin Company).

17 MRD Foot, 1984. SOE: *The Special Operations Executive 1940–46* (London: British Broadcasting Corporation), 19.

18 Alfred H Paddock Jr, 1982, *US Army Special Warfare: Its Origins* (Washington, DC: National Defense University Press), 6.

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

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21 Richardson, 1982.

22 Mao, 1978, 18–19.

23 Ibid., 20.

24 Edward C O'Dowd, 2007, *Chinese Military Strategy in the Third Indochina War* (New York, NY: Routledge).

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31 Michael WS Ryan, 2013, *Decoding Al-Qaeda's Strategy: The Deep Battle Against America* (New York, NY: Columbia University Press). Nor is an irregular warfare framework limited to al-Qaeda. Michael WS Ryan, 2015, *ISIS: The Terrorist Group That Would Be a State* (Newport, RI: Center on Irregular Warfare and Armed Groups Case Studies, US Naval War College), 10, notes: 'ISIS departed from al Qaeda's strategy by taking advantage of its best thinking about jihadist lessons as codified by Abu Mus'ab al-Suri … ISIS has used a strategic plan for establishing an Islamic emirate, as presented in broad strikes by another al Qaeda strategist with the pseudonym Abu Bakr Naji.'

32 David Kilcullen, 2007. 'Subversion and Countersubversion in the Campaign against Terrorism in Europe', *Studies in Conflict & Terrorism*, 30, no. 8, 647–8.

33 Ibid., 657–8.

34 Ryan, 2013, 136.

35 Ibid., 140–168.

36 *Lessons from Jihad Waged by Muslim Brotherhood against Hafiz al-Assad 1976–1982*, Combating Terrorism Center Harmony Program, AFGP-2002-600080 (full translation), at https://ctc.usma.edu/harmony-program/lessons-learned-from-the-jihad-ordeal-in-syria-original-language-2/, accessed 7 July 2020.

37 Hassan Hassan, 2018, *Out of the Desert: ISIS's Strategy for a Long War*, Policy Paper 2018–8 (Washington, DC: Middle East Institute); Ryan, 2015; Nate Rosenblatt and David Kilcullen, 2019, 'How Raqqa Became the Capital of ISIS: A Proxy Warfare Case Study', New America.

38 Craig Whiteside, 2016, 'The Islamic State and the Return of Revolutionary Warfare', *Small Wars and Insurgencies*, 27, no. 5, at https://www.tandfonline.com/doi/full/10.1080/09592318.2016.1208287

39 Otto Fiala (ed.), 2019, *Resistance Operating Concept* (Stockholm: Swedish Defence University), 121–124. This description is as follows: 'Preparatory phase (involving establishment of networks, fuelling of social tensions, strengthening of local separatist movements, a weakening of the target state through corruption and engagement with local organised criminal groups), Attack phase (involving the organisation of anti-government protests and riots, instigation of provocations and sabotage, commencement of a misinformation campaign, disrupt the target nation's ability to communicate, disable armed forces and continuously block counterattack options of the targeted state), and a Stabilisation phase (organise a referendum about secession/independence, establish an open or covert military presence—with the possibility of an open invasion under the pretext of peacekeeping or crisis management).'

40 Mark Galeotti, 2019, *Russian Political War: Moving Beyond the Hybrid* (New York, NY: Routledge Focus), 27.

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43 Ross Babbage, 2019, *Winning Without Fighting: Chinese and Russian Political Warfare Campaigns and How the West Can Prevail*, Center for Strategic and Budgetary Assessments (CSBA); Ross Babbage, 2019, *Stealing a March: Chinese Hybrid Warfare in the Indo-Pacific; Issues and Options for Allied Defense Planners*, CSBA. Both at https://csbaonline.org/about/people/staff/ross-babbage

44 Strategist Lawrence Freedman draws attention to the fact that 'there is nothing particularly new with either cyber or information campaigns—in the past they came under the heading of sabotage, subversion, and propaganda. They can now be implemented with great speed and reach.' (Lawrence Freedman, 2020, 'Who Wants to Be a Great Power?', *PRISM*, 8, no. 4, 10.

45 Jude Blanchette, 2020, 'Strengthening the CCP's "Ideological Work"', translation of Huang Xianghuai, 'Emphasising and Strengthening the Party's Ideological Work', Center for Strategic and International Studies, 13 August 2020, describes Maoist progression in the information domain: 'At present, there exist three kinds of "zones" in the field of ideology and public opinion—red, black and grey. The red zones our main battlefront positions, which we must hold onto and never lose; the black zones consist mainly of negative things, which must be resolutely controlled, greatly compressing their territory, and gradually pushing them to change colour; and the grey zones must be fought over with great fanfare, accelerating their conversion into red zones, and preventing their metamorphosis into black zones.' (page 14).

46 Babbage, 2020; Blanchette, 2020.

47 Babbage, 2020, 37–38.

48 Dr Samantha Hoffman, 2019, *Engineering Global Consent: The Chinese Communist Party's Data-Driven Power Expansion,* Policy Brief No. 21/2019, Australian Strategic Policy Institute, 3.

49 Fergus Ryan, Audrey Fritz and Daria Impiombato, 2020, *TikTok and WeChat: Curating and Controlling Global Information Flows*, Policy Brief No. 37/2020, Australian Strategic Policy Institute. Ryan et al. go on to note: 'Internal Chinese Communist Party (CCP) committees at both companies [WeChat and TikTok] are in place to ensure that the party's political goals are pursued alongside the companies' commercial goals' (page 2).

50 Alex Joske, 2020, *The Party Speaks for You: Foreign Interference and the Chinese Communist Party's United Front System*, Policy Brief No. 32/2020, Australian Strategic Policy Institute; Alex Joske, 2020, *Hunting the Phoenix: The Chinese Communist Party's Global Search for Technology and Talent*, Policy Brief No. 35/2020, Australian Strategic Policy Institute.

51 Fergus Hanson, Emilia Currey and Tracy Beattie, *The Chinese Communist Party's Coercive Diplomacy*, Policy Brief No. 36/2020, Australian Strategic Policy Institute.

52 Office of the Secretary of Defense, 2020, *Military and Security Developments Involving the People's Republic of China 2020*, Annual Report to Congress.

53 Brendan Nicholson, 'ADF Chief: West Faces a New Threat from 'Political Warfare', *The Strategist* (ASPI), 14 June 2019, at: https://www.aspistrategist.org.au/adf-chief-west-faces-a-new-threat-from-political-warfare/

54 At Wilson Centre Digital Archive, https://digitalarchive.wilsoncenter.org/document/116178.pdf

6. The Debris of an Organisation—Thinking About How the ADF Recovers from the First Losses of War

David Beaumont

> *In war, mistakes are normal; errors are usual, information is seldom complete, often accurate, and frequently misleading. Success is won, not by personnel and materiel in prime condition, but by the debris of an organisation worn by the strain of campaign and shaken by the shock of battle. The objective is attained, in war, under conditions which often impose extreme disadvantages. It is in the light of these facts that the commander expects to shape his course during the supervision of the planned action.*[1]
>
> *Sound Military Decision, United States Naval College, 1942*

Wars are usually longer than expected and are rarely fought in accordance with the plans made by military planners at their outset. Australian experiences in the Middle East over nearly two decades remind us that war shapes itself around ever-changing contexts. The 'new dawn' of 'grey-zone' conflict, a reflection of the age-old reality that nations consistently seek to preserve strategic interests and prosperity with resources they have, reminds us that competition is not confined to a staccato series of disparate actions. Success in competition requires resilience, persistence, presence and sustainability. This truism applies to conflict. The fighting in war occurs in ebbs and flows as adversaries play advantages and disadvantages until victory is assured. However, in an affliction common to Western preparations for future war, there is a tendency for planners to limit their imagination to the first salvos.[2] This creates the situation where the really difficult part of war is not prepared for—how a military organisation (probably left in dysfunction and ruin at war's outset) recovers, reconstitutes and responds. It is rare that these planners, when considering the capability needs that will make the Australian Defence Force (ADF) successful in its operations, think about exactly how the 'debris of an organisation' can succeed.

The central purpose of this essay is to challenge the reader to consider, *as a heuristic*, how the ADF should prepare for the consequences of the first phases of intense conflict.[3] It talks to the ideas of resilience, response and recovery—ideas that do not normally feature in preparedness plans and operational concepts. The first part applies examples to articulate concepts and ideas relevant to understanding the reality of war. From this point, the essay applies informed assumptions to paint a picture of how a contemporary nominally conventional conflict might unfold. It concludes with several basic principles that could be employed to guide future preparedness and contingency plans.

What a War Might Look Like—an Assumption-Based Depiction of a Future War

Competition, including conflict and warfare, is about the control of circumstances to give an advantage—potentially an irrevocable advantage—in the context of strategic requirements. Preparedness and operational plans, however, often start with an ending in mind, with subsequent

orders assigning tasks and responsibilities to get to that eventual point. Though planning is useful, plans can be written in such a way that they become virtual 'straw-man' arguments where assumptions and facts result in an outcome only possible in imagination. Such plans fail to capture the dynamics of competition and conflict, and adjustments become necessary to exploit successes and recover from destruction or inevitable failures. War is not a finely tuned balance of cause and effect, but a consequence of actions in a system that is ever changing. It is necessary for us in the ADF to prepare for the confluence of events that inevitably occur over a longer term than we envisage. Historian Cathal Nolan's *The Allure of Battle* is a testament to the truism that '[w]inning the day of battle is not enough. You have to win the campaign, then the year, then the decade'.[4]

The ADF, if called upon to respond to a significant attack on Australian interests, must be prepared for a situation in which its plans are found wanting, its capabilities caught in moments of relative 'unpreparedness', and its force posture offset by an enemy's own strategic mobility and firepower. It is safe to say that Australia is not a revisionist power employing aggressive military activities to address its strategic requirements. This means that if it is involved in conflict, even war, it will probably not have the time to prepare itself as well as we often assume it might. One study of 20th century conflicts after 1939 found that the average time between the 'first indication of war and the firing of the first shots has been 14.3 months', with smaller-scale contingencies around 10.6 months, and 'a 50% probability that conflict can occur in less than four months'.[5] These timings show how quickly conflict can occur, and the folly of the assumption often reflected in Defence planning that Australian will have 10 years of warning time before major conflict.[6]

There is every chance that a 21st century conflict will occur more quickly, with the first signs of conflict buried in geopolitical tensions already at play. The ADF, like Australia, is likely to be surprised by the attack, or surprised by the speed at which peace gives way to war. Furthermore, and because adversaries naturally target weaknesses, in the initial phases of any conflict the ADF is likely to be facing weapons and dangers that offset whatever strengths may be hastily generated by the joint force. The systems employed by the joint force will be targeted using weapons purpose built for the task, upsetting the processes of command and control that we think are our pathway to victory in a new age of war. Agility will be denied. Strengths will be bypassed, or even prove to be vulnerabilities to an adversary that has chosen the time of opportunity to strike.

