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## Chairman's comments

Welcome to *Australian Defence Force Journal* Issue No. 186.

As the incoming Commander, Australian Defence College, and Chair of the Australian Defence Force Journal Board, I am pleased to thank Rear Admiral Goldrick for his chairmanship since 2008 and welcome readers to Issue No. 186.

The edition features a range of articles addressing contemporary military and geo-strategic issues, with contributors from Australia, Canada and the US. They include the lead article by Major Andy Love on perceived gaps in Australia's future amphibious capability and a timely geo-strategic assessment by Charles Ikins, who is on secondment to the Department of Defence, on the importance of the Indian Ocean and its key littoral states.

We also have two articles on air power, one by Lieutenant Colonel Brian Murray (Royal Canadian Air Force) and one by Wing Commander Greg Weller (RAAF), as well as a joint contribution on retention bonuses and one on human systems integration. The edition concludes with an article by Major Ray Hingst on overseas developments relating to 'sense and respond' and autonomic logistics.

We also have a short 'opinion piece' on the recent Black Review, as well as a review essay on the war in Afghanistan. We are keen to feature more of these types of contributions and would encourage readers to consider submitting short opinion pieces and review essays on topical issues for future issues (both ideally around 2000 words).

As usual, we have a selection of book reviews, with an additional number in the on-line version of the *Journal*. We remain keen to hear from readers wishing to join the list of reviewers, who are sent books provided to the Editor by publishers. If you are interested, please provide your contact details and area of interest to the Editor at [publications@defence.adc.edu.au](mailto:publications@defence.adc.edu.au)

As foreshadowed in earlier issues, we are theming the March/April 2012 issue on 'the junior ADF leadership experience', particularly seeking contributions from junior officers, non-commissioned officers and other ranks in all three Services. We asked for contributions by mid January; however, we can accept contributions up until mid February. The best article from each Service will be awarded \$250, with an additional \$500 for the best overall article.

I would also take this opportunity to thank 'retiring' members of the Board for their much-appreciated contribution to the *Journal*, namely Air Commodore Mark Lax, OAM, CSM (Retd), Captain Gordon Andrew, RAN, and Group Captain Rick Keir, AM, CSC.

I hope you enjoy this edition.

**Craig Orme, AM, CSC**  
Major General  
Commander, Australian Defence College  
Chairman of the Australian Defence Force Journal Board



# You Can't Ride a Concept to the Beach: the gaps in Australia's envisaged amphibious capability

Major Andy Love, Australian Army

## Introduction

Amphibious operations typically, and arguably uniquely, involve the close integration of all three Services and a number of other government agencies. The decision by the Howard Government in 2004 to acquire a large-scale amphibious fleet signalled a considerable advance in Australia's capability and reach, providing 'a significant capacity for maritime manoeuvre of land forces in our littoral environment'.<sup>1</sup>

The decision, however, has also highlighted a number of inherent problems in traditional Defence culture and procurement. Moreover, the lack of clear strategic guidance on the planned use of the capability—demonstrated by the difference in language used between successive governments—has produced fragmented discussion on how the amphibious capability should be employed. Additionally, a lack of understanding of amphibious operational concepts and the lack of integration between some Defence Materiel Organisation (DMO) projects have exacerbated progress in developing what arguably should be the cornerstone of Australia's security concept for the next 20 years.

This article explores the perceived disconnect between the amphibious concepts and visions espoused over the last decade and the current reality. It attempts to establish what actual amphibious capabilities will be available to the Australian Government in the coming years, while also highlighting what will still be beyond our means.

## Strategic guidance

The 2007 *Defence White Paper* was specific in describing the ability of the future amphibious task force to project power in a hostile environment, 'recognis[ing] that our interests must often be secured in places distant from Australia'.<sup>2</sup> The mission profile for the ADF's resultant Joint Project (JP) 2048 was that our forces must be ready and prepared to execute missions across the broad spectrum of military utility, from high intensity conflict to humanitarian assistance and disaster relief.<sup>3</sup>

In providing more detailed guidance, the current 2009 *Defence White Paper* directed the ADF:

...to project and sustain land forces operating in our primary operational environment by air and sea, including in credible, non-permissive contingencies ... [while also] establishing and maintaining sea control and air superiority at key locations in the ADF's primary operational environment.<sup>4</sup>

The same guidance noted that the naval component must have the 'capacity to deploy and sustain land forces from the sea ... [and that] the ADF must have the capability to act independently where our unique strategic interests are at stake'.<sup>5</sup> While the language may be subtler, the intent is clear that the Australian Government is expecting the ADF to conduct

unilateral, sustained expeditionary operations in an amphibious operating area that is potentially hostile and 'non-permissive'.

The concept basis of JP 2048 further specified the requirement for task-organised forces that 'can be near simultaneously delivered to decisive points by air and sea insertion to dislocate and disrupt the enemy's scheme of manoeuvre, while also attacking his critical vulnerabilities'.<sup>6</sup> The experience of allied forces in the Normandy landings, and their slow progress to Berlin, highlight why bypassing tactical objectives to reach theatre or strategic objectives should be so attractive to both political and military commanders.

## Current capabilities

Rather embarrassingly for a littoral nation in the developed world, Australia currently has no credible amphibious capability. Problems with the management of maintenance cycles have resulted in the RAN's two Kanimbla class 'landing platforms amphibious' (LPA) ships, HMAS *Kanimbla* and HMAS *Manoora*, being retired earlier than expected.<sup>7</sup> Concerns over the seaworthiness of the 'landing ship heavy' HMAS *Tobruk* have necessitated a reliance, to fill the void, on New Zealand's multi-role vessel HMNZS *Canterbury*, the leasing of the civilian ice-breaker SOV *Windermere* and the acquisition of the Bay class 'landing ship dock' RFA *Largs Bay* from the Royal Navy.<sup>8</sup>

To support the 'temporary' amphibious force, the RAN is reliant on its current frigate fleet, as well as its Collin-class submarines (notwithstanding the latter's publicly-reported problems with under-manning and ongoing technical difficulties).<sup>9</sup> However, the ADF has several shortfalls in its surface 'connector' capability, notably that the current fleet of ageing landing craft (LCM-8s) are unable to offload the M1-A1 tank and are limited to certain beach gradients and operations during daylight hours.

In terms of air support to amphibious operations, the RAAF has retired its long-rank strike aircraft, the F-111, opting for an interim solution of F/A-18 Super Hornets until the Joint Strike Fighter (JSF) arrives, probably in 2015 (although the in-service date will be later). While the F/A-18 is certainly a more modern aircraft than the F-111s, it has a more limited range and arguably is a 'stop-gap' solution until the introduction of the JSF.

In essence, the ADF's current capability is limited to providing humanitarian assistance and disaster relief in a 'permissive' operating area, using the 'Ready Combat Team'—a high readiness, light infantry-based combat team from 3 Brigade—to perform military aid to the civilian population.

## JP 2048 planned capabilities

JP 2048 is a five-phase program responsible for introducing amphibious deployment and sustainment assets into service between 2005 and 2020, as well as a new fleet of watercraft, two amphibious assault craft and a strategic sea lift capability from 2008 to 2020.<sup>10</sup> JP 2048 also ties together several other joint and single-Service projects that are designed to integrate into the amphibious force. The current versus planned capability is outlined at Figure 1.

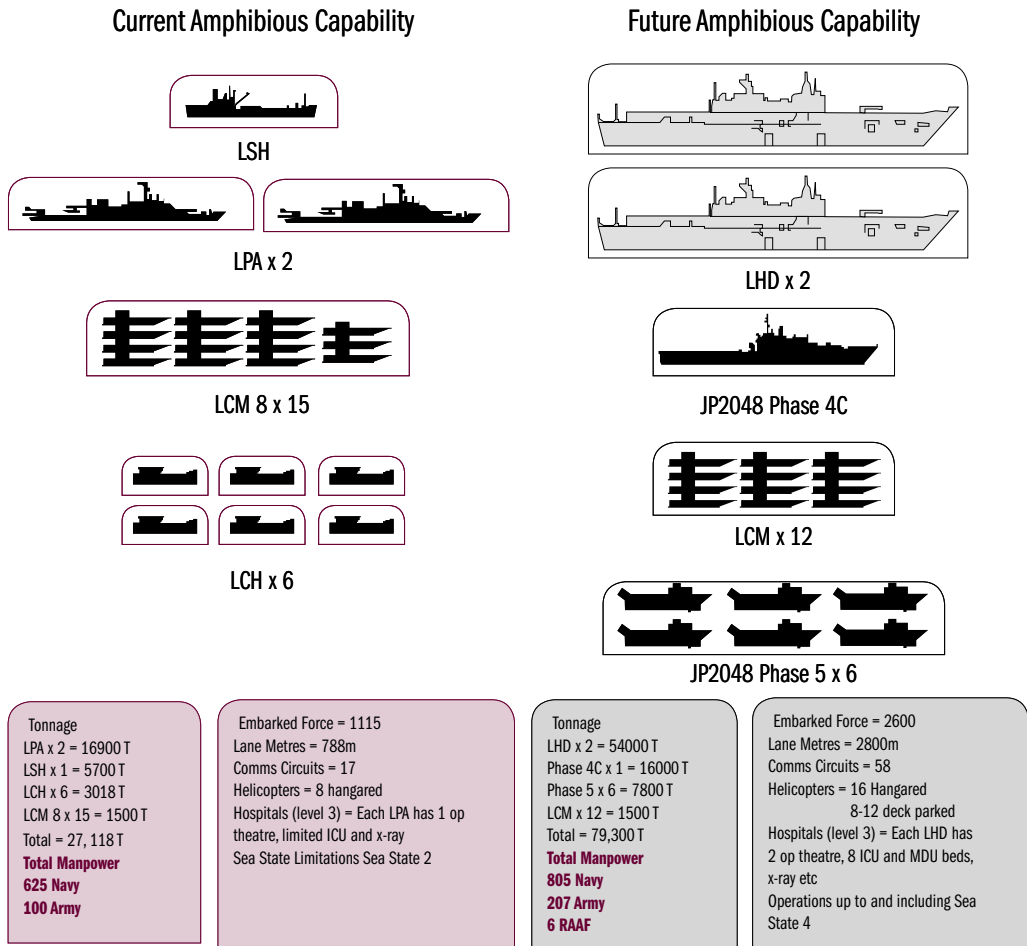


Figure 1. The ADF's current vs planned amphibious capability<sup>11</sup>

Unfortunately, the program has already courted some controversy. Phase 1 included the introduction of 'landing craft mechanised' (LCM) into service in 2005. The identified craft were the wrong dimensions to fit either the current LPAs or future 'landing helicopter dock' (LHD), and their hulls were susceptible to infrastructure fatigue at sea state five.<sup>12</sup> In February 2011, the Minister for Defence Materiel announced the cancellation of the phase, citing that 'they were unsuitable ... [and] not fit for alternative ADF use'.<sup>13</sup> Phase 5 now includes a 'landing craft heavy' (LCH) replacement, although this has yet to be fully researched and approved for funding by government.

Phase 3 of the project, the introduction of 'landing craft mechanical 1E' by the last quarter of 2013, is still going through the government approval process. Encouragingly, it is planned that these craft will be produced by the same Spanish company that is providing the Canberra class LHD. This phase will give the ADF a purpose-designed craft to carry infantry, vehicles and stores ashore (notwithstanding some limitations, including that it is constrained by certain tidal variations and surf zones, and when laden is capable of only 12 knots, which is less than ideal).

The cornerstone of JP 2048 is Phase 4, the A\$2 billion project delivering two Canberra class LHDs. These vessels provide a substantial increase in the ADF's ability to sea-base a combined-arms landing force of up to battle group strength. There will be some significant challenges in assimilating the LHDs and RFA *Largs Bay* (being renamed HMAS *Choules*) into service, including that all three will need essential 'deep maintenance' every five years. Through simple mathematics, the rotation cycle will be tight if Australia is to have at least one on standby at all times. There is, therefore, little flexibility or redundancy in the amphibious fleet. And recent history should serve to remind ADF planners of the wisdom of maintaining a reserve, should one of the ships encounter unexpected problems.

Moreover, the LHDs will obviously need to conduct deep maintenance at locations where maritime industry can support them, limiting their home ports to either Sydney or Melbourne. Equally, the land forces need to be based where there is sufficient training space to rehearse, likely creating a physical dislocation (albeit not unworkable). Certainly, the wharves and fuel storage facilities in Townsville and Darwin will need significant investment if the LHDs are going to berth alongside the docks there. And, at the moment, the loading doors of the LHDs are unsuitable for either location, meaning that the ships will have to remain at sea to be loaded, which is inefficient and at times difficult.

## **Challenges, shortfalls and opportunities**

### ***Personnel***

Contemporary thinking in the ADF is starting to shape towards an amphibious task force formed around a single infantry battalion. Arguably, this is a mistake. A single battalion will burn out and not last more than a couple of posting planning cycles. In the same way that it takes assets across a brigade to sustain the current 'Mentoring Task Force' in Afghanistan, the ability to form an 'Amphibious Ready Group' should have a multi-role brigade-level formation to pool from.<sup>14</sup>

Australia is fortunate in that its servicemen and -women are adept at being flexible. The majority will accept that time spent at sea is very similar to being deployed on operations abroad, complete with the lack of freedom, long and disruptive hours, and limited recreational opportunities. Nevertheless, the establishment of a 'marine' employment category would create a distinction and sense of pride, helping to foster a collective group of ground combat elements, aviation elements and logistic elements as Australian 'marines' while employed in the 'amphibious ready group'. It would certainly assist in breaking down the somewhat divisive arms and corps mentality the ADF inherited from its British roots.

### ***Concepts and doctrine***

The ability of the ADF to learn from the amphibious experience of allied nations gives Australia a unique opportunity to build strategic, theatre and tactical frameworks based on proven, successful models. In doing so, there is a risk that the ADF builds a capability that slavishly mirrors another country's or one that is optimised for contingencies or geographic locations that bear little resemblance to Australia's primary operating environment. Ideas, therefore, need to be refined and 'Australianised', rather than accepted on face value as best practice. Hence, while the US Navy, Royal Navy, US Marine Corps and the Royal Marines offer important



perspectives and models, it is important to build a force that matches Australian politics, Australian forces and the Australian temperament.

To that end, it would seem that the current, seeming fixation on 'ship-to-objective manoeuvre' (STOM) is driving the ADF along some bizarre lines of thinking, much of it resulting from a poor understanding of the concept. The three critical capabilities needed to achieve STOM are deep penetration, protected forcible entry of manoeuvre forces and a responsive offload and resupply capability. To achieve this, especially from over the horizon, requires an air-ground force that has specialist platforms to perform both kinetic and non-kinetic operations and one that is self-sustaining. As applied by the US Marine Corps, STOM is the direct action element of 'operational manoeuvre from the sea', enabling the landing force to gain and maintain momentum by manoeuvring from the sea.<sup>15</sup>

STOM allows an amphibious force to achieve both tactical and operational surprise by commencing operations at sea and projecting power directly to theatre or strategic objectives, thereby leap-frogging traditional tactical precursory objectives. The tempo and flexibility generated by such an operation denies the enemy sufficient warning or reaction time to deliver an adequate response. The STOM concept takes advantage of emerging mobility, and command and control systems, to manoeuvre landing forces in their tactical array from the moment they depart the ships, replacing the tedious ship-to-shore movement of traditional amphibious warfare. STOM is not aimed at seizing a beach but at thrusting combat units ashore in their fighting formations to a decisive place and in sufficient strength to ensure mission accomplishment. When applied in this manner, STOM would seem to be doctrinally well suited to the ADF's strategic requirements. However, it is a concept not enabled by the current naval, land and air 'connectors and protectors'.

### ***Major systems***

There are several ongoing ADF acquisition projects that are being developed without sufficient account of their potential utility in amphibious operations. For example, the system-need statement for the next-generation protected vehicle (be it an infantry fighting vehicle or armoured personnel carrier), being progressed under the Land 400 banner, makes no mention of littoral or amphibious operations.

The ADF's current suite of command and control systems are designed either to talk between naval forces or between land forces but are poor in cross communication. Looking at the finite number of seats in the nerve centre aboard the LHDs, compared to the size of a light infantry battalion headquarters (let alone a brigade headquarters staff), will require considerable 'rationalisation' of headquarters manning. The obvious question is whether the nascent 'amphibious ready group' is already being constrained to a physical design rather than demanding the facilities necessary for effective operational management.

The challenges associated with generating sufficient force ashore, with sufficient speed, have led the US Marine Corps towards lighter, smaller, fuel efficient, maritime-orientated fleets of equipment, vehicles and aircraft. By contrast, over the last decade, the Australian Army has moved towards larger, heavier, diverse vehicle fleets, such as the M1-A1 main battle tank at 65 tonnes, Bushmaster protected mobility vehicles at 40 tonnes and 155mm self-propelled howitzers at 57 tonnes, none of which seems well suited to amphibious operations.

Notwithstanding the support available from the RAAF's F/A-18s, the ADF lacks a sea-based integral amphibious fixed-wing platform to provide local air superiority, air interdiction and close air support capabilities for amphibious operations. Attack helicopters could support the landing force but would be highly vulnerable against an air superiority fighter. While the JSF VTOL (vertical take-off and landing) is a more expensive version—and no doubt carries greater risk in the development stages—the argument for fixed-wing amphibious support surely necessitates that a range of options should be considered. The alternative is that the Australian Government should not be expecting to use the amphibious capability in anything more than a benign environment, unless supporting US-led operations with guaranteed air cover.

Similarly, none of the landing craft being sourced through JP 2048 offers hardened protection to allow the landing force to conduct forcible entry from the sea. Unless there is an unlikely willingness to accept significant casualties, the Australian Government will have to accept that it will only be able to achieve unopposed surface landings in a permissive environment, as even in 'low spectrum' operations there is some risk of the potential use of cheap but highly effective anti-hard target weapon systems.

### ***Supplies and support***

Constraints on the ADF's ability to operate at any distance from direct logistical lines of communication limits its ability to sustain deployed forces. The US and the British employ a merchant marine force that enables maritime pre-positioning and resupply of equipment and supplies. Australia does not have the financial resources to employ such a force full time, limiting our ability to sustain operations to what the RAN can physically carry on its ships and resupply via an air-bridge. One option would be to engage with Australia's allies and regional partners to build stockpiles of essential and specialist items to facilitate the rapid pre-positioning of logistical lines of communication.

The ADF's current strategic airlift was not procured, nor has the capacity, to support the amphibious force with the rapid resupply of specialist parts once the capability is deployed. The choice is either to dedicate a cargo airframe, probably a C-130, to follow the amphibious fleet around or manage the risk and be prepared for the fleet to endure lengthy delays at foreign ports while parts are specially flown in by either strategic lift or a contracted solution.

Australia must gain a capability to expediently move materiel and logistical support to the fighting echelon. At present, the ADF is not looking to procure either a surface or vertical connector with the ability to sustain a substantial force ashore for any length of time, using purely the forces afloat. As the British found in the Falklands:

Shipping stores to the area off the beachhead is relatively simple .... the real problems begin when the supplies have to be landed and transported, sometimes hundreds of miles inland. Even without enemy interference, the difficulties can be considerable.<sup>16</sup>

As the ADF is not mandated for global reach, such a capability is not vital. However, a deployed commander does not necessarily leave Australia with the manning and equipment tailored for specific threats, so the risk of not maintaining such an asset needs to be recognised when employing the amphibious capability (and the expectations of the Government must be tempered or shaped accordingly).

## *Individual and collective training*

There are many positives in the ADF's current approach to its preparation for the new amphibious capability. Arguably, the Navy is in the best position, having secured the necessary platforms and manning increases to deliver its contribution. Moreover, the training continuum of the Navy is more a shift in attitude, to deliver seamless projection of influence from the sea through the littoral environment, rather than focusing on deep water operations.

The Army is equally well preparing the landing force. The current force generation cycle delivers battle groups that have many of the skills and collective training to conduct the vast majority of mission profiles, from high intensity raiding to humanitarian assistance. Indeed, the current 'Ready Battle Group' mission specific training is almost identical to the force preparation program of the US Marine Corps' 31<sup>st</sup> Marine Expeditionary Unit, save for vehicle boarding operations. The missing piece in both our Services is developing a coordinated strategy to bring the two together and form a deliberate training progression through to and beyond 2014.

Currently, Australia does not have an amphibious warfare school or collective pool of subject-matter experts, although Townsville's Combat Training Centre would be a natural choice to evolve into a 'Joint Training Centre'. The ADF's current ability to conduct amphibious training is built on the goodwill and ad hoc arrangements between the 'amphibious ready group' and Navy and Army units. Such arrangements exploit fleeting opportunities but do not build a fully-capable and mission-ready force in the way that the current 14 week pre-deployment mission-specific training package occurs. Equally, the notion of 'ring fencing' a battle group for a six-month period to work up to the required competency levels seems, in reality, improbably difficult, given the typical breadth of competing priorities in Australia.

The ADF is currently sending individual personnel to the US and UK to gain specialist qualifications in amphibious operations, as well as increasing the number of exchange posts with the US Marine Corps. However, the opportunity to maximise this experience has not been fully developed. Personnel who undergo costly training need to be given a deliberate career path that identifies positions that will facilitate either the growth of the capability or the growth of knowledge in the wider Defence community. At present, too few personnel with experience and interest are kept within the amphibious sphere, creating knowledge and continuity gaps at this crucial embryonic stage. There needs to be a structured approach that grows the individual, the organisation and the systems and processes that will lead to successful implementation of the new capability.

Similarly, the continued and improved series of annual and bi-annual exercises conducted with our strategic partners are becoming increasingly important to the growth of the ADF's amphibious capability. Additionally, the programming of staff exchanges, command-post exercises and amphibious specific exercises serve to use and share experiences and ideas from a broad spectrum of Australia's closest allies. Continued opportunities for short exchange positions to observe foreign force preparation and certification exercises will allow the ADF to learn from the successes and mistakes of others, allowing the capability to develop along those paths that offer tactics, techniques and procedures that are grounded in proven experience.

## Conclusion

By 2016 we will have an effective Standing Joint Amphibious Task Force capable of contributing significantly to a wide range of military strategic objectives set by the Australian Government.<sup>17</sup>

Chief of Navy's 'Amphibious Capability Strategic Plan', 2005

With the best will in the world, 2-3 ships do not make a full spectrum amphibious capability. The *Defence White Paper* (2009) identified many of the varying threats in Australia's littoral environment. However, it offered no clear strategies for tackling these issues. And contrary to the Government's expectations, we only have the capability to conduct low-to-medium level ship-to-shore operations—predominantly humanitarian in nature—against unopposed landings. The ADF and Government need to understand that while a professional force can learn how to conduct the full range of amphibious operations, our ability actually to conduct them is currently limited by manpower and equipment.

A future Australian Government may call for a more aggressive and self-sustaining force within the life cycle of our planned amphibious capability. In the meantime, it would seem prudent for strategic planners to consider whether Australia is comfortable with the ADF's planned capability or whether further investment should be made to give our forces the ability to generate a small, uniquely Australian expeditionary force that could unilaterally prosecute the full spectrum of amphibious operations.

As a Defence Force, we will continue to adapt our platforms to achieve maximum flexibility and performance. But there should be no doubt that with our current and funded projects, forcible entry and manoeuvre operations from the sea are beyond us.

*Major Andy Love is currently a Company Commander in the 1<sup>st</sup> Battalion, the Royal Australian Regiment. He holds a Bachelor of Science in International Politics and Strategic Studies from Aberystwyth University and has graduated from the US Marine Corps' Expeditionary Warfare School, Quantico. He has completed the Joint Amphibious Planners Course in Australia and has participated in several multinational amphibious exercises, notably embedded in the 3rd Marine Expeditionary Force (US) operational planning team during Exercise ULCHI FREEDOM GUARDIAN 11.*

## ACKNOWLEDGEMENT

Several mentors have assisted and given guidance in the formulation of this article or shaped my wider understanding of expeditionary and amphibious operations. I must emphasise, however, that except where I quote another source, all the opinions expressed in this article are my own and I take full responsibility for them. My thanks to:

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- Lieutenant Colonel S.M. Vella-Bonvita, current USMC-ADF Liaison Officer (Australia)
- Commander R.M. Westoby, RAN, Amphibious Operations Test Director (Australia)
- Lieutenant Colonel B. Hawkins, USMC, Operations Officer 31<sup>st</sup> MEU, 3rd MEF

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## NOTES

1. A. Borgu, 'Capability of First Resort – Australia's Future Amphibious Requirement', *Strategic Insights*, Australian Strategic Policy Institute: Canberra, 2005, p. 4.
2. Australian Government, *Australia's National Security: a Defence Update 2007*, Department of Defence: Canberra, 2007, p. 29.
3. Department of Defence, 'Joint Amphibious Capability Implementation Plan', Department of Defence: Canberra, 2008, p. A-1.
4. Australian Government, *Australia's National Security*, p. 29.
5. Australian Government, *Defending Australia in the Asia Pacific Century: Force 2030*, Department of Defence: Canberra, 2009, p. 73.
6. Australian Government, *Defending Australia in the Asia Pacific Century*, p. 88.
7. P. Gaertner, 'Army's Amphibious System Requirements to Conduct Entry from Air and Sea', Land Operations Division, DSTO, 2004.
8. This article pre-dates the Minister for Defence's announcement in December 2011 of plans to purchase an additional ship for peacekeeping and humanitarian relief operations.
9. Minister for Defence and Minister for Defence Materiel, 'Decommissioning of HMAS Kanimbla', Minister for Defence's website, 18 August 2011, see: <<http://www.minister.defence.gov.au/2011/08/18/minister-for-defence-stephen-smith-and-minister-for-defence-materiel-jason-clare-decommissioning-of-hmas-kanimbla/>>; and M. Colvin, 'Navy's third ship out of action', <<http://www.abc.net.au/pm/content/2011/s3139605.htm>>, accessed 15 February 2011.
10. See, for example, 'Australia's Submarine Program in the Dock', update report from the Defence Industry Group, 25 July 2011: <<http://www.defenseindustrydaily.com/Australias-Submarine-Program-In-the-Dock-06127>> accessed 10 October 2011.
11. Department of Defence, 'Joint Amphibious Capability Implementation Plan', Figure 3, p. 9.
12. Department of Defence, 'Current versus Future [Amphibious] Capability', RAN website, see: <<http://intranet.defence.gov.au/navyweb/sites/JACIT/comweb.asp?page=122131&Title=Amphibious%20Concepts>> accessed 5 October 2011.
13. 'LCM2000 Watercraft project cancelled', *Australian Defence Magazine*, Vol. 13, No. 2, February 2011.
14. Minister for Defence Materiel, 'Projects of Concern – Update', media release by the Minister for Defence Materiel, 1 February 2011: see <<http://www.minister.defence.gov.au/Claretpl.cfm?CurrentId=11348>> accessed 1 February 2011.
15. 3 Brigade has certain advantages over 1 Brigade and 6 Brigade, were it to become the first 'Marine Multi-Role Brigade'. It is the only formation with three full infantry battalions, as well as 10 Force Support Battalion and 5 Aviation Regiment in close proximity.
16. Department of Defense, 'US Marine Corps Vision and Strategy 2025', US Marine Corps: Quantico, 2007.
17. J. Thompson, *Lifeblood of War*, 4th edition, Brassey's: London, 1998, p. xvi.
18. Chief of Navy, 'Joint Amphibious Capability Implementation Team Induction Brief', January 2009, retrieved on 5 Oct ober11 from <[http://intranet.defence.gov.au/navyweb/sites/AASG/docs/JACIT\\_Induction\\_Brief.pdf](http://intranet.defence.gov.au/navyweb/sites/AASG/docs/JACIT_Induction_Brief.pdf)>

# What's Next in the Indian Ocean?

**Charles G. Ikins**

Only now Australians are turning their attention to the Indian Ocean and its littoral ... and the significant natural resources that exist not far inland from our sparsely populated coast.<sup>1</sup>

## Introduction

The above quote, while seemingly topical, is in fact a rather prescient judgment made in 1976 by Australia's Senate Standing Committee on Foreign Affairs and Defence. While the statement and the accompanying report are now 35 years old, it has taken just as long for Australians—and, in particular, Australia's policy makers—to consider seriously the issues of Australia's regional position in the 'Indo-Pacific' (meaning the geographic area comprising the Indian and Pacific Oceans, and the contiguous states), rather than just the Asia-Pacific.

Moving into the 21<sup>st</sup> century, it is apparent that the centre of gravity of international affairs is shifting to the Indo-Pacific.<sup>2</sup> Australia, centrally positioned in this region, will be affected by developments in either ocean. In the past, however, the weight of population in the east and Australia's alliance with the US has dictated the primacy of the Pacific Ocean in Australia's strategic thought.<sup>3</sup> The emergence of new regional powers within a transitional international order has pushed strategic thought in this country towards a two-ocean policy. This begs the question, what can Australia expect to encounter in the Indian Ocean in the 21<sup>st</sup> century?

Indo-Pacific economies are reliant on the large volumes of trade that transit the sea lanes of the Indian Ocean, transferring the resources of Africa, the Middle East and Australia to the manufacturing powerhouses of East Asia. China relies on the Indian Ocean for 80 per cent of its oil imports, and the bulk of its metal imports transit the region, including those from the northwest of Australia, an area which is helping to drive the Australian economy. The security of the expanding offshore resource extraction hubs of the north and northwest of Australia is a particular factor that is currently being addressed by the ADF Posture Review announced in June 2011.<sup>4</sup>

## The Indian Ocean – a short history

The emergence of the Indian Ocean as a trade route for vital goods to and from the major economies of the world is not new. The region and its rich resources have been a driver of several of the world's most successful colonial merchant empires, including the Portuguese, the Dutch and the British Empire. The Chinese exerted their power in the Indian Ocean in 1405, when a large fleet under Admiral Zheng He was despatched to expand the Chinese tributary system and attempt to control trade in the Indian Ocean basin. Internal priorities ended the maritime adventurism of the Chinese, who dismantled their navy in the mid-15<sup>th</sup> century, leaving Arab traders vulnerable to the numerous pirates on the trade routes.

Soon after Portuguese explorer Vasco da Gama rounded the Cape of Good Hope and sailed to India in 1498, Western naval technology quickly allowed the Portuguese to dominate trade in the Indian Ocean by occupying trading posts at key points on the coast, into which they could force merchant vessels by blockading rival ports. The Portuguese soon recognised that control

of the Indian Ocean relied on control of four key waterways: the Strait of Bab-el-Mandeb, the Strait of Ormuz, the Madagascar Channel and the Strait of Malacca. These waterways were 'choke points' on the coastal trade routes and enabled the Portuguese to easily head off any challenges to their power. A similar strategy was used by the Dutch to usurp the Portuguese position in the region.<sup>5</sup>

While the English moved into the region shortly after the Dutch, it was not until the mid-18<sup>th</sup> century that Britain's mercantilist policies prompted the increasingly dominant Royal Navy to eject the French and then the Dutch from the Indian Ocean. By 1763, the East India trade had effectively been passed to the British. British naval dominance and colonial possessions ensured that Britain, like the Portuguese and Dutch before it, could protect British trade to and from the East from the key strategic points in the Indian Ocean. The British trade and colonial strategy paid a great deal of attention to the protection of India, its 'Jewel of the Empire', and thus Indian Ocean security was a key task of the Royal Navy.<sup>6</sup> The freedom of navigation contributed to the development of Australia, as Australia-bound ships crossed the Indian Ocean, after which many would travel up Australia's east coast to collect cargoes of tea in China, or across the Pacific to return to Britain loaded with exports such as wool.<sup>7</sup>

The stability offered by British dominance lasted until 1967, seeing little decisive action in either World War 1 or 2, except for the withdrawal of the British East Indies Fleet from Sri Lanka to Kenya in 1942. The post-war decline of British maritime power and the subsequent withdrawal from its colonies and bases 'East of Suez' in 1967 saw the movement of US and Soviet vessels into the Indian Ocean, as the two superpowers extended Cold War competition into the region. Both had what they considered vital and legitimate national interests in the Indian Ocean, chiefly among them being natural resources including fisheries and oil. While the end of the Cold War saw the withdrawal of the Soviet fleet, the US Navy continued to maintain a presence, largely in support of operations in the Middle East directed against Iraq and Afghanistan.<sup>8</sup>

## **The here and now**

The history of the Indian Ocean has been shaped by its geography and resources. The geography of the Ocean, with its rich coastlines and narrow entry points, made it both desirable and easy to control. For the colonial powers, primacy in the Indian Ocean was eventually lost due to a decline in their international power, linked to disturbances in domestic affairs. While the free market state of global economics means that no state can currently be said to hold primacy in the Indian Ocean as the colonial powers did (although the US Navy would come close), the rise of other international navies with significant trade and national security interests in the region is likely to begin to challenge the status quo.

## **India**

India in many ways looks set to become the next great power in the Indian Ocean due to its size, economic growth and the centrality of its position. Some Indian strategists are feeling increasingly threatened by the movement of Chinese naval units into the Ocean. Considering the often violent history of relations between the two countries along their disputed 4000 km border (the 'line of actual control'), the fear of Chinese moves into the Indian Ocean—in addition to its deepening ties with Pakistan—has aroused the concerns of some strategists and commentators.<sup>9</sup>



The Indian Navy is the fifth largest maritime force in the world<sup>10</sup> and, according to India's Chief of Naval Staff, Admiral Nirmal Kumar Verma, it is set to become more capable in the future with the planned acquisition of 40 or so new ships and submarines, including two new aircraft carriers and conventional and nuclear submarines, as well as a variety of aircraft and support vessels, including new fighter aircraft, long range maritime patrol aircraft, unmanned aerial vehicles and a range of logistics ships, supported by indigenous technologies and combat systems.<sup>11</sup> Jane's believes this reflects a move by the Indian Navy from a defensive to a competitive strategy, aimed at dominating the Indian Ocean and extending its presence as far as the South China Sea.<sup>12</sup>

In September 2011, it was reported that the Indian Navy's INS *Airavat* was intercepted in international waters in the South China Sea by a Chinese naval vessel, shortly after leaving the Vietnamese port of Nha Trang.<sup>13</sup> The Indian Ministry of External Affairs played down the seriousness of the encounter, releasing a statement that the vessel had been engaged in a series of port visits in Vietnam and that:

... at a distance of 45 nautical miles from the Vietnamese coast in the South China Sea, it was contacted on an open radio channel by a caller identifying himself as the 'Chinese Navy' stating that 'you are entering Chinese waters'. No ship or aircraft was visible from INS *Airavat*, which proceeded on her onward journey as scheduled. There was no confrontation involving the INS *Airavat*.<sup>14</sup>

The growth of the Indian submarine and naval aircraft capabilities would indicate that economic growth and fear of containment are pushing a modernisation and expansion of the Indian fleet, although the actions of the government do not align with the rhetoric from New Delhi. In 2011-12, the Indian defence budget was ≈A\$30.4bn, however, the Navy received only 15 per cent, while the Army received the lion's share of funding (51 per cent) and the Air Force more than a quarter (28 per cent). The Navy also came last in 2011-12 in terms of capital expenditure, receiving only ≈A\$2.5bn, in comparison with the Army's ≈A\$2.6bn and the Air Force's ≈A\$5.2bn. Overall, despite increasing relative to the 2010-11 defence budget, the 2011-12 budget declined as a percentage of GDP to 1.83 per cent, from 2.12 per cent.<sup>15</sup> While these amounts are significant in a regional context, it also highlights the focus of India's strategic policy on protecting its land borders, despite the rhetoric that is emerging from New Delhi regarding the need to modernise and expand its naval forces.