History repeatedly reminds us that militaries usually go to war unprepared. It also reminds us that militaries often go to war disorganised, having to adapt rapidly to circumstances well beyond the expected. Martin van Creveld, writing about logistics, observed:

> *… most armies appear to have prepared their campaigns as best they can on an ad hoc basis, making great, if uncoordinated, efforts to gather the largest possible number of tactical vehicles, trucks of all descriptions, railway troops etc., while giving little, if any, thought to the 'ideal' combination that would have carried them the furthest.*[7]

The ADF's experiences in East Timor during Operation Stabilise in 1999 hold true to this view: in this operation—a peacekeeping operation—disorganisation resulted in tremendous inefficiencies and near exhaustion of the operational ADF.[8] So it is not only the effects of the enemy that the ADF needs to be prepared for, but also the failures baked into organisational structures which remain hidden until the moment of crisis.

We need only look at the events of late 2019 and 2020 and the confluence of bushfires, pandemics, and geostrategic tensions to show how organisations and other groups respond to the foreseen but unanticipated. The idea of 'national resilience'—not a new idea by any means—

was revisited as fires denied the population basic services and a pandemic denied the population toilet paper.[9] Complex supply interdependencies, combined with stock minimisation in the name of efficiency, amplified the impact of localised catastrophe. Trust in societal systems, trust in supply and trust in leadership declined during these events as individuals feared for their livelihoods, if not their lives. As Robin Dunbar wrote on The Mandarin recently, human behaviour during the COVID-19 crisis highlighted 'a strong tendency to prioritise the short term at the expense of the future'.[10] The evident absence of coherent plans for action over the length of the crisis exacerbated uncertainty.

The events of 2020 are analogous to the impact of the initial phases of a future war, where surprise may conspire with inadequate planning to sow confusion, compromise plans, and result in the loss of resources and lives. The reliance of the ADF on familiar command process and organisational behaviours that provide comfortable peacetime routine will be shaken by the need for frenetic activity and ad hoc changes as forces mobilise. War will come across multiple domains simultaneously, with the ADF responding to direct attack while potentially involved in a range of non-military civil defence responses as national infrastructure becomes a site for conflict. Supply chains will be interdicted and used as a point of leverage, denying the capacity of the ADF to scale as effectively as it might. Exquisite capabilities could be revealed as inhibitors to capacity-building for a joint force that somehow must create additional combat force mass in the short term.

Eventually whole-of-nation activity will be brought to bear as all elements of national power work more effectively with one another. The nation will bind diplomatic, informational, military, economic and other activities to strategic effect. Similarly, the ADF will bind a joint effort, gaining momentum, into coherent operations across all domains of war. Coalition partners will be increasingly involved, share resources, and develop war plans to achieve the next strategic objectives. Combat intensity might drop as the contest stabilises, the effects of surprise dissipate, forces focus upon repair and reconstitution instead of the offence, equipment may be unavailable and lines of communication interdicted. Adversaries may attempt to de-escalate, especially if nuclear and strategic weapons could be used, but competition to control the strategic environment and retain strategic mobility in all domains is likely to continue.

An ADF that endures will be quite different to the one that started the war. The characteristics of any war, whether it be a small-scale localised operation or a fight for national survival, will shape the capabilities and capacities required by the joint force. 'Seed' capabilities—those which exist in relatively small numbers in a peacetime force to preserve skills and an emergency capability, such as the Army's tanks or certain combat aircraft and ships—will form the basis upon which a larger ADF will expand. It is more likely than not that the ADF, reacting to a wartime adversary, will evolve to be fundamentally different to the force that is conceptualised in current capability development programs. Shaping factors will include wartime economic conditions and choices that the Australian Government has made in enacting domestic policies and working in partnership with other Commonwealth departments. A host of variously complicated and complex issues will impact how national power manifests into military outcomes. The ADF will have had to expand its training capacity and logistics, and invest in new capabilities to create strategic advantages. This will probably be achieved in partnership with allies, each of which may also be suffering the adverse consequences of the initial engagements of the war.

These scenario parameters offer a different focus for envisaging the next conflict that Australia faces. While they merely offer a heuristic employed to test and tease out ideas, they do help to remind us that there is much more to war than we tend to consider in concepts and preparedness planning. Furthermore, this scenario also illustrates that preparedness is about not just readiness but also

resilience and the capacity of the ADF to recover after a conflict-induced catastrophe. If, as the 2020 Defence Strategic Update suggests, the likelihood of conflict is increasing in an 'disorderly' and 'dangerous' geostrategic climate, it is prudent to comprehensively reflect upon the purpose of preparedness and what it might truly deliver the ADF during a conflict.[11] The question remains, however: how might the ADF best prepare itself?

Preparing to be Unprepared

Things will go wrong in competition, conflict and full-scale war, and the ADF must be prepared for this. Winning will be about resilience, recovery and response as much as it is about being prepared for any particular small set of carefully chosen, but ultimately speculative, approved ADF conflict scenarios. The ADF cannot rely upon the 'adaptiveness' of its people as a compensator for self-induced lazy policies and procedures designed to suit peacetime routine. Instead, preparedness leaders across the joint force should recognise that it is not just extant capability that matters. It is the latent capacity available at any one time which truly gives the force the ability to resist to shock, face losses, and use what remains in a response that counters the strategic advantage held by an aggressor. Moreover, winning requires fortitude, mental acuity, courage, and a leadership attitude based on problem solving, endurance, hopefulness, and opportunity seeking. These traits enable withstanding the first salvos of war, redirecting the means left in their wake to avoid shock loss, and eventually turning the tide of war to the positive. Recognising this, there are three areas in which the ADF can prepare for being unprepared, and be ready for the consequences of war so that the 'debris of an organisation' can respond.

First, the ADF must continue to work towards greater organisational flexibility so that it can adapt rapidly to strategic shocks. With 'mobilisation reviews' and Service reforms to preparedness systems underway, it is clear that planners across the ADF are attuned to the need.[12] However, before venerating 'adaptability' and placing too much dependence on flexible organisational designs and an already robust approach to command and control, the ADF should seek to accurately understand what it can and cannot do within various plausible time horizons. As renowned Australian strategist Desmond Ball wrote, 'it is not the force-in-being or the current order-of-battle that is relevant, but the mobilised force with which the adversary would have to contend'.[13] Capability should not be equated to readiness.[14] Capability programs should be sequenced with force posture changes and aligned to preparedness systems. This means that when surprise comes, ADF planners understand which parts of the force can act and when. The idea of 'scalability' as recently seen in some Service strategic doctrine must enter the day-to-day conversation of the ADF's preparedness and operational planners. Scalability needs to underpin the choices that the leaders of the joint force make as they contemplate how to lift the ADF out of the chaos of the first battles of a future war.

Second, the ADF should seek to create depth in its capabilities, and create capacity and sustainability rather than simply preferencing acquiring the best material it can possibly buy. This will both enable the ADF to better handle the inevitable losses of a conflict and deliver scale so that it is more able to respond across multiple areas of vulnerability. It is not realistic—at least not yet—for the Defence budget to grow to meet expanding needs. Instead, it is important that the ADF renew its concepts to leverage resources from elsewhere—potentially the national support base or alliance partners—in order to develop processes that will allow it to regain capacity after a significant strategic shock. This is not only about acquiring more materiel, 'war-stocks' and growing the size and scale of the ADF for that capacity; it is about efficiently managing resources in such a way that they are available at the time and place of need. Capability depth is likely to reflect the strength of civil-military relationships as much as it does materiel.

Third, all in the ADF must become aware that the force-in-being is not an end state in itself. The ADF of today is no longer structured to be the foundation of the force that will reconstitute, recover and respond after the first shots of battle. It will be even less capable of this if substantial damage is done to the ADF in the initial engagements of the war. Apart from smaller contingencies, the ADF can, without foreign assistance, initially only provide 'holding forces' to provide an immediate response and defend the most vital resources. In this period, much of its existing capacity is required for the mobilisation of other latent capacity. The time for which the ADF must be prepared to 'hold' in a high-intensity conflict could be considerable given the time it takes to activate industry to higher levels of production. Calculations undertaken in the 1970s suggested that it would take no less than two and a half years to expand an army from (for example) 50,000 regular and reserves to a multidivisional force of 150,000 capable of continental defence.[15] Quite clearly this means that everything the ADF has already achieved in the context of a 'total workforce' approach to its operations is far short of what is required in war.

Conclusion

Preparing for war is not just about preparing for the moment at which conflict is initiated. Australia's next war will not be won by an ADF in its 'prime' but by one that has been scarred and beaten down yet recovers to claim victory. It is important that the ADF be psychologically and materially prepared for the surprise and shock of the beginning of war.

This essay poses fundamental challenges about our assumptions and understandings around what preparedness for war is. While war may appear unlikely, that does not excuse our misrepresenting it. If the vision of the future outlined in the 2020 Defence Strategic Update rings true, it is important that the ADF's planners consider casualties, losses and destruction inflicted on the ADF in the early stages of a future war as they design the responses, if not the capabilities, that the ADF possesses.

Capability solutions and extra resources are not sufficient to ensure that the ADF can win the next war. Planners at all levels, from combat units to strategic headquarters, must also consider the arrangements and attitudes that will enable and ensure a considered and effective response to a crisis. It is fortunate that the ADF has more operating and planning experience than likely adversaries and has planning underway in response to the threats recent strategic policy advice highlights. Nevertheless, the challenges are vast and consequential. Crucially, if planners do not grasp that the next war may not be short, the ADF will waste the precious preparation time it currently has. It could build resilience, depth and expansion capacity. Without these, in the next war the ADF will surely fail.

Endnotes

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7. Artificial Intelligence and Battlefield Aviation—Peering Beyond 2040

Brenton T Day

Introduction

We are now entering an era where intelligent autonomous weapons and robot warriors are no longer in the realm of science fiction. Battlefield aviation in particular has experienced an accelerated evolution over the past decade. Unmanned systems are increasingly common and more complex. Our aircraft are augmented with fly-by-wire technology and sophisticated high-precision munitions, and real-time information sharing with the ability to stream HD video now seems like yesterday's technology. The next 20 years will be particularly disruptive for battlefield aviation, and it is extremely difficult to predict the full spectrum of new and emerging technologies set to develop by 2040. If we seek to maintain the advantages of employing battlefield aviation (increased operational tempo, reach and information gathering) through this period of disruption, then we must look to disrupt our own approach to employing this capability now.

Advances in artificial intelligence (AI) augmented unmanned aerial systems (UAS), airborne autonomous logistic supply systems (AALSS) and optionally manned aircraft will challenge the way we develop, acquire and employ these systems. These advancements require us to fundamentally shift the paradigm through which we employ battlefield aviation. Now is the time for us to start planning and testing our new approaches.

Future Opportunities

Current technology allows us to start shifting logistic sustainment tasks like movement of stores, and supplies and potentially even aeromedical evacuation (in low-threat environments) to AALSS—much like Amazon's Prime Air drone delivery service. Shifting of responsibility for these tasks will deliver increased availability of manned aircraft. This enables greater support to manoeuvre operations such as air assaults and quick response tasks, along with the potential to realise efficiencies in 'just in time' sustainment models.

Advances in the AI augmentation of UAS by companies such as Shield AI, Skycatch and Neurala have already demonstrated the ability of AI to use a 'hive mind'. The hive mind operates between systems to quickly build a full picture of multiple systems' surroundings, and mesh aerial images from multiple sources and sensor types into hyper-accurate 3D imagery in minutes. These methods have already been used to monitor elephant herds and spot poachers miles away.[1]

The military applications of such technologies and their future potential are abundant. The ability to use AI-augmented platforms to supplement or replace perimeter patrols; provide an airborne assassin capability; or provide near real time, fused and hyper-accurate reconnaissance information and even analysis is real. These capabilities are not pipedreams; the technology to start realising these opportunities within our operations exists now.

The advantages of such capabilities for the joint force are self-evident. The ability to generate fused hyper-accurate reconnaissance information from a swarm of AI-augmented small UAS will change the way the joint force plans and conducts reconnaissance for an entry operation. Such a capability would significantly increase the ability to 'pull' reconnaissance information to the joint force and no doubt decrease the planning time frames for such operations. Furthermore, the ability to swarm low-cost and expendable airborne sensors within engagement areas will present multiple dilemmas for adversaries, forcing them to weigh the cost of unmasking their positions or intentions against the possibility of detection.

Looking further ahead to 2040, the emergence of optionally manned aircraft and 'loyal wingman' like capabilities presents particularly interesting challenges and opportunities for the future employment of battlefield aviation.[2]

These developments provide an obvious force multiplier, potentially doubling the number of aircraft available to support almost any mission.[3] In terms of optionally manned aircraft, the biggest advantage that this emerging capability is likely to offer is a significant increase in flying hours available to support land forces. When aircrew return from complex combat missions, they can begin planning the next complex mission while the aircraft is dispatched again, unmanned, to carry out a routine task.[4]

Realising the Future

Until the ability of AI is proven, and trusted algorithms for the employment of lethal effects are developed, the need for a human 'on the loop' will remain.[5] In terms of battlefield aviation we should expect that the first iterations of this emerging capability will involve manned aircraft flying teamed with unmanned aircraft. The ability for the human pilot to choose to exercise level three or four interoperability to variously control the UAS's sensors, flight path and, ultimately, weapons[6] to deliver lethal effects will almost certainly remain a requirement for the near future. Human-machine teams such as these would be ideally suited to armed reconnaissance, strike, interdiction, escort, sustainment and logistics, and potentially close air support type missions.

To be prepared for the major paradigm shift these capabilities will lead to, a number of elements of our current approach to the employment of battlefield aviation will need to change. Despite the increasing proliferation of advanced unmanned systems, we can expect no significant decrease in the number of missions demanded of manned aircraft by 2040. This is based on the expectation that manned aircraft will remain the priority method for troop lift until 2040 and that we will continue to require a human 'on the loop' for lethal fires until 2030. Instead, key changes will include:

1. A shift in the *nature* of manned missions to the complex and time-sensitive end of the spectrum
2. Increasing use of unmanned systems as force multipliers and to complete routine tasks
3. Increasing availability of aircraft to regularly support complex land and amphibious manoeuvre missions
4. More congestion in the battlefield airspace, requiring robust traffic control measures and decentralised deconfliction of aircraft
5. An associated exponential increase in battlefield aviation sustainment and maintenance requirements to support the increase in both the number of aerial systems and the number of flying hours.

Starting now, we must look to 2040 and begin the groundwork to change our doctrine and operating concepts in order to take advantage of the emerging opportunities in battlefield aviation. UAS and AI technology beyond 2040 is likely to be key in empowering us to shape the deep battle space, mass airborne fires over friendly forces, optimise just-in-time sustainment models and quickly develop and sustain a superior level of situational awareness.

Procuring small numbers of emerging exemplar systems now, such as those discussed above, will provide an early opportunity to learn by doing. Additionally, the deliberate employment of battlefield aviation forwards, during exercises—to shape the deep battle and build situational awareness—will enable our forces to learn how they can effectively employ future unmanned capabilities. Our major land and joint exercises provide sandboxes where we can experiment with these emerging technologies, tactics and techniques to uncover asymmetric means to employ future capabilities. The notion of using exercises and training to experiment with new tactics, techniques and procedures is not novel. In 1914, Colonel John Monash published a guide to the officers of the 4th Infantry Brigade stating:

> *Knowledge can only be gained from experience … If, during training or manoeuvres, an idea occurs of performing some duty in a manner differing from that which has been the custom of the battalion, try it …*[7]

Conclusion

Creating future ready doctrine for the employment of emerging technology in battlefield aviation will be a time-consuming process rooted in lessons learned. The single most practical thing we can do right now is to prepare our aircrew and joint forces for the challenges of operating manned and unmanned aircraft simultaneously. Procuring capabilities now—such as air launched effects and AALSS—should be a high priority if we intend to quickly develop and build the requisite knowledge within our fighting force to be masters of these capabilities in 2040 and beyond. We need to foster a culture of employing battlefield aviation forwards into our exercise serials now, so our forces can get familiar with employing this capability forwards to shape their area of operations. Using battlefield aviation to shape the deep battle and build situational awareness, while ensuring that platforms remain available to support the close fight and force sustainment, must be founding elements of our future doctrine if we are to realise emerging and decisive opportunities in this space. We must start learning now.

Endnotes

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8. The Hidden Value of Change and Renewal for the Future Joint Force

Rebecca J Lacey

In the middle of difficulty lies opportunity.

Albert Einstein (1879–1955)

Introduction

Building a stronger future joint force for Australia that is both integrated[1] and sustainable is a highly complex and difficult endeavour. Recent economic circumstances have arguably exacerbated this challenge.[2] In this essay[3] I will argue that Defence investment in intangible assets, accompanied by a paradigm shift in thinking and behaviour away from single domain or Service capability success criteria to multi-domain and holistic enterprise capability, is key to building a stronger future joint force.

This essay defines what intangible assets are and examines how they have changed over time and why they are important to building a stronger joint force. The discussion is contextualised by providing examples of why intangibles matter to the future value and strength of the joint force. This is followed by an analysis and comparison of Defence practices with external industry practices, to highlight possible gaps and opportunities in what is measured.[4] Are current measures of success applicable and transferable to the joint force arena? The final section of this essay challenges traditional military views and assumptions by exploring established paradigms and visualising how they could be different in the future to set the conditions for a stronger joint force to emerge.

Part 1: Intangibles—the Hidden True Value of Contemporary Enterprises

Education is the most powerful weapon which you can use to change the world.

Nelson Mandela (1918–2013)

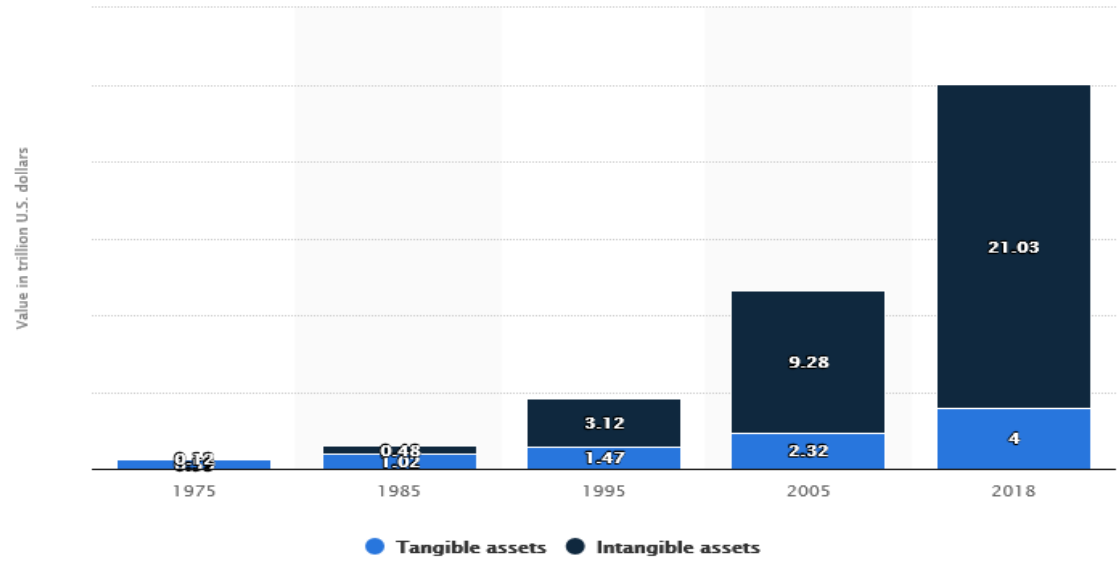
What Are Intangibles and Why Do They Matter to the Joint Force?

The definition of 'intangibles' refers to non-physical assets and opportunities that are often hidden and are therefore not easily valued, defined or measured. Intangibles include things like human capital (including talent, ability and training of a workforce); goodwill; organisational values and behaviours; employee loyalty and satisfaction; intellectual property such as patents, trademarks and copyright; brand names; and market share.[5] In a commercial context, intangible assets have current worth and the ability to appreciate in value over time. What is potentially less well understood is that intangibles form a critical component of the human dimension of joint force interoperability and integration that includes complex issues such as organisational culture, values, language and education. These issues are complex because they can be interpreted in multiple different ways depending on context and perspective.

How Does the Australian Defence Enterprise Compare to External Industry?