It is possible that the Indian Navy's slice of the budget will begin increasing in line with the growing fear in New Delhi of Chinese containment. However, the ageing Indian fleet will soon be dealing with the same issues as India's jet fighter fleet, namely mass obsolescence and difficulties in the development of replacement capabilities, many of which are already facing considerable delays, leaving gaps in the fleet as aged vessels are retired before their replacements reach operational capability.<sup>16</sup> Several projects are already delayed, including the upgrade of the ex-Russian Navy carrier *Admiral Gorshkov* (now INS *Vikramaditya*), leaving the new force of MiG-29K naval interceptors without a carrier until its expected delivery in 2013. The destroyer and frigate fleets are expected to suffer significant shortages in the period to 2013 and the 'Indigenous Aircraft Carrier' project has made little significant progress.

Australia's relationship with India is one of its most important in the region, however, this relationship has been accorded a low priority by successive Australian and Indian governments<sup>17</sup>, seemingly ready to 'take off' but never reaching the required airspeed.<sup>18</sup> Australia's relationship



with India faces several difficulties, including policy differences between Australia and India on a variety of issues—including nuclear weapons and the sale of uranium—as well as domestic politics, threat perceptions (especially regarding China) and even the treatment of Indian students in Australia.<sup>19</sup>

Moreover, as India grows, it will be difficult for Australia to approach India as an equal. This may create difficulties in building a strong relationship into the future, as India begins to reach into areas of common strategic interest.<sup>20</sup> The relationship between the US, India and China is likely to be an important element of international relations and stability into the immediate future. It will be in Australia's interests to ensure that this relationship is constructive and open, as these relationships are vital for continuing peace and prosperity in the Indo-Pacific region.<sup>21</sup>

The US has also met with difficulties in engaging with India. It was hoped by many in the US that India could become a key ally in the Indian Ocean or, as described by Sourabh Gupta, a 'Japan as it were ... of the Indian Ocean region'.<sup>22</sup> While the US and India engage in regular strategic talks and the US has made significant gestures of goodwill towards India, such as the civil nuclear cooperation agreement, New Delhi has resisted American attempts at engagement. New Delhi has scaled down joint exercises with the US, such as the Malabar series of war games, which have been restricted to a strictly US-India affair since 2007 when Beijing protested at five-party exercises held in the Bay of Bengal, and India has refused to sign a memorandum of understanding allowing it access to the US CENTRIX battle group networking system.<sup>23</sup>

This reluctance is possibly from fear of confronting the Chinese outside of the bilateral environment. Or it could be due to Indian fears of becoming an appendage to US maritime security strategy in what it considers to be 'India's ocean'.<sup>24</sup> Peter Drysdale believes that 'India will be no one's pawn in dealing with China ... [nor will it] rely on the dream of appeal to distant American power in managing its relationship with China'.<sup>25</sup> Similar to Australia, the US will continue to meet difficulties in rapprochement with India in a new international system, where growing powers like China and India must be treated like equals.

## China

The growth of China's economy has spurred the expansion of its interests further afield, including the Indian Ocean, a key maritime trading route for Chinese merchandise and energy imports, including 70 per cent of its energy resources.<sup>26</sup> China is moving to secure its trade routes, both through greater maritime capability development and the construction of alternatives to sea routes, such as pipelines and railways. These, however, are still insecure and cannot alone supply the resources needed.

The People's Liberation Army Navy (PLAN) is currently undertaking a large scale expansion to meet the new China's global 'blue water' interests, including in the Indian Ocean. This includes the development of a naval aviation capability and expanded blue water capabilities, such as destroyers, replenishment and logistics ships, and nuclear powered submarines.<sup>27</sup> While these developments have been focused on Chinese interests in the Western Pacific, the quantitative and qualitative superiority of the PLAN over the Indian Navy has strategic implications for India.<sup>28</sup>

The development by Chinese state corporations of ports in the Indian Ocean littoral, including Gwadar in Pakistan, has prompted Indian fears of a Chinese 'string of pearls' in the region from which PLAN vessels can operate without the constraint of distance from home ports.<sup>29</sup> This thesis has been met with some scepticism outside of India, as the ports also have clear commercial objectives, being connected to transport links including road, rail and pipelines to western Chinese provinces that are yet to benefit from the Chinese economic miracle.<sup>30</sup> Fear of foreign ports in the Indian Ocean is not new; fear of Soviet-controlled ports in the region provoked considerable concern during the Cold War—and it is unlikely to disappear in the near future.<sup>31</sup>

The movement of the Chinese into the Indian Ocean is unlikely to be disruptive to trade as, for the most part, it appears they are pursuing Mahanian concepts of commerce protection, which should benefit all maritime traders.<sup>32</sup> The move is seen as a containment tactic in some parts of India's strategic community, who fear that the Indian Navy will lose freedom of movement in the seas off their coast, as well as continuing to fear the threat of invasion across their borders. However, the PLAN's forays into the Indian Ocean, which have provoked the fear of Indian strategists, are—according to some commentators—a move by the Chinese to do exactly the opposite. By conducting friendly port visits and associated economic cooperation, including the development of ports that have become the 'string of pearls', some believe that the Chinese leadership is attempting to dispel the fear of a Chinese threat and portray its presence as benign.<sup>33</sup>

Competition between India and China, like Cold War competition between the US and the Soviets, could lead to disruptive incidents at sea between naval vessels, aircraft and submarines.<sup>34</sup> The growing blue water capability of the PLAN, including the development of a naval aviation capability, would make PLAN flotillas in the Indian Ocean increasingly threatening to India and more impervious to disruption by existing Indian forces. Chinese forces are currently constrained by the lack of friendly ports capable of supporting their vessels, although Chinese capabilities to operate independently may improve in the near future, or cooperation with other states such as Pakistan may grow into fully-fledged strategic partnerships. Despite the fears of competition, Ashley Townshend has assessed the risk of conflict between the PLAN and the Indian Navy in the next two decades as highly unlikely, due to the current imbalance in fleet composition and India's 'home court' advantage in the Indian Ocean.<sup>35</sup>

Despite the low risk of conflict, there continues to be mutual fear and distrust between the two emerging superpowers, while the absence of dialogue serves to exacerbate these fears, causing every move to be perceived as threatening despite whatever the actual motives may be. There are several avenues where dialogue could be undertaken, including an expanded 'Indian Ocean Naval Symposium' or the ASEAN Plus Eight Defence Ministers' Meeting. These would require alteration in their existing form to accommodate the discussions, as well as greater acknowledgment of the Indian naval capacity by the Chinese.<sup>36</sup> And while confidence building measures may build trust at the operational level, it is unlikely they will do much to change strategic misgivings.<sup>37</sup>

However, despite strategic mistrust, trade between India and China is booming. Since 2000, Chinese imports to India increased from A\$1.5bn in 2000 to A\$32bn in 2008, while Indian exports grew from A\$760m to A\$20bn over the same period.<sup>38</sup> It is possible that these strong trade links will, despite strategic misgivings, promote cooperation between the two in times of crisis.

## Australia

As an Indian Ocean littoral state, Australia has strong interests in strategic stability in the region. The mineral wealth of the north-west travels from Australia's Indian Ocean coast through the Southeast Asian archipelago to key markets in North Asia. With the rise of China and India, Australia finds itself in a new geopolitical position, as the focus of global economic activity shifts towards the Indo-Pacific, with Australia firmly in the centre. Australia faces a challenging situation regarding its economic and security partners, as growing trade relations with China on the one hand, and strengthening security ties on the other, create a difficult balancing act for Australian policy makers.

While Australia has a significant Indian Ocean coastline, the area has only been of interest to strategic thinkers intermittently throughout recent Australian history.<sup>39</sup> Australia's economic success in the recent global financial downturn has been largely linked to the Australian resource sector's trade with the global powerhouse China, which is now Australia's most important trading partner. Merchandise trade between Australia and China has grown so rapidly that it will soon be larger than the combined trade with Australia's third, fourth and fifth largest markets.<sup>40</sup> Usually unnoticed in the focus on China for Australia's sustained economic growth, India became Australia's third largest export market in 2009.<sup>41</sup>

On the security side of the policy scales, the longstanding alliance with the US looks set to continue for many years, possibly in a more integrated form, as the US seeks to balance the influence of China in the region by diversifying and hardening its presence in the region. Some commentators, such as the Lowy Institute's Raoul Heinrichs, have suggested that Australia's balancing act between economic and strategic partners is increasingly unstable as tensions grow between China and the US, pushing Australia closer to a decision in favour of one or the other.<sup>42</sup> However, the economic or military primacy of either China or the US is not assured and the prudent path appears to be one of hedging against several possible futures in the Indian Ocean.<sup>43</sup>

Considering Australia's economic and strategic interests in the Indian Ocean, it is in Australia's interests to prevent the emergence of sustained great power competition in the Indian Ocean region. However, Australia alone does not have the international weight to prevent this from occurring. Australia's interaction with the emerging powers in the Indian Ocean, namely India and China, is still developing—and often hampered by the concerns of the larger players. Australia withdrew from a quadrilateral security agreement with India, Japan and the US in 2007, largely due to fears of inciting containment fears in China.

The security relationship with India is developing slowly, even as strategic interests converge, as Australia seems reluctant to offend China, and India seemingly regards Australia as a low priority for engagement.<sup>44</sup> The reluctance of Indian Ocean littoral states and regional powers to engage in multilateral bodies or the tendency to refuse membership from important players such as China in the 'Indian Ocean Naval Symposium', are seemingly fading as fears of China's growing influence emerge. It is these forms of international engagement that are required for middle powers like Australia to engage with the region and create a venue for frank discussion of strategic issues and possibly cooperation between the emerging powers and the rest of the region.

## United States

The interests of the US in the Indian Ocean are currently centred on support for its operations in the Middle East, energy security and, increasingly, balancing the growing influence of China in Asia, which the US has seemingly neglected in the decade long 'war on terror'.<sup>45</sup> The US Navy has made it clear that the Indian Ocean is now a prime region of concern for its operations, replacing the Atlantic Ocean in its two ocean structure.<sup>46</sup> The military primacy of the US, although seemingly challenged by China in the region, still far and away outweighs the blue water capabilities of the PLAN or any other global navy.<sup>47</sup>

However, the emerging anti-access/area denial capabilities of the Chinese mean that the US Navy is now looking towards a diversification of its fleet structures and basing locations in the region, in part also because existing fleet locations of the 5<sup>th</sup> Fleet in Bahrain appear increasingly threatened by its reliance on narrow exit points to sortie into the Indian Ocean and the 7<sup>th</sup> Fleet in Japan appears vulnerable to Chinese missiles. The US appears likely to continue and perhaps increase operations in the Indian Ocean from bases in Bahrain and Diego Garcia, supported by key Pacific bases in Hawaii, Guam and Japan. It would also seem to be complementing existing bases by apparent moves to establish expeditionary training access in regional countries, such as Australia, and basing rights for new 'littoral combat ships' in Singapore.

The US is also looking to deepen its relationship with India, which it recognises as a key partner in its strategic future, as India's growth increases its importance in the region, causing US Secretary of State Hillary Rodham Clinton to appeal to India, while in Chennai in July 2011, to take up a greater role in the region, saying '... when I look at the potential of the people in this region, I am absolutely convinced you can out-compete, outgrow, out-prosper anyone else in the world'.<sup>48</sup> While events such as India's nuclear tests have given pause to the US-India relationship in recent years, the growing cooperation between the world's two largest democracies, represented by the 2008 agreement to export uranium for civil purposes to India, is likely to cause concern in China as the world's most powerful navy begins to cooperate with its near rival India.

Whether the economic difficulties of the US and the apparent turn towards a more insular foreign policy result in a steady decline in US influence in the region or whether the US will move strongly to arrest any decline in its influence and seek to balance the emerging powers is difficult to assess.<sup>49</sup> While it has been suggested that the US could share power in the Asia-Pacific with China, the ideological differences between the two would seem to indicate that an orderly handover of primacy would be unlikely.<sup>50</sup> Although the US seems to have acknowledged that its primacy is now being challenged—and is pursuing options to diffuse the attempts of China to challenge its power—there is still a considerable amount of strategic thought (even in the US) which believes that we are witnessing the final throes of the 'American Empire'.

Certainly, it would be foolish to assume that the US can remain hegemonic in perpetuity. But it would also be foolish to assume that China will inevitably be the new global hegemon or at least the regional hegemon. The US has reacted strongly to recent provocations in the South China Sea and, with the drawdown of operations in the Middle East, may focus greater attention on retaining a position of power in the region. The US faces numerous strategic choices in the Indo-Pacific in the coming decades, decisions on which will be affected by domestic and

international concerns. For strategic partners like Australia, it will be important to engage with the US to ensure that its engagement in the region aligns with Australia's interests.

## **The future?**

The Indian Ocean is likely to continue to assume a position of strategic importance in the future. However, whether it becomes a place of strategic competition or cooperation remains to be seen. It is in Australia's interest that cooperation among the rising powers of the new century dominates the Indo-Pacific, as competition between regional powers is likely to have negative effects on trade and security relationships. Australia's strong economic and security ties with China, India and the US mean that conflict between these states would be cause for some painful choices by Australian policy makers.

The current suspicions in the Indian Ocean region appear to have the capacity to almost become a 21<sup>st</sup> century 'Great Game' that may lead to unnecessary conflict. It is possible that some of this tension and suspicion could be diffused through careful diplomacy and the development of stronger multilateral forums and confidence building measures. However, it does require substantial shifts in thinking from policy makers and also among the increasingly nationalistic general populations of key regional states to be completely effective. Australia likely lacks the critical weight to cause these shifts alone and would need to enlist the support of several other regional and external states to push for the cooperation that is needed to reduce strategic tension and suspicion.

The geography of the Indian Ocean indicates that competition is likely to take place in the narrow entry and exit points. Considering its importance to global trade, the Malacca Strait especially will possibly see increasing naval activity, a concern for the littoral states, primarily Singapore.<sup>51</sup> The importance of chokepoints like Malacca to seaborne trade, specifically oil and gas shipments, means that regional powers will place significant emphasis on their security and may act decisively if they feel freedom-of-access is endangered by another state. If dialogue between regional powers and other regional states is not forthcoming, strategic suspicion and a lack of transparency regarding activity in the region make this a possible future flashpoint. While it has been argued that the emerging powers would seek to avoid conflict that would endanger their trade routes, it stands to reason that they would engage in conflict if they felt the security of their sea lines of communication were threatened.

In the short term, the management of piracy in the Indian Ocean is likely to be a significant focus of international efforts. The effects of climate change may also be a cause of conflict as resources, energy and food resources become scarce, especially for the poorer states of the Indian Ocean littoral.

Piracy is a concern to all nations in the Indian Ocean; it is inherently linked to instability on the mainland. For example, the situation in Somalia needs a more comprehensive strategy to address it. Naval task forces, such as Combined Task Force 151 and the EU's Operation ATALANTA, cannot prevent piracy on their own; they are just part of the solution to a complex problem that requires a multi-faceted solution composed not only of politico-military initiatives but developmental and financial measures, especially cutting the links between offshore piracy financiers and pirates. There is little international appetite for 'boots on the ground' in Somalia and the apparent success of the offshore support strategy in Libya may

create some push for the continuation of the current approach to Somalia, even though it has consistently failed to provide stability in Somalia for nearly 20 years.<sup>52</sup>

The possible effects of climate change on energy and food supplies are likely to have a severe effect on the Indian Ocean region due to the high proportion of less developed and developing states in the region. Shortages of water and food, such as Somalia is currently experiencing, are precipitating factors for the mass movement of people as refugees, including the arrival of illegal immigrants in Australia and possibly localised conflict over resources. The fishing stocks of the Indian Ocean are also a critical source of global food supplies, and the management of resources in international waters and policing of economic exclusion zones, especially off the east African Coast, will be important for the maintenance of fishing supplies and food security in the region.

## Conclusion

The Indian Ocean, far from being the 'forgotten ocean', is assuming an important place in global strategic thinking. The future of the Ocean and the relationships of its littoral and extra regional actors are unclear, but an unsettling pattern of distrust is emerging. As a littoral state with significant trade and security links to the status quo power and its emerging rivals, Australia most assuredly has a role to play in the development of the Indian Ocean's future.

Recognising the dangers of great power competition in the region is an important step in driving the development of a peaceful future for all states in the region. Australia does not have the weight to do this alone and should continue to look to the development of stronger regional and global forums and international organisations to promote transparency and cooperation.

*Charles Ikins is a US foreign affairs specialist seconded from the US Office of the Secretary of Defense to the Australian Department of Defence. He has just completed a two-year exchange tour as Director, Strategic Advice. He would like to express his great thanks and appreciation to Liam Nevill for his assistance in the preparation of this article.*

## DISCLAIMER

The opinions expressed in this article are the views of the author and do not necessarily reflect the views and opinions of the Australian Government or Department of Defence, or the US Government or Department of Defense.

## NOTES

1. Senate Standing Committee on Foreign Affairs and Defence, *Australia and the Indian Ocean Region*, Parliamentary Paper No. 330/1976, Commonwealth Government: Canberra, 1977.
2. Commonwealth of Australia, 'Defence White Paper 2009', *Defending Australia in the Asia Pacific Century: Force 2030*, Department of Defence: Canberra, 2009, p. 30.
3. Commonwealth of Australia, 'Defence White Paper 2009', p. 30.
4. Stephen Smith, 'Australian Defence Force Posture Review', media release MR177/11, 22 June 2011.
5. See Clark G. Reynolds, *Command of the Sea: the history and strategy of maritime empires*, Hale & Co.: London, 1976 and Richard Hall, *Empires of the Monsoon: a history of the Indian Ocean and its invaders*, Harper Collins: London, 1996, p. 297, noting that 'the insolent Dutch domineere (sic) in all places, styling themselves already as kings of the Indian Sea'.
6. See Ranjan Gupta, *The Indian Ocean: a political geography*, Marwah: New Delhi, 1979.
7. See Geoffrey Blainey, *Tyranny of Distance: how distance shaped Australia's history*, Sun Books: Melbourne, 1966.
8. See Senate Standing Committee on Foreign Affairs and Defence, *Australia and the Indian Ocean Region*, p. 81, and Kim C. Beasley and Ian Clark, *Politics of Intrusion: the super powers and the Indian Ocean*, Alternative Publishing Ltd: Chippendale NSW, 1979.
9. Geoffrey Barker, 'Jostling Giants', *Inside Story*, 4 February 2011.
10. Jane's, 'Indian Navy', *Sentinel Security Assessment – South Asia*, 27 July 2011.
11. See, for example, Ranjit B. Rai, 'Future Indian Navy holds many business opportunities for Indian industry', *India Defence Update*, January 2011: <[www.indiadenfenceupdate.com](http://www.indiadenfenceupdate.com)> accessed 4 November 2011.
12. Jane's, 'Indian Navy'.
13. David Brewster, 'Test Looms for China as India Enters the Fray', *The Australian*, 2 September 2011.
14. Rajeev Sharma, 'India, China Navies Face Off', *The Diplomat*, 1 September 2011.
15. Laxman K. Behera, 'India's Defence Budget 2011-12', *Institute for Defence Studies and Analyses*, 7 March 2011.
16. Jane's, 'Indian Navy'.
17. Sam Bateman and Anthony Bergin, *Our Western Front: Australia and the Indian Ocean*, Australian Strategic Policy Institute: Canberra, 2010, p. 34.
18. Greg Sheridan, quoted in Bateman and Bergin, *Our Western Front*, p. 34.
19. Bateman and Bergin, *Our Western Front*, p. 35.
20. Bateman and Bergin, *Our Western Front*, p. 35.
21. Peter Drysdale, 'Indo-American Defence Ties: a reality check', *East Asia Forum*, 1 August 2011.
22. Sourabh Gupta, 'US-India Defence Ties: the limits to interoperability', *East Asia Forum*, 31 July 2011.
23. Gupta, 'US-India Defence Ties'.
24. A. Townshend, 'Sino-Indian Maritime Relations: managing mistrust in the Indian Ocean', *Strategic Snapshots*, Lowy Institute-MacArthur Asia Security Project: Sydney, December 2010.
25. Drysdale, 'Indo-American Defence Ties'.
26. Alan Dupont and Michael Hintze, 'Living with the Dragon: why Australia needs a China strategy', *Policy Brief*, Lowy Institute, June 2011, p. 6.
27. Townshend, 'Sino-Indian Maritime Relations'.
28. David Brewster, 'An Indian Sphere of Influence in the Indian Ocean', *Security Challenges*, Vol. 6, No. 3, 2010, p. 5.



29. Brewster, 'An Indian Sphere of Influence in the Indian Ocean', p. 5.
30. Ashley Townshend, 'Few Reasons to Fear China's Pearls', *The Australian*, 27 May 2011.
31. P.G. Skelton, 'Indian Ocean's Longest Coastline', *ADF Journal*, No. 17, July/August 1979, p. 19.
32. Robert K. Kaplan, *Monsoon: the Indian Ocean and the battle for supremacy in the 21st century*, Black Inc: Melbourne, 2010, p. 281.
33. Vijay Sakhuja, 'Maritime Multilateralism: China's strategy for the Indian Ocean', *China Brief*, Vol. 9, No. 22, November 2009, p. 12.
34. Rory Medcalf, Raul Heinrichs, and Justin Jones, *Crisis and Confidence: major powers and maritime security in Indo-Pacific Asia*, Lowy Institute for International Policy: Sydney, June 2011, p. 20.
35. Townshend, 'Sino-Indian Maritime Relations'.
36. Medcalf, Heinrichs and Jones, *Crisis and Confidence*, p. 43.
37. Townshend, 'Sino-Indian Maritime Relations'.
38. Future Directions International, 'China's Strategic Objectives in the Indian Ocean Region', Workshop Report, 23 May 2011.
39. Bateman and Bergin, *Our Western Front*, p. 33.
40. Dupont and Hintze, 'Living with the Dragon', p. 3.
41. Rupakjyoti Borah, 'India, Australia and the United States in the Indian Ocean Region: a growing strategic convergence', *Future Direction International Strategic Analysis Paper*, 12 May 2011.
42. Raoul Heinrichs, 'We're carrying the flag for the US', *Lowy Institute Interpreter*, 14 September 2011, <<http://www.lowyinterpreter.org/post/2011/09/14/Australia-Overreliant-and-under-prepared.aspx?p=true>> accessed 21 September 2011.
43. Malcolm Cook, Raoul Heinrichs, Rory Medcalf and Andrew Shearer, *Power and Choice: Asian security futures*, Lowy Institute for International Policy: Sydney, June 2010, p. 5.
44. Amitabh Mattoo, 'Time to Invest in India Partnership', *The Australian*, 17 August 2011.
45. Bateman and Bergin, *Our Western Front*, p. 17.
46. James Holmes and Toshi Yoshihara, 'US Navy's Indian Ocean Folly?', *The Diplomat*, 4 January 2011.
47. Dupont and Hintze, 'Living with the Dragon', p. 6.
48. William Wan, 'Hillary Rodham Clinton Urges Greater Leadership Role for India', *The Washington Post*, 20 July 2011.
49. See Carl Ungerer, 'The politics of US foreign policy', *Policy Analysis*, National Security Note 2, Australian Strategic Policy Institute: Canberra, August 2011.
50. Dupont and Hintze, 'Living with the Dragon', p. 9.
51. Kaplan, *Monsoon*, p. 261.
52. David Axe, 'America's Somalia Experiment', *The Diplomat*, 13 September 2011.



# Air Power's Contribution to Coercion

**Lieutenant Colonel Brian Murray, Royal Canadian Air Force (on secondment to the RAAF's Air Power Development Centre)**

One of the frequent debates regarding the use of air power revolves around whether it can decisively win wars by coercing adversaries to accede to a nation's or coalition's will. While many theories of air power employment insist that strategic attack—where the adversary's centre of gravity and will to fight are the main targets—is the best path to victory, other military theories espouse that only battle winning and seizing and holding territory can achieve victory.

Ideally, Service preferences should not drive the 'ways' of warfare. In a truly joint environment, the strategic objectives, the most effective ways to achieve those objectives in the given situation and the available means to achieve them (involving all elements of both national and military power) should determine the most suitable strategy. 'Coercive strategies', aimed at affecting both the adversary's will and capability, can be effective tools in the strategist's toolbox to contribute to the achievement of objectives involving the prevention of war and, if necessary, the prosecution of war.

This article aims to describe what coercion, coercive diplomacy and coercive force are, the types of coercive strategies and their goals, and how air power contributes to the achievement of these goals. It will also describe 'counter-coercion', offer some lessons learned from the analysis of air operations that have successfully contributed to coercion of an adversary, and take a look at air operations in Libya as an example of air power's contribution to coercion.

## Coercion, coercive diplomacy and coercive force

The *Macquarie Dictionary* defines 'coerce' as 'to restrain or constrain by force, law, or authority; force or compel, as to do something or to compel by forcible action: coerce obedience' and 'coercion' as 'the act or power of coercing; forcible constraint or government by force'.<sup>1</sup> So, by definition, coercion implies the use of force to compel someone to do something. In the military context, it is sometimes defined as:

Coercion is the use of threatened force, including the limited use of actual force to back up the threat, to induce an adversary to behave differently than it otherwise would.<sup>2</sup>

Another definition is:

Coercion, in its broadest sense, is causing someone to choose one course of action over another by making the choice that the coercer prefers appear more attractive than the alternative. In the international arena, coercion is usually intended to change the behaviour of states.<sup>3</sup>

While the common thread in these definitions involves influencing an adversary's behaviour, it is the threatened use of force or limited use of actual force that causes this influence.

'Diplomacy' is sometimes defined as 'the art and practice of conducting negotiations between nations'.<sup>4</sup> Coercive diplomacy would therefore be the art and practice of conducting negotiations between nations, using threatened or actual force. This force could be generated

from any or all of the four elements of national power, namely diplomatic, informational, military or economic. If it is military force, then the term 'gunboat diplomacy' is sometimes used, however:

Although the term 'coercive diplomacy' has come to be associated primarily with military force, coercive diplomacy best describes a nation's coercive use of the four pillars of national power in the foreign relations arena.<sup>5</sup>

While it is appreciated that all forms of national power can contribute to coercive diplomacy and influence the behaviour of an adversary state, this article will focus on the coercive use of military force and, in particular, the air power element.

## **Types and goals of coercion**

Before looking at how air power can contribute to coercion, it is important to appreciate what types of coercive strategies exist and the goals of each of these strategies. While diplomatic effort or military campaigns can and do employ multiple ways to achieve their defined ends, knowing what these ways are meant to achieve—and selecting the most appropriate ones for the situation at hand—are key to their successful employment.

The two major categories of coercive strategies are deterrence and compellence.<sup>6</sup> While these two concepts are related, deterrence generally aims to prevent an adversary from doing something they<sup>7</sup> would otherwise do or want to do, while compellence aims to alter behaviour already commenced or to force an adversary to do what the coercer wants them to do. It is recognised that a significant amount of academic debate surrounds the inclusion of deterrence as a form of coercion. While deterrence is often viewed as a passive act, relying on the adversary's perceived belief or fear of destructive retaliation by the deterring force or nation, and coercive force or compellence is viewed as an active act that relies on the effectiveness of the coercer's methods, this article argues that the goals of deterrence and compellence are the same, that is, to affect the behaviour of an adversary, one through fear and one through threat or use of force.

Deterrence can truly be said to be 'in the eye of the beholder' and it most often involves the threatened use of force, rather than actual use. It is aimed at the adversary's will to commence hostilities, not at their ability to fight. For a deterrent to be deemed effective, it must cause the adversary to decide to forego initiating a possible action. The adversary must believe both that the deterring force is capable of inflicting an unacceptable level of destruction on their military force or nation, and in the deterring nation's willingness to inflict such destruction. Interestingly, a deterrent based on a perceived (but not actual) threat can be completely effective, while an actual threat—which the adversary is unaware of—is of no deterrent value at all.

Peacekeeping forces, stabilisation forces and carrier battle groups are examples of military missions or capabilities used for deterrence of potential aggression, or compellence (coercive force) should hostilities break out. Sometimes referred to as representing a coercive military presence,<sup>8</sup> these forces have the capability, mission and defined methods of escalating their response to aggression that includes the use of force. Even unarmed personnel and observation technologies, which have the capacity to view and report adversary action, act as a deterrent if the information they report could be damaging to the adversary nation's reputation or efforts and incur negative political, diplomatic or military reactions.

Compellence can involve the threatened or actual use of force, ranging in scale from mildly influencing the adversary's will to physically removing the adversary's means to accomplish their goals and to resist coercion through isolation, capture and/or destruction of their forces. Seizing, holding and controlling the adversary's nation is the ultimate way of compelling an adversary to behave in a prescribed manner. The spectrum of compellence therefore ranges from strategies to affect the will of the adversary, to strategies that aim to destroy the adversary's ability to accomplish their goals and resist the coercer's will.

The spectrum of compellence can be described using three strategies: punishment, denial and destruction. Military campaigns can employ lines of operation that use more than one of these compellence ways and most likely will employ elements of all three.

Punishment strategies are designed to target the adversary's will to continue to fight or to continue to behave in a certain way. They seek to increase the costs of resistance or non-compliance with the coercer's will, and can be directed against anything the enemy values, including its military forces, economic wealth, national infrastructure or international influence. While early air power theorists, such as Douhet, viewed the civilian population of an adversary as a valid target for aerial bombardment, history has not shown appreciable evidence that the bombing of civilians has significantly decreased an adversary nation's will to fight, nor is it considered a legally, ethically or morally justified strategy in the post-World War 2 era. Punitive coercion is intended to invoke the fear of future pain in the adversary's key decision-making apparatus.

Denial strategies are aimed at affecting the adversary's desire and ability to achieve their objectives. They seek to reduce the likelihood that the adversary's pursuit of their intended objectives and their resistance to the coercing force's efforts will be successful. If an adversary is primarily using their military forces to achieve their objectives, denial is most often achieved by attacking the adversary's military forces, the means to generate those forces and other systems that move and sustain them.<sup>9</sup> Denial strategies seek to affect the will of the adversary by invoking a feeling of hopelessness due to the physical removal or degradation of the key means being used to pursue their goals.

Destruction strategies are simple in concept but may be extremely costly to both adversary and coercer alike. They are aimed at eliminating the adversary's capabilities. While there are psychological effects associated with the loss of capability through its destruction, the aim of destruction is to remove options and leave the adversary without the means to resist and with no choice but to comply.

## **The coercive use of air power**

Air power is a form of military power ideally suited for coercion. Considering its flexibility—and its ability to be applied concurrently on many different types of missions—air power can be employed in various ways, for a multitude of purposes, to simultaneously achieve many different and complementary effects. By taking the air campaign approach to joint air operations, air power can concurrently deter and compel adversaries, in a 'scalable' manner, with minimal footprint in a contested operating environment and with great effectiveness and survivability.

Air warfare theory has largely been focused on using air power to affect the will of the adversary. The original air power theorists were typically army officers who had converted to their respective air arms during World War 1. Shocked and appalled by the huge cost of human life in attritional trench warfare, their thoughts turned to alternative warfare strategies. Hence, early theorists professed that the object of war was to destroy the enemy's will to fight by attacking its infrastructure and heartland, rather than its fielded forces.<sup>10</sup>

Later, Slessor took a more balanced view by realising that in addition to strategic bombing, interdiction of the adversary's battlefield supply system and supporting land forces were also important contributions air power could make to warfare. Slessor, a product of the fledgling Royal Air Force in World War 1, was the first air power theorist to take a truly joint view of warfare.<sup>11</sup> Colonel John Warden, one of the most noteworthy air power theorists of the modern era, was—like the early theorists—also a proponent of strategic attack. However, his view differed slightly in that he saw the enemy as a five-ring system, where each ring represented groups of thematically bound centres of gravity. At the bullseye of the rings was the enemy leadership, which represented the highest priority target for air power. The outermost and lowest priority ring was enemy fielded forces. Warden's ultimate goal was to force the enemy to comply with friendly objectives.<sup>12</sup>

At the strategic level, we attain our objectives by causing such changes to one or more parts of the enemy's physical system that the enemy decides to adopt our objectives, or we make it physically impossible for him to oppose us. The latter we call strategic paralysis.<sup>13</sup>

All this is to say that air power theory has been relatively consistent since the first theorists put pen to paper in the early 1920s. It has been very much focused on coercing the adversary's will to fight, rather than using its brute force for purely the destruction of fielded military forces, although the methods used to coerce the adversary's will have varied with time and theorist. While some espouse that air power is best suited for one coercive strategy or another, it is the inherent versatility and flexibility of air power and its offensive nature that enable it to contribute effectively to most, if not all, strategies.

Recognising the differences between theory and practice is important. Air power has inherent characteristics and capabilities which, when postured for use or when employed, may create many effects, some intended and some not. For example, destruction can adversely affect the adversary's morale and will to fight but excessive destruction can turn fear into resolve, increasing an adversary's determination to resist. The application of force will incur many effects simultaneously and to say that one can employ a specific air power capability in the context of a specific coercive strategy and achieve a single desired effect is unrealistic.

The situation in which the coercive force is applied—and the combination of many positive and negative influences, both internal and external to the adversary force—will ultimately determine the degree to which the adversary's will is affected. When assessing the effectiveness of air power or air power effects to coerce, it is more realistic to speak of expected or intended effects and contributions, as opposed to drawing absolute causal linkages between air action and changes to adversary behaviour.

## **Air power and deterrence**

The characteristics of air power make it a particularly effective and economical deterrent force. Speed, reach (in some cases global reach), responsiveness, flexibility and penetration enable a relatively small force, centrally located, to quickly forward deploy, posture to dissuade or counter aggression, or conduct destructive, retaliatory strikes if necessary. If the reach of this force is global, then the deterrent effect becomes location independent. If the force is sufficiently robust (and of reasonable size, containing world-class capability), the deterrent effect becomes adversary independent. While most air forces do not possess true global reach and dominance in all air power capabilities, the deterrent effect of medium and small air forces will likely be regional in nature and dependent on both the adversary's strength and the type of situation presented.

## **Air power and compellence**

The missions that air power elements undertake can produce multiple effects at the tactical, operational and strategic levels of war. While air power can conduct 'control of the air' operations, aimed at preventing adversary air power from influencing friendly force operations, it achieves this objective by concurrently conducting offensive missions (that is, offensive counter air, to destroy adversary air power capability either in the air or on the ground) and defensive missions (that is, defensive counter air, to deny the adversary's ability to achieve their air objectives in friendly airspace).

Strike missions, such as air interdiction, are generally employed to destroy targets on the ground, although these strikes can be tailored to maximise demoralisation (will to fight) effects as well. The following paragraphs illustrate how air power can be or has been employed to achieve coercive effects.

## ***Air power and punishment strategies***

The characteristics of air power and the experience of air warfare have led many theorists to conclude that air power is fundamentally a strategic force with the inherent ability to strike targets of high strategic value. However, in the history of warfare, there is not a large body of evidence to suggest that strategic air attacks, by themselves, have directly coerced a regime to capitulate or appreciably accede to a coercer's demands. What can be stated is that there are examples where air power has contributed significantly to a coercive diplomacy or coercive force strategy.

As previously stated, the goal of a punishment strategy is to use the fear of future pain as the motivator for a change in behaviour. Perhaps the best example was the use of atomic bombs against Japan in August 1945. While the real and growing threat of invasion was also, undeniably, a coercive factor in influencing the behaviour of the Japanese leadership to change from resistance to compliance, the use of atomic bombs, and more importantly their continued potential use, was the tipping point.

The continuing US strategic bombing campaign, culminating in the atomic strikes against Hiroshima and Nagasaki, brought about Japanese surrender prior to an invasion. During his radio address to the Japanese people on August 14, 1945, Emperor Hirohito was clear in recognizing the role of the atomic bombs in his decision to surrender. Although casualty projections for the scheduled land invasions are debatable, the atomic strikes undoubtedly saved hundreds of thousands of Allied lives, as well as millions of Japanese lives, both military and civilian.<sup>14</sup>

A more recent example of air power's contribution to a coercive diplomacy strategy using punishment methods was Operation ALLIED FORCE and its air campaign over Serbia and Kosovo in 1999. While this campaign also employed significant elements of denial and destruction strategies, ultimately the gradual increase in air attacks on targets in Serbia increased the pressure on Serbian leadership. When this coercive force was considered alongside the coercive presence of regionally deployed ground troops, together with coercive diplomacy isolating Serbia from its presumed allies, it was enough to cause the Serbian leader, Slobodan Milosevic, to accede to NATO's demands. As noted in a 2000 article:

... air power might best be thought of as the force driving Milosevic into a deadend corner and threatening to crush him against the far wall. But had NATO not remained unified, Russia not joined hands with NATO in the diplomatic endgame, and the alliance not begun to develop a credible threat of a ground invasion, Milosevic might have found doors through which to escape from the corridor despite the aerial punishment.<sup>15</sup>

It should be noted that although air warfare theory sometimes states that punishment strategies or targeting adversary leadership (decapitation) can lead to a severe loss of morale, regime change or capitulation, some prominent theorists argue against this idea. While Warden's five-ring theory places leadership at the centre of the enemy system and represents the highest priority target, Robert Pape has asserted that:

Decapitation, like punishment, is not likely to topple governments, by fomenting either popular rebellion or a coup. Air attack is a weak instrument for producing popular rebellions, mainly because conflict with a foreign power typically unleashes political forces (such as nationalism and fear of treasonous behaviour) which make collective action against even unpopular regimes unlikely until the opportunity for military victory has been lost.<sup>16</sup>

### ***Air power and denial strategies***

While coercive strategies based on denying the adversary's achievement of their goals seem like a compromise between punishment and destruction, they arguably represent the most complementary blend of desirable characteristics of each. Denial strategies recognise the interconnection between destruction and will to fight. Air power, using its ability to range throughout the battlefield and deliver large yield weapons with a high degree of accuracy, day and night, has proven to be a very effective weapon in using destruction to change the will of an adversary.

Denial strategies are aimed at inducing a feeling of futility or hopelessness in the adversary. While punishment strategies aim to target any centre of gravity the adversary values, coercive force in denial strategies is normally applied to the primary mechanisms the adversary is using to achieve their objectives. For adversary military operations, this mechanism is most often the adversary's fielded military force, including their supplies, lines of communication, and command and control centres.

The most striking example of the effect of air power on fielded military forces was the Gulf War in 1991. Of the estimated 400,000 Iraqi troops deployed to the Kuwait theatre of operations, more than 160,000 deserted before the commencement of the ground offensive, while over 80,000 more surrendered during the 100-hour ground campaign.<sup>17</sup> While it is acknowledged that more than just air power was a factor in this, it was a significant one, with a RAND study noting that:

Strikes on enemy ground units were the air campaign's most significant contribution to the war. This use of air power—which did not rely on the spectacular new 'smart weapons' but on traditional 'dumb' iron bombs employed in mass—reduced the Iraqi army in Kuwait to a frightened and ineffectual fighting force. The result was light opposition, non-engagement, or surrender by Iraqi units and low casualties on both sides during the ground war. Air power had demonstrated most convincingly that—skilfully employed under the right conditions—it can neutralize, if not completely destroy, a modern army in the field.<sup>18</sup>

The ability to coercively affect fielded military forces from the air is dependent on the situation. Large forces in prepared, static defensive positions, such as those used by Iraqi forces in Kuwait, were susceptible to air strikes. In another example, dispersed Viet Cong forces in Vietnam were much less susceptible. What can be gleaned from examination of the use of air power to inhibit the adversary's achievement of their objectives through the use of coercive denial is that the psychological effect of attacking fielded forces can at times be the dominant effect and it is often the most underappreciated, with a RAND report noting that:

An Iraqi officer told his interrogator that he had surrendered because of B-52 strikes. 'But your position was never attacked by B-52s', his interrogator exclaimed. 'That is true', the Iraqi officer replied, 'but I saw one that had been attacked'.<sup>19</sup>

### ***Air power and destruction strategies***

Air power has the ability to effectively destroy adversary targets wherever they can be detected. What makes air power well suited to eliminating the adversary's means of conducting warfare is its inherent ability to seek out and locate targets, and then rapidly send attacking forces to where the targets are. In addition to holding expertise in conducting devastating campaigns against a broad range of deliberate targets, air power has also developed the ability to bring aerial fires onto emerging, dynamic or mobile targets equally effectively.

While air power planners and strategists acknowledge that certain conditions are more conducive to air attack than others—and that air power is not the sole means of delivering destructive power to the battlefield—the sensors, intelligence resources, situational awareness and command and control systems, and precision air weapon systems now being employed enable unprecedented levels of responsiveness and destructive capability on the modern battlefield. The battle of Khafji, the only post-invasion offensive operation conducted by the Iraqi forces during the 1991 Gulf War, showed how air power could detect, attack and destroy emerging adversary ground forces with devastating effect:

On January 29, 1991, Iraq launched its only offensive of the Gulf War—and was promptly clobbered by airpower.... Khafji demonstrated to all but the most ingrained sceptic the ability of deep air attacks to shape and control the battle and yield advantages for engaged ground forces. In 1991, airpower identified, attacked, and halted division-sized mechanized forces without the need for a synchronized, ground counterattack.<sup>20</sup>

Air power has also demonstrated the ability to destroy much of a nation's war-making capacity through strategic attacks. The 'US Strategic Bombing Survey', conducted during the latter stages of World War 2 by a group largely composed of impartial civilian businessmen, lawyers and bankers,<sup>21</sup> compiled 212 volumes of information and analysis regarding the actual effectiveness of strategic air power in both the European and Pacific theatres.



The survey argued that particularly in the last year of the war, 'strategic bombing had a catastrophic effect on the German economy and transportation system, and this in turn had a fatal impact on German armed forces'.<sup>22</sup> Albert Speer, the German Minister for Armaments and War Production, later stated that May 1944—when the strategic bombing campaign was ramping up to full force—was the beginning of the end and that '[t]he war was over in the area of heavy industry and armaments'.<sup>23</sup>

## Coercion and counter-coercion

Diplomacy, conflict and coercion are not one-sided affairs. Both sides influence the outcome of any interaction. This concept certainly applies to coercive diplomacy and coercive force. As one side tries to coerce their adversary, the adversary will normally try to recognise and affect the vulnerable aspects of the coercer. As an example, to avoid nuclear war, the deterrent strategy based on mutually-assured destruction (MAD) quickly developed. This strategy aimed to discourage any nuclear nation from using the threat of the use of its nuclear weapons to achieve its aims by countering with the threat of full nuclear retaliation.

MAD is a doctrine of military strategy and national security policy in which a full-scale use of high-yield weapons of mass destruction by two opposing sides would effectively result in the complete, utter and irrevocable annihilation of both the attacker and the defender, becoming thus a war that has no victory nor any armistice but only effective reciprocal destruction. It is based on the theory of deterrence according to which the deployment, and implicit menace of use, of strong weapons is essential to threaten the enemy in order to prevent the use by said-enemy of the same weapons against oneself.<sup>24</sup>

A coercer or dominant coercing force will also have centres of gravity that it must protect, as the adversary will most certainly try to apply coercive force against them. As an example, one of the common, critical vulnerabilities or own-force centres of gravity that are exposed to adversary coercion in almost every form of conflict is public support. As this is a 'will to fight' vulnerability, the adversary will probably attempt to employ a coercive punishment strategy and escalate the cost of the conflict. The nature of these costs could be political (for example, support for leadership), financial (sustainment costs for large military deployments or the costs of expensive equipment required for the operation), human (casualties) or moral (excessive collateral damage and/or civilian casualties).

Air power can effectively negate coercive adversary attacks by demonstrating how the above costs can be minimised. In particular, air power can minimise human and moral costs by continuing to employ methods that minimise risk to non-combatants, demonstrate accuracy and proportionality in their offensive action and maintain high levels of survivability for friendly combatants.

## Key lessons

Examination of the ability of air power to apply coercive force has revealed some key lessons for political leaders contemplating the use of deterrence or coercive force, and for military commanders, planners and strategists charged with devising plans to apply coercive force. They can be summarised as:

1. Air power is most coercive when it is used in conjunction with other coercive elements. Coercive diplomacy, other military elements that form a coercive presence, parallel psychological operations and forces that can immediately exploit changes in adversary behaviour all enhance the coercive effect of air power.



2. Enemy demoralisation (the degrading of the will to fight) should be an air campaign objective.<sup>25</sup>
3. Coercive strategies, including those employing air power as a coercive means, are often dependent on successfully exploiting one or more of the following three factors:<sup>26</sup>
  - a. Escalation dominance (the ability to turn the heat on the enemy up or down at will).
  - b. Defeating the adversary's military strategy (denial).
  - c. Magnifying third party threats (reducing the ability of the adversary to defend against a third party). Air power was used successfully in this capacity at the start of Operation ENDURING FREEDOM (the Northern Alliance was the third party) and during Operation UNIFIED PROTECTOR in Libya (where the anti-government forces were the third party).
4. Coercion has a good chance of success if the coercer can bring about four related conditions:<sup>27</sup>
  - a. Adversary feels victory is impossible.
  - b. Adversary feels resistance is futile (hopelessness).
  - c. Surrender now is better than surrender later (the future will hold increased levels of pain).
  - d. Compliance must bring some benefit.
5. Too much destruction or destroying the wrong things (including non-combatants) can be detrimental to coercion and expose a coercing force to counter-coercion. Air power must be used proportionally, with discrimination and with restraint.<sup>28</sup>

## Coercive force in Libya

Following the passage of UN Security Council Resolution 1973 on 17 March 2011, authorising 'all necessary measures' to protect civilians, establish a no-fly zone and enforce an arms embargo,<sup>29</sup> US and allied forces commenced military operations against Libya on 19 March. This action, titled Operation ODYSSEY DAWN, was a US Africa Command-led combined operation initially involving control of air and strike missions. Offensive missions commenced with strikes by US (US Air Force and US Navy), French and British aircraft, and cruise missiles from American and British naval vessels.<sup>30</sup> On 24 March, the US handed control of the operation to NATO and it became known as Operation UNIFIED PROTECTOR. A media report by NATO noted that:

Since March 24, an unprecedented coalition of NATO Allies and non-NATO contributors have been protecting civilians under threat of attack in Libya, enforcing an arms embargo and maintaining a no-fly zone. As NATO Secretary General Rasmussen explained, under Operation Unified Protector, NATO is doing 'nothing more, nothing less' than meeting its mandates under UN Security Council resolutions. No NATO ground troops have participated in the operation—NATO's success to date has been achieved solely with air and sea assets.<sup>31</sup>

At the conclusion of the operation, NATO and coalition aircraft had flown over 26,500 sorties, including 9,700 strike sorties, and had destroyed over 5,900 military targets.<sup>32</sup> No doubt much analysis of the effects of this operation will now take place, which will most certainly include coercive effects and the role air power played in achieving them.

In the meantime, it may be valuable to take a cursory look at the way air power was employed to see if it fits into one or more of the coercive strategies identified in this article and if it appreciated the above lessons learned.

In essence, this operation employed what can be viewed as a coercive denial strategy to prevent the then-Libyan Government from achieving its objective of quelling by force the rebellion of a large portion of its civilian population. Air power was used to target the Libyan means being used to attack rebel forces and subdue civilian unrest and, in particular, the military aircraft and heavy weapons being employed. Whether air power actually achieved denial effects, including the changing of Gaddafi's or his force's behaviour or will to fight, requires more analysis. If it did persuade or dissuade Gaddafi's forces—and if air power only had tactical, destructive effects—it can still be viewed as being destructively coercive if the elimination of Gaddafi's heavy weaponry, including much of his armour and artillery, rendered his forces incapable of defeating the rebel forces.

Interestingly, during the middle portion of this operation, when there seemed to be little progress in the civil war either way, doubts about air power's ability to significantly influence the outcome began to surface, such as:

We have reached the stalemate that we always seem to reach when there is a great reliance on Western airpower supporting local forces. We saw it quite often in the Balkans and other places. There's a limit to how much air strikes can do especially when the government or loyalist forces have most of the firepower on the ground. There's a situation with the geography and the military tactics being used by both sides. To break the stalemate you'd need to have some quite heavy conventional forces move into the country.<sup>33</sup>

While the above comments were written in early August, by the end of that month rebel forces, backed by air power, had captured the Libyan capital, and Gaddafi's days in power were numbered. By 20 October, Gaddafi was dead and a rebel victory was secured. While it is difficult to gauge how much air power contributed to this result and how coercive that power actually was, there is little doubt that it contributed to the demise of Gaddafi and his forces.

The lessons learned regarding the coercive use of air power that have been shown previously may be of use in interpreting how air power affected this civil war. The assertion by Byman, Waxman and Larson that coercion could be deemed effective if it defeated the adversary's military strategy (denial) or magnified a third party threat<sup>34</sup> seems applicable in the Libyan case. With the denial aspect already discussed above, the 'levelling of the playing field' that air power offered by defeating Gaddafi's air force and heavy weapons may have made the rebel forces (the third party) a bigger threat to Gaddafi's forces than previously anticipated.

Perhaps the indication that the air power-backed rebellion was being viewed as a serious threat came on 1 September when the media reported that one of Gaddafi's sons attempted to negotiate with the rebel leadership.<sup>35</sup> Interestingly, while Saadi seemed willing to negotiate, his brother Saif, who was under indictment by the International Criminal Court (ICC), was not. This begs the question if the ICC's action helped or hindered a quick resolution of the conflict. While indictment by the ICC may have lent some legitimacy to the forces opposing Gaddafi and de-legitimised the Gaddafi regime, when viewed against Mueller's guidance<sup>36</sup> for conditions conducive to successful coercion, it may have hindered. Although the first two conditions (the adversary feels victory is impossible and resistance is futile) had probably been met by early September, for Muammar and Saif Gaddafi the potential humiliation of a public

trial at the hands of the ICC may have negated any chance of achieving the last two conditions (surrender now is better than surrender later, and with compliance comes some benefit).

With regard to counter-coercion, it appears that NATO's employment of air power and their counter-coercion methods were successful. From the commencement of air strikes, media messages like 'CF-18s abandon attack on Libyan airfield to avoid collateral damage'<sup>37</sup> were clearly proactive measures to ensure public support for the operation was retained. Additionally, as no NATO personnel were killed in combat in Libya during the almost 10,000 strike sorties flown, the perceived human cost of this operation remained low and not susceptible to coercive pressure on public support.

Air power's contribution to coercion in Libya will be judged over time, as more information becomes available. Nevertheless, there is little doubt that air power had a significant effect and that some of the air power effects were coercive:

'Whether one agrees with the intervention, one thing is clear, and no surprise to objective observers: modern airpower is the key force that is directly leading to the overthrow of the Gadhafi regime—just like it was the key force that led to the replacement of the Milosevic regime in 1999, and the Taliban regime in 2001', e-mails retired Air Force Lieutenant General David Deptula, who planned the air campaign during the 1991 Gulf War. 'Airpower eliminated the Libyan integrated air defense system, instilled a no-fly zone rendering Libyan air forces ineffective, and reduced the organized Libyan Army to dismounted infantry unable to mass to achieve sufficient effectiveness to survive'.<sup>38</sup>

## Conclusion

Coercion is not a single or rigid strategy to be used in conflict. It is a tool that a nation or coalition of nations can use to help impose its will on an adversary nation or definable group. The spectrum of coercion contains coercive strategies that aim to achieve the goal of dominating an adversary but in different ways, including deterrence, punishment, denial and destruction. While these can involve all the elements of national power in their application, one of the key coercive elements is normally military force. Coercive force is rarely one-sided and most adversaries are able to apply coercion to some of the critical vulnerabilities or centres of gravity, particularly those associated with the financial, human and moral costs of conflict.

Air power with its inherent speed, reach, penetration, versatility, flexibility and precision is ideally suited for most coercive strategies. While in the past air warfare theory sometimes exaggerated the likely coercive effects of air power, analysis of a century of air warfare experience has revealed that air power has been an extremely effective coercive force, although sometimes serendipitously so. The demonstrated capability of air power, most often acting in conjunction with other coercive elements, to force behavioural change on an adversary are now well documented. In the words of General Omar Bradley:

Airpower has become predominant, both as a deterrent to war, and—in the eventuality of war—as the devastating force to destroy an enemy's potential and fatally undermine his will to wage war.<sup>39</sup>

*Lieutenant Colonel Brian Murray has completed operational tours on the CH-136 Kiowa and CF-18 Hornet, accumulating over 4000 hours of helicopter and fighter flying time since joining the Canadian Forces in 1985. He deployed to Aviano, Italy and flew CF-18s during Operation ALLIED FORCE in 1999, was officer-in-charge of the Canadian Fighter Weapons Instructor Course in 2000 and 2001, and was the deputy commanding officer of 410 Tactical Fighter (Operation Training) Squadron in 2002. In 2009, after completing a tour as the Analysis and Lessons Learned Branch Head in the Canadian Forces Aerospace Warfare Centre, Lieutenant Colonel Murray became the Canadian Forces Liaison Officer to the RAAF's Air Power Development Centre. He holds a diploma in Aviation and Flight Technology from Seneca College of Applied Arts and Technology (Toronto) and a Bachelor of Military Arts and Science degree from the Canadian Royal Military College (Kingston).*

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## NOTES

1. See, for example, *Macquarie Dictionary*, 4th edition, Macmillan: South Yarra, 2005.
2. Daniel L. Byman, Matthew C. Waxman and Eric Larson, *Air Power as a Coercive Instrument*, RAND: Santa Monica, 1999, p. 10.
3. Karl Mueller, *The Essence of Coercive Air Power: a primer for military strategists*: see <<http://www.airpower.au.af.mil/airchronicles/cc/mueller.html>>, accessed 30 August 2011.
4. *Merriam-Webster Dictionary*: see <<http://www.merriam-webster.com/dictionary/diplomacy>>, accessed 5 November 2011.
5. Alan J. Stephenson, *Shades of Gray: gradual escalation and coercive diplomacy*, Air War College: Maxwell Air Force Base, Alabama, 4 April 2002, p. 3.
6. Mueller, *The Essence of Coercive Air Power*. Note that while Thomas Shelling, the noted author of *Arms and Influence*, also agrees with Mueller's assertion that deterrence and compellence are both elements of coercion, it is recognised that not all theorists share this view.
7. Editor's note: while it is acknowledged that 'they' in relation to an adversary is grammatically incorrect, it is used in this article as a gender-neutral term, rather than the more cumbersome 'he or she' or the impersonal 'it'.
8. Stephenson, *Shades of Gray*, p. 9.
9. Mueller, *The Essence of Coercive Air Power*.
10. Raymond P. O'Mara, 'Clearing the Air: airpower theory and contemporary airpower', *Air Force Journal of Logistics*, Vol. 34, Nos. 1 and 2, Annual Edition, pp. 52-9.
11. O'Mara, 'Clearing the Air', p. 63.
12. O'Mara, 'Clearing the Air', p. 65.
13. O'Mara, 'Clearing the Air', p. 65.
14. Phillip S. Meilinger, 'A Short History of Decisiveness', *Air Force Magazine*, September 2010, p. 100.

15. Ivo H. Daalder and Michael E. O'Hanlon, *Winning Ugly: NATO's war to save Kosovo*, The Brookings Institution: Washington DC, 2000, p. 184.
16. Robert A. Pape. *Bombing to Win – Air Power and Coercion in War*, Cornell University: Ithaca (New York), 1996, p. 82.
17. Stephen T. Hosmer, *The Psychological Effects of US Air Operations in Four Wars 1941-1991*, Rand: Santa Monica, 1996, p. 153.
18. *Air Power in the Gulf War - Evaluating the Claims*, RAND Corporation: see <[http://www.rand.org/pubs/research\\_briefs/RB19/index1.html](http://www.rand.org/pubs/research_briefs/RB19/index1.html)>, accessed 6 November 2011.
19. Hosmer, *The Psychological Effects of US Air Operations in Four Wars 1941-1991*, p. 165.
20. Rebecca Grant, 'The Epic Little Battle of Khafji': see <<http://www.airforcemagazine.com/MagazineArchive/Pages/1998/February%201998/0298khafji.aspx>>, accessed 8 November 2011.
21. Phillip S. Meilinger, 'The USSBS' Eye on Europe', *Air Force Magazine*, October 2011, p. 75.
22. Meilinger, 'The USSBS' Eye on Europe', p. 76.
23. Meilinger, 'The USSBS' Eye on Europe', p. 78.
24. Wikipaedia, definition of 'mutual assured destruction': see <[http://en.wikipedia.org/wiki/Mutual\\_assured\\_destruction](http://en.wikipedia.org/wiki/Mutual_assured_destruction)>, accessed 5 November 2011.
25. Hosmer, *The Psychological Effects of US Air Operations in Four Wars 1941-1991*, p. 189.
26. Byman, Waxman and Larson, *Air Power as a Coercive Instrument*, p. 29.
27. Mueller, *The Essence of Coercive Air Power*.
28. Byman, Waxman and Larson, *Air Power as a Coercive Instrument*, p. 138.
29. UN Security Council Resolution 1973 (2011), 17 March 2011, p. 3, see: <<http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N11/268/39/PDF/N1126839.pdf?OpenElement>>, accessed 7 November 2011.
30. Jeremiah Gertler, *Operation Odyssey Dawn (Libya): background and issues for Congress*, Congressional Research Service: Washington DC, 28 March 2011, p. 7: see <<http://fpc.state.gov/documents/organization/159790.pdf>>, accessed 9 November 2011.
31. NATO, 'NATO and Libya', media release: see <<http://www.nato.int/cps/en/natolive/71679.htm>>, accessed 10 November 2011.
32. NATO, 'Operation UNIFIED PROTECTOR Final Mission Stats', media release, 2 November 2011: see <[http://www.nato.int/nato\\_static/assets/pdf/pdf\\_201111/20111108111107factsheet\\_up\\_factsfigures\\_en.pdf](http://www.nato.int/nato_static/assets/pdf/pdf_201111/20111108111107factsheet_up_factsfigures_en.pdf)> accessed 10 November 2011.
33. Mat Hardy, 'The Libyan Stalemate: can it be Broken?', *The Conversation*, 5 August 2011: see <<http://theconversation.edu.au/the-libya-stalemate-can-it-be-broken-2699>>, accessed 10 November 2011.
34. Byman, Waxman and Larson, *Air Power as a Coercive Instrument*, p. 29.
35. Sky News, 'Gaddafi's Sons At Odds Over Ending Conflict', *Sky News*, 1 September 2011: see <<http://news.sky.com/home/world-news/article/16060347>>, accessed 10 November 2011.
36. Mueller, *The Essence of Coercive Air Power*.
37. 'CF-18s abandon attack on Libyan airfield to avoid collateral damage', *The Spectator*, 22 March 2011: see <<http://www.thespec.com/news/world/article/505477--cf-18s-abandon-attack-on-libyan-airfield-to-avoid-collateral-damage>>, accessed 10 November 2011.
38. Noah Shachtman, 'So Much For "Stalemate": Libyan rebels enter Tripoli, backed by US firepower', 21 August 2011: see <<http://www.wired.com/dangerroom/2011/08/so-much-for-stalemate-libya/>>, accessed 10 November 2011.
39. Phillip S. Meilinger, *Ten Propositions Regarding Airpower*, US Air Force School of Advanced Airpower Studies: Maxwell Air Force Base, Alabama, 1995: see <<http://www.airpower.au.af.mil/airchronicles/cc/meil.html>>, accessed 6 November 2011.

# Military Retention Bonuses: fact and fiction

Lieutenant Colonel Phillip Hoglin, Australian Army

Angie Sturrock, Department of Defence

Major Phil Brezzo, Australian Army

Commander David Goble, RAN

## Introduction

Retention bonuses are generally accepted as short-term fixes to longer-term workforce issues, implemented to address a specific and immediate need. Whether workforce issues are caused by high separation rates, low recruitment, poor force structure or some other external factor, the view exists that applying a bonus will mitigate some or all of the causes of the problem. Unlike other retention initiatives, they are also thought to have an almost instantaneous effect, the results of which can supposedly be observed shortly after implementation. Longer-term solutions, however, are not always implemented within the life span of any retention bonuses and, as such, the underlying issues continue to plague the workforce segments targeted.

Additionally, analysis targeted at determining the general effectiveness of retention bonuses, a subject area that requires attention in its own right, is limited. Despite the lack of analysis, the continued application of bonuses suggests there is little doubt among policy developers that they increase retention; to suggest otherwise would seem counter-intuitive. As a consequence, bonuses are applied without a sense of their potential effectiveness and, in many cases, without a well-defined objective as to what the bonus is intended to achieve.

Presumably, the broad assumption is that retention is directly linked to remuneration and the higher the remuneration the higher the retention. There is, however, little evidence to support such an assumption and there are costs and risks in applying a bonus which are not immediately evident and which may not surface until well after the bonus has come and gone. Recent work within the Department of Defence suggests the elements of employment most important to ADF members span the entire employment offer and that less tangible elements—such as leadership, the ability to balance working and personal lives, and control over individual careers—are viable avenues to influence behaviour.

This article will discuss the potential second-order effects arising from the application of retention bonuses. In order to place discussion in context, an overview of the conventional rationale behind a bonus will be outlined, along with a short discussion on recent literature. The article will then highlight some of the more commonly-held and misleading assumptions surrounding the implementation of bonuses. The main section of the article will detail some of the possible second-order effects of retention bonuses, while the final section will suggest a process to assist in determining when bonuses are appropriate and when they should otherwise be avoided.

## **The rationale and theory of retention bonuses**

The commonly accepted first-order effect of a retention bonus is that it will reduce the likelihood that individuals in a particular target group, whether it is rank, category or experience level, will choose to resign. It is generally believed this will reduce separation rates, resulting in higher cohort numbers of the target group in current and later years, consequently enhancing or maintaining Defence capability while creating enough time to correct the deficiency in force structure. The base assumption, therefore, is that members who would otherwise resign had a bonus not been offered, will change (or at least defer) their decision by accepting the bonus and a subsequent undertaking for further service.

While the amount of bonus required for an individual to be retained may vary, there is no remuneration strategy in the ADF for determining exactly how much the monetary amount should be. The dollar value of recent bonuses, such as that offered by the 'Navy Capability Allowance' of 2008 and 'Army Expansion and Rank Retention Bonuses' of 2007, seem to be arbitrary and based on a combination of subjective assessments and the funding available in the retention budget, rather than how much is actually required.

Pragmatically, to achieve the specified intent, bonus amounts cannot be set too low, so as not to achieve any increase in retention, but also cannot be set so high that they place an unreasonable financial liability on the ADF. While setting a bonus amount that entices a member to stay could be seen to represent the efficient use of government funds, it also requires a well-defined intent for the bonus in a measurable context, the inherent difficulty of which is discussed later.

## **Selected literature review**

### ***Nunn Review***

The *Review of Australian Defence Force Remuneration 2001* provided one of the more recent public reviews relevant to the current ADF remuneration structure. The review found that 'payment of bonuses, and in some cases multiple bonuses, to individuals who either had no intention of leaving the ADF, or who did not possess the skill sets being sought by the external market' have been made (Nunn et al 2001, p. 126). The review indicated that payment of bonuses can be inefficient and may not achieve the intended effect of improving retention.

Of note, Nunn et al (2001, p. 126) also stated that bonuses should 'be devices of last resort used to counter unexpected external targeting of high value employees' and when used 'they should be specifically targeted and monitored for performance'. The review also discounted the concepts of remuneration equity and instead proposed that financial incentives could be offered on an individual basis rather than across cohorts.

### ***Australian National Audit Office***

The Australian National Audit Office (ANAO) has produced two reports on the retention of military personnel, the first in 2001, followed by a later audit in 2003. The initial report indicated that 'expenditure on retention has the potential to be much more cost-effective than expenditure on recruitment and training' (p. 13). The research, however, also outlined a perception that some retention and completion schemes (including bonuses) 'did not



necessarily have a great impact upon retention rates .... because they did not address the reasons personnel were separating, but merely raised the price of someone who was in the market for other reasons' (p. 38).

The ANAO research provided some qualitative evidence that bonus schemes may not be cost effective because they are paid to personnel who are not intending to separate and are often applied after a problem had become apparent (p. 39). The ANAO also found that 'Defence has not conducted an overall assessment of the effectiveness and efficiency of retention schemes for use in the development of subsequent retention schemes' (p. 58). It outlined that Defence needed to develop a much better knowledge of the incentives that work and the reasons for their success. The report concluded by stating 'there is no clear evidence that specific retention schemes are cost effective' and recommended that Defence should collect evidence concerning the effectiveness of these schemes (p. 41).

The follow-up ANAO audit leveraged heavily from the findings of the review by Nunn et al. In its discussion on the costs of recruiting and training compared with retaining already trained personnel, the report surmises that 'substantial investment in retaining these personnel could be cost-effective' (p. 30). The difficulties in attributing the cost of recruiting and training in order to inform an assessment of how much should be expended to retain an individual, combined with the intangible cost of experience were, however, acknowledged.

## **Retention and recruitment program**

Post both the Nunn and ANAO reviews, Defence implemented the 'Retention and Recruitment (R2) Program'. R2 was a suite of 12 government-funded initiatives each designed to address specific retention and/or recruitment concerns, all with the ultimate goal of increasing the size of the full-time ADF. The R2 Program included a number of retention bonuses and allowances, the majority of which have reached the end of their life-cycle (all funding for R2 Program bonuses and allowances, with the exception of the Submarine Deployment Allowance, will cease by June 2012). An Audit Division (Department of Defence 2010a) assessment of the effectiveness and efficiency of the bonus-related initiatives was undertaken in 2010, as was a departmental review (Department of Defence 2010b) of the entire program.

In assessing the effectiveness of bonuses paid as part of the R2 Program, Audit Division noted that Defence could not 'determine whether it has paid more in R2 bonuses than it needed to or whether it needed to pay more to achieve the required results' (Department of Defence 2010a, p. 10). It concluded that 'there is no formal Defence policy that provides direction for the development, implementation and ongoing assessment of retention bonuses' (p. 3). Similarly, the departmental review highlighted issues with the collection of baseline data, setting appropriate and measurable key performance indicators (KPIs), and the concurrent nature and interdependencies of many of the individual initiatives. This review concluded that such issues made it difficult to make a valid assessment of the impact and magnitude of effect of the R2 Program overall and the individual initiatives within it.

Taken together, the Nunn and ANAO reviews, and the Audit Division and departmental evaluations of the R2 Program highlight three key points in relation to the payment of retention bonuses. These are:



- The ADF does not know whether retention bonuses are effective in increasing retention;
- The ADF does not know whether retention bonuses represent a cost-effective method for retaining personnel; and
- There has been no formal analysis of the effectiveness of bonuses to inform decisions on the efficacy of these schemes to reduce retention or achieve the desired outcome.

### **Some false and misleading assumptions**

One criticism of the rationale behind applying a bonus is a seemingly habitual assumption that retention is the root problem in a category that suffers from a high proportion of vacancies. A high number of vacancies in a particular category does not necessarily mean separation rates are high; in fact, high vacancies are very often a symptom of poor workforce structure. Although it is true that some employment categories and ranks suffer from high separation rates at some career stages, those most frequently listed on critical category reports also suffer from a poor structure, with career progression systems that are not sufficient to provide the necessary numbers at the appropriate ranks and cohorts. Bonuses can do little to alleviate an inherently poor structure and, where they can produce an influence, the effect will only be temporary.

A second misleading assumption is that separation is a bad or undesirable characteristic of the ADF workforce and must be reduced. Separation is necessary for a healthy workforce in order to allow a reasonable flow of personnel to progress through the system and allow opportunity for both promotion and career enhancement activities. Reducing separation rates too far will slow promotion rates, with the potential side effects of increasing average age, increasing time-in-rank and potentially inducing more separations due to a lack of promotion and career opportunity in the long-term.

A further misleading assumption in the application of bonuses is that the ADF can control its separation rates. Although there are obvious policies and internal factors that can be controlled, in reality separation rates are the consequence or final output of the workforce system, not an input. In other words, separation rates occur as a product of all the internal and external factors (many of which are unknown or not measurable) that affect the behaviour of individuals. To view separation rates as the workforce lever that can be controlled by the ADF simply ignores the fact that personnel choose to stay or leave based on a variety of factors—and not because there is an arbitrary target rate to be achieved. Separation rates are analogous to national unemployment rates; that is, they occur as a product of other factors and are not determined independently of all these various influences.

It is unfortunate that these misleading assumptions have often guided the application of such bonuses. Policy documents covering initiatives, such as the ADF Pay and Conditions Manual (Department of Defence 2011), have reiterated that the intent of many bonuses is to encourage retention through additional service. While the intent may be justified, the detrimental second-order effects are often ignored, the schemes are not well designed to achieve the intent, suitable metrics designed to measure the success or otherwise of the scheme have not been put in place, and/or schemes are unnecessary in the first place and, as such, do not achieve their intended outcome.

## Understanding second-order effects

As with many policies, particularly in the personnel space, there can be numerous second-order effects, some of which enhance the intended effect of the policy and others that may compromise the intended outcome. With the implementation of bonus schemes, most of the second-order effects relate to cost, force structure and career impacts. The collection of these effects represents an impact, either positive or negative, of bonus scheme implementation.

### *Premium on a bonus (economic rent)*

To be effective, a bonus must be appealing to those personnel who would otherwise resign; that is, the target group. Payment of a bonus to personnel who would otherwise stay is effectively the premium paid to retain the few who would not have stayed. There is, however, a danger; if the bonus is not well accepted by the target group, its payment may be nothing more than extra money in the pockets of people who were prepared to stay in any case, while at the same time missing those who intend to separate. Enticing the right people to accept a bonus is a complex challenge and the likelihood that the wrong people will accept a bonus represents a fiscal risk to the cost effectiveness of a bonus before the results are known. The fact remains there are no methods currently available to assess bonus acceptance or whether it will attract the target group prior to its implementation.

### *Timing of a bonus*

There is tacit acknowledgement that military personnel make their retention decisions during certain discrete periods of service. In general, personnel do not continually scan employment pages or submit resumés to external organisations (public or private); instead, they enter particular periods where their risk of separation is higher than at other times. These periods are historically represented through an increased *propensity to leave* at certain points in a person's career, such as completion of an initial obligated period of service, postings, promotion cycles, or a change in personal circumstances. Unfortunately, a poorly-timed bonus scheme may introduce a decision period that did not previously exist and may inadvertently increase separation rates.

In designing a bonus, the timing of the undertaking for further service should be planned such that it does not introduce a new decision period. If it can be timed to occur at an existing career decision period, such as promotion, selection for career courses, post-graduate training or a posting, then the individual is still only confronted with the same number of decision periods. Unfortunately, many previous bonus schemes appear not to have considered the decision cycle of individuals around these career periods and, in some instances, may have inadvertently introduced an additional decision period leading to unexpected separations.

### *Delaying the inevitable?*

Bonuses, in effect, buy personnel for additional time. Once that time elapses, the characteristics defining the structure of the category may simply return to pre-bonus conditions, assuming there have been no further bonus schemes or other confounding retention initiatives. Unfortunately, there is little empirical evidence by which to examine whether workforce behaviours have returned to their pre-bonus status or not, simply because bonus schemes and their consequences are not well analysed.