Figure 1 shows the investment changes and component of total enterprise value of tangible versus intangible assets in the top five S&P500 companies from 1975 to 2018.[6] Of note, there has been a significant and exponential rise in investment in intangible assets, which rose from approximately 15 per cent of total enterprise value in 1975 to approximately 85 per cent in 2018. This trend is common across external industry as companies compete in different ways for a greater market share.[7] Although Defence is a public organisation, many companies that support Defence are commercial, and it could be argued that the whole of the Defence Enterprise is behind the current commercial industry investment trend curve—the vast majority of the Defence budget still being investment in the acquisition of tangible depreciating assets such as major platforms and weapon systems, estate and infrastructure.

Figure 1: Exponential investment growth in intangible assets from 1975 to 2018[8]



Is Greater Investment in Intangibles Useful During an Economic Recession?

Some argue that there is a case for investment in more intangible assets during times of economic recession.[9] The key question is what the opportunity cost of Defence's traditional approach to capability development is. What opportunities are being overlooked or missed, and will this have a negative longer term impact on joint force integration and sustainment? According to some critics[10] the current approach has deep-seated cultural roots within Defence and needs to be challenged through renewed approaches. The latest version of the Defence Capability Life Cycle Manual,[11] released in June 2020, captures the importance of the initial investment in design and research, an important intangible aspect of the capability development process. However, the wheels of capability development are slow to turn and it remains to be seen whether these changes will be adopted widely. It is not clear how recent changes will be practically integrated into the capability development culture across all Services, Groups and domains that make up the joint force. A shared purpose and understanding of how to implement changes at all levels, from the individual to the largest cultural groups, is important for success.

Part 2: How Should Overall Value and Success Be Measured for a Joint Force?

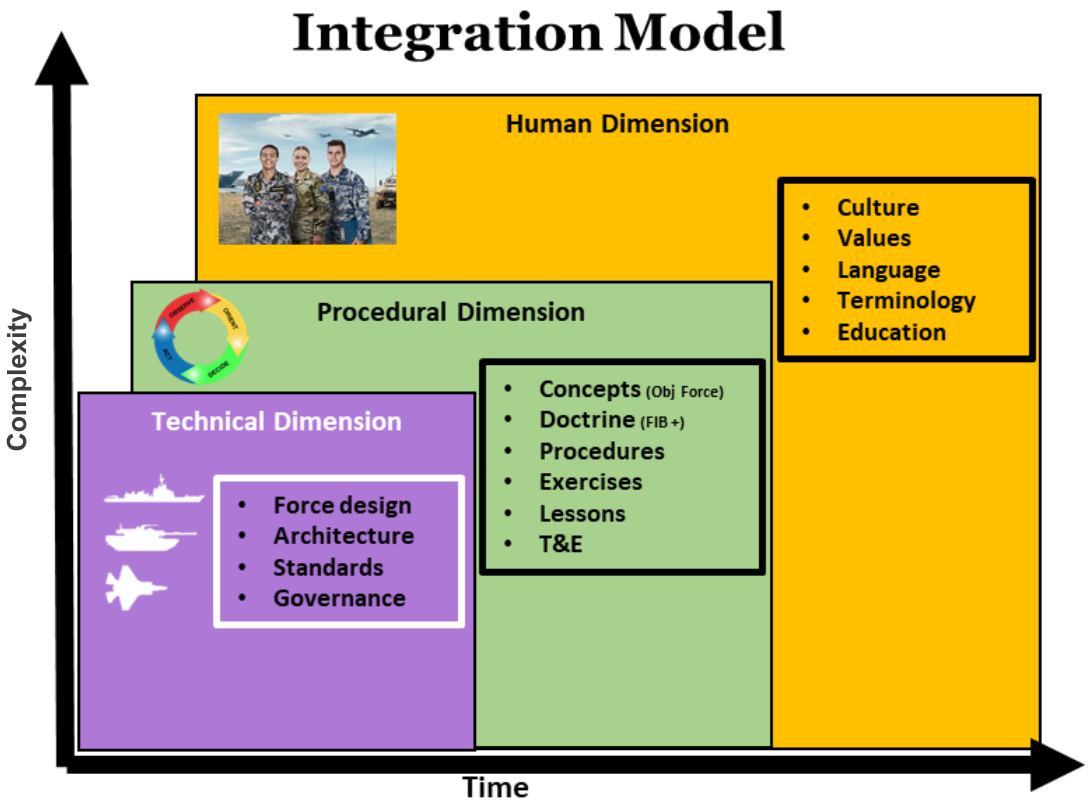
You must be the change you want to see in the world.

Mahatma Gandhi (1869–1948)

Are Current Measures of Value and Success Within the Joint Force Valid?

Even if we are all prepared to make a positive change, what exactly do we need to change? What is the vision of a successful future joint force and how does each individual contribute to that vision? Defence has based its initial classification and understanding of joint force integration issues on a model adopted from NATO as depicted in Figure 2 below. This model has three different dimensions—technical, procedural and human—that are measured according to time and complexity of implementation. Since the First Principles Review of Defence in 2015,[12] the establishment of the Australian Defence Force Headquarters has seen progress in the technical and procedural dimensions of integration. These have been measured through the introduction of Plan AURORA in 2018. While some studies have been completed on cultural analysis to enhance military operational planning,[13] more focus is needed on understanding and harnessing the human dimension of integration, which is arguably the most complex and critical of the three dimensions.[14]

Figure 2: **Current integration model used by Defence, adapted from NATO**



How Should Success be Defined and Measured for the Joint Force?

A common theme in the academic literature on organisational change and behaviour is that organisations will generally end up with results directly related to what they measure.[15] What is typically measured is tangible factors that can be clearly reported on in quantitative figures. In measuring success, the dilemma of Campbell's Law often arises. This states that: the more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to measure.[16]

> *In other words, what is measured becomes the focus, instead of what the organisational vision or true goal is. While Defence must report on its budget expenditure, dollars spent by Defence do not necessarily translate to increased capability or the ability of Defence to achieve its mission. Arguably, then, expenditure by Defence is not an accurate or complete measure of success or value of Defence's contributions to the nation. Yet there is a disproportionately high level of focus and scrutiny on Defence financial accountability in tangible terms that may overshadow the value of intangibles that may not have been traditionally accounted for in Defence.*[17]

The future will require more flexibility and adaptability in terms of budgetary allocations and actual risk management rather than risk avoidance. This approach would ensure any unforeseen emerging opportunities can be capitalised without significant detriment to ongoing initiatives and programs. One issue that is becoming increasingly difficult for Defence is the VUCA environment in which it operates, which requires significant agility, innovation, collaboration and team effort. Budgets and finance are more rigid and are driven by external factors that require strict compliance and reporting and are not necessarily designed for a VUCA environment. Strengthening these fiscal frameworks and building resilience and flexibility into the financial levers within Defence is an important driver for future joint-level transformation.

Part 3: Optimising Intangible Integration Opportunities in a Future Joint Force

> *Culture eats strategy for breakfast.*
>
> *Peter Drucker (1909–2005)*

What Common Joint Defence Values and Leadership Qualities are Required?

Each Service and Group within the joint force is proud of its own culture, traditions and values. Table 1 is a simple comparison of Service values between the Defence Leadership Framework, the Australian Public Service (APS), Navy, Army and Air Force. It highlights some common themes in values but also shows how some values of one Service could potentially be at odds with those of another Service. A possible example is the meaning of the APS value 'impartial' in contrast to Navy's value 'loyalty'.

Table 1: Comparison of the different values within the joint force

Defence Leadership Framework	APS Values	Navy Values	Army Values	RAAF Values
Professionalism	Impartial	Honour	Courage	Respect
Loyalty	Committed to Service	Honesty	Initiative	Excellence
Integrity	Accountable	Courage	Teamwork	Agility
Courage	Respectful	Integrity	Respect	Dedication
Innovation	Ethical	Loyalty		Integrity
Teamwork				Teamwork

The alignment, agreement and adoption of a common set of values is important to achieve the behavioural and cultural changes required in the human dimension of joint force integration so that all Services and Groups can become a champion team rather than a team of champions. The question is what values should be prioritised to build a stronger and more united joint force team. Until this point, different Services have often placed their own Service values first; however, a set of simple joint Defence values would contribute significantly to enhancing the human dimension of integration of the joint force.

So what should these values be, and why? Are the 'Defence One' leadership behaviours[18] relevant to the joint force? Have they been effectively used since they were introduced? Some would argue that there are too many behaviours to remember, let alone implement. A very simple set of Defence values that apply to all elements in the joint force would be very useful. For example, respect and trust could form the core of a set of Defence values that would apply across the entire Australian Defence Organisation (ADO).

Is Joint Force Command and Control Realistic?

Command and Control (C2) has always been a central idea for the employment of Australian forces and it forms much of the foundational architecture and design of our defence communications networks and systems. However, is joint C2 realistic and do we need it to achieve the joint outcomes or the range of response options intended? This idea may be summarily rejected initially on the basis of what has already been invested into joint C2 for the future force. Why reinvent the wheel or change something that works? But does it really work? The counterargument is that trying to achieve C2 in a complex, contested and congested joint battlespace may be practically impossible or far too slow to take advantage of initiative and mission command to more rapidly achieve the desired effect.

An alternative and fundamentally different approach to C2 is command and feedback. This approach makes full use of the concept of mission command and teaming by leveraging the speed of information sharing and encouraging more decentralised decision-making. It involves a clear and comprehensive commander's intent up front, a shared purpose, and comprehensive understanding of the vision. Once this is clear and tested through rehearsals, the stage is set and the show goes on without significant interference or any direct control from the higher commander. The commander may influence through minor indirect adjustments made by monitoring key feedback loops to ensure the 'show' is still on track. The feedback loops allow any form of complex system to self-organise inside the VUCA environment and achieve the desired objectives

through more creative and innovative approaches that leverage opportunities at the local context. This type of flexibility and adaptation on the move can only occur if trust is placed in subordinates to make the best decision as the 'show' unfolds. This approach acknowledges and embraces the VUCA environment and allows those inside the arena to make decisions to meet the commander's intent without suffering penalties for using initiative. There is a collaborative culture of learning from mistakes and improving as a team. This approach allows a different type of thinking and instinctive action to occur that allows fleeting opportunities to be leveraged when they arise. A common language and shared understanding and purpose is critical for success of the command and feedback approach.[19]

How to Leverage the Human Dimension of Joint Force Integration

> *There is no magic bullet, nor technological break-through that will win this fight for us. Empathy may be as important a weapon as an assault rifle.*
>
> *General Jim Mattis, 2019*

If the ADO seeks to create a more agile and dynamic joint force that is capable of responding to a wide range of future challenges, then investment in enhancing the human dimension through better joint education and cross cultural understanding is critical. Advanced technology and strategic capabilities cannot currently be employed to their full potential without the human element. Even artificial intelligence, robotics and autonomous systems are merely different vehicles to compete in the VUCA arena and influence and deter actions by adversaries. The human dimension contains factors that can transform the joint force of the future. The power of the human dimension should never be underestimated, even if there is no clear logic or reason behind what seems to work and what does not. Just because something cannot be measured in our current remit does not mean that it is not important or worth investing in now, despite the uncertainty and lack of guarantee of success. There are times when taking calculated risks is more important than remaining in a known comfort zone.