It is reasonable to suggest that at the completion of an undertaking for further service, there will be an increase in separation in the target cohort, as those personnel who had previously delayed their separation reconsider their military options. Without analysis and an appreciation that this is a side-effect of applying a bonus in the first place, personnel planners may perceive the sudden increased separation as a worsening situation and it may induce them to recommend a subsequent retention bonus, leading to a risk of introducing a rolling bonus strategy that will not resolve the real reasons for the criticality of the workforce.

Provided ADF planners are aware that the main purpose of a bonus is to 'buy time'—and then use the time to address the longer-term underlying workforce issues causing the problem—post-bonus increases in separation rates should be understood in context. Should a Service fail to correct underlying issues during this grace period, then the bonus will only have been successful in the short-term; the category will continue to experience force structure problems (perhaps even exacerbated by the bonus) and there will be pressure for a rolling requirement for more bonuses at greatly added expense.

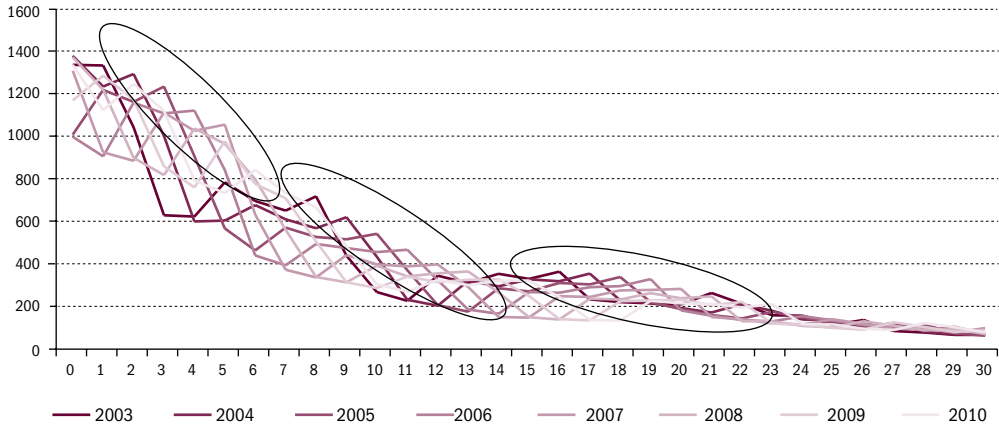
### ***Category structure***

Notwithstanding the possibility of a bonus simply delaying the inevitable, there are also several force structure implications associated with the introduction of such a scheme. Most notably, within a particular cohort or category, a bonus could create larger numbers in the targeted cohort compared with other more senior or junior cohorts. As this cohort progresses through its career, it distorts the normal years of service profile of an employment category and can appear as a cohort 'bubble', which has ramifications for both career management and force structure. Figure 1 shows, at the Service-level, the enduring bubbles which currently exist in the Services caused by personnel decisions in the past.

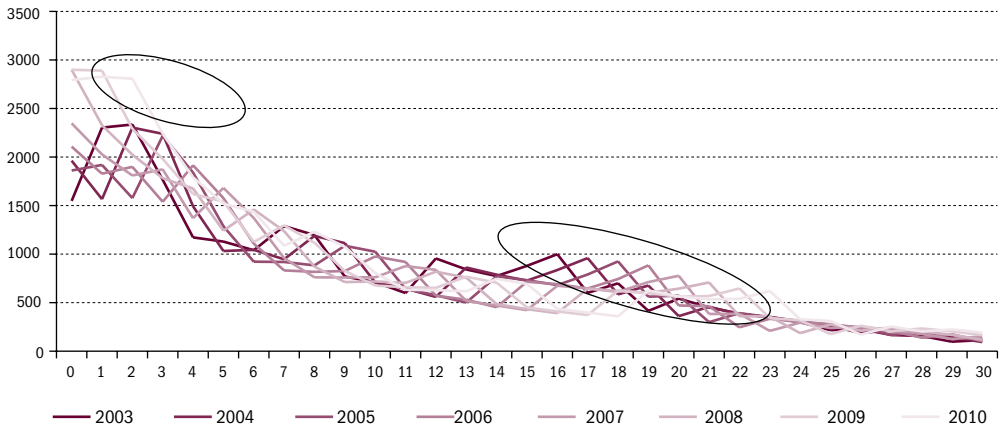
This bubble has its own suite of second-order effects. Varying cohort sizes can change the promotion requirements of a category or Service from one year to the next, resulting in some cohorts spending more time-in-rank than others, creating instability in the posting cycle, different demographics (such as age) of some cohorts, inconsistencies in the reporting system (including report inflation) and numerous other side effects. All of these effects have the potential to be measured and in some cases can be forecast. Furthermore, they can conspire to reduce or negate the effectiveness of a bonus and confound attempts at correcting inadequacies in category structure.

**Figure 1. Progressive length of service profiles**  
 (as at 1 July for each year 2003 to 2010)

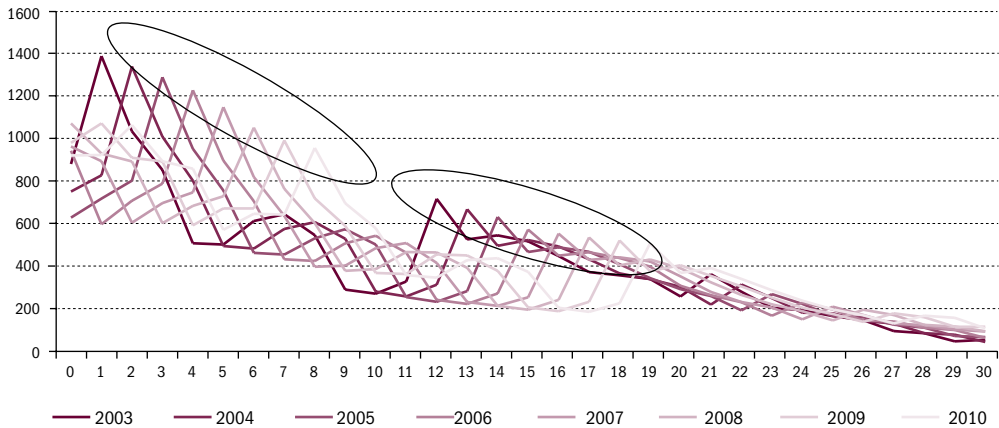
**Navy**



**Army**



**Air Force**



## ***Equity***

Remuneration equity essentially refers to the concept that individuals doing the same or similar work at a similar standard should get paid, on balance, the same. Equity, and the impact of perceived inequity, appears largely ignored in consideration of bonuses and discussion does not appear in any policy document. Statements implying personnel 'are better off or at least no worse off' do little to reduce the impact of inequity in remuneration, although these statements perhaps provide some principled comfort to the policy makers themselves (Cosgrove 2002, p. 7).

The effect of inequitable remuneration in the workplace is, however, difficult to estimate within the ADF. Attitude surveys, and the recently articulated Defence Employment Offer, indicate the extent to which remuneration is important for serving personnel. However, whether an individual is inclined to make a decision to stay or leave the ADF on the basis of incomparable remuneration with another member performing a similar function is unknown, as is their functional work output when they are earning different quanta. It is possible that a bonus awarded to one person but not to another, when the work value is similar, may encourage separation. At the very least, a changed self-perception of work and personal value to the organisation should perhaps be anticipated despite the expectation of a professional attitude to the work performed.

## ***Reversibility***

Regardless of the success or otherwise of a bonus, once offered it is generally not reversible and cannot be easily retracted. Even if the bonus does not address the perceived retention problem, there is little the ADF can do once the initial offer is made, and the risk of failure should be accepted and quantified from the outset. In addition, 'the ongoing use of retention bonuses can create a culture of expectation that, if not met, may result in a concentrated period of separations from a particular employment group' in its own right (Commonwealth of Australia 2002, W28). Hence, it is ironic that the application of a bonus may induce separations if the expectation that a bonus will be forthcoming is not met.

The acceptance of a bonus by an entire cohort can, paradoxically, actually result in reduced remuneration for many members of that cohort in the medium to long-term. If almost an entire cohort accepts a bonus, and a significant reduction in promotion opportunity and increased practical time-in-rank ensues, then some personnel will experience delays in a salary increase commensurate with promotion (or may never get promoted). Depending on the size of the bonus offered, if promotion either does not occur (when previously it would) or is delayed, then these personnel could feasibly have been financially better off had a bonus scheme not been introduced.

With the likelihood that negative second-order effects will reduce the effectiveness of bonuses, consideration should be given to better defining a set of circumstances under which a bonus should or should not be implemented. Any assumption that bonus initiatives will achieve the desired retention or force structure outcomes should be challenged during deliberate consideration of expenditure on such schemes. This process is neither new nor foreign to the Services, as all other purchases and contracts follow strict procurement guidelines. The fact that bonuses seem quarantined from these guidelines is curious because, after all, retention can be considered as a component in the *procurement* of personnel.

## When to introduce a bonus scheme

Bonuses should not routinely be considered as a panacea for the remediation of retention or category structure problems. Having outlined the potential for second-order effects to occur, retention bonuses may still provide a valid solution to retention and force structure deficiencies. Defence unfortunately lacks a reward and remuneration strategy and the associated policy to guide when this option should be employed beyond that offered in the Pay and Conditions Manual (para 3.5.20).

Despite the proportion of the Defence budget that is spent on remuneration, the actual roles of salary, allowances and bonuses—and where these fit within the overall Defence employment offer—are not articulated by higher direction. As a result, the evolution of Defence's remuneration offer has been ad hoc, rather than nested and aligned under one directed purpose. Given that Defence will likely face an on-going requirement to respond to retention challenges in an environment of defined workforce budgets, clearly stating the purpose and requirements of remuneration is critical to ensuring the efficiency and transparency expected of the organisation.

In the absence of a reward and remuneration strategy, several questions should be asked in order to determine whether a bonus is appropriate. Figure 2 provides a suggested decision tree that addresses the issues to be considered. If an assessment of 'bonus initiative considered for implementation' results from using this tree, then a bonus should be given serious consideration. Any other result suggests either a reduced likelihood of success in the use of a bonus scheme or a reduced need for it in the first place; and the possible increase in adverse effects on the workforce.

Note that even after having determined that a bonus may rectify a problem in the short-term, consideration should still be given to its cost effectiveness or whether funds can be better used in other areas also known to affect retention (for example, education, training, flexible work-practices, welfare and family assistance). With the recent advent of prescribed and directed work around Defence's overall employment offer, the areas of specific importance to different segments of the workforce can now be identified. This work will provide the evidence-base required to progress retention initiatives beyond those based on cash payments.

Although the considerations noted above offer a clear path toward whether or not to use retention bonuses, there may be instances when the circumstances support their use despite a lack of definitive workforce intelligence (such as excessive separation rates). In these instances, arguments for assurance based or pre-emptive bonuses can be developed. Should labour force trends indicate there is a likelihood of an increased future demand for a vulnerable workforce sector, pre-emptive measures (including bonuses) may be sought.

While such arguments have historically not been supported by the Defence Force Remuneration Tribunal, Services have understandably looked to reduce the risk of groups becoming perilous or critical by taking immediate action. In such cases, compelling business cases for the employment of bonuses must be developed. Traditional measures of effectiveness may not be appropriate but the detailed reasoning for the bonus needs to form the basis of future evaluation. Defined workforce budgets necessitate accountability and transparency in this process, rather than Services hiding behind the cloak of subjective 'professional judgment'.

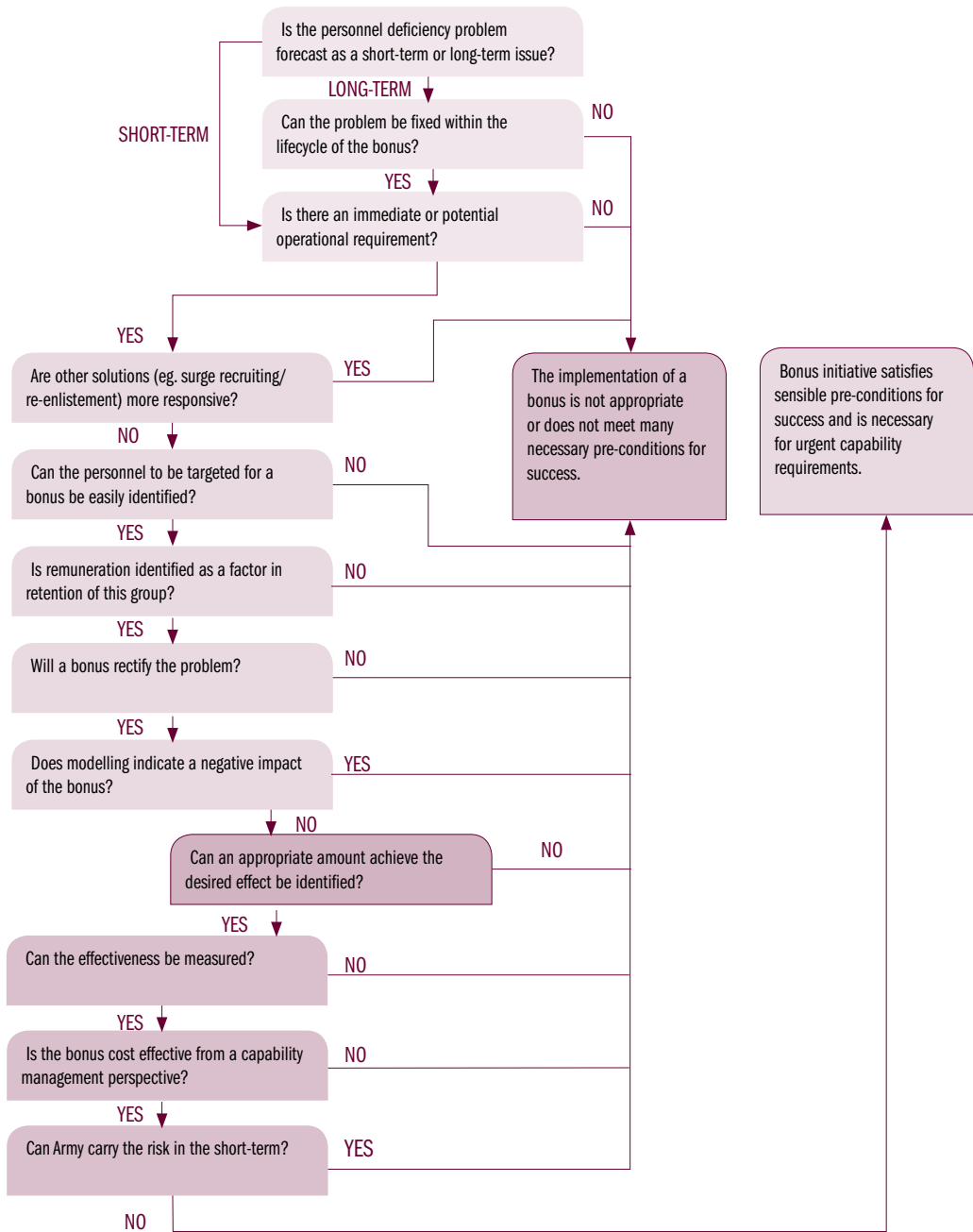


Figure 2. Suggested decision tree for considering bonuses

## Measuring the success of bonuses

Conventional wisdom suggests effectiveness measures should be a routine aspect of the introduction of any bonus and should be considered from the earliest stages of development. Evaluation processes should measure impacts in the short, intermediate and longer-term and should consider how any potential second-order effects will be addressed. The ADF, however, has not conducted any statistically robust and peer reviewed analysis of the short or long-term success of bonus schemes. The most obvious reason for this lack of analysis is simply because it is particularly difficult to determine the degree to which any one initiative influences the decisions of its targeted audience. While separation rates may alter during the lifetime of a bonus, definitively attributing that change to any one factor is questionable when one considers the number of other possible variables involved.

As a direct result of the R2 Program's review and audit, Defence has sought to improve its evaluation of retention bonuses through the development of an assessment framework. The 'Workforce Initiative Assessment Framework' is based around a check-list of considerations designed to streamline the development of bonuses (and other workforce initiatives). Whether it will ultimately aid in measuring the effectiveness of bonuses remains to be seen. If the framework is used by Defence, it will at least introduce rigour into the development and evaluation processes, enabling greater transparency and alignment across the organisation. In addition, developments in workforce intelligence, including the movement towards an articulated and managed Defence Employment Offer, should provide the Services with the evidence required to target retention initiatives more accurately.

## Conclusion

This article identifies that bonuses are likely to be an expensive and unnecessary means to improve retention, especially given there is no historical precedent showing that they work in the medium to long-term. Importantly, if remedial action is not taken to correct the underlying reasons why a bonus was considered necessary, then the problems will likely resurface after the cessation of the bonus period. Funds allocated for use in bonus schemes may, therefore, be better targeted and more effective in areas that are known to affect retention other than remuneration.

Ideally, policy developers should challenge more widely the simplistic yet prevailing view that there is a causal link between bonus schemes and increased retention. Such schemes rarely consider the possible negative second-order effects, many of which are likely to reverse or neutralise any positive benefit arising from a bonus. The creation of an inequitable remuneration structure, ambiguity in long-term effectiveness, the introduction of variations in cohort sizes, disruptions to force structure, increases in time-in-rank, increased competitiveness for promotion and postings, and the development of bonus expectations are all valid reasons not to introduce a bonus. It is unfortunate, regardless of a positive or negative impact of a bonus scheme, that the ADF is not well equipped to analyse and research these effects. Such research and analysis requires the establishment of rigorous evidence-based research regimes for which appropriate personnel, data and systems are required. At present, these assets are in limited supply.



Notwithstanding the potential negative second-order effects, there may be very specific occasions where there are few viable alternatives to improve retention. If, for example, there is an immediate and pressing capability deficiency for an existing or pending operational requirement, then the application of a bonus might rectify the deficiency and buy time to correct the underlying problem. On the other hand, if the deficiency is not critical, there is no existing operational requirement, and it can be solved through other initiatives, then bonuses should not be entertained as the viable and fiscally responsible solution to capability deficiencies.

*Lieutenant Colonel Phillip Hoglin is the 2011 CDF Fellowship recipient and is currently studying a Master of Philosophy through ADFA @ UNSW. He graduated from RMC in 1994, having completed a Bachelor of Science (Honours) Degree, and has also completed a Master of Science in Management through the US Naval Postgraduate School. He has been involved in workforce analysis since 2004, most recently as the Deputy Director for Workforce Modelling, Forecasting and Analysis - Army.*

*Angie Sturrock is the Deputy Director of Workforce Intelligence and has been in this position since 2009. Before this, she worked with the Directorate of Strategic Personnel Policy Research in various research roles encompassing the Defence Attitude Survey, Defence Census and Occupational Analysis. Angie joined the APS in 2004 as part of the Department of Defence's graduate program. She holds a first class Honours Degree in Psychology from Murdoch University and is currently studying her Doctor of Philosophy through ADFA @ UNSW.*

*Major Phil Brezzo is a research officer in the Directorate of Workforce Intelligence. He graduated from RMC to the Royal Australian Infantry Corps in 2000, having completed a BA (Politics) through ADFA @ UNSW. He has served in a range of regimental and staff postings, including as a liaison officer to the PNG Defence Force. Major Brezzo has deployed on Operation TANAGER and Operation ANODE, and also served as aide-de-camp to the Chief of Army. He has completed a Master of Arts (International Relations) from Deakin University and a Master of Management (Human Resource Management) from UNSW.*

*Commander David Goble is currently Deputy Director Workforce Modelling, Forecasting and Analysis – Navy. He joined the Navy as a reserve member in 1984 and trained as a Maritime Warfare Officer before transferring to the Permanent Navy. He has been posted to a variety of positions, including the RAN Recruit School, HMAS Cerberus and HMAS Creswell. Commander Goble completed a Master of Educational Psychology at the University of Melbourne and the Canadian Command and Staff Program at the Canadian Forces College, Toronto, and is also a Registered Psychologist.*

## REFERENCES

- Australian National Audit Office, 2000, *Retention of Military Personnel: Australian Defence Force*, 35 1999-2000, Canberra.
- Australian National Audit Office, 2003, *Retention of Military Personnel Follow-up Audit*, 31 2002-2003, Canberra.
- Commonwealth of Australia, 2000, *Official Hansard* in House of Representatives, 1 November 2000, Question 1856 (5) Australian Defence Force: Retention Bonuses, Canberra, p. 184.
- Commonwealth of Australia, 2001, *Recruitment and Retention of ADF Personnel* in Senate Foreign Affairs, Defence and Trade References Committee, Canberra, p. 126.
- Commonwealth of Australia, 2002, *Budget Supplementary Estimates 2002-2003* in Senate Foreign Affairs, Defence and Trade Legislation Committee, Question W28 Critical personnel shortages - Navy retention bonuses, November 2002, Canberra, p. 35.
- Commonwealth of Australia, 2002, *Additional Estimates 2001-2002: Answers to Written Questions on Notice* in Senate Foreign Affairs, Defence and Trade Legislation Committee, Question W39 Recruitment and Retention Issues, 20 February 2002, Canberra, p. 5.
- Commonwealth of Australia, 2003, *Official Hansard* in Senate, 14 May 2003, Question 976 Australian Defence Force: Retention Bonuses, Canberra, p. 186.
- Commonwealth of Australia, 2003, *Official Hansard* in Senate, 4 February 2003, Question 834 Australian Defence Force: Army Staffing, Canberra, p. 325.
- Commonwealth of Australia, 2007, *Portfolio Additional Estimates 2006-2007: Responses to questions on notice from Department of Defence* in Senate Standing Committee on Foreign Affairs, Defence and Trade, Question W28 Australian Government changes to ADF recruitment and retention, Canberra, p. 45.
- Commonwealth of Australia, 2007, *Portfolio Additional Estimates 2006-2007: Responses to questions on notice from Department of Defence* in Senate Standing Committee on Foreign Affairs, Defence and Trade, Question W30 ADF Retention, Canberra, p. 45.
- Cosgrove, P., 2002, Address by General Peter Cosgrove, AC, MC, Chief of the Defence Force, *Defence Media Watch Lunch*, The National Press Club, Canberra.
- Department of Defence, 2007, *Recruitment and Retention Implementation Strategy*, Version 2.09.
- Department of Defence, 2010a, *Compliance and Effectiveness of ADF Retention Initiatives*, Audit Task 09-071, Canberra.
- Department of Defence, 2010b, *R2 Program Review: Volume 1*, People Strategies and Policy Group, Canberra.
- Department of Defence, 2011, *Australian Defence Force Pay and Conditions Manual*, Canberra. Available from: <http://www.defence.gov.au/DPE/pac/>.
- Hoglin, P., 2009, The Burden of Bonuses, *Australian Army Journal*, 6(1), 23.
- Nunn, B., Kennedy, P. & Cupper, L., 2001, *Review of Australian Defence Force Remuneration 2001*, Department of Defence, Canberra, 191 pp. Available from: <[http://web.archive.org/web/20030904062232/www.defence.gov.au/remuneration/Nunn\\_Review.pdf](http://web.archive.org/web/20030904062232/www.defence.gov.au/remuneration/Nunn_Review.pdf)>.

# Human Systems Integration in Defence and Civilian Industries

**Professor Robin Burgess-Limerick, University of Queensland**  
**Cristina Cotea, University of Queensland**  
**Dr Eva Pietrzak, University of Queensland**  
**Peter Fleming, Department of Defence**

## Introduction

'Human systems integration' (HSI) is defined as the process of integrating the domains of human factors engineering, system safety, training, personnel, manpower (crewing), health hazards and survivability into each stage of the defence systems capability life cycle (needs, requirements, acquisition, service and disposal)<sup>1</sup> where:

- 'Human factors engineering' (HFE) is defined as the systematic application of information about human capabilities, limitations, characteristics, behaviour and motivation to the design of equipment, facilities, systems and environments,
- 'Systems safety' is the process of minimising safety and health risks through identifying, assessing and controlling hazards associated with the system,
- 'Manpower' (crewing) refers to the number of persons required to operate, maintain, sustain and provide training for systems,
- 'Personnel' refers to the aptitudes, experience and other personal characteristics required,
- 'Training' refers to the instruction and training required to fulfil the person's role in the system,
- 'Health hazards' refer to conditions inherent in operation and use of a system that may cause death, injury, illness, disability or reduce the performance of personnel, and
- 'Survivability' refers to the characteristics of a system in order to reduce fratricide, the probability of being attacked and war fighter injury.

The aim of this article is to describe current strategies for implementing HSI employed by defence and civilian industries, and the evidence which exists for the benefits arising from such implementation.

## Defence implementation

The US Department of Defense (US DoD) and UK Ministry of Defence (UK MoD) have formal HSI policies in place for major systems acquisition, and the Canadian Department of National Defence is in the process of establishing such a program.<sup>2</sup> While the details vary, the general procedure is to place responsibility on the program manager to ensure that implementation of HSI occurs during equipment acquisition. For example, US DoD instruction 5000.02 includes an enclosure which requires the program manager:

... to have a plan for HSI in place early in the acquisition process to optimize total system performance, minimize total ownership costs, and ensure that the system is built to accommodate the characteristics of the user population that will operate, maintain, and support the system.<sup>3</sup>

The US DoD's 'Human Systems Integration Management Plan'<sup>4</sup> sets out a plan for HSI management within the DOD, and describes formal responsibilities, authorities and accountabilities. The plan encompasses the organisational structures, roles, responsibilities, processes, tasks, metrics and enabling resources provided for the implementation of HSI. A range of guidance material is provided, including a comprehensive on-line 'Defense Acquisition Handbook', Chapter 6 of which 'provides the program manager with the necessary background and understanding to design and develop systems that effectively and affordably integrate with human capabilities and limitations'.<sup>5</sup>

The US DoD's 'Manpower and Personnel Integration' publication<sup>6</sup> defines a process for the implementation of the US Army's longstanding program that aims to ensure that human considerations are integrated into the system acquisition process.<sup>7</sup> This is achieved by ensuring that personnel are fully and continuously considered as part of the total system in the development and/or requisition of all systems. Human performance is considered to be a key factor in 'total system performance' and it is recognised that enhancements to human performance will correlate directly to enhanced total system performance and reduced life cycle costs.<sup>8</sup>

Similarly, the US Air Force's 'Air Force Human Systems Integration Handbook'<sup>9</sup> provides a description of its HSI process and identifies key considerations for the development of HSI plans and implementation of HSI programs. The US Navy undertakes a 'System Engineering, Acquisition and Personnel INtegration' (SEAPRINT) program<sup>10</sup> which aims to insert HSI throughout the systems engineering process. Wallace *et al*<sup>11</sup> and Landsburg *et al*<sup>12</sup> provide further commentary on the importance of the implementation of HSI within the US Navy.

The UK MoD refers to 'human factors integration' (HFI), rather than HSI, however the intent is similar. The formal requirements are set out in a series of Defence Standards 'Human Factors for Designers of Systems', Part 4 of which provides information about a large array of HFI methods, tools and techniques.<sup>13</sup> Additional guidance is also available in an 'HFI Technical Guide', provided by the UK MoD's Sea Systems Group.<sup>14</sup> Detailed guidance for high speed craft has also been sponsored by the Directorate of Sea Systems.<sup>15</sup>

The UK Human Factors Integration Defence Technology Centre (HFIDTC) is a virtual centre of excellence, funded by the MoD, which undertakes research to develop and evaluate processes methods and tools.<sup>16</sup> Reviews of a wide range of human factors design and evaluation methods<sup>17,18</sup> are provided, as well as a series of advisory documents, including 'The People in Systems TLMC Handbook'<sup>19</sup> which deals with the consideration of the human element during through life capability management. A 2006 HFIDTC document provides 'cost arguments and evidence for human factors integration',<sup>20</sup> while a more recent article<sup>21</sup> provides detailed guidance regarding the methods to be employed to make the cost case for HFI projects or programs.

## Civilian implementation

A range of civilian agencies, including NASA, the US Federal Aviation Administration (FAA) and the European Organisation for the Safety of Air Navigation,<sup>22,23</sup> include HSI within equipment procurement policies and provide a range of guidance material. For example, section 4.7 of the FAA's 'Acquisition Management System Policy' stipulates that:

Human factors are a *critical* [as italicised in the original] aspect of aviation safety and effectiveness. Service organizations must assure that planning, analysis, development,

implementation, and in-service activities for equipment, software, facilities, and services include human factors engineering to ensure performance requirements and objectives are consistent with human capabilities and limitations. Human factors engineering should be integrated with the systems engineering and development effort throughout the lifecycle management process, starting with concept and requirements definition and continuing through solution implementation and in-service management.<sup>24</sup>

The FAA also provides a 'Human Factors Acquisition Job Aid'<sup>25</sup> and 'Human Factors Design Standard'<sup>26</sup> to assist this process.

Similarly, NASA's procedural requirements include 'Human-Rating Requirements for Space Systems',<sup>27</sup> which explicitly mandates the application of HFE throughout the development lifecycle<sup>28</sup> and refers to NASA-STD-3001, Volume 1 (Crew Health),<sup>29</sup> the 'Human Integration Design Handbook',<sup>30</sup> which provides guidance for the crew health, habitability, environment and HFE design of all NASA human space flight programs and projects, as well as NASA-STD-3001.<sup>31</sup> The European Organisation for the Safety of Air Navigation provides extensive guidance material via its 'Human Factors Integration in Future ATM Systems' website (see: <<http://www.eurocontrol.int/hifa/>>).

## HSI methods and tools

Regardless of the domain of application, a similar set of tools and methods are utilised. Particular emphasis is placed on methods, such as scenario-based requirements capture,<sup>32,33</sup> and HSI top-down requirements analysis,<sup>34-36</sup> which are applicable early in the design process. Similarly, Rhodes *et al*<sup>37</sup> describe the extension of systems engineering leading indicators to HSI as a means of enhancing the consideration of HSI early in the design process. Newman *et al*<sup>38</sup> describe management tools developed by the HFIDTC, including the 'desktop support tool' and 'human factors impact tracking tool'.

Modelling and simulation techniques are commonly employed throughout the defence equipment lifecycle.<sup>39,40</sup> 'The Human View Handbook for MoDAF'<sup>41</sup> describes how 'human views' are employed in a systems engineering modelling approach to communicate human-related design concerns to engineers, with the aim of enabling early application of HSI methods in the cognitive systems engineering process.<sup>42,43</sup>

Adelstein *et al*<sup>44</sup> emphasise the use of 'preliminary hazard analysis' to identify potential human errors early in the design process. The use of 'fault tree analysis' (a top-down approach) in conjunction with 'human factors process failure modes and effects analysis' (a bottom-up approach) is suggested. Other methods and tools commonly utilised include:

- Task analysis techniques,<sup>45</sup>
- Cognitive task analysis techniques (for example, critical decision methods),
- Field observations and ethnography,
- Participatory analysis,
- Charting techniques,
- Human error identification techniques (for example, systematic human error reduction and prediction approach),
- Situation awareness measurement techniques (for example, situation awareness global assessment technique),

- Mental workload assessment techniques (for example, NASA's task load index),
- Team performance analysis techniques,
- Interface analysis techniques (for example, link analysis),
- Performance time assessment techniques,<sup>18-46</sup> and
- Physical ergonomics techniques.<sup>47</sup>

Recent publications have focused in particular on the assessment of team performance.<sup>45,48-50</sup>

## Evidence of HSI benefits

Evidence regarding the effectiveness, efficiency, productivity and safety of HSI is widely available. The case studies below were identified in the literature and describe successful implementation of HSI, or the undesired consequences of failing to implement HSI in either military or civilian domains. While cost-benefit has been of interest<sup>51</sup>, and techniques for estimating the health costs associated with Army materiel have existed for some time,<sup>52</sup> detailed guidance for assessing cost-benefit associated with HSI has only been provided relatively recently<sup>21,42,53,54</sup>—and relatively few detailed cost-benefit case studies are available in the public literature.

### *Defence case studies*

The most widely-cited example, and one of the most detailed available, is the Comanche helicopter acquisition program. Booher<sup>51</sup> and Booher & Minninger<sup>55</sup> cite a 1995 report by Minninger (which unfortunately is not readily accessible) as demonstrating that the implementation of HSI within the acquisition program for a design investment of 4 per cent of the research and development budget (or US\$75m) resulted in cost avoidance of US\$3.29bn, a 44:1 return on investment (ROI)—in addition to avoiding 91 fatalities and 116 disabling injuries over 20 years. Other examples reported in some detail by Booher & Minninger<sup>55</sup> include critical design improvements to the Apache Longbow helicopter, where costs savings of US\$269m were attributed to an HSI investment of US\$12m (22:1 ROI), and the Fox M93A1 nuclear, biological and chemical reconnaissance system reconnaissance vehicle, where a 33:1 ROI was calculated.

The US Air Force's 'Human Systems Integration Handbook'<sup>56</sup> suggests that HSI typically comprises 2.0-4.2 per cent of the total system acquisition cost and leads to a ROI of between 40-60 times the investment. The handbook cites an evaluation of the implementation of HSI within a fighter jet program as leading to lifecycle cost savings in maintenance, manpower and support in excess of US\$4bn.

Defence Research and Development Canada applied an HSI program to a range of acquisition projects<sup>57</sup> and estimated the resulting cost-benefit. C\$3.3m was invested in HSI application across eight case studies, resulting in C\$3.5m in immediate savings, that is, an immediate cost benefit of 106 per cent. An extrapolated savings for one system of C\$131m resulted from reduced manning levels, while C\$2m was assessed as the consequence of the elimination of an unnecessary display on a shipboard system. The report also includes an instructive summary of 'lessons learned', which concluded that:

Simulation-based, iterative design and experimentation cycles can effectively address a range of HSI variables. Military operators are able to effectively extrapolate their experiences in

medium fidelity virtual simulation environments to provide structured feedback on task performance, workload, situational awareness, usability, training, system safety, health hazard and personnel impacts of future system designs. Objective measures used in virtual simulation-based experimentation can provide data sets on task performance, workload, usability and learning time.<sup>57</sup>

The largest demonstrated savings in the Canadian program resulted from reduced manning, and this is a common theme across US Navy case studies. For example:

- Anderson *et al*<sup>58</sup> described an application of decision-aiding techniques which allowed the reduction in aircraft carrier manning levels by 11 per cent, while at the same time reducing the time taken for aircraft launch and recovery by 20 per cent.
- Anderson *et al*<sup>59</sup> suggest that implementing HSI achieved reduced manning, while retaining or improving system operability and effectiveness. The DD21 destroyer program manning levels versus the previous DDG79 were noted to be a reduction of 144 sailors (from 188 to 44)—an annual cost avoidance of US\$9.4m and, assuming 40 ships and 30 years life, a total saving of US\$11.3bn.
- Militello *et al*<sup>60</sup> reviewed a number of optimised manning case studies, including the first ship to be outfitted as a ‘smart’ ship, the USS *Yorktown*, and documented the methods used to achieve reduced manning and reduced workloads, and improved quality of life for the remaining personnel. Spindel *et al*<sup>61</sup> similarly cited the ‘smart ship’ program as demonstrating that technology and process improvements can reduce manning, maintain capability and improve shipboard quality of life.
- Johnson *et al*<sup>34</sup> describe in some detail the execution of a top-down requirements analysis which suggested that a 25 per cent reduction in manning of landing helicopter dock (LHD) amphibious-assault-class ships can be achieved using mature or relatively mature technologies and no major redesign, leading to life cycle savings of US\$1bn per ship, with 35 per cent manning reductions being a realistic goal for the future.
- Malone *et al*<sup>35</sup> reported that the use of top-down requirements analysis reduced the manning requirements for the ‘Fast Sealift’ from 47 to 12, and described a similar process for the JCC(X) (Joint Command and Control) ship. The results suggested that a 30 per cent reduction in workload was possible through the introduction of technology and expanded use of automation.
- A US General Accounting Office investigation<sup>62</sup> estimated that an emphasis on HSI early in the DD(X) destroyer program reduced personnel by 70 per cent, leading to US\$18bn in savings over the life of the 32-ship class. The report recommendations included that the Secretary of the Navy:
  - ‘requires that ship programs use human systems integration to establish crew sizes and help achieve them,
  - clearly defines the human systems integration certification standards for new ships, and
  - formally establishes a policy evaluation function to examine and facilitate the adoption of cost-saving technologies and best practices across Navy systems’.
- An example from the French Navy<sup>63</sup> describes the use of the *Illustrateur de Besoin d’Exploitation Operationnelle* process and simulation tools to specify and assess work



organisation, automation, human computer interaction modes and training needs for future naval platforms featuring reduced manning levels. The process features the iterative use of full-scale models running realistic operational scenarios with current and future operators.

- The need to reduce naval crewing levels was also the impetus for a report to the Canadian Defence Force<sup>64</sup>, which catalogued techniques for achieving such reductions and concluded that the Canadian Navy should develop its own capability to evaluate workload and crewing reduction technologies. Reducing naval costs and, in particular, the costs of a 'Future Aircraft Carrier Programme', was the subject of a report to the UK MoD.<sup>65</sup> The report reviewed complement reduction options employed internationally, and identified six particularly promising options, all of which were dependent on HSI implementation for success.
- Cost reductions from effective HSI have also been demonstrated by the US Air Force. Lizza *et al*<sup>66</sup> cite a 2007 DoD review as finding that a US\$2m analysis of manpower, personnel and training associated with the F-22 Raptor resulted in an estimated US\$700m in lifetime cost avoidance, and subsequent manpower implementation was credited with approximately US\$3bn in lifecycle savings. HSI evaluations during the C-12 Huron acquisition process were also cited as leading to the automation of tasks previously requiring a flight engineer, with a consequent reduction in crew complement and lifecycle cost savings greater than US\$3bn.
- Human factors issues associated with remotely-piloted vehicles, or unmanned vehicles, have been the subject of considerable attention.<sup>67,68</sup> Tvaryanas *et al*<sup>69</sup> highlighted human factor causes of US military unmanned aerial vehicle (UAV) mishaps and concluded that attending to HSI is critical for the design of such equipment.<sup>70</sup> Questions addressed by these analyses include the operator training needs, workload issues and the role of automation. Hunn and Heuckeroth<sup>71</sup>, in particular, provide a detailed description of the use of an 'Improved Performance Research Integration Tool' (IMPRINT) model to assess operator workload levels associated with the Shadow UAV.

Other publications describe success in achieving improvements in military equipment design at a more restricted level. For example:

- Improved maintainability of the F119 engine (F22 Raptor) is described by Liu *et al*<sup>72,73</sup> as a consequence of implementing HSI. Only five hand tools are required to service the engine; all line replaceable units are designed to be serviceable without replacing any other; each unit is replaceable using a single tool within 20 minutes; and maintenance is possible while wearing hazardous environment protection clothing. Importantly, the extensive commitment by the manufacturer to improving maintainability was a direct consequence of the emphasis placed on this issue by the US Air Force during the acquisition process, and was central to the manufacturer's competitive strategy.
- Hamburger<sup>74</sup> describes the use of a bridge design mock up to identify design deficiencies in the DDG-1000 program, suggesting that a US\$20k investment achieved cost avoidance of US\$10m.
- Hendrick<sup>75</sup> claimed that US\$500k in human factors efforts saved more than US\$5m for the USAF C-141 Starlifter aircraft.



- Osga<sup>76</sup> describes a multi-modal watch station project and highlights the improved performance demonstrated over the legacy Aegis integrated naval weapons system.
- Runnerstrom<sup>77</sup> describes an example of effective HSI for shipboard damage control. Tests in an environment, replicating the effects of an anti-ship missile hit, demonstrated that effective damage control was possible in the redesigned systems with 60 per cent fewer personnel.
- Dobbins *et al*<sup>78</sup> provide a series of case studies of the implementation of HFI within the design of high speed craft with defence purposes. The examples provided demonstrate improved performance, reduced manning, improved maintainability, and increased occupant comfort and safety benefits.
- Folds *et al*<sup>79</sup> cite 'astonishing' improvements in engine change time for a high mobility multi-purpose wheeled vehicle arising from an HSI approach.

### ***Civilian case studies***

Relatively few examples of well-documented case studies of HSI implementation exist in the civilian area. Examples which are available include:

- NASA authors<sup>28,80</sup> refer to successful HSI implementation in civilian aerospace, including references to historical successes of HFE in the Apollo program, as well as more recent examples such as the Constellation program's Crew Exploration Vehicle, Lunar Lander and extra-vehicular systems.
- HSI implementations in oil and gas industry are described by a number of authors,<sup>81-83</sup> claiming improvements in safety as a result.
- Kirwan<sup>84</sup> describes the implementation of a human factors program for a new nuclear power plant which identified important safety issues.
- Hastings *et al*<sup>85</sup> describe the implementation of an organisational change to the work of FAA safety inspectors, which allowed inspectors to log their work using portable computers. An evaluation found that better usability was accompanied by a 19 per cent time saving.
- Becker<sup>86</sup> describes the design of a complex intensive care workstation through use-cases and a set of safety goals.
- Heape and Low<sup>87</sup> describe HFI in the design of signal and train control systems for the Victoria line upgrade of the London Metro rail network.

### ***Sub-optimal outcomes***

Another avenue for assessing the value of HSI implementation is to examine situations in which HSI was insufficient. For example, a 2006 HFIDTC document titled 'Cost Arguments and Evidence for Human Factors Integration'<sup>20</sup> lists MoD acquisition failures resulting from poor HSI as including the Bowman man-portable radio; RB44 light vehicles; SA-80 Rifle and Light Support Weapon; and the single role mine hunter's recovery of remote control mine disposal system.

Other examples referred to in the literature include:

- Deficiencies of human factors, manpower, personnel and training were identified during the 'reverse engineering' of the Black Hawk helicopter acquisition program.<sup>88</sup>
- Many HSI problems discovered during testing and development of the US Army's Aquila remotely-piloted vehicle led to the cancellation of the program.<sup>89</sup>
- A premature decision regarding manning levels constraints for the Oliver Hazard Perry class guided missile frigate (FFG-7 class) led to expensive redesign of accommodation, and difficulties manning the vessels upon completion.<sup>90</sup>
- Patriot air and missile defence units were involved in two incidents occurring during Operation IRAQI FREEDOM (18 per cent of engagements), in which fatalities of allied forces resulted. Hawley<sup>91</sup> examined the HSI lessons to be learned from this unacceptable fratricide rate, concluding that the causes of operator errors can be traced to decisions made by designers and others responsible for the development of the system over 25 years. The dominant mode of control changed from manual to supervisory control as increasing levels of automation were added. However, the operators' role change was not reflected in design and evaluation, or training practices.
- MIL-HDBK-46855A<sup>92</sup> provides details of several catastrophic events caused by failure to consider human capabilities, including the downing of Korean Air Lines flight 007, which strayed into Soviet air space; the Three Mile Island nuclear accident; the downing of Iran Air flight 655 by the USS *Vincennes*; the Bhopal release of methyl isocyanate; the 1972 crash of a Lockheed L-1011 in the Florida everglades; and additional lessons learned from more minor incidents.
- Hobbs *et al*<sup>93</sup> cite the fatal decompression of Salyut 11 as an example of a failure to consider human capabilities in design.
- Tvaryanas *et al*<sup>69</sup> highlighted human factor causes of US military UAV mishaps and concluded that attending to HSI is critical for the design of such equipment.
- Cockshell & Hanna<sup>94</sup> nominate two ADF examples of sub-optimal HSI, noting that:
  - the operations room of the ANZAC class frigates required redesign to correct deficiencies which resulted in poor situation awareness for the command team, space restrictions, excessive reach distances and visibility issues; and
  - Seasprite helicopter cockpit design issues, with detrimental operational consequences, cost an estimated A\$100-200m to rectify.
- An insufficient focus on 'the incorporation of OHS concerns into engineering design' was also identified as a factor which contributed to the chemical exposure of Air Force maintenance workers during F-111 fuel tank maintenance, leading to recommendations by the Board of Inquiry that 'occupational health and safety should be integrated into the engineering change management process. This means, in particular, that designs should undergo a risk management process' and that 'the Air Force should review its acquisition policies to ensure that suppliers have systematically identified the hazards posed to personnel who use or maintain the equipment and, as far as possible, designed out these hazards'.<sup>95</sup>

## Summary and conclusions

Formal HSI implementation programs have been established within the US DoD, and more recently in the UK MoD, as well as civilian agencies such as NASA, the FAA and the European Organisation for the Safety of Air Navigation. Program managers within these agencies are required to develop and implement an HSI plan. Program managers require support to develop and implement HSI plans, and extensive direction, guidance and advisory documentation is provided by these agencies and others, such as the UK's HFIDTC. An extensive range of tools and techniques have been developed for use within HSI activities.

Quantification of safety benefits arising from HSI is problematic because of the relatively low baseline incident rates and is generally not attempted. An exception is the evaluation of the Comanche helicopter acquisition program which estimated the HSI implementation as avoiding 91 fatalities and 116 disabling injuries over 20 years. Claims for safety improvements arising from the implementation of HSI in civilian oil and gas, and nuclear industries have also been made. The number of fatalities, injuries and illnesses which have been attributed to sub-optimal HSI also lends weight to the potential for effective HSI implementation to prevent fatalities, injuries and illnesses. The evidence sustains a conclusion that effective implementation of HSI will reduce the probability of adverse safety and health outcomes.

Productivity, effectiveness and efficiency have been assessed in a variety of ways. Examples of improved ability to undertake mission critical tasks resulting from HSI have been provided, while improved platform availability will result from improved engine maintainability. Increased efficiency through decision aiding and increased automation leading to reduced workload and manning has been well documented, and HSI is essential for the successful introduction of automation. Numerous sub-optimal effectiveness outcomes have also been attributed to insufficient HSI. Implementing HSI will improve productivity, effectiveness and efficiency; as a corollary, these actions will reduce the probability of acquisition program failure. Assessments of cost-benefit of HSI of varying complexity have been conducted with generally positive results. The largest cost benefits calculated have been associated with reductions in manning levels.

Considerable direction, guidance and advisory material is available to assist in the implementation of HSI, and this literature includes guidance in the evaluation of cost-benefit and cost-effectiveness. The assessments are not straight forward, however, because investments occur over time, returns are uncertain and may be indirect and/or intangible. Even tangible outcomes, such as reduced injury rates, are difficult to translate to economic gain. Rouse & Boff<sup>53</sup> describe a seven-step method utilising a multi-attribute utility model, and provide three examples of the application of this technique to assess performance improvements resulting from HSI in military systems. More recently, the UK's HFIDTC<sup>21</sup> has provided a 'practical guide' for cost-benefit analysis which describes a six-step process (establish objectives; identify and quantify project risks; specify HFI influence; quantify required HFI effort; specify options; choose preferred option).

Relatively few detailed case studies of the consequences of HSI implementation during equipment acquisition are available in the public literature. However, on the basis of the evidence cited above, a conclusion is justified that investments in HSI implementation will have a positive, and probably large, return on investment in terms of:

- Reduced probability of adverse safety and health outcomes;
- Reduced probability of program failure;

- Improved equipment effectiveness; and
- Reduced overall costs.

Financial returns are likely to be greatest, or at least most straight-forward to estimate, where HSI implementation allows personnel levels to be reduced.

*Dr Robin Burgess-Limerick is a Certified Professional Ergonomist and ex-president of the Human Factors and Ergonomics Society of Australia. He is currently Professor of Human Factors within the Minerals Industry Safety and Health Centre, Sustainable Minerals Institute, The University of Queensland. His principle research interests lie in optimising the design of equipment to accommodate human abilities and limitations.*

*Cristina Cotea is a Research Officer at the Centre for Military and Veterans' Health (CMVH) and provides advice and assistance with the implementation of e-Health solutions and technology initiatives to address stakeholders' needs. Her principal research interests lie in seeking innovative solutions to military and veterans' health issues.*

*Dr Eva Pietrzak is a Senior Researcher at the Centre for Military and Veterans' Health (CMVH) and conducts systematic literature reviews for ongoing projects. Prior to joining CMVH, Eva worked in biomedical research at The University of Queensland (UQ) in the Departments of Biochemistry and Oral Biology, as a consultant toxicologist for the Therapeutic Goods Administration and in the Queensland Evaluation Group at the School of Population Health, UQ, as an evaluator of the submissions made by pharmaceutical companies to the Pharmaceutical Benefits Advisory Committee.*

*Peter 'PJ' Fleming is a Fellow of the Safety Institute of Australia (SIA), a Registered Safety Professional (Aust) and current Deputy Chair of the SIA's ACT Branch. He is the HSI Project Manager in OHS Branch, Department of Defence, Canberra and implementing HSI framework enhancements to Defence acquisition processes. He is a professional member of the American Society of Safety Engineers (ASSE).*

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## REFERENCES

1. Booher, H. (2003). *Handbook of human systems integration*: Wiley.
2. Greenley, M., Scipione, A., Brooks, J., Salway, A., Dyck, W., & Shaw, C. (2008). *The Development and Validation of a Human Systems Integration (HSI) Program for the Canadian Department of National Defence (DND)*: Defence Research and Development Canada.
3. US DOD. (2008). *Instruction number 5000.02*.
4. US DOD. (2009). *Human Systems Integration Management Plan (Version 1.0.)*.
5. US DOD. (2010). *Defense Acquisition Guidebook*.
6. US DOD (2001). *Manpower and Personnel Integration (MANPRINT) in the System Acquisition Process*. Department of the Army Regulation 602-2.
7. Booher, H. R. (1990). *MANPRINT: An approach to systems integration*. New York: Van Nostrand Reinhold.
8. MIL-HDBK-46855A "Human Engineering Program Process and Procedures" also provides useful guidance.US DOD. (1999). *Human Engineering Program, Process and Procedures*.
9. US Air Force. (2009). *Air Force Human Systems Integration Handbook*.
10. Dolan, N., & Narkevicius, J. (2005). *Systems Engineering, Acquisition and Personnel Integration (SEAPRINT): Achieving the Promise of Human Systems Integration*. Paper presented at the Strategies to Maintain Combat Readiness during Extended Deployments – A Human Systems Approach.
11. Wallace, D. F., Bost, J. R., Thurber, J. B., & Hamburger, P. S. (2007). Importance of addressing human systems integration issues early in the science and technology process. *Naval Engineers Journal*, 119, 59-64.
12. Landsburg, A., Avery, L., Beaton, R., Bost, J., Comperatore, C., Khandpur, R., et al. (2008). The art of successfully applying human systems integration. *Naval Engineers Journal*, 120(1), 77-107.
13. UK MOD. (2008). *Human Factors for Designers of Systems* (No. Def Stan 00-250 ).
14. UK MOD Sea Systems Group. (2006). *Maritime Acquisition Publication No 01-011. Human Factors Integration (HFI) Technical Guide (STGP 11)*.
15. Dobbins, T., Rowley, I., & Campbell, L. (2008). *High speed craft human factors engineering design guide*: Human Sciences and Engineering Ltd.
16. Newman, P., Bruseberg, A., Lowe, M., Borrás, C., & Tatlock, K. (2008). Improving HFI within systems acquisition: methods, tools and future directions. *Cognition, Technology & Work*, 10(3), 173-180.
17. Borrás, C., & Goom, M. (2003). *HFI DTC: HFI Methods and Processes Literature Review* (No. HFIDTC/ WP3.1.1 SEA/03/TN/4385).
18. Salmon, P., Stanton, N., Baber, C., Walker, G., & Green, D. (2004). *Human factors design & evaluation methods review*: HFIDTC.
19. Salmon, P., Stanton, N., Baber, C., Walker, G., & Green, D. (2004). *Human factors design & evaluation methods review*: HFIDTC.
20. UK HFIDTC. (2009). *The people in systems TLMC handbook*.

21. UK HFIDTC. (2006). *Cost Arguments and Evidence for Human Factors Integration*. HFIDTC.
22. Bruseberg, A. (2009a). *Cost-Benefit Analysis for Human Factors Integration: A Practical Guide*. HFIDTC.
23. Kjaer-Hansen, J. (1999). *Human factors module: A business case for human factors investment*. (HUM.ET1.ST13.4000-Rep-02): European Organisation for the Safety of Air Navigation.
24. Shorrock, S. T., Woldring, M., & Hughes, G. (2004). *The human factors case: Guidance for human factors integration*: European Organisation for the Safety of Air Navigation.
25. FAA (2011). *Acquisition Management System Policy*.
26. FAA (2003). *Human factors acquisition job aid* (DOT/FAA/AR-03/69): Department of Transport.
27. Ahlstrom, V., & Longo, K. (2003). *Human Factors Design Standard (HF-STD-001)*. Atlantic City International Airport, NJ: Federal Aviation Administration William J. Hughes Technical Center.
28. NASA. (2008). *Human-Rating Requirements for Space Systems*. (NPR 8705.2B).
29. Adelstein, B., Hobbs, A., O'Hara, J., & Null, C. (2006). *Design, Development, Testing and Evaluation: Human Factors Engineering* (No. NASA/TM-2006-214535). Hampton, VA: NASA, Langley Research Center.
30. NASA. (2007). *NASA space flight human system standard volume 1: Crew health*. (NASA-STD-3001, Volume 1).
31. NASA. (2010). *Human integration design handbook* (NASA/SP-2010-3407).
32. NASA (2011) *NASA space flight human system standard volume 2: Human factors, habitability, and environmental health* (NASA-STD-3001, Volume 2).
33. Gregoriades, A., & Sutcliffe, A. G. (2006). Automated assistance for human factors analysis in complex systems. *Ergonomics*, 49(12-13), 1265-1287.
34. MacLeod, I. (2008). Scenario-based requirements capture for human factors integration. . *Cognition, Technology & Work*, 10(3), 191-198.
35. Johnson, J. A., Osborn, D. B., Previc, F. H., & Prevost, G. L. (2005). Human Systems Integration/ Manning Reduction for LHD-Type Ships. *Technology Review Journal, Fall/ Winter 2005*.
36. Malone, T., & Carson, F. (2003). HSI top down requirements analysis. *Naval Engineers Journal*, 115, 37-48.
37. Rhodes, D., Ross, A., Gerst, K., & Valerdi, R. (2009). *Extending Systems Engineering Leading Indicators for Human Systems Integration Effectiveness*. Paper presented at the 7th Annual Conference on Systems Engineering Research 2009 (CSER 2009), US.
38. Newman, P., Bruseberg, A., Lowe, M., Borrás, C., & Tatlock, K. (2008). Improving HFI within systems acquisition: methods, tools and future directions. *Cognition, Technology & Work*, 10(3), 173-180.
39. Cox, D., & Hariri, S. (2007). *Efficacy of modeling & simulation in defense life cycle engineering*.
40. Hunn, B. P., Schweitzer, K. M., Cahir, J. A., & Finch, M. M. (2008). *IMPRINT Analysis of an Unmanned Air System Geospatial Information Process*: U.S. Army Research Laboratory, Aberdeen Proving Ground.
41. Bruseberg, A. (2009b). *The human view handbook for MODAF, second issue*: HFIDTC.
42. Bruseberg, A. (2008). Human Views for MODAF as a Bridge Between Human Factors Integration and Systems Engineering. *Journal of Cognitive Engineering and Decision Making*, 2, 220-248.
43. Handley, H. A. A., & Smillie, R. J. (2010). Human View Dynamics- The NATO approach. *Systems Engineering*, 13, 72-79.
44. Adelstein, B., Hobbs, A., O'Hara, J., & Null, C. (2006). *Design, Development, Testing and Evaluation: Human Factors Engineering* (No. NASA/TM-2006-214535). Hampton, VA: NASA, Langley Research Center.
45. Stanton, N. A., Stewart, R., Harris, D., Houghton, R. J., Baber, C., McMaster, R., et al. (2006). Distributed situation awareness in dynamic systems: theoretical development and application of an

- ergonomics methodology. *Ergonomics*, 49(12-13), 1288-1311.
46. Pew, R., & Mavor, A. (2007). *Human-system integration in the system development process: A new look*: National Academies Press.
  47. Salvendy, G. (2006). *Handbook of Human Factors and Ergonomics, Third Ed.* Hoboken, NJ: Wiley.
  48. Bolia, R. S., & Nelson, W. T. (2007). Characterizing team performance in network-centric operations: philosophical and methodological issues. *Aviation Space & Environmental Medicine*, 78(5 Suppl), B71-76.
  49. Gorman, J. C., Cooke, N. J., & Winner, J. L. (2006). Measuring team situation awareness in decentralized command and control environments. *Ergonomics*, 49(12-13), 1312-1325.
  50. Walker, G. H., Gibson, H., Stanton, N. A., Baber, C., Salmon, P., & Green, D. (2006). Event Analysis of Systemic Teamwork (EAST): a novel integration of ergonomics methods to analyse C4i activity. *Ergonomics*, 49(12-13), 1345-1369.
  51. Booher, H. (1997). *Human Factors Integration: Cost and Performance Benefits on Army Systems*.
  52. Bratt, G. M., Doganiero, D. M., & Spencer, C. O. (1997). Estimating the Health Hazard Costs of Army Materiel: A Method for Helping Program Managers Make Informed Health Risk Decisions. *Acquisition Review Quarterly*, 443-455.
  53. Rouse, W. B., & Boff, K. R. (2003). Cost-benefit analysis for human systems integration. In H. R. Booher (Ed.), *Handbook of Human Systems Integration* (pp. 631-657.). Hoboken: Wiley.
  54. Rouse, W. B., & Boff, K. R. (2006). Cost-benefit analysis of human systems investments. In G. Salvendy (Ed.), *Handbook of Human Factors and Ergonomics* (pp. 1133-1149). Hoboken, NJ: Wiley.
  55. Booher H. R., Minninger J. (2003). Human systems integration in army systems acquisition. In Booher H. (Ed.), *Handbook of human systems integration* (pp. 663-698). Hoboken, NJ: Wiley.
  56. US Air Force. (2009). *Air Force Human Systems Integration Handbook*.
  57. Greenley, M., Scipione, A., Brooks, J., Salway, A., Dyck, W., & Shaw, C. (2008). *The Development and Validation of a Human Systems Integration (HSI) Program for the Canadian Department of National Defence (DND)*: Defence Research and Development Canada.
  58. Anderson, D., Oberman, FR, Malone, TB, & Baker, CC. (1997). Influence of human engineering on manning levels and human performance on ships. *Naval Engineers Journal*, 67-75.
  59. Anderson, D., Malone, T., & Baker, C. (1998). Recapitalizing the navy through optimized manning and improved reliability. *Naval Engineers Journal*, 110(6), 61-72.
  60. Militello, L., Klein, G., Crandall, B., & Knight, B. (1998). *Optimized Manning Case Studies*.
  61. Spindel, R., Laska, S., Cannon-Bowers, J., Cooper, D., Hengmann, K., Hogan, R., Hubbard, J., Johnson, J., Katz, E., Roberts, K., Sheridan, T., Skalka, S., Smith, J. (2000). *Optimized surface ship manning*. (NRAC-00-1).
  62. US General Accounting Office. (2003). *Military personnel: Navy actions needed to optimize ship crew size and reduce total ownership costs*. (GAO-03-520).
  63. Blin, M. P., & Bry, A. (2005). *Human factor integration method in complex naval systems design: An example, military integrated bridge IBEO (Illustrateur de Besoin d'Exploitation Operationnelle)*. Paper presented at the Oceans 2005 - Europe, Vols 1 and 2, Brest, FRANCE.
  64. Beevis, D., Vallerand, A., & Greenley, M. (2001). Technologies for workload and crewing reduction. Defence R&D Canada Technical Report DCIEM TR 2001-109.
  65. Schank, J., Yardley, R., Riposo, J., Europe, R., Thie, H., Keating, E., et al. (2005). *Options for reducing costs in the United Kingdom's future aircraft carrier (CVF) programme*: RAND Corporation.
  66. Lizza, G., Lockett, J., & Narkevicius, J. M. (2008). Human Systems Integration: Synergy Across the United States Military Services. *INCOSE INSIGHT*, 11(2), 28-30.
  67. Barnes, M., Knapp, B. G., Tillman, B. W., Walters, B. A., & Velicki, D. (2000). Crew systems analysis of unmanned aerial vehicle (UAV) future job and tasking environments.: Army Research Laboratory,



Alderdeen Proving Ground.

68. Mulgaonkar, P. e. a. (2002). *Ad hoc study on human robot interface issues*: Army Science Board.
69. Tvaryanas, A. P., Thompson, W. T., & Constable, S. H. (2005). *U.S. Military Unmanned Aerial Vehicle Mishaps: Assessment of the Role of Human Factors Using Human Factors Analysis and Classification System (HFACS)*: 311th Performance Enhancement Directorate Performance Enhancement Research Division.
70. Tvaryanas, A. (2006). Human systems integration in remotely piloted aircraft operations. *Aviat Space Environ Med*, 77(12), 1278-1282.
71. Hunn, B. P., & Heuckeroth, O. H. (2006). *A Shadow Unmanned Aerial Vehicle (UAV) Improved Performance Research Integration Tool (IMPRINT) Model Supporting Future Combat Systems*: U.S. Army Research Laboratory, Aberdeen Proving Ground.
72. Liu, K., Valerdi, R., & Rhodes, D. (2009). *Economics of Human Systems Integration: The Pratt & Whitney F119 Engine*. Paper presented at the Human Systems Integration Symposium 2009.
73. Liu, K., Valerdi, R., Rhodes, D., Kimm, L., & Headen, A. (2010). *The F119 Engine: A Success Story of Human Systems Integration in Acquisition*.
74. Hamburger, P. S. (2008). Ten Questions: An interview with Patricia S. Hamburger, Director, Human Systems Integration Engineering, Naval Sea Systems Command (NAVSEA). *Naval Engineers Journal* 120, 15-21.
75. Hendrick, H. W. (1996). *Good ergonomics is good economics*. Paper presented at the Proceedings of the Human Factors and Ergonomics Society 40th Annual Meeting.
76. Osga, G. (2003). Human-Centered Shipboard Systems and Operations. In H. R. Booher (Ed.), *Handbook of Human Systems Integration* (pp. 743-793): Wiley.
77. Runnerstrom, E. (2003). Human systems integration and shipboard damage control. *Naval Engineers Journal*, 115(4), 71-79.
78. Dobbins, T., Rowley, I., & Campbell, L. (2008). *High speed craft human factors engineering design guide*: Human Sciences and Engineering Ltd.
79. Folds, D., Gardner, D., & Deal, S. (2008). Building Up to the Human Systems Integration demonstration. *INCOSE INSIGHT*, 11(2), 15-18.
80. Baggermann, S., Berdich, D., & Whitmore, M. (2009). *Human Systems Integration (HSI) Case Studies from NASA Constellation Program*. Paper presented at the Human Systems Integration 2009.
81. Cullen, L. (2007). Human factors integration - Bridging the gap between designers and end-users: A case study. *Safety Science*, 45, 621-629.
82. Khan, F. I., Sadiq, R., & Husain, T. (2002). Risk-based process safety assessment and control measures design for offshore process facilities. *Journal of Hazardous Materials*, 94(1), 1-36.
83. McSweeney, K. P., De Koker, T., & Miller, G. (2008). A human factors engineering implementation program used on offshore installations. *Naval Engineers Journal* 120, 37-49.
84. Kirwan, B. (2003). An overview of a nuclear reprocessing plant human factors programme. *Applied Ergonomics*, 34, 441-452.
85. Hastings, P. A., Merriken, M., & Johnson, W. B. (2000). An analysis of the costs and benefits of a system for FAA safety inspections. *International Journal of Industrial Ergonomics*, 26(2), 231-248.
86. Becker, U. (2008). *Applying Safety Goals to a New Intensive Care Workstation System*. Paper presented at the Computer Safety, Reliability, and Security, Proceedings 27th International Conference, Newcastle upon Tyne, UK.
87. Heape, S., & Lowe, C. (2009). *Effective human factors integration in the design of a signalling and train control system for the metro rail industry*. Paper presented at the Third International Conference on Rail Human Factors.
88. Hartel, C. R., & Kaplan, J. (1984). *Reverse Engineering of the BLACK HAWK (UH-60A) Helicopter*:



- Human Factors, Manpower, Personnel, and Training in the Weapons System Acquisition Process* (No. 84-100): US Army Research Institute for the Behavioral and Social Sciences.
89. Stewart, J., Smootz, E., & Nicholson, N. (1989). MANPRINT Support of Aquila, the Army's Remotely Piloted Vehicle: Lessons Learned, Research Report 1525. Alexandria, VA: US Army Research Institute for the Behavioral and Social Sciences.
  90. Schwartz, M. A. (1981). *Austere manning in the guided missile frigate (FFG7 class): Lessons learned*: Navy Personnel Research and Development Center.
  91. Hawley, J. K. (2007). *Looking Back at 20 Years of MANPRINT on Patriot: Observations and Lessons*: Army Research Laboratory.
  92. US Department of Defense. (1999). *Human Engineering Program, Process and Procedures*.
  93. Hobbs, A., Adelstein, B., O'hara, J., & Null, C. (2008). *Three principles of human-system integration*. Paper presented at the Proceedings of the 8th Australian Aviation Psychology Symposium. Sydney.
  94. Cockshell, S., & Hanna, S. (2006). *Human Systems Integration for the Australian Defence Force: Integration of human needs and requirements into the capability lifecycle*. DSTO-Cr-20006-0209
  95. Royal Australian Air Force. (2001). *Chemical exposure of Air Force maintenance workers: Report of the Board of Inquiry into F-111 (fuel tank) deseal/reseal and spray seal programs.*: Royal Australian Air Force.

# Air Power and ISR: the RAAF approach<sup>1</sup>

Wing Commander Greg Weller, RAAF

Once a commander gets a taste of what we can do with the kinds of support that intelligence, surveillance and reconnaissance provide, they can't get enough of it.<sup>2</sup>

Admiral Michael Mullen, USN,  
Chairman of US Joint Chiefs of Staff, 2008

## Introduction

The use of the air to collect data and information for development into intelligence has been an important air power role ever since the beginning of military aviation. In recent years, this role has become known as 'intelligence, surveillance and reconnaissance' or ISR. As noted by Admiral Mullen, ISR has grown in importance and complexity to the point where today, demand exceeds capacity, capability and resources. This has led to the development of ISR as an integrated concept to synchronise, prioritise and manage collection, analysis and processing activities as a single, integrated activity.

Air forces have been at the forefront of ISR because of air power's flexibility, reach, perspective and speed. This relationship has been recognised in the RAAF recently deciding to take a leading role in developing the ADF's ISR capability by developing its own ISR doctrine and a Chief of Air Force 'Capability Intent' to identify Air Force ISR capability requirements out to 2030.

The purpose of this article is to describe the RAAF's understanding of the nature of ISR to educate not only RAAF but also Army, Navy and joint personnel. It firstly discusses air power and identifies the unique advantages air power brings to ISR. This provides the basis for then defining ISR—an important aspect given there are differing perceptions of what ISR is. The article then discusses the objective, value and nature of ISR. A discussion on the command and control (C2) imperatives of airborne ISR concludes the paper.

## Air power

Air power is generated by operating in and from the air domain. The air domain is one of four physical (air, land, maritime and space) domains which, when combined with cyberspace, forms the five operational domains. The air domain envelops the land and maritime domains just as the space domain envelops land, maritime and air domains (see Figure 1).

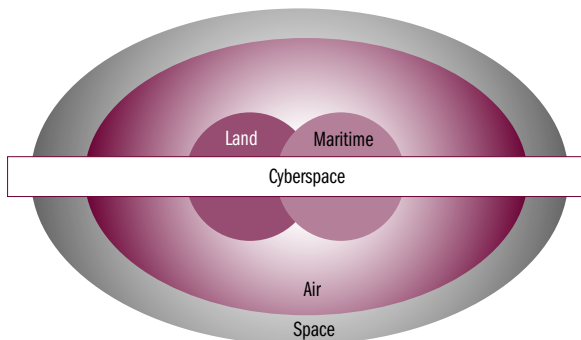


Figure 1. The operational domains

Although there are similarities between the air and space domains, there are also fundamental differences and they are therefore understood as distinct environmental domains. The cyberspace domain—defined as ‘a global domain consisting of the interdependent network of information technology infrastructures, including the internet, telecommunications networks, computer systems, and embedded processors and controllers’<sup>3</sup>—pervades all four environmental domains. The air domain is fundamentally different to land, maritime, space and cyberspace domains and, accordingly, has unique physical attributes.

## Air power characteristics

The characteristics of air power are those distinctive attributes or qualities that are inherent to the nature of the air domain and thus reflect these unique physical properties. The characteristics are neither specifically advantages nor disadvantages; they are simply factors that impact how operations are conducted in the air. Further, the characteristics are not necessarily applied individually. Indeed, their greatest potential is realised when they are applied synergistically. In this respect, they enable each other. These enduring characteristics enable ISR to be particularly effective when conducted in and from the air domain.

*Perspective* is the way that a force views the battlespace. At the basic level, perspective is a reflection of the ability to operate in the third dimension and thus exploit the benefits of operating above surface combatants, which provides a unique perspective. The broader perspective of airborne systems/platforms provides a field of view for ISR sensors that cannot be obtained from the surface domains.

In the air domain, platforms can operate with distinctly greater *speed* than those on land or sea due to the lesser levels of physical friction. In tactical terms, the speed of airborne systems allows specific actions to be conducted quickly in response to emerging events. Additionally, an ISR mission can be conducted minutes after being tasked. At the operational level, the highly networked and integrated nature of the ISR system allows ISR missions and the ‘processing, exploitation and dissemination’ (PED) function to be planned and executed dynamically and in near real-time, enabling time-sensitive decision making and the ability to operate inside the adversary’s decision-making cycle.

*Reach* is the ability to project military power over great distances unconstrained by barriers anywhere across the globe. In combination with speed, reach provides the means for air power to swiftly create an effect not only in a theatre but also to another theatre on the other side of the world. Reach provides the means to conduct extended ISR missions across a theatre that could not normally be achieved by land or maritime assets.

The combination of perspective, speed and reach enables air power to penetrate the adversary’s battlespace in ways that land and maritime operations cannot. In simplest terms, aircraft can fly over physical barriers such as land and water and through an adversary’s air defence system using stealth, speed and tactics to penetrate deep into the adversary’s territory. *Penetration* can enable surprise and enhance strategic effect. Penetration can also be understood in terms of a synergistic effect. For example, the adept synchronisation of diverse airborne ISR systems can pervade the adversary in terms of depth and breadth.

The combination of perspective, speed, reach and penetration enables air power to respond quickly, adeptly and decisively. *Responsiveness* is particularly critical to minimising the sensor-to-shooter timeframe—a key objective of C2 and a key advantage in modern warfare.

The combination of perspective, speed, reach, penetration and responsiveness provide air power with distinct *flexibility* and *versatility* in its application. Air power is inherently flexible in that it can quickly be diverted from one target, task or role to another. Flexibility is further enhanced by aircraft being increasingly able to conduct multiple concurrent missions against multiple targets. For example, the F-35 Lightning II aircraft, commonly referred to as the JSF, will excel in three of the four air power roles (control of the air, strike and ISR). Likewise, an AP-3C Orion aircraft can, on one sortie, conduct ISR (collect acoustic intelligence, imagery intelligence and electronic intelligence on various land and maritime targets), as well as prosecute and/or strike a submarine and/or surface vessels concurrently.