Conclusion

This essay has argued a case for greater Defence investment in intangible assets, accompanied by a paradigm shift in thinking and behaviour towards a united multi-domain and holistic enterprise capability approach. There is strong evidence to suggest that future organisational success is determined by the type of investment choices that an organisation makes. The ADO can learn from external industry and adopt a renewed approach that considers more investment in intangible assets that appreciate over time.

In addition, measures of success need to be renewed to align with the joint force vision and purpose. This is likely to require additional analysis as to whether some traditional assumptions and ways of thinking are still valid for a joint force context. Various arguments point towards the human dimension being critical to successful joint force integration. This comes down to a shared purpose and understanding of what the priorities are for a joint context within a VUCA environment. Better internal integration of the various cultures within the joint force through a shared understanding will in turn enable the joint force to be stronger because it will operate together as a united team. However, there is no easy or quick solution to this complex challenge and it is important to define what success looks like from the start so that implementation can be visualised and successfully achieved.

Change starts with individual decisions and the values and behaviours that each member of the joint force demonstrates. A set of simple Defence values that all elements of the joint force can readily adopt is the first critical step towards enhancing the human dimension of joint force integration. The associated change and renewal of behaviours is likely to be a catalyst that can leverage other hidden intangible value that will contribute to building a stronger, integrated and sustainable future joint force. If the ADO seeks to create a more agile and dynamic joint force that is capable of responding to a wide range of future challenges, then investment in enhancing the human dimension through better joint education and cross-cultural understanding is critical for future success.

Endnotes

1 There are many different definitions of integration from psychology, mathematics or sociology perspectives. For the purpose of this essay, the meaning of the word integration is taken from a sociology perspective to mean 'the intermixing of people who were previously segregated' (Oxford Dictionary, 2020) or 'the action or process of combining two or more things in an effective way' (Cambridge Dictionary, 2020). Integration is a critical part of building a stronger joint force as it refers to combining components from different Services, Groups and Domains within Defence across the technical, procedural and human dimensions to achieve higher performance as a united and integral whole-of-force effort.

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In 1985 the five biggest companies were IBM, Exxon Mobil, GE, Schlumberger and Chevron.
In 1995 the five biggest companies were GE, Exxon Mobil, Coca-Cola, Attria and Walmart.
In 2005 the five biggest companies were GE, Exxon Mobil, Microsoft, Citigroup and Walmart.
In 2018 the five biggest companies were Apple, Alphabet, Microsoft, Amazon and Facebook.

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Contributor: I am a leader who is focused on achieving Defence Outcomes and I ensure my team understands how their work contributes to these outcomes.
Learner: I learn and reflect on my performance and that of my team.
Accountable: I am accountable for my actions and how I respond to the actions of those around me.
Risk manager**:** I take calculated risks and make judgements about what risks are necessary and acceptable to deliver the outcome.
Inclusive: I seek out and accept the diverse perspectives of others in exploring opportunities and solving problems; I trust they will offer good ideas and will challenge in a constructive and respectful way.
Team Builder: I build teams through managing performance honestly and respectfully.
Innovator: I actively adapt and seek to innovate.

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9. A Festival of Dangerous Ideas: Multi-Domain Operations and Australia's Joint Force—Risk and Opportunity

Mark O'Neill

> *The armed forces of a minor power are not in a position to make major contributions to the development of the art of war and taking our cue from the British, in this as in so much else, the Australian Forces have thrown up no great theorist or systemiser. If the hallmarks of the American way of war are power and mobility, what can be said of the Australian variant?*
>
> *Jeffery Grey*[1]

Introduction

The quest to identify an Australian 'way of war' has spluttered along since federation. Thirty years after Grey's observation, we appear no closer to answering the question he posed. The continuity of our military history and practice in this regard is relentless and depressing. Arguably, we are again in the midst of adopting yet another essentially foreign concept—multi-domain operations (MDO)—as a de facto warfighting concept in the absence of an original and appropriate sovereign concept. In this paper I argue that critical examination of MDO can create 'a festival of dangerous ideas' around the development of an Australian way of warfighting, and also challenge how we might think about the operational employment of Australia's joint force. The idea of 'a festival of dangerous ideas' is apt. Channelling the actual festival (held in Sydney each year since 2009), this critical examination of MDO seeks to 'bring to light important conversations that push the boundaries of conventional thought'.[2] The 'dangerous ideas' which emerge illuminate risk and opportunity for the Australian joint force in the increasingly uncertain years ahead.[3]

It is apparent that MDO is a chameleon-like concept, adopting various and often inchoate forms, dependent upon both context and the understanding of the person engaged. This paper will describe the three most common forms of understanding which MDO generates in the Australian Defence Force (ADF) today, before examining the most substantive form currently developed—the US Army's doctrinal version.[4] The review of US Army doctrine will include description of emergent US issues and criticism. This understanding in turn informs identification and evaluation of the likely risks and opportunities MDO implies for the ADF joint force. Awareness of such risks and opportunities will offer us the chance to develop sovereign Australian approaches to the emergent challenges of the 21st century, aligned with the sense of the 2020 Defence Strategic Update.[5] It is acknowledged that any such action will necessarily be tempered by the impact of the 'fear of abandonment' that 'lies deep in the history of European settlement in Australia'.[6] Despite this paper's ambition, it is unlikely that any Australian military concept will drift far too from the century-plus pattern of comfortable acquiescence to the doctrine of a stronger military partner. The paper concludes with 'dangerous ideas' for the Australian joint force, such as suggestion of an emergent way of Australian warfighting appropriate to strategic guidance, sovereign circumstance, alliance requirements and the context of the times.

What Is MDO?

What's in a name? That which we call a rose by any other name would smell as sweet.

William Shakespeare, Romeo and Juliet

Surprisingly for a topic which is subject to a lot of contemporary discussion, 'MDO' is either not defined or ill-defined by the institutions that discuss it.[7] For the purpose of this paper I will offer three normative senses of MDO that cover the most common forms encountered. The first is the 'plain English' sense which can be made of the words 'multiple domain operations': *military operations, actions and activities conducted in and across two or more domains (such as land, air, sea, space and cyber/information) in order to achieve planned operational effect(s)*.[8] The second is MDO as an artefact of endorsed military doctrine. The US Army's *The U.S. Army in Multi-Domain Operations 2028* is the most obvious and complete example, although other nations also have doctrine treating the subject.[9] The final normative form of MDO encountered in the ADF is a confused offering. It is reminiscent of the fictional solicitor Denis Denuto's famous line in the 1997 Australian film classic *The Castle*: 'It's the vibe of it. It's the Constitution. It's Mabo. It's justice. It's the law. It's the vibe and ah. No that's it. It's the vibe. I rest my case.'[10] This final form of 'understanding' of MDO, while arguably the most common, is also the most concerning. It combines ignorance of the subject with a half-grasped understanding from hearing something of the first and second forms of MDO. The problem arises because the term/catchphrase 'MDO' often leads individuals to leap to the framing (without the understanding) provided by the US concept.[11] The 'Mabo/vibe' form will only be eradicated by development of—and subsequent education about—an endorsed ADF view of MDO.

The first sense of MDO is one the ADF needs to carefully and critically engage with, think about and assess. The second, the US doctrinal sense, is one the ADF must carefully understand and develop appropriate responses to, given the weight of the ANZUS alliance, the fact that it is the most 'mature', and the possible impacts on Australian concepts, joint force design and interoperability.

The US Army in Multi-Domain Operations 2028

Why, sometimes I've believed as many as six impossible things before breakfast.

Lewis Carroll, Alice's Adventures in Wonderland

US Army MDO doctrine arose in a context of increasing United States concern about the 're-emergence' of actual or potential great-power competition, and the development and acquisition of sophisticated technological capabilities that can create so-called 'anti-access and area denial'(A2AD) zones.[12] This was coupled with a perception of emergence from a period of 'strategic atrophy, aware that our competitive military advantage has been eroding'.[13] Army's MDO doctrine reflects the 'conceptual azimuth' taken in response, 'returning the U.S. military to a time when each higher echelon (division, corps, theatre Army) has a unique task and purpose across domains'.[14] Unsurprisingly, the pamphlet detailing the doctrine is long and dense (102 pages).[15] A useful summary is offered by the former Commanding General of US Army TRADOC, General Stephen Townsend:

The U.S. Army in Multi-Domain Operations 2028 concept proposes a series of solutions to solve the problem of layered standoff. The central idea in solving this problem is the rapid

> *and continuous integration of all domains of warfare to deter and prevail as we compete short of armed conflict. If deterrence fails, Army formations, operating as part of the Joint Force, penetrate and dis-integrate enemy anti-access and area denial systems; exploit the resulting freedom of maneuver to defeat enemy systems, formations and objectives and to achieve our own strategic objectives; and consolidate gains to force a return to competition on terms more favorable to the U.S., our allies and partners.*[16]

The doctrine is succinctly summarised in the pamphlet by the catchphrase 'Compete, Penetrate, Dis-integrate, Exploit and Re-compete'.[17]

Examination of MDO must include *The U.S. Army in Multi-Domain Operations 2028* as a case study because it is the most definitive and comprehensive example of a developed MDO doctrine among the 'Five Eyes' partners. Given its predominance in the lexicon, it is not unreasonable to assume ADF members subscribing to the 'Mabo/vibe' sense of MDO have in some way been influenced by it. However, it would be wrong to assume universal acceptance of the doctrine, even within the US joint force—it is an *Army* doctrine, burdened with both the authority and the challenges that come with such status. The example of the United States Marine Corps *Commandant's Planning Guidance* is illustrative.[18] Conceptually rich (in the document it mentions composite warfare, expeditionary advanced based operations, and distributed operations), it nevertheless makes no mention of MDO. Another difficulty arises from MDO being an 'operational approach for a very context specific US military problem designed to drive US Army force design and resourcing that manifests as an output of the US Program Objective Memorandum process'.[19] Despite general acknowledgement that it is a 'work in progress' constructive criticism of the MDO doctrinal work is common.