*Versatility* provides the ability to create tailored air power effects for application in military and military supported operations. Versatility allows an air force to be military focused, yet also provide important effects for national tasking. For example, in 2009 an AP-3C Orion conducted ISR missions in support of Operation VIC FIRE ASSIST, the ADF response to a coordinated multi-agency response to devastating bushfires in Victoria. Versatility enables air power to make effective contributions to the military component of whole-of-government issues.

## What is ISR?

The acronym ISR has been increasingly adopted as a single term in Australian and allied military terminology. Key foundation doctrinal and strategic guidance documents provide strong direction and endorsement for ISR. The 2009 *Defence White Paper* and 2009 'Defence Capability Plan' both identify ISR capabilities as one of the key elements for information superiority and the future force. Future 'Joint Operating Concept 2030' identifies 'know' as an operational function, stressing that the future joint force must 'access, integrate and use information drawn from multiple sources', that 'information must become knowledge and knowledge must be tailored for distribution "vertically" within command hierarchies and "laterally" within the social and technical networks'.<sup>4</sup>

Despite the term ISR being in general use for over 10 years, Air Force has only formally adopted the above definition with its recent doctrine, AAP 1003.2 – 'The Air Force Approach to ISR'. ISR integrates the intelligence and operations functions to provide actionable information and intelligence to supported commanders, which aids in developing the battlespace awareness required for decision superiority. Importantly, the ISR definition is distinctly different to the three separate and unrelated definitions. Understanding ISR as separate intelligence, surveillance and reconnaissance activities significantly limits the value that ISR provides as a single, synchronised and integrated process.

The 'Defence ISR Roadmap: 2007–2017' (published in 2007) did not provide an ISR definition, reflecting a general inability for Defence to agree on a standard definition. This deficiency was amplified at a Williams Foundation seminar in April 2011, where there appeared to be considerable desire to avoid entering a debate over definitions, with some speakers suggesting battlespace awareness was a more amenable term to ISR. Interestingly, the discussions invariably returned to using the term ISR, reflecting how battlespace awareness and ISR are fundamentally separate things. ISR is a process that enables battlespace awareness, which is a state of mind.<sup>5</sup> Australian Defence Doctrine Publication (ADDP) 3.7 – 'Collection Operations', published in 2009, identifies ISR as a collection activity only defining it as 'a collection activity that synchronises and integrates the acquisition, processing and provision of information and single source intelligence by sources and agencies tasked to satisfy a collection requirement'.<sup>6</sup>

From an air power perspective, identifying ISR as only a collection activity does not acknowledge the broad integrated nature of ISR to effectively synchronise the collection, processing, exploitation and dissemination of information and intelligence across the battlespace. It effectively separates intelligence, surveillance and reconnaissance from each other. In effect, the ADDP 3.7 interpretation of ISR inhibits the ability of ISR to provide an effective integrated approach to synchronising information collection, processing and dissemination across the battlespace, across all domains and all command levels.

The ADDP 3.7 definition conflicts with allied doctrine. The US Department of Defense and US Air Force define ISR as ‘an activity that synchronises and integrates the planning and operation of sensors, assets, and processing, exploitation and dissemination systems in direct support of current and future operations’.<sup>7</sup> Such a definition reflects the broader value that ISR provides to air power in its ability to synchronise and integrate the many different sensors, platforms, and analytical capabilities that Air Force provides. Accordingly, it is this definition that the RAAF has adopted.

The term ISR is used by the RAAF, and many similar air forces, because of its value to enable battlespace awareness across the theatre—a reflection of air power’s inherent and unique perspective. However, some forces (predominately armies) have adopted the term ‘intelligence, surveillance, target acquisition and reconnaissance’ (ISTAR).<sup>8</sup> Currently, there is no joint ADF definition for ISTAR and it is not identified in broader ADF capability or policy guidance. The term has developed over time with armies recognising the need to provide data and information direct from a sensor to forces in a time-critical manner to enable tactical target engagement.

Thus the key differences between ISR and ISTAR are that the latter does not have a strong multi-sensor synchronising and integrating capacity, nor does it incorporate a PED role that can operate across all levels of command—key aspects of Air Force ISR. Lastly, joint and air power doctrine clearly identifies ‘target acquisition’ as part of the dynamic targeting process, with ISR undertaking the find, fix, track and assess functions. Therefore, some key doctrinal differences exist between ISR and ISTAR, and the terms should not be used interchangeably. Interestingly, while British joint doctrine recognises both ISTAR and ISR, the Royal Air Force appears to be increasingly using the term ISR in preference to ISTAR.<sup>9</sup> While ISTAR may have value in the conduct of land warfare at the tactical level, from an air power perspective the term has limited utility and is not used by the RAAF.

## Objective of ISR

The fundamental objective of ISR is getting the right information and intelligence to the right people, in the right format and at the right time to achieve decision superiority. The objective of ISR can best be achieved by capitalising on the inherent synergies that exist among the Air Force and Defence ISR enterprises. In this respect, Air Force ISR is a process and capability whereby Air Force ISR systems are synchronised with other ADF and joint systems to ensure that all Defence ISR requirements are effectively satisfied. ISR provides the key pieces of data, information and intelligence that assist the RAAF and the ADF to achieve battlespace awareness and understanding, and information superiority and, thus, decision superiority. In essence, this is a key way in which Air Force ISR contributes to joint effects. The synergistic effect of ISR also provides the best possible intelligence to the commander, producing 'actionable' and predictive intelligence that can be quickly used to make operational decisions.

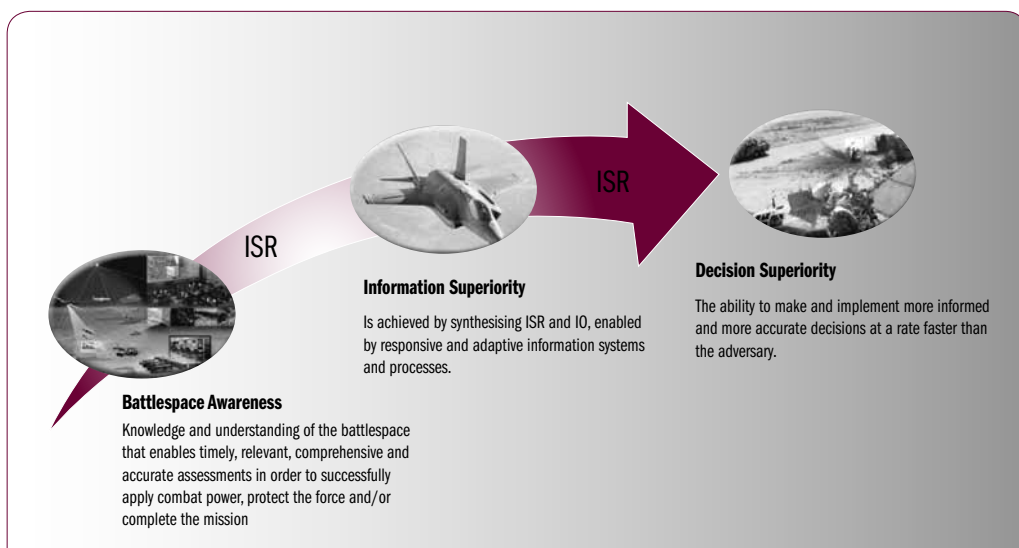
## The value of ISR

A key to success in conflict is the effective use of information as a vital weapon of war. As weapons have become more precise, engagement criteria more stringent and targets more difficult to find, fix and track (for example, submarines, insurgents, ballistic missiles or stealth fighters), ISR has become increasingly critical to the warfighter. Precise weapons require accurate intelligence and, as such, ISR is of paramount importance to air power because it provides the backbone for the successful application of air power and directly enables the air campaign planning process.

It is the principal driver for the 'kill chain', where it directly enables each phase of the dynamic targeting process (find, fix, track, target, engage and assess—F2T2EA). In the joint environment, ISR provides a key mechanism for Air Force to directly contribute to land and maritime combat. This has been particularly evident in recent operations in the Middle East area of operations, where airborne ISR has been critical to enabling ground and maritime forces to find, fix and engage targets quickly and successfully. ISR also provides the vital information that allows the commander to assess engagement effects.

As illustrated in Figure 2, ISR is a critical process that enables complex and diverse operations across the battlespace through realising battlespace awareness and information superiority. Information superiority enables the planning and conduct of operations and the selection and creation of effects that enable commanders to achieve objectives across the full range of military operations. It is the fundamental enabler of the cognitive and human element of the C2 system's ability to understand and act through the delivery of timely, accurate and high-fidelity information and intelligence. Through information superiority, appropriate actions can be undertaken at a speed that increases the ability to understand, and acquire and maintain the initiative, thus contributing to decision superiority.

ISR also provides an important interface that maps theatre-level activities to national-level objectives. ISR provides the means to effectively synchronise theatre-wide collection requirements and activities within the overall operational campaign plan, and in accordance with strategic and national intent.



**Figure 2: ISR enables battlespace awareness, information superiority and decision superiority.**

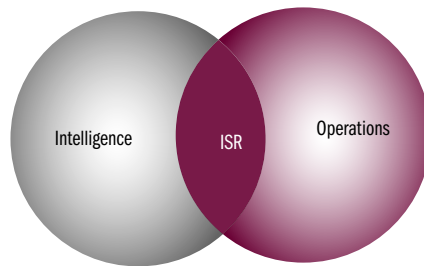
While ISR is particularly important during military operations in conflict, it also has a critical role in enabling joint and Air Force peacetime intelligence functions, such as monitoring the region, providing routine situational awareness, maintaining intelligence databases, guiding tactics development, assisting capability development, and providing indicators and warnings (I&W) analysis. During periods of escalating tension, Air Force ISR enables joint intelligence preparation of the battlespace, I&W, threat warning and broader situational awareness.

## The nature of ISR

Like force application, ISR is effects driven. ISR is about generating decision superiority over the adversary; that is, obtaining the intelligence required to enable the commander and warfighter to operate inside the adversary’s decision cycle and make better decisions. While this dominance is an effect in its own right, it also enables the creation of other kinetic and non-kinetic effects against the adversary.

ISR is increasing in importance as warfare becomes increasingly characterised by higher operational tempo and highly adaptable and mobile adversaries operating in complex terrain. With the current prevalence of irregular warfare, ISR has been increasingly focused on a mobile adversary, operating in small groups, concealed in complex terrain and often interspersed with the civilian population. In irregular warfare, greater effort is required in identifying the adversary where the target is easy to neutralise but hard to find. However, in conventional conflict, ISR has likewise confronted highly mobile and difficult to detect adversaries, such as mobile surface-to-surface and surface-to-air missile systems. In this context, targets will be both hard to find and hard to neutralise. Within the Australian context, ISR has increasingly been used to enable broader national security activities and, as such, it has been focused on adversaries across the spectrum of conflict.

Recent operational experience highlights that ISR should be an integrated rather than stove-piped activity. The modern requirement is to have a singular and holistic ISR capability that operates across the spectrum of conflict and levels of command in peace and war. Maintaining separate tactical, strategic, surveillance or reconnaissance capabilities does not provide the holistic approach required to realise an efficient and effective ISR capability. Accordingly, the terms 'surveillance' and 'reconnaissance' are no longer as relevant as they used to be and there is greater value in collectively referring to operations and missions that collect data and information, and their seamless transition into intelligence, simply as ISR.



**Figure 3: ISR represents the intersection of intelligence and operations.**

As shown in Figure 3, ISR represents the intersection of the intelligence and operations functions and it is often difficult to divide the two into separate meaningful entities, with intelligence-led operations now being the norm and with ISR capabilities essential to the conduct of operations.

To realise the desired level of integration, the Air Force ISR enterprise requires its intelligence and operations functions to be seamless. This will require a transformation in the cultures of the intelligence and operations communities to think and act as one. It is only through this transformation that ISR will be capable of synchronising the activities of the intelligence and operations functions to achieve the desired effect.

ISR is typically characterised as a technological process, given its critical dependence on technological factors, such as platforms, sensors and processing networks interconnected through a communications system. It is also, equally, inherently a human process where knowledge, human initiative, thinking and decisions drive the technological cogs that enable timely information collection, processing, analysis and dissemination of data, information and intelligence. Moreover, the principal battlespace effect of ISR is a human cognitive one.

ISR is effective across the three levels of command. At the strategic level, Defence ISR enables strategic decision-making, is managed by the single Services and intelligence agencies, and coordinated across the joint environment. National agencies conduct ISR collection and process, exploit, analyse and disseminate ISR product to decision-makers, commanders and warfighters. Air Force ISR contributes capability, workforce, and data, information and intelligence, and in turn receives support from the national agencies in terms of the information and intelligence they produce that supports ongoing RAAF operations and preparedness.

At the operational level, Air Force ISR is managed through the Air and Space Operations Centre (AOC), where ISR missions and PED are synchronised in accordance with Joint Force Air Component Commanders (JFACC) direction to meet the requirements of the Joint Commander.



It is at the operational level that ISR acts as a coordinating activity for the joint campaign and the supporting air campaign. At the tactical level, ISR missions are executed to provide data and information that is then processed, exploited and disseminated, and then used at all levels of command. Air Force ISR missions and activities can be conducted by all force elements, such as airfield defence guard patrols, remotely-piloted aircraft, manned aircraft, ground-based radars and space-based capabilities, and their PED nodes.

The development of ISR concepts and doctrine has paralleled the exponential growth in ISR technology where, today, ISR information in the battlespace is potentially limitless. Likewise, as technology has increased the capability of platforms, sensors and PED systems, collection capacity has continued to exceed PED capacity. Paradoxically, warfighters often flag that they do not have enough ISR—demanding more awareness and understanding delivered by the ISR enterprise. The subsequent need to prioritise and manage ISR activities is the reason why ISR is defined as a single integrated activity within the AOC.

## **Command and control of ISR**

C2 delineates the degree of authority commanders have over assigned forces. Given Air Force ISR is an enterprise, it is vital that airborne ISR C2 is clearly and effectively defined, assigned, deconflicted and communicated. It is critical that airborne ISR is commanded in accordance with the air power tenet of 'centralised control and decentralised execution'. This tenet has been consistently proven to be correct in the effective and efficient synchronisation and employment of scarce air power resources. Airborne ISR assets, like most air power systems, tend to be scarce, in high demand and thus liable for misapplication.

Because of its characteristics, airborne ISR can simultaneously affect all levels of command. Experience has highlighted that airborne ISR capabilities must be controlled and coordinated by a single commander at the highest practicable level of command. The theatre-wide perspective of an air commander allows limited resources to be prioritised against a multitude of tasks and flexed appropriately to meet the most important objectives. Furthermore, a single coordinating authority allows a joint commander to concentrate assigned airborne ISR assets to achieve the required effects and ensure that immediate requests for ISR are balanced against deliberate and planned requirements.

Centralised control ensures the following benefits:

- the most effective use of limited airborne ISR resources (platforms, sensors, people and communications);
- concentration of airborne ISR platforms, sensors and PED nodes at decisive times and at places of a commander's choosing;
- concurrent airborne ISR operations that enable manoeuvre;
- enhanced responsiveness of airborne ISR capabilities across the full spectrum of contingencies;
- effective and efficient provision of airborne ISR capability to the joint environment within the wider battlespace; and
- the most effective and efficient management of critical PED and communications capabilities.

The centralised control of airborne ISR capabilities is undertaken by the JFACC with a dedicated Air Staff integrated into the air campaign planning environment, and an AOC to coordinate, integrate, execute, monitor, re-task if required, and assess ISR missions. As the JFACC is at the component commander level, they are able to maintain the necessary theatre-wide perspective.

Decentralised execution, enabled through the delegation of authority and resources to accomplish specific tasks, enables a commander to plan and conduct operations and manage forces in a timely, efficient and effective manner without undue interference. In effect, a decentralised execution process maximises the benefits of air power's characteristics such as speed, perspective and reach. The clear communication of an air commander's intent is critical if tactical commanders are to exploit ISR opportunities in accordance with the overall scheme of manoeuvre and the joint commander's theatre-wide objectives. Decentralised execution provides the following benefits:

- Provides greater flexibility to the control and execution of airborne ISR missions by allowing subordinate ISR elements to act as the situation requires and the subordinate commander deems appropriate.
- Allows the Air Force ISR enterprise as a whole, and individual ISR elements, to be more responsive to the situation and the time sensitive requirements of commanders and warfighters.
- Allows subordinate elements to act decisively and quickly and thus meet the high operational tempo.

When the tenet of 'centralised control and decentralised execution' is not adhered to, there are increased risks of:

- Inefficient use of scarce airborne ISR resources that are often 'high demand but low density'.
- 'Penny-packeting' of resources so that all component or environmental commanders have some ISR but no one commander has enough to achieve allocated tasks. This generally means that the ability to concentrate force is removed and scarce resources are not shared to maximise the information and intelligence produced, and avoid duplication.
- Misapplication of ISR by personnel not skilled in the planning, execution and exploitation of ISR capabilities and acquired data, information and intelligence.

## Conclusion

The purpose of this article is to provide a philosophical understanding of ISR in the RAAF and its relationship to air power. It has briefly discussed the air domain, identifying its unique characteristics and noted how these characteristics largely make air power so closely tied to, and suitable for, ISR. It is also these characteristics that effectively lead to ISR being defined as it is by air forces.

ISR is inherently an integrating and synchronising process that brings synergy to information and intelligence outputs by bringing together the combined capabilities of the many and diverse sensors, platforms, PED and enablers available in the air domain. In this respect, the Air Force approach to ISR has direct and significant value to the broader Defence community, where ISR has the same potential to synchronise and integrate the many individual defence intelligence and information collection, processing, analysis, dissemination and enabling

capabilities within the Services, and other groups, to better enable not only Defence ISR but also Air Force ISR capabilities and, thus, decision superiority.

*Wing Commander Greg Weller joined the RAAF as an Intelligence Officer in 1989. Career highlights include serving as the Australian Liaison Officer, UN Special Commission - Iraq (UNSCOM) from June-December 1997, where he undertook four UNSCOM inspections in Iraq, in the Headquarters International Force East Timor in 1999, and running the target materials division in the Joint Intelligence Center Pacific (US Pacific Command) in 2003-2004, where he gained a unique US combined command perspective of Operation FALCONER/IRAQI FREEDOM. From 2009-2011, Wing Commander Weller was Deputy Director Doctrine, Air Power Development Centre, where he co-authored AAP 1001.1 – ‘Command and Control in the RAAF’, authored AAP 1001.3 – ‘The Air Force Approach to ISR’, was a lead author for the forthcoming 6th Edition of AAP 1000 – ‘The Air Power Manual’ and wrote over 15 ‘Pathfinder’ bulletins. He has been posted as Commanding Officer 87 Squadron, RAAF Base Edinburgh, in January 2012.*

## NOTES

1. This article and its diagrams are derived from Chapter 2 of the RAAF’s recently published AAP 1001.3 – ‘The Air Force Approach to ISR’, a Chief of Air Force doctrinal handbook at the philosophical/application level, drafted by the author.
2. Admiral Mike Mullen, ‘Remarks by Chairman of US Joint Chiefs of Staff’, at Nellis Air Force Base, Las Vegas, NV, 2008: see <<http://www.jcs.mil/speech.aspx?ID=1083>> accessed 10 October 2011.
3. US Department of Defense, ‘Joint Publication (JP) 1-02, Dictionary of Military and Associated Terms’, Department of Defense: Washington, 2010.
4. Department of Defence, *Future Joint Operating Concept 2030*, 25 March 2011, p. 13.
5. The author’s observations of presentations and discussions at the Williams Foundation Seminar on ISR, held 19 Apr 2011 at Australian Defence College, Weston Creek.
6. Department of Defence, ‘Australian Defence Doctrine Publication (ADDP) 3.7—Collection Operations’, Joint Warfare Doctrine and Training Centre: Canberra, 2009.
7. See ‘Air Force Doctrine Document 2-9, Intelligence, Surveillance and Reconnaissance Operations’, dated 17 July 2007 and JP 1-02.
8. See Department of Defence, ‘LWD 3-1-0 Intelligence, Surveillance, Target Acquisition and Reconnaissance – Developing Doctrine’, Australian Army: Canberra, 2007, and Department of Defence, ‘LWD 3-2-0, Information Actions – Developing Doctrine’, Australian Army: Canberra, 2009, that define ISTAR as ‘the coordinated acquisition of timely, accurate, relevant and assured information that supports the planning and conduct of operations, as well as the targeting and integration of effects’.
9. See UK Ministry of Defence, ‘Joint Doctrine Note 1-10 Intelligence and Understanding’, Ministry of Defence: London, 2010, pp. 3.11-12, which refers to ISR and ISTAR; and UK Ministry of Defence, ‘AP 3000, British Air and Space Power Doctrine’, 4th Edition, Ministry of Defence: London, 2009 and UK Ministry of Defence, ‘AP 3002 Air and Space Warfare’, 2nd Edition, Ministry of Defence: London, 2009, which refers to ISR.

## BIBLIOGRAPHY

- Air Force Doctrine Document 2-9, 'Intelligence, Surveillance and Reconnaissance Operations', dated 17 July 2007.
- Australian Army, LWD 3-1-0 'Intelligence, Surveillance, Target Acquisition and Reconnaissance – Developing Doctrine', AL1, 2007.
- Australian Army, LWD 3-2-0, 'Information Actions – Developing Doctrine', dated 22 June 2009.
- Australian Defence Doctrine Publication (ADDP) 3.7—'Collection Operations', Joint Warfare Doctrine and Training Centre, 2009.
- Commonwealth of Australia, *Future Joint Operating Concept 2030*, Canberra: Department of Defence, 2011.
- Commonwealth of Australia, *Defence ISR Roadmap 2007-2017*, Canberra: Department of Defence, 2007.
- Deptula, Lieutenant General Dave, and Brown, Major Greg, 'A House Divided: the indivisibility of intelligence, surveillance and reconnaissance', *Air and Space Power Journal*, Summer 2008.
- Deptula, David A. and Marrs, James R., 'Global Distributed ISR Operations: the changing face of warfare', *Joint Force Quarterly*, Issue 54, 3rd Quarter 2009.
- Downs, Lieutenant Colonel Michael, 'Rethinking the Combined Force Air Component Commander's Intelligence, Surveillance, and Reconnaissance Approach to Counterinsurgency', *Air and Space Power Journal*, Fall 2008.
- Hallen, Travis, *Airborne Intelligence, Surveillance and Reconnaissance for the Australian Defence Force*, Air Power Development Centre: Canberra, 2009.
- Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*, dated November 2010.
- Ministry of Defence UK, 'Joint Doctrine Note 1-10 Intelligence and Understanding', dated April 2010.
- Ministry of Defence UK, 'AP 3000, British Air and Space Power Doctrine', 4th Edition, dated 2009.
- Ministry of Defence UK, 'AP 3002 Air and Space Warfare', 2<sup>nd</sup> Edition, dated November 2009.

# **‘Sense and Respond’ and ‘Autonomic’ Logistics: a review of US and UK developments**

**Major Ray Hingst, Australian Army Reserve**

## **Introduction**

Until recently, platform-based logistic applications required data to be physically downloaded and transferred between systems to analyse the status of key components. However, in both the ‘sense and respond’ (S&RL) and ‘autonomic’ (AL) logistics systems being developed in the US and UK, prognostics have been added to monitoring functions. These real-time and predictive aspects are relatively new developments, facilitated by the real-time communication of data from operating platforms to the on-board crew/operators and through external links into the logistics support chain.

While the ADF’s ‘Military Integrated Logistics Information System’ (MILIS) proposes to extend the reach of supply chain information to sub-unit level, it falls short of crossing the gap to link ‘Health and Usage Monitoring System’ (HUMS), platform-based data into the logistics continuum to provide end-to-end visibility and a ‘foxhole-to-factory-to-foxhole’ perspective of the supply chain.

This article reviews developments in recent military applications of S&RL and AL in the US and UK, as well as considering their suitability to ADF programs. It will state the case for the application of both systems to the ASLAV (Australian Service Light Armoured Vehicle) and Bushmaster armoured vehicle platforms, in a similar fashion to those employed in the US and UK, as a source of accurate and up-to-date combat service support information for various levels of command.

## **HUMS and issues for the ADF**

At present, key ADF decision makers do not have access to complete logistical data impacting on the tactical aspects of immediate operations; for example, the answers to questions such as what is the current and projected ammunition and fuel usage of critical vehicles, and can that helicopter make another mission based on actual maintenance required, as opposed to flight time limitations. Such critical questions require answers best provided by accurate and timely information. Yet many such capabilities are already available, evidenced in some of the current initiatives in the US and UK, as well as programs in the commercial sector.

HUMS-related data has existed for decades. A well-known example has been the engine monitoring system developed for the F-15 and F-16 combat aircraft, consisting—in basic terms—of an engine diagnostic unit and a ground diagnostic unit. The former records the operating conditions and any anomalies. Once the aircraft is on the ground, data is downloaded to the latter for analysis.

The same concept was transferred to the automotive arena, with some form of diagnostic system now incorporated into most family cars. But even here, the car typically has to be taken to a workshop and hooked up to a ‘ground diagnostic unit’ so that the system’s data

can be downloaded for analysis. The real potential of HUMS data will not be realised until it is available synchronously to the entire logistics system, in real time, which is the stated goal of both the US and UK armed forces.

## S&RL and AL in the US

The S&RL concept is being employed by the US Marine Corps to enhance the quality of logistics decision making. It was initially trialled on its Light Armoured Vehicle (LAV) platform, using 'bolt on' sensors to generate vehicle status and prognostic information, such as fuel consumption and other operating data including the rate of ammunition consumption and the number of rounds remaining. The information was provided to the vehicle crew, with consolidated data available to various levels of command. In a 2007 study by Pennsylvania State University, the authors stated that 'one of the key benefits of the project to date has been the organizational learning.... In our opinion, 'sense & respond' has significantly increased the Marine Corps' institutional knowledge'.<sup>1</sup>

The same study asserted—through the extrapolation of data gained from trials—that when utilised by the entire fleet of similar vehicles, the following benefits would be realised:

- *Cycle time.* An estimated reduction in customer 'wait time' of ~50 per cent through the ability to provide early warning of abnormal conditions, thereby enabling the logistics, operations and maintenance planners to optimise the repair and return-to-service timeframes.
- *Cost avoidance.* Estimated at >US\$10m annually, based on an inventory of ±400 LAV-25 variants (and an estimate of US\$22.35 per mile cost of operating, including personnel and depreciation costs).
- *Reliability.* An estimated increase in 'mean time between failure' of > 14 per cent (from 64 to 73 hours).
- *Availability.* An estimated 7 per cent increase in operating availability, translating to 34 additional vehicles based on the data above.<sup>2</sup>

In the S&RL system, data is gathered for current-level usage of various classes of supply and transmitted to the next level in the chain of command for aggregation, review and decision making. The US Marine Corps' Evaluation Division has noted that:

With information technology, S&RL receives, recognizes and responds to consumption and requirement patterns through the use of equipment embedded Intelligent Agents. S&RL leverages the capabilities of network-enabled forces to share logistics information, share a common perspective of the battle space, and provide early awareness of consumption and needs, allow commitment tracking and allow for reconfiguration of the logistics system when needed. It will tell the Commander 'how much fight is left' in his units.<sup>3</sup>

While the US Marine Corps has invested significant effort in developing S&RL, the Office of Naval Research is the lead US agency of this program. Its view of the benefits is that:

The Sense and Respond Logistics program will enable commanders to more accurately assess their environment, identify when a plan is executing differently than intended, and help develop alternatives ahead of real time. The technology developed for the program will combine the commander's intent with 'ahead of real time' data and use that information to develop potential courses of action and evaluate the impact of those decisions.<sup>4</sup>

On the otherhand, AL was developed by the Lockheed Martin Corporation, specifically for the Joint Strike Fighter (JSF/F-35) program. It links data from S&RL into the supply chain continuum, reaching back to 'original equipment manufacturers', enabling them to become more active participants in the logistics support chain. The system links real-time platform-level data on JSF/F-35s to Lockheed Martin's headquarters in the US and various suppliers around the world. Based on this information, the status and requirements of individual aircraft are aggregated so that a 'picture' for the whole fleet can be determined and acted on.<sup>5</sup> More recently, the system has been expanded to support test aircraft at the Edwards and Eglin Air Force Bases and the US Navy's Patuxent River flight test centre.<sup>6</sup>

A further logistics layer in the JSF/F-35 program is the 'Autonomic Logistics Global Sustainment' solution being developed by Lockheed Martin. It will integrate existing and planned production and sustainment capabilities in the partner nations of the JSF/F-35 program.<sup>7</sup> While many of the developments associated with the program are US-centric, its reach will be far more extensive—not least because of the involvement of Lockheed Martin and as it extends to all partners of the program.

## Evidence from the UK

The UK Ministry of Defence (MoD) has embarked on the 'Logistics Network Enabled Capability' (Log NEC) program—which, in some respects at least, reflects the goals of Australia's MILIS program—as an attempt to transform 'the current complex web of processes and systems into a streamlined, optimised, agile and effective end-to-end logistics support chain'<sup>8</sup>

However, Log NEC exceeds the scope of MILIS in two important dimensions: firstly, its reach includes 'front line' platform-level data and, secondly, it includes contractors.<sup>9</sup> The latter objective is facilitated by the establishment of a 'Green Box' to enable input from industry into 'the requirements of Defence's future logistics information architecture, so that the system supports the needs of both Defence and industry'.<sup>10</sup>

Specifically, the Log NEC program has identified a suite of 'significant improvements to the joint support chain across the whole of Defence ... [that] will deliver major benefits to operational performance, [namely]:

- More accurate data and information,
- Greater visibility across the support chain,
- Better management of stock,
- Improved operational planning and decision making,
- Increased availability of spares, platforms and units, and
- Increased operational flexibility'.<sup>11</sup>

One of the key elements is the 'Joint Asset Management and Engineering Solutions' (JAMES), established in July 2005, and now subsumed under the Log NEC umbrella. It:

... currently manages more than 60,000 pieces of equipment for the British Army, giving users and commanders the ability to identify the availability, status, condition, ownership and location of a piece of equipment in moments.<sup>12</sup>

The UK MoD has announced Phase 2 (JAMES Land), which covers all land vehicles for the Navy and Air Force, as well as the Army. One of the vehicles covered by the JAMES program, which has the ability to be fitted with a suite of equipment to provide HUMS data, is the Bushmaster armoured vehicle, manufactured in Australia by Thales and in service with the ADF.

Other projects within the Log NEC suite include:

- MJDI (Management of the Deployed Inventory);
- MMiT (Management of Materiel in Transit);
- CONVIS (Consignment Visibility);
- AMO (Air Movements Operations); and
- EBC (Electronic Business Capability).<sup>13</sup>

It is difficult to determine, at this stage, how anticipated cuts to the UK defence budget will impact on the Log NEC program. The consensus would seem to be that any cuts 'are being applied gradually and are often not as dramatic as feared'.<sup>14</sup>

## Applications in the private sector

In considering the requirements that joint operations in a coalition environment impose on contributing partners, there are obvious and significant parallels between the logistic needs of the US, UK and Australia. Moreover, similar developments are occurring across all three, to varying degrees, with the lead in several areas coming from commercial activity. Notably, the private sector has moved swiftly to embed HUMS-related systems into the aviation industry, taking a leading role globally and, through platform acquisition, in Australia. For example:

QANTAS Airbus' 'AIRTRAC' system provides a link between the airframe and a dedicated support facility staffed with specialist engineers available 365 days a year. The A380's onboard software monitors every system and instantly sends an email to AIRTRAC if any anomaly is spotted. The instant the email is received, the required part is ordered so it's ready for the arrival of the A380.<sup>15</sup>

Other manufacturers offer a similar 'logistic information system' for platforms in ADF service, such as the RAAF's C-17A Globemaster III heavy-lift aircraft.<sup>16</sup> Elsewhere, the agriculture sector has adopted the concept, using sensors in every aspect of planting and harvesting. State-of-the-art tractors have 'telematics' and remote monitoring features, whereby 'if a service issue develops in the field, technicians at the dealership can remotely identify the problem, determine the tractor's location and proactively address the problem'.<sup>17</sup>

## Implications for the ADF

When acquiring a new system, a general rule in estimating the life cycle costs is that the platform acquisition accounts for one-third of total costs, with logistics and operational costs making up the other two-thirds. An example is the JSF/F-35 program, where it has been noted that:

The true cost of owning a modern jet fighter includes 25 or 30 years of maintenance support, and pilot and ground crew training .... This is often twice or more the original purchase price [and] that doesn't include the cost of fuel and weapons.<sup>18</sup>



Australia is planning to buy 100 JSF. The purchase cost (based on a per aircraft cost of US\$50m) would be around US\$5bn. Applying the general rule above, the support and operating costs could equate to an additional US\$10bn. The supplier, Lockheed Martin, estimates a 20 per cent reduction in the logistics costs over the life cycle due to the application of AL, which would equate to a potential US\$2bn savings for the Australian program.<sup>19</sup> While the financial aspects are impressive, the theatre commander would be more impacted by the reduced turn-around times and availability, which would be based on the actual condition of platforms, rather than modelling.

This discussion raises the obvious question of the current status of HUMS in the ADF. The need has been identified in the Department of Defence's 2007 'Network Centric Warfare Roadmap'.<sup>20</sup> Logistics is included under 'Collaborative Planning' and the target state for 2020 is described as:

- Key logistic function networks within the National Support Area are linked with those in theatre, and provide connectivity and a collaborative ability with industry and coalition partners.
- Commanders have an end-to-end visibility of the logistic system, providing the ability to rapidly and effectively prioritise scarce resources required to generate and sustain deployed force elements.
- Automated ordering and replenishment takes place as supplies and ordnance are consumed by platforms and field units.
- The deployed force has minimised its vulnerabilities and greatly enhanced its mobility through more effective 'reach back', optimum force presence and the precision sustainment for the majority of logistics requirements.<sup>21</sup>

When the JSF/F-35 is introduced into service in Australia, it will bring with it participation in Lockheed Martin's AL system.<sup>22</sup> But what about the rest of the ADF? MILIS was cited in the 'Network Centric Warfare Roadmap'—and this project certainly has addressed many concerns, notably the reduction of legacy systems in Defence, improved interconnectivity between information systems, and the introduction of technology, such as 'radio frequency identification' devices, for asset tracking. However, MILIS does not provide real-time information to decision makers in the supply chain or related logistics areas. It was conceived as a system which, at the theatre end, terminates at unit level. There is, therefore, an 'air gap' between the platform and MILIS at this point, and data is not available as a synchronous input into MILIS.

Since HUMS-related data is not available real time to all stakeholders, the logistic 'end states' described in the Network Centric Warfare Roadmap cannot be met. Most importantly, the forward commander does not have the information required to make the best use of allocated assets. Indeed, farmers on the Darling Downs arguably have better visibility of the capabilities, connectivity and support for their machinery than an Australian Commander in Afghanistan.

This concern impacts across the board, with the ADF potentially 'missing out' on:

- Financial savings on all operational and maintenance costs of 7-20 per cent;
- Increased platform reliability;
- Reduction in repair cycle times;

- Increased asset availability; and
- Enhanced situational awareness.<sup>23</sup>

It is acknowledged that concerns have been expressed about the ADF's participation in the proprietary logistic information systems of commercial, non-Australian entities, including in terms of the 'sovereignty' of operational information and the ability of such systems to integrate with MILIS.<sup>24</sup> It is also accepted that the capture and transmission of vast amounts of platform-level data will impose an additional burden on communication networks. These certainly are issues that need further consideration, including the potential vulnerability of such data to targeting.