Several criticisms are identified by Huba Wass de Czege, the founder of the School of Advanced Military Studies, in analysis published by the US Army's Strategic Studies Institute.[20] The most telling is that MDO as presently advocated by the US Army is a 'theory of warfare' rather than a 'theory of victory' for war. This is a strong criticism—one that an alliance partner such as Australia with far fewer means and endurance than the US should find disturbing. Another problem de Czege perceives is equally concerning: he regards the schema underpinning the concept as reactive, rather than proactive, to threats to allies and partner nations the US is 'treaty bound to defend'—essentially ceding the strategic initiative to an enemy.[21] Both of these are valid concerns; equally, they may be relatively easily 'fixed' in any revision of the doctrine. Other problems are less easily fixed; they reflect flaws in the doctrine's underlying logic.

The summative catchphrase 'Compete, Penetrate, Dis-integrate, Exploit and Re-compete' draws attention to two large problems of logic. The first is an assumption that an enemy, having been 'defeated' through the loss of their A2AD system through competition, penetration, dis-integration and exploitation by the 'blue force', will readily retreat from conflict and resume 'competition'. This idea is both fanciful and without historical precedent. The historical record actually suggests the opposite. From the Spartans to the British Expeditionary Force at Dunkirk, or the Vietnamese Communist forces 'defeat' during the Tet Offensive, an enemy often does not realise they are 'done'. This is recognised in the often repeated military truism 'the enemy has a vote'.
The second significant flaw in this 'return to competition' logic is that it fails to address the nuclear power elephant in the room. The US specifically mentions Russia and China, both nuclear armed powers, as potential threats or aggressors. But the doctrine is conspicuously silent on what might trigger a nuclear response from either in the face of provocation or military operational distress.

Other criticisms range from the serious to the almost inevitable. An obvious one is that the concept, while superficially situated within a 'joint force' premise, is no real way 'joint' at present. Another is the sheer complexity which manifests from the concept as envisaged. This complexity comes less from the large number of players, units or agencies required to make MDO 'work' than from the increasingly exponential number of transactions they generate through interaction and influence. This is creating institutional thought about command, control and management of MDO—such as the challenge of re-creating or reintroducing 'Theatre Armies' between Corps Headquarters and Combatant Command (COCOM) Component Theatre Command Headquarters.[22]

At the serious end of the scale of concern is the premise of deliberately planning to take on and defeat a threat to the A2AD zone. This is the exact opposite of an asymmetrical approach—it is taking on the enemy on the ground and theatre of their choosing, where they have invested considerable time and effort to array layers of sensors, networks, defences and lethality. Attrition is both an acceptable and often a necessary strategic or operational approach. However, defaulting to it risks not only costs in blood and treasure but also distortion of force design. War comes in many forms, and while the US may have resources and agility to adapt when it gets involved in a different war to the one envisaged, it is almost certain Australia does not. Australia's joint force needs to be an 'all-rounder', able to meet the demands of many missions. This leads to consideration of other specific concerns for the Australian joint force.

Concerns for the Australian Joint Force

> *If we plod along with only the feeble lantern of our vision of contemporary events, unaided by history, we see—to be sure—a little of the past just under our feet; but the shadows are grotesque and misleading, the darkness closes in again behind us as we move along, and none can be sure of direction or of pace or of the trueness of action.*
>
> *George F Kennan, 1957*[23]

Kennan wrote in a time which is—in many respects much like today—a time of revisionism, the ever-developing threat of peer-on-peer state war with a nuclear branch or sequel, and proliferation of coercive statecraft. Such conditions demand strategic agility and original thought specific to the circumstance of each nation-state. Aspects of US MDO doctrine currently appear unhelpfully misaligned with the Australian circumstance.

Australia's 2020 Defence Strategic Update is inherently *defensive* in scope and aspiration. It favours a secure immediate region over distant crusades in support of an already diminished 'rules-based global order'. In contrast, US MDO doctrine is literally and explicitly offensive; effectively envisaging the conduct of high-end attrition warfare outside of Australia's immediate region. This divergence, if unaddressed, has potential to warp Australia's strategic and operational approach to its sovereign defence needs. Specific problems include the possible distortion of Australia's joint force design in order to fit a foreign warfighting concept. This could hasten the componentisation of ADF force elements as part of a putative combined joint Indo-Pacific force already evident in some parts of the Australian joint force. It may also further the perception of the ADF as a 'strategy taker' rather than a 'strategy maker'. The inferences for Australian sovereign force thinking, design and warfighting cannot be easily dismissed.

Another concern goes to the negotiation and development of interoperability. The advent of 'Theatre Army HQ' for the conduct of MDO within the Indo-Pacific has implications for a joint force Australia's size. A current debate in the US Army is about how the difficulties of raising such headquarters, estimated at being 4,000 people or more in size and staffed with experienced and 'joint enabled' people.[24] Clearly Australia will not raise, or have the ability to raise, such headquarters. But this does raise the issue of how any (likely two-star) Australian Joint Task Force will 'connect, integrate and operate' with a plethora of three- and four-star US headquarters at the corps, theatre army and COCOM 'Title 10' component and COCOM levels is a serious command and control interoperability question. A related concern also requiring attention is the control, access and use of the sensitive sovereign national assets allies would need to use in order to conduct MDO as envisaged.

A Few Dangerous Ideas

> *Scenarios have the power to engage and open the minds of decision makers so that they pay attention to novel, less comfortable and weaker signals of change and prepare for discontinuity and surprise.*[25]

MDO may well be the scenario which, combined with contemporary Australian strategic guidance, challenges us to reassess the operational practice and coordination of the US alliance. As such, it may unexpectedly enhance the alliance by challenging us to operational pragmatism and the development of new ideas and contributions to shared security and defence concerns. Because sovereignty matters, this is a profound issue. It would be unacceptable to ADF force designers to circumscribe the freedoms of any future Australian government in a crisis through the constraints of a force designed for a non-sovereign way of war or operational approach. The further development or advent of MDO as a US concept may well have a 'forcing function' to drive decisions about an 'Australian way of war' for our circumstances in the 21st century.

So what might a way ahead look like? The policy detail in the 2020 Defence Strategic Update is sympathetic with, if not already implying, the idea that the Australian joint force could or should develop an A2AD zone for our sovereign defence in or near our immediate region. Development of such a zone aligns with attainment of the strategic defence objectives of *shape*, *deter* and *respond*.[26] Such conceptual development could be presented to the US alliance relationship as complementary to the US MDO concept through securing both the immediate region (it is another military truism that all theatre commanders like a secure flank and rear) and Australia itself as a combined allied support area for operations in the Indo-Pacific. This would help the ADF to identify areas of technical development, cooperation and coordination with the US that could allow mutual benefit and inform 'interoperability wins'. The idea has the potential, through negotiation, to pragmatically define agreed and contingent operational outcomes of the alliance relationship. This may reduce the risk of surprise in the event of conflict and enhance partnership on the basis of shared understanding. These ideas will allow us to distinguish the unique military challenge the ADF is required to address, and propose an overarching central idea (concept) that is distinguishable from, but interoperable with and complementary to, any US MDO concept.

Conclusion—Surviving the Festival of Ideas

Colin S Gray titled the introductory chapter of one of his books 'Getting the big things right enough'.[27] It is an appropriate thought to conclude this paper with. MDO presents a large and varied conceptual presence—and this paper necessarily only lightly touches on the possible range of complexities. The risks and opportunities raised in our examination of MDO are matters of complex and enduring strategic and operational significance. Themes such as the nature of alliance partnerships, combined interoperability of joint forces, employment of national strategic assets across and through domains, command and control of combined theatre armies, and the possible emergence of a sovereign Australian way of warfighting for the emergent 21st century Indo-Pacific contribute to a 'festival of dangerous ideas' that emerges from consideration of MDO. By their very nature the issues arising from these themes challenge the status quo of conventional thinking in today's ADF. Yet the unpredictability of long-term national security challenges will always confound the irresistible forces that drive prediction.[28] This offers a cautionary note for those who are profoundly enthusiastic about the prospects of MDO and equally for those who are cynical.

The Australian government's strategic direction in the 2020 Defence Strategic Update is crystal clear with respect to the importance of the ANZUS alliance, the imperative for Australian sovereign approaches and the primacy of geographic focus on Australia's immediate region over all others. Australia's joint force is at a pivotal point in time. MDO presents it with options ranging from being a sovereign joint force operating in a secure alliance relationship through to being a subordinate force provider for a larger alliance partner. Getting 'the big things right enough' through careful consideration of an Australian way of joint warfighting will ensure we neither limit future options nor unwittingly subvert strategic guidance through simply embracing a foreign MDO concept. We have an opportunity to address Jeffrey Grey's challenge as to the contribution a minor power might make to the art of war as well as securing the nation against emergent challenges through development of an Australian way of warfighting: dangerous ideas indeed.

Endnotes

1 Jeffrey Grey, 1990, A Military History of Australia (Sydney: Cambridge University Press), 5.

2 The Festival of Dangerous Ideas was co-founded by the Ethics Centre and the Sydney Opera House in 2009. It was presented at Sydney Opera House for eight years and in its ninth year inhabited Cockatoo Island with a festival presented by the Ethics Centre with the UNSW Sydney Centre for Ideas. See The Ethics Centre, 2020, Festival of Dangerous Ideas, at https://festivalofdangerousideas.com/info/about/, accessed 28 September 2020.

3 The phrase *dangerous ideas* is used throughout this paper in the sense of new or emergent ideas that challenge the conventional or accepted orthodoxy.

4 United States Army, 2018, *TRADOC Pamphlet 525-3-1, The U.S. Army in Multi-Domain Operations 2028*.

5 Department of Defence, 2020, *2020 Defence Strategic Update* (Canberra: Commonwealth of Australia).

6 Allan Gyngell, 2017, *Fear of Abandonment: Australia in the World since 1942* (Melbourne: La Trobe University Press with Black Inc.), 5.

7 For example, the ADF does not define MDO in either the Joint Glossary or any extant doctrinal publications.

8 Author's developmental 'working' definition.

9 United States Army, 2018, *TRADOC Pamphlet*. For an example of allied 'Five Eyes' doctrinal treatment of MDO, see United Kingdom Ministry of Defence, 2020, *Integrated Operating Concept 2025 Primer*, (Shrivenham, Wiltshire: Development, Concepts and Doctrine Centre).

10 *The Castle* (1997), Rob Sitch (Director), Working Dog and Village Roadshow (Production).