## Conclusion

This article has reviewed developments in S&RL and AL in the context of military applications in the US and UK. It has shown that recent developments in the logistic support chain in both countries have focused on the integration of data at platform level as the foundation of an end-to-end approach to logistics. It has argued that the way forward for the ADF is for HUMS-related data to be recognised as an important factor, not only as a maintenance tool but as a critical input into the management of military assets. Several examples of commercial applications have been provided to illustrate the deployment of readily available enabling technology to better manage assets.

The ADF will eventually adopt the concept of a true end-to-end logistics system, if for no other reason than the need to inter-operate with US and UK forces. However, it would obviously make sense to provide ADF commanders with the best logistics support available—and to reap the financial and efficiency benefits—as soon as possible. As a first step, this could be achieved relatively quickly and at reasonable cost, by procuring kits, proved by the US Marine Corps, for the ADF's ASLAVs. The same application could be trialled with the ADF's Bushmaster armoured vehicles to evaluate the UK's JAMES approach. Other platforms could then have the capability retrofitted, where no direct interface exists between them and the MILIS/theatre level communications system. Without such initiatives—and a sustained focus on S&RL and AL, or similar programs—the ADF will struggle to achieve the 'end states' laid out in its Network Centric Warfare Roadmap.

*Major Ray Hingst is a reserve officer posted to the CIMIC Branch of Headquarters 1<sup>st</sup> Division. He enlisted in 1988 as a private soldier in the RAAMC, serving with 1<sup>st</sup> General Hospital. He graduated from OCTU and was commissioned into the RACT, where he qualified as a Movements Officer and served in a variety of logistics appointments. In his civilian career, he is an academic at the University of Southern Queensland.*

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## NOTES

1. S.R. Haynes and A.L. Skattebo, 'Sense and respond evaluation for the Program Manager of Light Armored Vehicles', Report presented to the US Marine Corps PM LAV, College of Information Science and Technology, Detroit, 2007.
2. Haynes and Skattebo, 'Sense and respond evaluation for the Program Manager of Light Armored Vehicles'.
3. US Marine Corps, *Concepts and Programs*, Program assessment and Evaluation Division, HQ Marine Corps: Washington, 2009, p. 147.
4. T. Seman, 'Office Of Naval Research Selects Lockheed Martin-Led Team For Sense & Respond Logistics Phase', *The Street*, Lockheed Martin Corporation, March 2010.
5. Lockheed Martin Corporation, 'Lockheed Martin Combines OEM Expertise with Low Cost Services For Total Life Cycle Support of Aircraft', *Earth Times*, 19 June 2007.
6. J. Kerr, 'JSF Support in Australia', *Australian Defence Magazine*, Vol. 19, No. 2, February 2011, p. 48.
7. Kerr, 'JSF Support in Australia'.
8. Ministry of Defence (UK), 'Logistics Network Enabled Capability (Log NEC)', <<http://www.mod.uk/DefenceInternet/MicroSite/DES/OurTeams/JointSupportChainTeams/TheLogisticsNetworkEnabledCapabilitylogNecProgramme.htm>> accessed 27 May 2011.
9. Ministry of Defence (UK), 'Future Logistics Information Services (FLIS)', <<http://www.mod.uk/DefenceInternet/FactSheets/FutureLogisticsInformationServicesflis.htm>> accessed 27 May 2011.
10. Ministry of Defence (UK), 'Green Box', <[www.mod.uk/DefenceInternet/FactSheets/GreenBox.htm](http://www.mod.uk/DefenceInternet/FactSheets/GreenBox.htm)> accessed 27 May 2011.
11. Ministry of Defence (UK), 'Logistics Network Enabled Capability (Log NEC) Project Team'.
12. Lockheed Martin Corporation, 'Lockheed Martin to Provide UK With Second Phase of Joint Asset Management and Engineering Solutions Programme', *PRNewswire*, 23 July 2010.
13. Ministry of Defence (UK), 'Logistics Network Enabled Capability (Log NEC) Project Team'.
14. A. Nativi and C. MacKenzie, 'Selective cuts', *Defense 2011 (Defense Technology International)*, January 2011, p. 43.
15. G. Thomas, 'Magic carpet ride', *QANTAS the Australian Way*, December 2007, p. 38.
16. N.R. Collie, 'Managing global supply chains', *Australian Defence Force Journal*, Issue No. 183, 2010.
17. John Deere Corporation, 'JD offers new simple to use intelligent tractors', *Rural Weekly*, 3 September 2010, p. 13.
18. G. Ferguson, 'Customers join to deal a price', *The Australian, Defence Special Report*, 7-8 June 2008, p. 3.
19. R. Hingst and G. Gunter, 'Autonomic logistics: An Infrastructure View', paper presented at the 'Australian JSF Advanced Technology Conference', Melbourne, 2008.

20. Department of Defence, *Network Centric Warfare Roadmap 2007*, Department of Defence: Canberra, 2007.
21. Department of Defence, *Network Centric Warfare Roadmap 2007*.
22. Hingst and Gunter, 'Autonomic logistics: An Infrastructure View'.
23. R.D. Hingst and G. Gunter, 'Autonomic and Sense and Respond Logistics: The 'Foxhole to Factory to Foxhole' Continuum of Combat Service Support', *The Australian Army Journal*, Vol. VII, No. 1, Autumn 2010.
24. Collie, 'Managing global supply chains'.

## SELECT BIBLIOGRAPHY

Billison, C., *About the Green Box*, UK Council for Electronic Business Task Force, v1.2, May 2010, p. 4.

Collie, N.R., 'Managing global supply chains', *Australian Defence Force Journal*, Issue No. 183, 2010.

Department of Defence, *Network Centric Warfare Roadmap 2007*, Department of Defence: Canberra, 2007.

Haynes, S.R. & Skattebo, A.L., 'Sense and respond evaluation for the Program Manager of Light Armored Vehicles', Report presented to the US Marine Corps PM LAV, College of Information Science and Technology, Detroit, 2007.

Hingst, R.D. & Gunter, G., 'Autonomic and Sense and Respond Logistics: The 'Foxhole to Factory to Foxhole' Continuum of Combat Service Support', *The Australian Army Journal*, Vol. VII, No. 1, Autumn 2010.

Hingst, R. & Gunter, G., 'Autonomic logistics: An Infrastructure View', paper presented at the 'Australian JSF Advanced Technology Conference', Melbourne, 2008.

Kerr, J. 'JSF Support in Australia' *Australian Defence Magazine*, Vol. 19, No. 2, February 2011, p. 48.

Ministry of Defence (UK), 'Logistics Network Enabled Capability (Log NEC) Project Team', <<http://www.mod.uk/DefenceInternet/MicroSite/DES/OurTeams/JointSupportChainTeams/LogisticsNetworkEnabledCapabilitylogNecProjectTeam.htm>> accessed 27 May 2011.

Seman, T., 'Office Of Naval Research Selects Lockheed Martin-Led Team For Sense & Respond Logistics Phase', *The Street*, Lockheed Martin Corporation, March 2010.

US Marine Corps, *Concepts and Programs*, Program assessment and Evaluation Division, HQ Marine Corps: Washington, 2009 p. 147.<sup>oo</sup>

## Opinion piece

# ‘From Black to Black’: a reform veteran’s perspective of the Black Review

**Brigadier Nick Jans, Australian Army Reserve**

Dr Rufus Black’s 2011 review of Australian defence decision-making process goes much deeper than its centrepiece set of proposals aimed at improving corporate governance practices. Black also noted that ‘underlying culture and skills issues will need to be addressed as thoroughly and as explicitly as the changes to mechanisms and processes’.<sup>1</sup> Thus his report contains some equally relevant recommendations for developing the competencies and leadership style needed to initiate and sustain such improvements.

Black supported his recommendations with information derived from a range of interviews and an internal survey (the sampling details of which are not given). Most experienced observers would conclude that his recommendations make sense; commonsense even.

Let’s be clear: what Black has recommended is indeed commonsense. But let’s also be clear that Voltaire’s dictum – ‘the problem with commonsense is that it’s not common’ – holds just as well now as it did in the 18th century. So this might explain why something that is so eminently ‘common-sensible’ has popped up regularly in various guises over the last generation, only to be defeated each time by opposition, apathy or inertia.

Proposals for a ‘people’ strategy that would establish effective ‘followership’<sup>2</sup> levels in Defence first surfaced in the mid-1970s and have reappeared at least once every decade since.<sup>3</sup> Not only did none have legs but, judging by the absence of any attribution by Black of such studies (except for a footnote reference to the Glenn Review), one can assume that they have also been wiped from corporate memory—ironically thereby providing an excellent demonstration of why such a people strategy is needed.<sup>4</sup>

Why are genuine ‘people’ reforms so difficult to bring about in the Australian military establishment? During the last decade, I addressed this issue in a book with my colleague Dr David Schmidtchen<sup>5</sup> and an analysis of senior leadership in Defence.<sup>6</sup> The central thesis in both works was that the career system is the key to understanding military culture and to understanding why some things are very difficult to change even with ministerial clout behind them.

The career system is important because it fundamentally influences individual and collective perspectives and career priorities and other factors that affect behavioural change in strong cultures. It does this by determining such things as what kinds of skills people will bring to any particular role, how long they will have in each appointment to use those skills, and the extent to which their colleagues are also likely to have appropriate skills and commitment. In operational units and formations, these factors are favourable: for example, people are well-prepared for their work and each officer knows that they and their profession will inherit the consequences of inadequate decision-making and planning if they don’t get it right first time. So things get done and things progress.

But the same is not nearly the case for bureaucratic staff appointments. Black found, for example, that nearly three-quarters of his respondents did not believe that 'Defence people would be willing to take personal responsibility when things go wrong'. If this is even half right, it is a worrying reflection of the current state of the Australian military profession and its career systems and priorities. (Imagine what it would say about the Australian military profession if an equivalent proportion of incumbents in ships and operational units had said the same!). Either senior military officers are treating bureaucratic staff appointments in a cavalier fashion (which I doubt) or (more likely) they feel so disempowered by the decision-making process that they feel that it would be unjust to allocate/take personal responsibility for something which is so frequently the consequence of a convoluted process.

The Australian military profession prides itself on its sense of professionalism. If the higher levels of Defence management were staffed by people with skills appropriate to their appointment and with a career stake in ensuring that decisions made today will be timely and robust enough to be carried to fruition tomorrow, the organisation probably wouldn't really need explicit changes to governance and organisation. Because if the people making the decisions today are the people who will have the carriage of the implementation tomorrow and the consequences of the decision the day after, it's a pretty good incentive for them to get it right the first time.

Moreover, if and when some future senior leadership team finally brings such a people strategy into play, it is a fair bet that Defence will find that it didn't need all those additional civilian executives that Black is recommending. Defence may simply find that improved corporate governance will be one of the many natural benefits that come from putting the right people with the right skills in the right place at the right time. It may even find that the addition of bureaucratic elements had actually slowed the strategic decision-making and implementation processes even further.

It's another fair bet that none of the organisational and procedural changes will fix the problem in the absence of fundamental reform to career development system. After all, that's what it found the last time it tried to do this and the time before that and the time before that. And the challenge to 'get it right or face the consequences' may not be sufficient to sustain any reform program. As Black points out, cultural currents run deep. The misguided tribal-driven gut-reaction that sunk so many well-argued proposals for improving Defence staffing in the past has not gone away.

It goes without saying that it will take genuine and sustained leadership by everybody at the top of the organisation to make the Black Review work. But don't hold your breath. Why would 2011 be any different to 2001, 2000, 1995, 1989, 1985 or 1978?

## NOTES

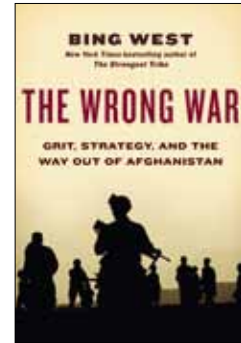
1. Rufus Black, *Review of Accountability and Governance in the Defence Department*, Department of Defence: Canberra, 2011.
2. 'Followership' is the companion to 'leadership', and is the extent to which members of the team are ready, willing and able to give support and assistance to the person in charge.
3. This series of studies began in 1978, with the Army's Regular Officer Development Committee (RODC) Report, and it resurfaced periodically in subsequent decades, most notably in the 'Careers in Conflict' study (1985), 'Facing up to the Future' (1989), the 'Glenn Review' (1995), the 'Officer Performance and Effectiveness Review for the Army' (2000) and Defence's 'Action Plan for People' project (2001).
4. The title of this paper is a pun on the fact that one of the RODC team, Lieutenant Colonel Adrian Black, went on to be the key staff officer responsible for implementing the report's recommendations. These were the Army's first major post-war attempt for significant change to the officer career system. Adrian Black resigned—I suspect in some frustration—at the end of that appointment.
5. Nick Jans and David Schmidtchen, *The Real C-Cubed: culture, careers and climate and how they affect capability*, Strategic and Defence Studies Centre (ANU): Canberra, 2002.
6. Nick Jans, *Once Were Warriors: leadership, culture and organisational change in the Australian Defence Organisation*, Leadership Paper 3/2004, Centre for Leadership Studies: Canberra, 2004. The *Once Were Warriors* report scarcely got off the starting blocks, and its conclusions and analyses were ridiculed and dismissed by key members of the senior military establishment at its launch. It has ceased to be on the radar screen of even the most senior Defence educational institution.

## Review essay

### *The Wrong War: grit, strategy and the way out of Afghanistan*

Bing West  
Random House: New York, 2011  
ISBN: 978-1-4000-6873-9

Reviewed by Dr Richard Brook Connell, UNSW @ ADFA



The most far-reaching act of judgment that the statesman and commander have to make is to establish ... the kind of war on which they are embarking; neither mistaking it for nor trying to turn it into something that is alien to its nature.

Carl Von Clausewitz, *On War*

I have had more than a passing interest in insurgencies since my exposure to South Vietnam in the 1960s. And I knew of Bing West from his previous title, *No True Glory: a frontline account of the battle for Fallujah*. I have also appreciated West's insights—aired on radio and television—into asymmetric conflicts, particularly the insurgencies in Iraq and Afghanistan.

Given the currency of the book's core issue—withdrawing from Afghanistan—and the credibility of the author,<sup>1</sup> I thought I might compare my views with those of other reviewers. So I consulted several reviews of *The Wrong War*, including one in the *New York Times Book Reviews*<sup>2</sup> and another in the *Harvard Review*.<sup>3</sup> The first characterised West's book as a 'crushing and seemingly irrefutable critique of the American [strategy] ... in Afghanistan'; the second referred to the book as 'a scathing attack' on US policy.

Faulting US policy and strategy was clearly one of West's intentions. But his criticisms are used constructively as input for formulating recommendations for a new and hopefully more productive strategy, ultimately leading to the withdrawal of Western forces. He couches the criticisms in answers to several questions; I will focus on two, namely:

- What strategy is being pursued and is it likely to succeed?
- If not, how should it change such that reasonable conditions for withdrawal can be achieved?

### **What strategy is being pursued today?**

The US perceived itself as having a choice between a post-Vietnam counterinsurgency strategy and one based on a 'new' counterinsurgency (new-COIN) doctrine. The first has a 'hard core' that West maintains 'concentrate[s] on destruction or neutralization of the enemy not on terrain'. That is, it is enemy-centric. This approach was successfully used by Australia in Malaysia and Phuoc Tuy province in Vietnam. The Americans used it with good effect in the Philippines and some provinces in Vietnam, including those in the IV Corps area of operations, where the fight was overwhelmingly with irregular forces. Experience suggests it works in some circumstances.



New-COIN, the second option, suggests that efforts should be oriented towards protecting the population and providing it with services to render the insurgents impotent and irrelevant. In emphasising a terrain/population-centric approach, it seemingly contradicts the post-Vietnam doctrine. New-COIN proved efficacious in Iraq, where kinetic operations and efforts to imprison insurgents had failed. It then became the US military's mantra. It also gained high-level political support from US Secretary of Defense Gates and President Obama. It followed that new-COIN was chosen to combat the insurgency in Afghanistan. However, West asserts that new-COIN is not a 'how to' doctrine in the traditional sense but a broad framework that outlines general counterinsurgency principles and, as such, is too generic to be translated into doctrinal terms that are relevant to the unique conditions in Afghanistan.

The inherent limitations of new-COIN and its lack of success to date notwithstanding, it still provides the guidelines for fighting the war today. One of West's most damning (and best documented) conclusions is that new-COIN would not have worked in Afghanistan even if its objectives had been more clearly defined<sup>4</sup> and a more consistent approach to its implementation taken by the generals in command.<sup>5</sup> Nor is it likely to work in the future.

The new-COIN framework outlines a process of three sequential stages: first, clear an area, then hold it and, finally, build it. West explains why achieving success in Afghanistan in each of these stages has been (and will remain) problematic, frequently using comparisons with Vietnam and Iraq to build his arguments.

'Clearing' involves separating the insurgents from the population and securing the population by posting troops in a village and/or frequently patrolling it. In Iraq, clearing was far less of a problem than it has proved to be in Afghanistan. Sunni tribes in Iraq have hierarchies. Some strong tribes came over to the coalition's side because they believed it was winning. Weaker tribes followed. In Afghanistan, tribes are more fragmented and independent of one another. Moreover, because of on-going threats to the population from the Taliban, the coalition has not been able to demonstrate that it is winning. Hence, many Afghans are unwilling to cast their lot until they have a more consistent picture of who will ultimately triumph.

The coalition's inability to guarantee security stems, in large measure, to a paucity of resources. Helmand province alone has a population of slightly less than 1.5 million, spread throughout 8000 isolated villages. West notes that the 'standard' counterinsurgency ratio of military forces to population is 1:50. The coalition's ratio in many parts of Helmand has been 1:2000. Distances and driving times between coalition outposts also precludes maintaining anything more than a token presence in most of the province. Many more 'boots-on-the-ground' would be required to deal with this limitation, which is an unlikely scenario.

'Holding an area' calls for providing services to the people and giving them aid (for example, building schools and mosques) to ensure their loyalty. To earn aid, the population should shift its support from the insurgents, who they would betray, to the central government (represented by coalition forces). If they continue to support the Taliban, they would be subject to clearing attacks by coalition forces.

According to West, the coalition's ability to establish a 'social contract' with the population was based on a critical erroneous assumption: that rewards and punishments offered to influence people's behaviours were relevant and could be used effectively by the coalition. However, many Afghans simply do not value the improvement in living standards that coalition aid can provide. West observes that by doling out so much aid, without explicit preconditions for

cooperation, the coalition has created a 'culture of entitlement'. The people do not believe they have to fulfil their part of the social contract—that is, giving up the Taliban—in order to receive aid.

In addition, the extent to which a military 'stick' could have actually been used against the Taliban in uncooperative villages has been highly limited due to onerous 'rules of engagement'. The consequences of breaking the rules, according to West, stoked 'fears about the political consequences of collateral damage [that] have sapped commanders of their aggressiveness and offensive spirit, which are necessary to confront the Taliban and demonstrate that there were, indeed, disincentives to non-cooperation with the coalition'.

'Nation building', the third process stage, has also been constrained. It requires good governance which is achieved, in part, by connecting the people to competent local officials and both of these to a competent and honest central government. Good governance presupposes the presence of some locally-based government institutions to which the local population can shift its allegiance. In Iraq, there was an infrastructure of qualified civil servants and ministry offices that provided an extension of the central government to the provinces.

In Afghanistan, the central government does not have much of a presence outside of Kabul and, for the most part, locals are not sufficiently educated to fill local, provincial or central government positions even if an institutional structure was available to employ them. Those officials that do represent the government in the countryside, such as local police chiefs and governors, are virtually all appointed by President Karzai on the basis of patronage, nepotism, payoffs or tribal connections, independently of their competence. Corruption is rife throughout the skeleton government system. Since the coalition has no influence over who is appointed to key positions, West contends that opportunities to achieve good governance within the current system are virtually non-existent.

In addition to the above, the coalition has a crucial deficit in its ideological offering. Afghanistan is a religious country. Eighty-four per cent of Afghans identify themselves primarily as Muslims. Although radical Islam has relatively few adherents, West suggests that a majority of non-extremist Afghans do not want 'infidel invaders' on their soil. Appeals of the Taliban that it is the people's jihadist duty to resist the invaders resonate even among the non-radicals. And, according to West, what the coalition has on offer—the rule of law, social services and government legitimacy—it could not deliver or was insufficient to counter 'the magnetic power of radical Islam'.

Finally, there are problems that derive from abutting Pakistan. The Pakistani government has little presence or influence in the tribal homelands and they have become a sanctuary for the Afghan insurgents (used for rest, training, recruitment and logistics). It was not until Ambassador Holbrooke became the US plenipotentiary to Afghanistan in 2009 that the US Administration recognised the need to address Pakistan's contribution to the insurgency. This recognition influenced the positions the US took in its diplomacy with Pakistan but had little impact on the ground in Afghanistan. West, who may have drawn from his Vietnam experience, notes that 'you cannot win a war when a determined enemy has a sanctuary next door'.

To briefly summarise, West maintains that new-COIN provided a generic counterinsurgency framework that may be relevant to some conflicts but does not take into account factors unique to Afghanistan, a large and populous country. Its implementation cannot change the culture of patronage, bribes and corruption and therefore reduce inept Afghani government. Nor can the

coalition use aid incentives, which worked so well in Iraq, to influence individual and group loyalties to tribes that currently co-opt stronger ties to the central government. Moreover, an infrastructure that provides incentive for the population to support the government cannot be built. Finally, the porous nature of the border with Pakistan makes sustainable progress against the Taliban difficult. West concludes that the pre-conditions for new-COIN to work do not exist in Afghanistan nor can many be met.

## **How should the strategy be changed?**

West believes that the coalition must 'win' the counterinsurgency. He speculates that a precipitous pull-out would result in a civil war which the Taliban would win. Under this scenario, the West's national interests would be threatened and Pakistan, with its nuclear arsenal, might become destabilised. West would find acceptable a government and military in place with the strength to avoid a unified, national, radical Islamic group assuming power in Kabul. To achieve this goal, West proposes that the coalition immediately cut back its unsuccessful attempts to 'un-corrupt' the Karzai regime and win over the Taliban. He posits that the war can only be settled between Afghan loyalist forces and the Taliban. And he suggests three specific actions the coalition should take as soon as practicable.

The most important is to improve Afghan forces to the point that they can take over responsibilities now assumed by the coalition. As a first step, West recommends that the coalition cuts its 'regular' force level from 100,000 to 50,000, and transition to 100 advisor teams. Until the Afghan Army is ready to take over, coalition forces would have some highly specific roles and responsibilities, like training the Army, giving it operational advice and providing fire support, logistics expertise and, where necessary, command.

Second, West would establish commando/Ranger-type units to work in the Pakistani border region to interdict the flow of men and materiel to the Taliban. They would engage in ambushes and be supported by air power that would adopt the 'free fire' zone principles that were used in South Vietnam.<sup>6</sup> Finally, he would increase the use of special operations forces to track down and eliminate insurgent leaders.

Having thought about West's recommendations, for which he builds a well-argued case, I developed some reservations about whether they are workable.

West points out how weak the Afghan Army is as an institution. He notes that coalition forces have been there for nine years, training and advising it, and it is still corrupt and lacks leadership. He also quotes a British sergeant who characterised the performance of the Afghan Army as 'patchy', with some units performing satisfactorily but many poorly and 'all mixed in'.

As an example of the raw material with which West's proposed advisor teams would work, West cites the performance of a battalion whose troops were fully integrated with a British advisory team for three months but still argued with their officers during fire fights, bunched up while patrolling, had no fire discipline and were poor marksmen, and remained essentially untrained. West attributes this to a lack of leadership, which is inherent in a system that bases promotions on tribal loyalties, payoffs and other political factors rather than courage, competence and performance. He states that advisor teams should have input into appointments and promotions within the Army. However, in a different context, he states that changing the incentive system for appointments and promotions is impossible, which begs the question of whether one of the pre-requisites for upgrading the Afghan Army can be met.

West also leaves open the question of how long his recommendations might take to yield results. In the last quarter of 2009, President Obama stated that after 18 months, troops would start to be withdrawn.<sup>7</sup> West is against setting a time-line for total withdrawal, an idea under debate. West sums up the coalition's dilemma: if you pull out troops after they have achieved local security, the villages from which they have withdrawn are still not linked to central government. If you leave troops in a village until good governance is achieved, coalition troops may have to be there indefinitely. West suggests that coalition governments should be willing to maintain a (reduced) Western military presence 'for as long as it takes' to achieve his acceptable end-state. Given the current condition of the Afghan Army—and the mounting political pressure for a total withdrawal—this may be more aspirational than realistic.

Although I have reservations about West's recommendations, my conclusion is 'why not try them'? Nothing in the coalition's current kit bag has worked so far. Moreover, the potential problems with West's recommended approach might not be as insurmountable as they seem. Who, for example would have believed that the Army Republic of Vietnam (ARVN) could have held the line against the People's Army of Vietnam after the latter's full scale invasion of South Vietnam in the Easter offensive of 1972? At the time, the US had only engaged in its 'Vietnamisation' strategy for about five years; yet the ARVN generally performed admirably when it had US fire support.

The frequently controversial content of the book (White House staff refused to comment on it), the rigour of his research approach and his easy-to-read style may result in *The Wrong War* becoming West's third best seller. It should be of interest to military and foreign policy professionals to whom his 'lessons learned' are particularly thought provoking. Second, its 3-page bibliography and the 1000 interviews from which he draws make the book a significant contribution to contemporary military history.

Finally, the book contains a good selection of maps and 50 high quality photos that are geared to the text. They show the terrain and troops patrolling, policing battle fields, interacting with the Afghani population and at rest. The book is supplemented by a video library that features coalition forces engaged in offensive operations. These bring the book to life in a way that I have not seen done so innovatively elsewhere and will no doubt extend the market for the book to the general reader.

I can say without reservation that reading and reviewing *The Wrong War* was a most favourable part of my job. I strongly recommend it.

## NOTES

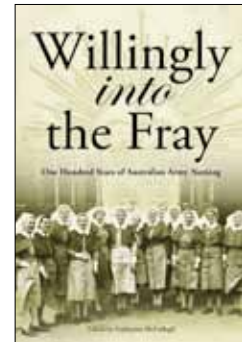
1. West served as an infantry officer in Vietnam and then wrote a book about counterinsurgency, *The Village*. It has been on the 'Commandant's Reading List' for 40 years. He was an analyst at the Rand Corporation and an Assistant Secretary of Defense in the Reagan Administration.
2. Dexter Finkin, *New York Times Review of Books*, 27 February 2011.
3. Gerard Russell, *Harvard Review*, 14 April 2011.
4. West highlights the lack of consensus about US objectives in Afghanistan between and within two presidential administrations. Should the coalition try to eliminate locally-based al Qaeda affiliates and deny foreign al Qaeda fighters an infrastructure and sanctuary? Or should it seek to build a free and democratic Afghanistan?
5. West provides a chronology of US leaders and comments on how their approaches to warfighting changed based on their individual interpretations of the new-COIN framework, for example, from kinetic operations to good governance to winning hearts and minds.
6. As a practical matter, there were no rules of engagement in these known enemy strong-holds, with virtually no neutral or friendly civilian populations.
7. There was a lack of consensus on how to interpret Obama's statement. Secretary of Defense Gates said that only a token forces level reduction ('a handful') was planned within 18 months; Vice President Biden disagreed but later reversed himself.

## Book reviews

### *Willingly into the Fray: one hundred years of Australian Army nursing*

Catherine McCullagh (ed.)  
Big Sky Publishing: Newport NSW, 2010  
ISBN: 978-0-9806-5826-2

Reviewed by Jim Truscott



I was keen to review this book as I was well aware of the writing capability of its editor, Catherine McCullagh. At the same time, I felt somewhat inadequate as—while having served for 26 years—my sole exposure to Army nurses had been as a result of time spent in Duntroon Hospital and 2<sup>nd</sup> Military Hospital at Ingleburn as a Lieutenant some 30 years ago, following a serious rock climbing accident. Waking up after surgery to be confronted by someone wearing a starched veil and red cape was somewhat frightening! Nonetheless, I found this compilation of 65 individual experiences over 100 years to be simply inspirational reading.

They span 14 conflicts, large and small, in war and peace. It is a bolus-like dose of serious history and more than a military history. It is a history of humanity through very Australian eyes. There are myriad nursing stories, from finding casualties lying on the ground at Lemnos in World War 1; the torpedoing of a hospital ship off Brisbane and prisoner-of-war experiences in Japan in World War 2; being bombed in Korea; the frenzy of dust-offs in Vietnam; a grandmother serving in the First Gulf War; combat insertions in East Timor; and the sight of 'body farms' after the tsunami in Aceh. Some stories are very close to the sound of battle, such as at El Alamein. The photographs bring the enteric stories alive and add much understanding to what can be a lot of packed text.

There is a consistent theme of the presence of nurses raising morale among the troops—and not just because they are women. There are descriptions of the truly remarkable bond between a military nurse and a wounded soldier. So much so that a group of Army nurses was invited to lead the march of the returning 7<sup>th</sup> Division through Sydney in October 1943. Recognition of service does not get much better than that. There is a pervading feeling of hardship, particularly in the first 50 years. There is a consistent theme of having to clean and prepare their working areas, which were often either non-existent or spartan on their arrival in a theatre of war. Nurses cannot be effective too close to the front line as they need infrastructure to do their job best.

There are stories of devotion to duty, selflessness and an oft feeling of hopelessness. There is the tang of adventure but it is not self-adulatory. There are constant conclusions of post-war service and leadership in nursing. By reality of sheer survivors, there are more stories available from the second 50 years compared with the early days. The complete feeling of the book changes in the accounts of the more recent non-warlike peacekeeping and humanitarian operations. But they are still punctuated by two deadly Gulf wars. The latter stories are slightly

more technical in nature, although primitive conditions frequently prevailed—still carnage but amongst the people.

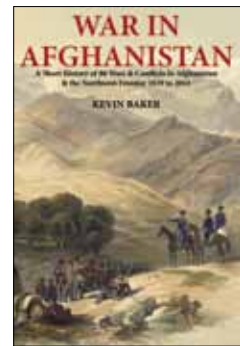
By design it is an individual history and, with some 65 stories, it is hard to assess their overall numbers and impact on various theatres of war. I would like to have seen some context of unit history or some other comparative interpretation. But that discussion is for another author to measure their contribution to war efforts and the survivability of injured and maimed men. It begs more in terms of the impact of nursing on the morale component of combat power. These are personal tales that have to be analysed and there is another book waiting to be written.

The compilation of stories is so personal and so raw that you cannot read the whole book in one sitting. It would be too insensitive not to give each story due attention. It needs to be read in segments. Every story leaves you with a feeling of lives well spent and richly rewarded as a consequence. It is powerful testament to a group of women and some men who have devoted a large part of their lives to care. It is a fantastic book for people thinking of taking on nursing as either a military or civilian career.

### ***War in Afghanistan: a short history of 80 wars and conflicts in Afghanistan and the North-West Frontier 1839 to 2011***

Kevin Baker  
Rosenberg Publishing: Dural NSW, 2011  
ISBN: 978-1-8217-1912-7

**Reviewed by Dr Noel Sproles**



For millennia, great armies have marched through Afghanistan in search of conquest and strategic advantage. None of them has found it easy going. A resilient local population, often bouncing back from initial defeat, has typically taken advantage of the harsh terrain to resist the invaders with tenacity, skill and great ruthlessness. When not fighting the armies of invaders, such as Alexander, the Moguls or the British Empire, this same population would often make war on itself. With such a long history of invasion and internecine conflict, the region is undoubtedly one of the more turbulent parts of the world.

*War in Afghanistan* does not attempt to cover this great saga in its entirety but limits itself to the events of the past 170 years or so. But even this small part of Afghanistan's history is a sobering record indeed, both in the intensity and frequency of outbreaks of conflict. The narrative commences in 1839 when the British first invaded Afghanistan, thus marking the commencement of 'the Great Game' between Russia and Britain for strategic dominance in Central Asia. By coincidence, it coincided with the Victorian era (which commenced in 1837), the blooming of the Industrial Revolution and the consolidation of British power in India.

The 80 conflicts discussed cover the three major wars that the British Empire fought with whoever was in control in Kabul at the time; the clashes between the British Indian Army and various tribal groups on what is now the border between Afghanistan and Pakistan; the war with the Soviet Union late last century; the more recent ousting of the Taliban; and, finally, the present conflict between the 'coalition' and the resurgent forces of the Afghan Taliban and al



Qaeda. Interspersed, as if to fill the gaps, is inter-tribal warfare.

With such a range of conflicts, it is understandable that it would not be possible to discuss any in detail while still remaining within the reasonable confines of a book. This is acknowledged by the author who states that it is intended as a narrative of what occurred rather than an in-depth analysis of the reasons why. His aim is limited to providing an account only of the conflicts which have occurred over this period. However, even this brief treatment of each war or conflict presents the reader with a mass of detail concerning events, dates and the names of significant places and actors. Instead of trying to retain all this, I found it useful to adopt the approach of building up an overall impression of what was happening as events unfolded.

The book has a well-organised layout which, coupled with the author's articulate writing style, makes for an easy read. The story is broken into four parts, each devoted to a particular phase of Afghanistan's history. These parts are, in turn, sub-divided into chapters relating to each of the conflicts or periods of related conflict that occurred in that period. The copy reviewed was in a soft cover and published on good quality paper. It is amply illustrated with interesting and relevant black-and-white images, ranging in quality from good to excellent. An appendix lists all the conflicts by the year in which they occurred and a comprehensive bibliography is supplied. Maps were included but I still found it necessary to supplement them with downloads from the internet. This did not present a problem as I found that, in the process, I built up a reasonable geographical knowledge of a country of which I initially had only the broadest of impressions.

Operations since 2001 are necessarily covered with the same broad brush as the events that occurred during the time of the British Empire, with only a selection of events discussed. Topics covered include the establishment of the current Karzai Government, the US troop surge that commenced in 2009 and General McChrystal's resignation in 2010. Reference is made to the rise of the Pakistani Taliban and signs of the growing unity of insurgent groups operating from within the Afghanistan and Pakistan border areas. Only passing reference is made to the establishment of the Afghanistan–Pakistan theatre and none to al Qaeda's role in establishing unity between the various groups and in bringing about the rise in insurgent activity since 2006.

With the benefit of hindsight, Baker has been able to reveal a recurring pattern of conquest, often followed by several years of calm, followed by a resurgence to eject the invader. The reader is led to question if this pattern is repeating itself today. For example, Baker tells us that in the past, tribal divisions played into the hands of the British, yet now there are signs of tribal unity. And again, the conflicts were once confined to Afghanistan or the former North West Frontier Province. Now there is evidence of it spreading into Pakistan. Why is this so? Is there any possibility that the machinations of al Qaeda and its ideology are breaking the pattern that has prevailed in the past? We would be wise to remember the author's advice that nothing in Afghanistan is simple when pondering such questions.

I feel that it is incumbent on us, particularly those watching from the sidelines, to attempt to gain an understanding of what is happening today in Afghanistan. This is not easy if we are reliant only on what is available from open sources. The contribution that *War in Afghanistan* makes to such an attempt lies in revealing a pattern that has occurred in the past, enabling the reader to compare it to what is happening now. *War in Afghanistan*, when complemented by a wider reading of the political movements currently extant in the Muslim world generally and

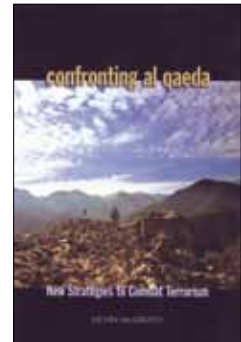


the Arab world specifically, will assist in developing an appreciation of events as they unfold in this region. I cannot recommend it too highly.