11 Personal correspondence, 2020, email 'RE: Welcome your thoughts on the thought bubble below' between author and LTCOL XXXXXX (anonymised to enable blind assessment), 11 September 2020.

12 Department of Defense (2018), *Summary of the 2018 National Defense Strategy of The United States of America: Sharpening the American Military's Competitive Edge* (Washington, DC: United States Government), 1.

13 Ibid.

14 General William S Wallace (retired), 2020, *Multi-Domain Operations in Context*, Landpower Essays, LPE 2-4 (Arlington, VA: The Association of the United States Army), 1.

15 United States Army, 2018, *TRADOC Pamphlet*.

16 Ibid., iii.

17 Ibid., v.

18 United States Marine Corps, 2019, *Commandant's Planning Guidance, 38*th *Commandant of the Marine Corps*, at https://www.marines.mil/News/Publications/MCPEL/Electronic-Library-Display/Article/1907265/38th-commandants-planning-guidance-cpg/, accessed 27 September 2020.

19 Personal correspondence, 2020. A 'Program Objective Memorandum' (POM) is a recommendation from the U.S. Services and Defense Agencies to the Office of the Secretary of Defense concerning how they plan to allocate resources (funding) for a program(s) to meet the Service Program Guidance and Defense Planning Guidance.

20 Huba Wass de Czege, 2020, *Commentary on 'The US Army in Multi-Domain Operations 2028'* (Carlisle, PA: Strategic Studies Institute and US Army War College Press).

21 Ibid., xxi.

22 United States Army, 2018, *The U.S. Army Concept for Multi-Domain Combined Arms Operations at Echelons Above Brigade 2025–2045*, Version 1, September 2018 (Fort Leavenworth, KS: United States Army Combined Arms Center); Colonel Darren W Buss (2020), 'Echelons above Brigades Headquarters in Multi-Domain Operations: Field Army Alternatives' in Colonel Gregory L Cantwell (retired) (ed.), 2020, *Theater Army Role in Multi-Domain Operations Integrated Research Project* (Carlisle, PA: United States Army War College), 23–54.

23 Cited in Gyngell, 2017, 1.

24 Buss, 2020, 23–54.

25 Angela Wilkinson and Ronald Kupers, 2013, 'Living in the Futures', *Harvard Business Review*, 91, no. 5, 126.

26 Department of Defence, 2020, *Defence Strategic Update*.

27 Colin S Gray, 2009, *Fighting Talk: Forty Maxims on War, Peace, and Strategy* (Lincoln, NE: Potomac Books Inc., University of Nebraska Press).

28 Richard Danzig, 2011, *Driving in the Dark: Ten Propositions about Prediction and National Security* (Washington, DC: Center for a New American Security), 4.

10. A Proposed 'Future Concept Narrative' for the Australian Defence Force

Ian Langford

Introduction

The 2020 Defence Strategic Update (DSU) and its companion document the 2020 Force Structure Plan have given an insight into possible future concepts and employment options for the Australian Defence Force (ADF). Most pundits agree that it is a timely and relevant update to the strategic assessments and investment priorities of the Australian Government's Defence White Paper 2016, with an emphasis on increasing the ADF's space and cyber capabilities and lethal strike capabilities and its recognition of the emerging role of the ADF beyond the traditional notion of declared military conflict.[1] The DSU also emphasises the inclination of rival states and future adversaries to operate against Australian national interests using tactics and capabilities that are offensive in nature but fall below the accepted threshold of what is typically identified as an act of war. The DSU assesses that these 'grey-zone' actions will require a proportional response principally from the ADF but also from the non-military whole-of-government elements of national power. The findings of the DSU suggest that the ADF has no choice but to change. Failure to do so would be potentially disastrous.

As clear and as articulate as the DSU findings seem to be for many in the national security community, their significance may not resonate beyond. Across government sectors and the polity more broadly, there are differing levels of understanding regarding the contemporary role and purpose of the ADF.[2] One of the critical questions asked of the DSU is to explain *how* the ADF *proves* itself as an important and necessary national endeavour. To some, the need for an ADF is not necessarily self-evident.[3] That question must be set aside, however, to consider another important follow-on enquiry. Crucially, does the ADF need a single, end-to-end, agreed concept or narrative describing 'how it fights'? [4]

Narratives are critical in that they give shape to strategy.[5] Military-strategic narratives in particular need to have resonance, coherence, authenticity and relevance across both space and time. This is vital to win public trust, gain legitimacy and secure cooperation at the nation-state level.[6] Military-strategic narratives strengthen the joint force by enabling and powering new thinking. This intellectual input is crucial now that the ADF is faced with responding concurrently to the variety of traditional and non-traditional security challenges that have emerged within the global system since the terrorist attacks of September 11, 2001.

The aim of this short paper is to propose the foundations of a future ADF 'narrative'. Rather than attempting to address every possibility for the employment of the ADF, the idea is to describe how it fights—by 'the sum of its parts'—in a way that is easily applied across a range of future scenarios. It is a strategic narrative insofar as it seeks to establish a link between the *ends* as outlined in the DSU, the *ways* in which the ADF contributes to regional and global order, and the *means* by which it utilises its resources so it can fight and win in an era of accelerated global change and disruption. The paper is structured to introduce the problem, describe what the ADF must do, explain the proposed approach, identify what must be done to make the approach effective, and conclude with a description of failure.

A Future ADF Narrative: 'How We Will Fight'

The ADF has a proud history of serving the Australian people. It holds the unique and ultimate responsibility of fighting Australia's wars, in concert with the non-violent levers of national power. Outside of war, in an era of *persistent competition*, the ADF contributes to national security by shaping the operating environment, deterring potential adversaries, and preventing strategic miscalculation. Shaping in peace seeks to maximise ADF leverage if deterrence fails, requiring a response to a national threat with the full force of military power.[7] Equally, the ADF understands that credible military capability gives substance to Australia's strategic principle of self-reliance.

To be a relevant and agile strategic instrument that can offer government a broad range of military response options in a conflict, the ADF has to be 'operationally adaptable'. This requires seamlessly orchestrating effects across all five operational domains. To ensure unity of effort, and to act at the *decisive point* of warfare, the ADF must be capable of commanding, controlling and coordinating joint and interagency operations across all these domains at the tactical, operational and strategic levels of the international system. Not only this—the ADF should also expect to fight against an adversary who has technological parity and is capable of sensing and kinetically targeting Australian and allied military forces from their home locations.

These are demanding requirements for the ADF. What is needed is a unifying concept that frames how they will be approached and delivered. The simple idea at the heart of this narrative is that the ADF delivers military power for Australia for three purposes, or 'outputs', and from within two broad organisational groupings. These outputs follow three established strategic objectives —*shaping*, *deterrence*, and *response*[8]—but are now developed as more specific constructs. They are *regional forward presence*, *conditional offence/defence* and *protection of the region*, all of which are described and analysed further below. Organisationally, the ADF distinguishes between the strategic force generation (STRATFORGEN)[9] necessary to maintain its own core functions, and fielding the Joint Task Forces (JTFs) raised to conduct joint military operations.

The ADF is a strategic tool. Its posture, operational capacity, sustainment and capability development are set accordingly. Within Australia's strategic arc, the future ADF can expect to be forward deployed within a dedicated theatre campaign plan which prioritises the notion of *persistent engagement*. It is just one, albeit major, part of an enhanced, integrated, expeditionary and networked whole-of-government footprint. The collective force posture, task organisation and preparedness measures deliver, under the three constructs introduced above:

Regional forward presence: a **shaping** 'anti-access' ADF posture designed to retain unambiguous allied regional primacy across Australia's *strategic arc* through forward-deployed military forces. This presence focuses on ADF persistence in 'contested spaces', prioritises integration with regional partners, and acts as an 'always-on' capacity to gain and retain competitive advantage for Australia in the fields of diplomacy, information-sharing, capacity-building, economic development, regional health leadership and security cooperation.

Conditional offence/defence: a primacy-orientated 'area-denial' ADF force disposition that stresses a posture capable of **deterrence** in a more overt manner, reinforcing existing security agreements as well as establishing and maintaining an Australian-derived 'balance of power'. The use of emerging technological ADF capabilities with an emphasis on leveraging the space and cyber domains, as well as the forward basing of offensive strike capabilities in partnership with friendly host nations, represents an ADF area denial capability that can be 'dialled up' in the event of a hostile act from a rival nation. The ability to militarily escalate in these situations brings real meaning to Australia's ability to provide regional and global leadership in situations where the *status quo* is under imminent or direct challenge from a hostile actor.

Protection of the region: a posture that sets the conditions for armed **response** when necessary. This posture also enables operational-level theatre setting, theatre-level campaign planning, conflict termination, and transition to a post-conflict balance of power when it is suitable and appropriate.

The rest of this document examines these three constructs and their relationship with strategy and identifies the capabilities essential for them to be effective.

'Shape' as a Strategic Objective

There appears to be support amongst Australia's policymakers to conceive shaping as a whole-of-government approach that proactively stimulates the operating environment. It envisages targeted, deliberate engagement and shaping events that together elicit a unified effect. The ADF functionally groups its JTFs in support of this approach. Initiatives include targeted activities as an extension to the Defence International Engagement Plan and the Defence Integrated Investment Program, as well as long-term partnership development and capacity-building with both traditional and non-traditional security allies.[10] Shaping also includes the efforts of the ADF to conduct *advanced forward staging* as part of an overall attempt to generate 'strategic poise'. Adjusting the readiness of its force elements is also tool to shape and influence, as this acts as a signal to rivals and adversaries.

Shaping is here conceived broadly to include the underpinning idea of environmental 'understanding' which enables it. Within the intelligence capabilities of the ADF, low-signature special collection operations address the critical information requirements necessary to support strategic military planning. Maintaining access for all elements of national power within the global commons is also a critical requirement to which the ADF will expect to contribute. Cyber, space, naval and air operations would support this effort. It is a sound and perhaps desirable option to force generate a bespoke JTF headquarters to command, control and coordinate this type of shaping activity as an always-on function consistent with the notion of *persistent engagement* as articulated within the DSU.[11]

'Deter' as a Strategic Objective

The future ADF contributes to strategic deterrence by broadcasting to any future potential adversary that the costs outweigh the benefits. It does this by fielding, and being able to force generate, credible military forces. This now requires an increased emphasis on procuring offensive strike capabilities, including long-range missiles, a greater ability to project power across the region, and the ability to field more capable and better equipped Special Forces. The ADF must also be better prepared for an increased leadership role throughout Australia's near region.

As discussed, deterrence demands capability. While some improvements, such as a better capacity to conduct joint operations, are not primarily technological, broadly the ADF will have to continually modernise its capabilities. This is needed, above all, to maintain an ability to generate the asymmetric offsets which are derived from its existing technocratic edge in fielding modern joint forces. It must also develop an ability to conduct expeditionary tactical cyber network and space operations, which includes an evolution from a reliance on space and cyber-supported capabilities that only provide assurance and management systems to a fully integrated offensive and defensive component of the ADF targeting system. The ADF also requires the necessary assurance and attack systems capable of operating in contested domains as part of a joint, interagency effort. Above all, deterrence demands an expeditionary strike, as this gives the ADF

the ability to impose a significant cost on any rival nation or future adversary seeking to directly threaten or undermine Australian security interests across the region.

The future ADF will also strengthen its deterrence capabilities via its regional and global defence frameworks. Alliances such ANZUS and the Five Power Defence Agreement set the conditions for the ADF to be able to contribute to regional security.[12] Additionally, the use of the Special Forces within a joint, interagency context to support intelligence collection and development in support of the Australian Intelligence Community would form part of a normal framework of conflict prevention. The employment of ADF personnel in non-military standing interagency task forces, including border protection, domestic security and counter-terrorism, would also be habitual.

'Respond' as a Strategic Objective

The ADF will be called upon to win the nation's wars. This is the core of the ADF's purpose.[13] These military operations include the cooperative and focused employment of conventional, special and joint forces in conjunction with other tools of national power coordinated by a joint, interagency command and control headquarters. Once task organised and force assigned, joint forces must be able to operate as either a lead 'framework nation' or as part of broader coalition. Importantly, operational preparation of the environment (OPE) tasks which commenced in the pre-conflict phase of *competition* will now transition into a planned and coordinated advance force operation (AFO) as part of an acknowledgement that conflict is now likely.

STRATFORGEN supports the deployment of the joint force drawn from the conventional and Special Forces inventory, supplemented by national intelligence, logistics, diplomatic and industrial agencies. JTFs, comprising task-organised elements assigned to be 'mission focused' would deploy as part of an expeditionary joint force. They must be capable of:

- deploying rapidly (by sea, air and land)
- setting operational theatres (positioning forces capable of facilitating a campaign)
- conducting decisive joint combat operations
- creating the conditions for favourable conflict resolution
- sustaining and concluding the military operation.

AFO, concentrating on special reconnaissance, special recovery, support operations, and direct action missions, would focus on providing situational awareness and securing the entry point(s) for the joint force. This would be achieved via a horizontal or vertical envelopment, a tactical air-land operation, parachute assault, the use of a proxy force, or the coordination of a number of these activities. This operation would be heavily supported by cyber, space, maritime, air and land domain capabilities, and utilise a number of orthodox and unorthodox means. Once secure, the entry point would be ready to receive the main elements of the joint force.

In order to be effective throughout the response phase of an operation, the ADF must possess a force able to deploy rapidly to austere areas. From those locations, the ADF must be capable of immediately commencing decisive combat operations. There must be little to no reliance on intermediate staging bases, minimising an adversary's anti-access area denial strategy to interdict ADF lines of communication. JTFs must possess the necessary organic capabilities to conduct mounted and dismounted close combat operations, employ direct and indirect kinetic and non-kinetic fires, command and control at the formation or divisional joint headquarters level, and conduct counterinsurgency and other stability and support operations. Combat service support

using organic, close, and supporting logistic systems would be capable of sustaining the force throughout the operation. Manned and unmanned semi-autonomous systems drawn from organic elements and supporting joint force elements capable of providing surveillance and reconnaissance capabilities are essential to support the analysis and fusion of intelligence in support of the JTF commander. Signature management, cyber defence, and space network capabilities all form part of the resilience framework that make the ADF capable of operations in electromagnetic denied and contested environments.

The ADF's ability to effectively operate in an urban, littoral and highly lethal operating environment is an imperative for success during the decisive phase of joint combat operations.[14] The ADF must be adequately protected, armed and mobile to function there. Joint forces must be able to conduct effective tactical and operational combined arms operations through the execution of rapid and decisive short engagements concentrating on manoeuvre, mass, and weapons overmatch using combinations of land, maritime, air, space and cyber force elements and operational effects. Concurrently, STRATFORGEN must be capable of supporting joint operations using its readiness cycle to raise, replace and regenerate 'Rotation 2' capabilities. The ADF must also retain the ability to meet concurrent training and contingency tasks in parallel with the emergent operation.

The ADF must be capable of applying the objectives for conflict termination.[15] This must be set within the broader strategic framework and would be accomplished through collaboration, synchronisation, and coordination with other elements of national power. JTFs would be required to plan and conduct war termination tasks as well as joint force redeployment to home locations or other operational areas as the mission transitions from conflict into a newly defined balance of power.

Supporting Themes

The future ADF must possess a doctrine that addresses the moral, social, cognitive and physical impact of humans on the operating environment.[16] This also reflects the growing importance of understanding the impact of global media and the rise of 'fake news' with its potential to 'lose the narrative'.[17] Future ADF operations must place greater emphasis on the 'human terrain', and this must increasingly form part of the ADF's intellectual foundation for training and education of its personnel. A values-based approach to leadership and ethical decision-making must reflect Australian culture and society.

The ADF must preserve and enhance its aim to be an employer of choice as part of an all-volunteer force. Its ability to refine its workforce management strategies to recruit, select, train, educate and employ high-quality personnel will directly affect its ability to field future capability. Future military operations also include the capacity to support the nation during times of natural disaster and emergencies. Effective responses to these types of events are critical to the maintenance of public trust and positive sentiment towards the ADF across the community.

The ADF is the component of national power expected to win at war. In future conflict, strategic outcomes will be achieved through effective all-domain joint operations. The ADF must represent a credible, robust combat capability. The ADF needs to continue to expand its operational adaptability to include tasks beyond declared conflict—it must be able to *shape*, *deter* and *respond.* A 'war ready' ADF is critical to protect Australia's national security interests in war, and to ensure the ability to achieve victory in war as well as being able to continue to 'win the peace'.

Conclusion

This paper offers a military strategic narrative for the ADF that codifies its essential contributions to national security in a simple, clear and memorable manner. This narrative leverages the policies, resources and mandate given to the ADF by the Australian Government in a way that gives purpose and meaning to its core functions and outputs. Such narratives are critical to the future success of the ADF, which is expected to *shape*, *deter* and *respond* in an increasingly complex, ambiguous, volatile and uncertain operating environment.

Failure to realise the importance of a strategic narrative risks increasing the dissonance between the Australian public, its government and the ADF. This fissure could create opportunities for non-state actors and rival nations to exploit. As alluded to already in this paper, these include attempts by future adversaries to undermine national cohesion through the targeted and deliberate use of misinformation aimed at undermining political will and community support for the ADF. The articulation of a clear, powerful narrative is a critical future requirement for the ADF if it is to fully execute its task to protect Australian sovereignty and further national interests.

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Author Biographies

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Mr Tim Gellel is the Head of the Australian Army History Unit, responsible for preserving Army's heritage through a nationwide museums network, and promoting Army's History through programs such as the Army History Publishing Scheme and the biennial Chief of Army History Conference. Prior to taking up this appointment, Tim was a serving Army Officer. He holds a Master of Arts through Deakin University.

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Robin Smith

Colonel Robin Smith is the inaugural Director of the Army's Robotic & Autonomous Systems Implementation & Coordination Office (RICO) within Future Land Warfare Branch of the Australian Army HQ. RICO leads concept development around emerging and disruptive technology, including autonomy and AI, Quantum Technologies and alternative power and energy. He has overseen Army's exploration of autonomous systems since 2017 after he authored the Australian Army Robotic and Autonomous Systems Strategy.

He is a logistician by background and served for over 30 years in the British Army before transferring to the Australian Army. He has commanded at all levels up to and including Regimental level and deployed a number of times. He has a background in Electronic Engineering and has fulfilled a number of roles in the Joint logistics domain at the tactical and operational levels.

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Major Andrew Maher is an Infantry Officer who has a particular interest in operations conducted by, with and through foreign forces. He has served multiple times in both Afghanistan and Iraq, with command experience at Platoon and Company levels, including experience within combined and interagency appointments. He is a Military Fellow, Lecturer, and PhD candidate with the University of New South Wales, Canberra, exploring the strategy of proxy warfare. In 2021, he is a Chief of Army Scholar.

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Colonel David Beaumont is currently the Director of the Australian Army Research Centre. A logistician by background, he recently Commander the Army School of Logistics Operations and has seen operational Service in Joint and Army logistics roles. He is a graduate of the University of New South Wales (Master of Business) and the Australian National University (Master of Arts (Research)) through the Australian Command and Staff Course. He is undertaking a Doctor of Philosophy through the Australian National University; in this research he is examining the effectiveness of the ADF's approach to leveraging civilian resources for preparedness and operations

Brenton Day

Major Brenton T Day is currently employed as the MA to Deputy Commanding General for Operations – United States Army Central. His previous experience includes postings as SO2 for Concepts of Employment, Future Land Warfare Branch at Army Headquarters, and 2IC 161 Reconnaissance Squadron, 1st Aviation Regiment. Brenton is an Army Aviator with over six years of attack and reconnaissance aviation experience. He holds a Bachelor's Degree in Aeronautical Engineering, has attended the United States Marine Corps – Weapons and Tactics Instructor Course, and is a qualified Army Aviation Unit Checking and Training Instructor.

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Major Rebecca J Lacey is the 2021 Chief of Defence Force Fellow. She is a Royal Australian Signals Officer who holds a Bachelor of Economic and a Bachelor of Science from the Australian National University and a Master of Business from the University of New South Wales. She is currently pursuing a Professional Doctorate in Public Management through the University of New South Wales that she hopes will provide a significant contribution to Defence through the effective design, implementation and activation of joint force leverage points across the human dimension of the future Australian Defence Organisation.

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Lieutenant Colonel Mark O'Neill is an Army officer who works in the Future Land Warfare Branch of Army Headquarters. He has served operationally in Somalia, Mozambique, Iraq and Afghanistan. His PhD (UNSW 2013) examined contemporary counterinsurgency strategy.

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Brigadier Ian Langford, DSC and Bars, assumed the role of Director-General of Future Land Warfare, Army Headquarters, in December 2018. Brigadier Langford is a Distinguished Graduate of the United States Marine Corps Command and Staff College and the School of Advanced Warfighting. He has a PhD from Deakin University.

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