***Confronting Al Qaeda:  
new strategies to combat terrorism***

Kevin McGrath  
Naval Institute Press: Annapolis, 2011  
ISBN: 978-1-5911-4503-5

**Reviewed by Dr Hank Prunckun**



As a general position, a nation's security rests with its military and the military's ability to project force against aggressors. This certainly holds true when considering nation-states as actors. But what about non-state actors in the form of transnational organisations whose activities are grounded in criminal or terroristic behaviour? Hard-power options are no doubt a viable option when dealing with the immediate threat posed by such menaces. In this regard, military and law enforcement tactical assault teams are the logical choice when dealing with small scale threats, with larger units of fighting forces reserved for larger security threats, such as the situation in Afghanistan.

Moreover, when a nation is confronted with unfolding peril, force-on-force may well be the only answer. But once the immediate threat has been subdued, how do nations deal with a vanquished enemy? If the enemy is another nation-state, then a surrender is negotiated, which includes armament destruction, standing-down and decommissioning of troops, and so on. This may be a somewhat simplified version of the political wrestling that would take place. But when compared to having to deal with a militarily-subdued transnational terrorist organisation like al-Qaeda—which has little in the way of a hierarchal structure—the options are much simpler.

The world's foremost transnational terrorist organisation is certainly al-Qaeda. It is well established what this organisation's motives were leading up to and after its 9/11 attacks (including the subsequent attacks on London, Madrid and Bali). But a policy based solely on the reasoning that radical Islamic terrorism can be defeated by the use of force or coercive hard-power options alone is unrealistic.

When the author of *Confronting Al Qaeda* was asked if the 'war on terror' had been won, he was blunt in his reply. McGrath's view was that 'America is still in the first phase of its 9/11 response. The United States' fight with al-Qaeda, and developing a long-term US strategy to win it, still has a long way to go'. Remembering that it is now some ten years since 9/11, then still to be in the first phase of the war is sobering. But this conclusion was recently supported by the US State Department, which reiterated (in August 2011) its view that al-Qaeda is still a threat.

McGrath's research shows that strategies and tactics used in the 'war on terror' so far have been largely focused on force-based options, at the almost total exclusion of politically-

ordinated soft-power options. Although al-Qaeda's military menace must be dealt with by force each time it emerges, McGrath argues that the underlying causes that bring about the group's extremist views need to be understood so that the causal conditions that generate its belligerent thinking can be targeted. McGrath advocates that the widespread support for terrorist organisations is what political decision-makers should now be focusing on and that, until the base that supports these dangerous views is diminished, the West can expect more attacks.

McGrath takes several chapters firstly to describe the framework of the US/al-Qaeda struggle and then turns his discussion to the strategies that have been employed to deal with that framework. The conclusion McGrath reaches is that the post-9/11 counter-attack was successful but that further gains using force-on-force are unlikely to yield substantial gains. From this position, he then devotes the remainder of the book to a number of important policy questions, including the issues of priorities, leverage and willpower. He concludes with a chapter on what he sees as a viable way forward.

*Confronting Al Qaeda* is an important treatise on reassessing the West's ongoing battle with the threat of terrorism. The bulk of its 323 pages are dedicated to building the case for a new set of strategies that will hopefully diminish Islamic-centric terrorism. In essence, this means assailing the key political disputes that drive the conflict. McGrath posits that any attempt to eliminate all al-Qaeda's members by force will be futile. There are over one billion people in the worldwide Muslim community, so even the small percentage which espouses the radical ideology that underpins movements like al-Qaeda will be too great numerically to engage using conventional forces. Besides, these radical elements are not nations; they operate from everywhere, including Western soil, and their strength is their global connection.

Instead, says McGrath, the West needs to manage the conflict rather than seek eradication. The use of asymmetrical warfare by al-Qaeda is likely only to deplete the West's resources and, in the long term, al-Qaeda will remain. However, if the West can fracture al-Qaeda's global network into a number of disjointed national movements, McGrath suggests this will make its management far more realistic.

In this regard, targeting al-Qaeda's power and influence offers optimism for the West. Addressing the factors that give rise to disaffected, dispossessed and marginalised young men being drawn to the radical teachings of radical mullahs is one way the West can prevent new recruits from joining al-Qaeda, as well as other organisations, such as Hamas, Islamic Jihad and Jemaah Islamiyah. Another is to target the financial base of these organisations. All this requires intelligence and an intelligence support base to make it happen. McGrath advocates that if the West can engage in these new strategies, then Western liberal democracies can expect to start to win the next phase of the 'war on terror'.

This is a well written and thought-provoking book that will find an audience with subject specialists as well as general readers. It certainly provides food for thought for anyone engaged in counterterrorism policy development.

## ***Caught in the Crossfire: an Australian peacekeeper beyond the front-line***

Matina Jewell  
Allen & Unwin: Sydney, 2011  
ISBN: 978-1-7423-7567-0

Reviewed by Elyssa Comer, University of Canberra



Matina (Matti) Jewell's memoir is a multifaceted story of a female Australian Army officer. The book, 288 pages in length, centres on Matti's experience during a 12-month deployment as a UN military observer in the Middle East. At the crux of this book is the desire to share experiences to help others who face similar plights. The story is an eye-opening account of the physical and mental tolls our service personnel face in modern warfare, including peacekeeping operations. Matti's story provides insight into the extraordinary pressures and measures taken to ensure mission satisfaction, despite personal safety and fears. This book has something to say about how exceptional our servicemen and -women are and how they operate under pressure.

While the memoir is centred on a career and life-changing deployment, it also delves into Matti's personal experiences as a soldier; development, career progression, learning and love. The 23-chapter book begins by covering pre-deployment preparations and the inconvenient arrival of love to complicate the issue. It encapsulates an all-inspiring tale of the difficulties faced in sustaining a relationship while serving in the military and the uncompromising balance that has to be found. Readers could be forgiven for feeling that the book is a love story at times, but they will be quickly reminded where the story is set—a developing war zone.

Matti's story covers many aspects of a military life; the family-like bond within battalions, camaraderie, culture shock, deployment experience and the turmoil of recovering and rebuilding after a deployment gone wrong. Matti truly takes the reader on a real life journey, an emotional roller coaster, exploring the ups and downs of life and unpredictable tragedy. Her ability to describe situations, recall feelings and set the scene of the fast-paced and turbulent roller coaster gives the reader a greater appreciation of what Matti has been through and you begin to understand the complexities and stresses faced.

The intent of the book is not to bait the reader's breath; it is a capturing, eye-opening memoir full of raw emotion. The inclusion of photographs is excellent and positively supports the story. However, the indexation of these in the centre of the book spoils and prematurely informs readers unfamiliar with Matti's plight of what is to come. The reader would be better supported and placed in Matti's shoes, to appreciate the unexpected and tragic events, if the photographs had been printed in the relevant chapters.

*Caught in the Crossfire* is recommended to a wide audience. It is easy to read and follow, even for those without knowledge of the ADF, military or Army. While acronyms do not pose any significant issues, the book may have benefited by the inclusion of a glossary for reference. Matti's easy-to-read style and ability to place the reader in her shoes with encapsulating experiences brings the book to life.

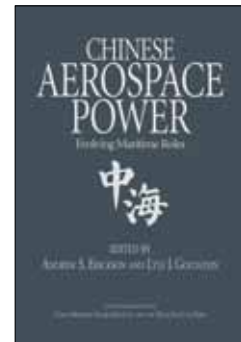
It also embraces new technology to further captivate and include the reader in the story. 'QR' codes placed throughout the book allow readers with 'smart' phones to jump to clips on Matti's YouTube channel, which further explain and provide vision to accompany what the book is talking about. This is a great way to embrace new technology in an easy-to-use way to allow the reader to understand what Matti saw, heard and felt.

*Caught in the Crossfire* makes a valuable contribution to the book shelves. Matina Jewell should be praised for addressing the hard issues and telling her story. The story has something more than a 'life in the military' contribution; it says something more about human nature. Matti says that she wrote this book to assist others who may face similar issues and, while not many people can picture themselves on a peacekeeping mission serving in warlike conditions, Matti's story of self-discovery and recovery can be applied to a myriad of issues. Her story is inspirational, encouraging and thoroughly worth reading.

### ***Chinese Aerospace Power: evolving maritime roles***

Andrew S. Erickson and Lyle J. Goldstein (eds.)  
Naval Institute Press: Annapolis, 2011.  
ISBN: 978-1-5911-4241-6

**Reviewed by Captain Gordon A. Andrew, RAN**



*Chinese Aerospace Power* is the fifth book in a series jointly published by the China Maritime Studies Institute (CMSI) and US Naval War College. Like the other titles in the series, many of the articles came originally from presentations at the CMSI's annual conference. Like the others in the series, it is also rich in detail, comprehensive in approach, strong in analytical rigour and light on speculation.

The book is a comprehensive look at changes in Chinese air power from a maritime perspective. Twenty seven chapters approach the subject from different directions. There are capability-based chapters, such as those on aerial refuelling and ASW; platform-based chapters, such as those on cruise missiles and unmanned aerial vehicles; and a number of chapters which attempt a doctrinal and strategic understanding of how and why China is developing its aerospace power.

To match this diverse approach, the range of sources is impressive. Nearly always primary source—many translated from Chinese—and including more unusual techniques, such as the analysis of Chinese UAV exhibitions at trade shows, it allows for an authoritative discussion. This authority is, however, self-tempered by the inclusion of a chapter discussing 'Challenges in Assessing China's Aerospace Capabilities and Intentions', which recognises that Chinese military capability remains a difficult area to gain reliable data. Such honest self-assessment is admirable.

The book concludes with two chapters discussing the ramifications for the changes to Chinese air power for the US Air Force and US Navy respectively. Here personal opinion is expressed,

firstly by a senior engineer at the RAND Corporation, Jeff Hagan, and secondly by Eric McVadon, a former naval attaché in Beijing. These final two essays form a good basis for contextualising all the information presented earlier and as a lead-in to the inevitable ‘so what’ question all readers should be asking themselves.

While it is hard to find fault with this book, the Australian reader needs to be aware that, like much of the debate about China that emanates from the US, it is US-centric in its approach. This book is about China and what China’s increasing aerospace capabilities mean for the US armed forces—it is not about the effect of China’s rise on the regional dynamics in the western Pacific. So, in over 500 pages, Australia gets mentioned only five times, Vietnam four and South Korea nine, mainly in the context of being US allies or having shared weapons systems. Japan is mentioned far more frequently but mainly as the location of the large number of US forces permanently stationed there and as a vital ally in any potential conflict.

Uninformed and speculative comment on China can be found almost daily in our major newspapers, blogs and magazines. The need to have a deep understanding of what China is—and is not—militarily capable of is therefore growing to ensure that reasoned debate can occur. As is noted in *Chinese Aerospace Power*:

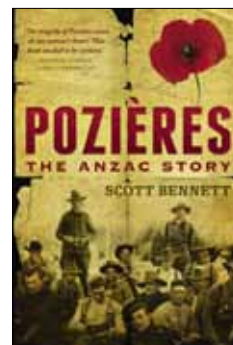
Effective and complete military discovery, as it pertains to China or anything else, is an art that is accomplished not by meekly repackaging questionable information but through deep study, contemplation, and professional discussion.

Books such as *Chinese Aerospace Power* provide the basis of that discovery and anyone who is interested in gaining a deeper understanding of the rise of China would benefit from reading it.

### ***Pozières: the Anzac story***

Scott Bennett  
Scribe Publications: Carlton North, 2011  
ISBN: 978-1-9216-4035-3

**Reviewed by Lex McAulay**



Scott Bennett’s interest in Pozières was activated when his grandmother gave him, a teenager born in 1966, a newspaper clipping which described her brother as the youngest Australian to fight at Pozières. He began to research the Anzacs and their campaigns, visited the area and was appalled at the seemingly pointless repetitive slaughter of tens of thousands of men for insignificant farms and villages.

Bennett has made extensive use of diaries, letters and memoirs of participants of all ranks to present a human aspect of the battles rather than a more impersonal account of the actions. Some readers might be irritated by his use throughout of nicknames, such as ‘Birdie’ for Birdwood and ‘Hooky’ for Major General Harold Walker, GOC 1st Australian Division.

Bennett is a supporter of Haig as the best and only man for the task of command of the Commonwealth forces who, in his view, correctly employed the only possible policies. But apparently Bennett has not read Norman Dixon on military incompetence—and so missed the 60 or so references to Haig in that work—nor Lord Moran’s on the anatomy of courage.

Birdwood is presented as a shallow but well-connected British officer, supported by the industry and ability of the conscientious Brudenell White. And C.E.W. Bean’s creation of the mythological Australian bushman, with sterling qualities of courage, independence and endless bravery is easily dispelled in the slaughter of thousands in the artillery fire and mud of the Western Front; Bennett has little time for this stuff.

However, Bennett seemingly fails to understand that the solid reputation of the AIF was not a creation of Bean but of the achievements of the men who fought on through the mud and barrages, the barbed wire, the pillboxes, the interlocking machinegun fire, and captured their assigned objectives. Nothing in Australia or at Gallipoli prepared any member of the AIF—from Birdwood down—for what they encountered at Fromelles, Pozières and the later battles, yet they prevailed.

Bennett’s disappointment was compounded when his research showed that far from being a veteran of battle at Pozières, his great-uncle was an under-age enlistee, a continuous disciplinary problem with a psychological resistance to authority—more in keeping with Peter Stanley’s recently-published *Bad Characters*—who was eventually discharged and drowned in a fishing accident soon after.

### ***The Private Air Marshal: a biography of Air Marshal Sir George Jones, KBE, CB, DFC***

Peter Helson  
Air Power Development Centre: Canberra, 2010  
ISBN: 978-1-9208-0050-5



**Reviewed by Irena Ali, DSTO**

It is fitting that a biography of the longest continuous-service officer to stand at ‘the helm’ of the RAAF is published in the year marking its 90th anniversary celebrations. Peter Helson’s book of 404 pages provides an insightful account of the life of George Jones: from his humble beginnings in rural Victoria, through his enlisting in the AIF in World War 1, the Gallipoli campaign, his service during World War 2, a RAAF career spanning over 30 years, followed by post-retirement business involvements and his political ambitions.

Although Jones served as Chief of the Air Staff for almost ten years (May 1942-January 1952), to date relatively little had been written about the man who rose to take charge of the RAAF in the critical days of 1942, when the Battle of the Coral Sea was fought, the Japanese were advancing southwards, Singapore had fallen, and Darwin had been bombed.

Helson not only meticulously examines the military, public and private life of Jones but also provides a rich politico-historical context of the events that shaped Jones’ career. The

reader gains an appreciation of the intricacies of military service during those wars—and in peacetime—and also learns about the personal struggles this highly-accomplished man faced as a result of the traumatic events he experienced.

As much as this volume is a thorough biography of Sir George Jones, it is also a book about the shaping of the RAAF, about the development of its capabilities and training programs, and about the impact on the RAAF of personality clashes within its high command during World War 2.

The author is to be applauded for his thorough research in preparing this publication and for an honest appraisal of this complex man in difficult times. The layout of the book enables it to be read in thematic sections. Although the chapters are outlined on the contents page, it is unfortunate that there is no index to refer the reader to specific issues of interest.

This book does justice to this humble man of rare strength of character, who could drive both himself and his subordinates hard. Perusing it would benefit those who are interested in the RAAF's history or want to learn about different leadership styles.

### ***Area 51: an uncensored history of America's top secret military base***

Annie Jacobsen  
Hachette: London, 2011  
ISBN: 978-0-3161-3294-7

**Reviewed by Ben O'Connor**



Annie Jacobsen's *Area 51: an uncensored history of America's top secret military base* is less a look at the conspiracy and controversy that surrounds 'Area 51' but a historic journey through the various covert and scientific projects that have, from time-to-time, had a presence in Southern Nevada. The inset of *Area 51* provides a number of black-and-white photographs that provide a visual context for much of Jacobsen's research, sourced from the personal collections of interviewees, Lockheed Martin and various government departments.

As a journalist, Jacobsen's investigation takes a narrative rather than academic tone and relies on former guards and scientists who worked at the Area 51 facility for much of the book's credibility. She provides an extensive list of interview subjects and includes names from the CIA, US Air Force and the contractors Lockheed and EG & G—all of which have had an influential impact on Area 51 during its life.

Rather than solely focusing on Area 51 itself, Jacobsen provides what amounts to a brief history of espionage in the US, and the people involved. Area 51, it seems, is simply the scene in which the story is set. Jacobsen begins by outlining how the area in Nevada had its first experience in



covert operations with involvement in the Manhattan Project, and later nuclear testing, before finally becoming the home of aircraft and weapons development.

In the immediate post-World War 2 era, Nazi scientists were recruited by the US in an effort to deny German scientific knowledge and expertise to the Soviets. The project, Operation PAPERCLIP—based largely at Area 51—assisted America with developments in nuclear weaponry and aerospace engineering. Notable developments included the design and testing of the U-2 strategic reconnaissance aircraft, used extensively in the Korean and Vietnam wars, and its successor, the Archangel 12 (A-12). This legacy continues with current ‘war on terror’ developments, including the Predator drones and parallel developments in stealth and radar technologies.

Jacobsen maintains that much of the obscurity and mystery surrounding the site has been because the Atomic Energy Commission (now the US Department of Energy) deliberately filed most of its working information in highly-classified records that have typically not been declassified to the public domain. She further contends that the various reviews and government investigations that have occurred in recent memory have tended to focus on the US Air Force and the CIA but have failed to take a closer examination of the workings of the Atomic Energy Commission.

It would not, however, be a book about Area 51 without mentioning unidentified flying objects (UFO). Jacobsen touches on the supposed UFO crash at Roswell in New Mexico, citing a single, anonymous Area 51 engineer as her source. She contends that the fiction of the Roswell crash is often supported by some element of truth, citing the claim that former Nazi pilots, Walter and Reimar Horten—operating in the Soviet equivalent of Operation PAPERCLIP—were the architects of a ‘flying disc’ that crashed in New Mexico. According to this version, the UFO was piloted by what appeared to be children with ‘unusually large heads and abnormally shaped oversize eyes’. These ‘anatomical conundrums’ were supposedly the products of post-war experiments by the former Nazi scientist, Dr Josef Mengele, sanctioned by Joseph Stalin and designed to instil fear in an ignorant American public.

This sole-sourced ‘revelation’ is a weak aspect of *Area 51: an uncensored history of America’s top secret military base*. Otherwise, it is a consumer-friendly read, providing a brief history of espionage and aerial developments in the US throughout the Cold War, linked by a small patch of desert in Southern Nevada. The truth, it seems, is still out there.

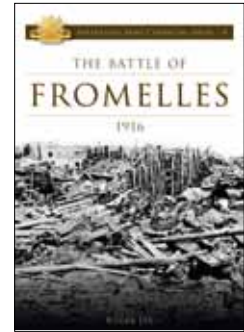


## *The Battle of Fromelles, 1916*

Roger Lee

Big Sky Publishing: Newport NSW, 2010

ISBN: 978-0-9806-5829-3



Reviewed by John Donovan

Roger Lee's book on the Battle of Fromelles can be broadly divided into four parts: an explanation of the context in which the battle was fought, a description of the tactics of 1916 and the planning processes that led to the battle, a description of the battle itself, and an epilogue on the discovery in 2008 of the remains of 250 casualties of the battle and their subsequent recovery and re-burial.

The section on the context makes many useful points about the other events of 1916 and their impact on relatively smaller battles like Fromelles, points of a kind often overlooked by less informed commentators. This context includes the heavy casualties around Verdun and in the early stages of the British Somme offensive, and the Russian Brusilov offensive.

These events were of a scale that explains why Fromelles might not have received much attention in broader histories of the First World War. Coverage by the Australian official history, however, seems broadly appropriate. The single day of battle at Fromelles, with its 5533 casualties, is covered in 120 pages in Bean's Volume III, compared to 430 pages for the seven weeks and around 23,000 casualties at Pozzières and Mouquet Farm. Fromelles has also been the subject in Australia of several recent popular histories.

This section also provides a useful reminder of the possible consequences of a German peace, possibilities often ignored by critics of Australian participation in the First World War. While the Treaty of Brest-Litovsk might not have imposed a 'Carthaginian peace' on Russia, it was at least as onerous as the Treaty of Versailles, sometimes considered a root cause for the Second World War. It is often forgotten that what was then Australian territory (Papua) was bordered by a German colony (New Guinea). A peace imposed by Germany on the British Empire and its dominions could well have had territorial effects on Australia.

The chapter on the planning for Fromelles is probably the least satisfactory part of the book. Lee explains clearly the problems with military technology (particularly limited communications and developing artillery tactics and technology) that were endemic in 1916. These contributed to the failure of many attacks, including Fromelles. He also makes some good points about the strategic reasoning and operational background to the attack and mounts a vigorous defence of the British high command. As he notes, it is the duty of a general to win wars—and that duty includes preparing and implementing attack plans.

Lee explains that the plan for Fromelles was not hastily cobbled together, contrary to some mythology. Rather, it was based on preliminary planning that Sir Richard Haking, commanding the British XI Corps, had already conducted as part of his normal command responsibilities.

Lee acknowledges later in the book that there was a major fault with the plan, in that the dominating German strongpoint, called the 'Sugarloaf', was on the boundary between the British 61st Division and the Australian 5th Division, rather than being made the responsibility of one division. While such a fault might have been understandable (although not acceptable) in a plan that had been hastily put together, it should not have remained in a more developed plan. The failure to capture the Sugarloaf led directly to the heavy losses in the Australian 15th Brigade, leaving the 14th and 8th Brigades isolated in those parts of the German lines they had entered.

This acknowledgement of a major planning failure weakens Lee's defence of the high command and the planning process, as does his comment about the many other 'poorly prepared and inadequately supported' attacks that took place in early July 1916. Fromelles comes to appear as nearer to an unsatisfactory norm, rather than an exception, as Lee's defence of the high command might wish to suggest.

Ultimately, and perhaps inadvertently, Lee's defence of the high command comes across more as damning with faint praise than as a convincing defence of the command process. A better assessment of Haking's part in Fromelles might be that he did not even reach the standard that Churchill ascribed to Haig:

He might be, he surely was, unequal to the prodigious scale of events; but no one else was discerned as his equal or better.<sup>1</sup>

The description of the actual battle is a model of clarity (leaving aside a minor problem with some of the maps, mentioned later). It makes plain the difficulties experienced by the 2/1st Bucks and the 59th Australian Battalion when attacking the Sugarloaf along converging lines, with inadequate communications further slowed by the extended chain of command. The attempt to coordinate a second attack on the Sugarloaf collapsed under the strain of communications inadequacy. After the failure to take or neutralise the Sugarloaf, the outcome of Fromelles moved to its (by then inevitable) tragic conclusion. The German counterattacks are clearly described, as is the fighting withdrawal of those elements of the 14th and 8th Brigades that had entered parts of the German defences.

The epilogue describing the discovery and recovery of the bodies of 250 casualties from Fromelles provides a sombre end to the book. While this process was essential once the bodies had been found, the effort needed to resolve the fate of a small percentage of the very many Australian soldiers still missing in France and Flanders demonstrates the wisdom of a ban on speculative searches. It also shows the thoughtfulness of the original British concept of an 'unknown soldier', later extended from Britain to other nations, including Australia. Those seeking closure can perhaps find consolation in the thought that the 'unknown' might indeed be their missing relative.

Unfortunately, there are some problems with the publication standard. While the maps produced specifically for the book are clear, and assist greatly with understanding the description of the battle, many of those copied from the *Kriegsarchiv* are so small when printed as to be almost unreadable. Also, some of the maps describing the course of the battle include reference numbers, not all of which are explained in the accompanying text. There is some difference between the text on French divisional organisation and the figure explaining it, with 'regiments' used in the text when 'brigades' was probably intended. Overall, however, this is a very useful description of the Battle of Fromelles, set in its wider context.

## NOTES

1. Winston Churchill, *Great Contemporaries: Churchill reflects on FDR, Hitler, Kipling, Chaplin, Balfour and other giants of his age*, Thornton Butterworth: London, 1937, p. 103.

## On-line book reviews

### *Storm over Kokoda: Australia's epic battle for the skies of New Guinea, 1942*

Peter Ewer  
Pier 9: Millers Point NSW, 2011  
ISBN: 978-1-7426-6095-0

Reviewed by John Donovan



A potential reader picking this book up in a bookshop and reading the title might expect that it would cover all of the events of the air war over Papua New Guinea during 1942. Unfortunately, that reader would be disappointed, as the story essentially ends with the Battle of the Coral Sea in May 1942. Despite the implication in the title, air operations in support of the Kokoda Trail campaign are not covered. Nor are the magnificent efforts of the RAAF in support of the Army at Milne Bay, and operations over the Papuan beachhead battles of late 1942/early 1943, where airpower made a significant contribution.

That said, what is covered in the book is covered well and in a readable style. This includes the early reconnaissance and bombing operations by Catalina and Hudson aircraft, and the fighter operations of 75 Squadron from its arrival in Port Moresby in mid March 1942 until the squadron was withdrawn in early May.

Peter Ewer provides useful background on the development of aviation in New Guinea between the World Wars. He also makes some acerbic (but well sourced) comments about the development of Australian air power in the same period, summarising the broader treatment of this subject in his earlier work, *Wounded Eagle: the bombing of Darwin and Australia's air defence scandal*.

Ewer's unflattering comparisons between the products of the inter-war British aviation industry and those of the more free-wheeling US industry are a timely reminder of the need to ensure that Australia purchases military equipment (not just aircraft) that is capable of performing the task, rather than favouring the output of those with whom we might be more familiar or comfortable.

The inadequate assessments of Japanese aviation capability made between the World Wars, and well into the second, emphasise the need for intelligence analysts to focus on facts, not prejudices. Japanese pilots were very effective and their aircraft had significant advantages compared to allied aircraft, albeit they also had weaknesses that allied pilots learned to turn to their own advantage.

The final chapter recounts the fate of many of the protagonists, a sad proportion of whom died later in the war, too often in flying accidents. The fate of many captured airmen is also recounted; while their captors treated some reasonably, many received a cruel death. The

remains of some were found in shallow graves after the war, while others have not yet been recovered.

While the focus of the book is on Australian efforts and those of their American allies, the Japanese are not neglected. Surely the adage that fortune favours the brave must apply to the Japanese naval reconnaissance pilot Nobuo Fujita, whose floatplane was carried to its operational areas in a submarine. Fujita made reconnaissance flights over Sydney, Melbourne, Hobart and Auckland in February 1942. Later in 1942, he made a lone bombing attack on the American northwest, in an attempt to ignite forest fires. Wet conditions defeated him but it is surely a just reward for his valour that Fujita survived the war, dying peacefully in 1997.

There are some minor quirks in the book. One Japanese formation appears as both the 25th Air Flotilla and the 25th Air Group, while it seems unlikely that the coast-watcher Leigh Vial walked from Port Moresby to the outskirts of Salamaua in twelve days; a flight to Wau and then walking across the Kuper Range seems more likely.

### ***Tunnel Rats: the larrikin Aussie legends who discovered the Vietcong's secret weapon***

Jimmy Thompson with Sandy MacGregor  
Allen & Unwin: Sydney, 2011  
ISBN: 978-1-7423-7489-5

**Reviewed by Jim Truscott**



Having read Sandy MacGregor's original book, *No Need for Heroes*, I was keen to read this account as well. And I was not disappointed. When I served as a young troop commander in 1 Field Squadron in 1979, some of the non-commissioned officers were Vietnam veterans who had served in 3 Field Troop on Operation CRIMP in January 1966. Having heard many of the stories before, I still found this version to be a very human story about the average sapper, who is not a pretty sight at work or at play! I did not realise that the Troop had less than six weeks to come together, from disparate engineer units, before deploying to Vietnam. It is testament to this band of around 40 men that ten of them subsequently went on to become warrant officers later in their military careers and three became officers as well.

While the Australian Army had developed tunnelling into an offensive mining art form in World War 1, it was the Vietcong who turned the tables on the allies 50 years later and who used subterranean warfare as both a sheer act of survival as well as to launch their own war-winning offensives. In 1966, the allies were seemingly oblivious to the network of tunnels that housed the Vietcong's Southern Headquarters and the some 5,000 men who were fighting them from below ground at any one time. When the Troop blew an anthill open to get at a bunker and discovered an entrance to the underground city, there were some 300 kilometres of tunnel waiting to be found. This system had doubled to 600 kilometres about ten years later.

However during Operation CRIMP, 3 Field Troop could only search a very small part of this network in the six days before being withdrawn—and after losing an experienced non-

commissioned officer from unconsciousness in the tunnel system in the process. Many others of these 'tunnel rats' were also on the verge of unconsciousness as they searched through very narrow chambers. There are pages describing the constant underlying fear of waiting to crawl into an enemy in the labyrinth. These sappers operated under extremes of stress and—save for the Vietcong ordering their own underground forces not to attack so as not to raise further suspicion—it could well have been a total bloodbath on both sides if time had allowed them to penetrate further and deeper.

It is not clear why the US-led operation was called off before more extensive searching could be conducted, especially given the vast quantity of intelligence gained. It would seem that the Americans simply did not realise the significance of what they had found; possibly one of their greater intelligence blunders of the war. The appendix makes the supposition that the war could have turned out completely differently if US forces had made the decision to go down the tunnels a lot earlier. While the book is a history of the 'larrikin' troop over their 12 months in theatre, I would have liked to have read much more context to this seemingly military failure.

All of that said, the book is really about the men themselves and the engineer's nature of finding a way over, round or under whatever obstacles get in their way. The book is laced with all manner of 'work-hard, play-hard' stories, ranging from stealing a forklift and timber from the port in Saigon, to an entire chapter on 'sex and the engineer'. There is a consistent theme of the close bond forged between soldier and engineer; with the Troop often fighting as infantry and some of them even being tasked as forward scouts for American units. So much so, the story line is that sometimes it was easy for them to forget that they were engineers as they just operated like infantry.

The book also describes the establishment of the all-important bomb museum which undoubtedly saved many lives in passing on hard-won delousing skills. There are accounts of experimenting in cutting stick grenades open—an 'engineer thing' to do—and the development of anti-doctrinal, small splinter teams to deal with the booby-trapping threat. There are also descriptions of the remarkable bond between black and white soldiers in the Troop. Even when Bill Unmeopa, a Torres Strait Islander who became my troop staff sergeant 12 years later, introduced himself to our troop, he started by saying that if there was to be any black humour, then we had to tell the jokes to him first.

This book is essential reading for any young sapper, soldier or officer, who must understand the quintessential nature of engineers. It will also be of interest to anyone who appreciates warfighting and human endeavour, friend and foe alike, above and below ground.

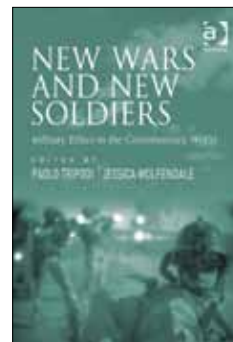
## ***New Wars and New Soldiers: military ethics in the contemporary world***

Paolo Tripodi and Jessica Wolfendale (eds.)

Ashgate: Farnham UK, 2011

ISBN: 978-1-4094-0105-6

**Reviewed by Brigadier Nick Jans, Australian Army Reserve**



Contemporary conflicts differ significantly to traditional wars between states. Campaigns in which state forces manoeuvre in the battlespace—managed by elaborate planning systems and governed by codes of ‘honourable behaviour’ and the Geneva Convention, often culminating in a clear-cut victory—have been replaced by asymmetric warfare (often of the ‘three-block’ kind), terrorism and counterterrorism, and humanitarian interventions.

Opinions differ about the ethical principles by which such ‘new wars’ should be conducted. One school of thought maintains that ethical codes of conduct, and even the laws of warfare, are not only decreasingly relevant but are even counter-productive because of the tactical and strategic disadvantages of naïve adherence to ‘honourable behaviour’ and the Geneva Convention.

Those promoting such a point of view often go on to argue for the need to take advantage of emerging technologies and capabilities. They point to new technologies, such as arms-length weapon systems that allow sophisticated military organisations to strike lethally and accurately with little or no risk to those operating such systems. They also point to new capabilities, such as well-run private military armies and security companies, which purportedly bring significant benefits in terms of flexibility, security and avoidance of messy legal and moral obligations. All this, the argument goes, not only demands a different approach to the conduct of military operations but also makes it safe to adopt a morally tougher, more hard-headed and hard-hearted *modus operandi*.

But many practitioners and scholars argue that the circumstances of asymmetric warfare demand more rather than less adherence to ethical and moral codes of conduct, and a consequently greater need to understand the complexities of the human dimensions of operational environments. Moreover, close examination of arms-length weapon systems uncovers a number of unexpected implications that at least partly negate their supposed tactical and logistic benefits. Similarly, the touted advantages of mercenaries and private military companies often diminish when they are weighed against the (admittedly somewhat intangible) benefits of ethical reliability.

This timely book helps us make sense of such issues and their complex legal, ethical and professional implications. It concludes that because contemporary warfare is significantly more complex than the conventional campaigns of the early and mid-20<sup>th</sup> century, it demands commensurately greater professionalism and moral courage, especially from its junior leaders and members. The book shows that dilemmas in military ethics as old as the history of armed conflict have re-emerged with a vengeance in the post-modern era. And it confirms that all Western militaries are reacting very seriously indeed to the challenges associated with increasing ethical complexity.

The book arose from a 2008 conference in Melbourne, for which a number of leading scholars from America, Australia, Canada, Holland and the UK gathered to consider the theoretical and practical implications of the above issues. Its contents reflect the wide range of disciplines—as diverse as philosophy, history, sociology, international relations, politics and psychology—that are now being brought to bear on such issues.

Aimed at both military and academic audiences, the book strikes a nice balance between scholarly rigour and practical relevance. Its chapters are grouped into several main themes: discussions of the continued relevance of ‘just war theory’; the implicit and explicit obligations of nations that engage in humanitarian intervention; the ethical implications of new technologies and new actors in the battlespace; and finally a ‘rubber-hits-the-road’ examination of the implications of all this for combat behaviour, leadership and training.

Australian military professionals are likely to be particularly drawn to the four chapters of this final section. In the first of these, ‘Deconstructing the evil zone: how ordinary individuals can commit atrocities’, Professor Paolo Tripodi of the US Marine Corps University shows how well-intentioned people can be induced to commit evil acts by situational and social factors of which they are usually only dimly aware at best.

The implications of this are further explored in ‘Psychological foundations of unethical actions in military operations’ by Canadian Peter Bradley of the Royal Military College of Canada, and ‘Moral formation of the strategic corporal’ by Rebecca Johnson of the US Marine Corps University (which for me was the standout chapter.)

Appropriately, the book closes with a thoughtful and provocative discussion of ‘Loyalty and professionalization in the military’ by Peter Olsthooren of the Netherlands Defence Academy. Among other things, Olsthooren challenges the unthinking acceptance of regarding loyalty as a virtue. Using appropriate examples, he shows that unthinking loyalty can easily lead to rogue behaviour and serious breaches of ethics. He closes with a thoughtful examination of the pros and cons of having the needs of the military institution and the nation—as opposed to, say, those of the local populations in which and for whom an intervening force is operating—as the major reference point for the practice of ‘military professionalism’. Even those who disagree with him will still appreciate the implications of his points.

All these chapters present a very strong case for giving serious attention to sophisticated training in applied battlefield ethics for officers and soldiers at all levels, and an equally strong case for developing junior leaders’ abilities to control their followers’ moral sensitivity and ethical judgment, especially in ethically ambiguous situations.

The book’s relevance to the ADF, especially to the Army, is obvious. In this respect, it is worth bearing in mind that we have been a comparatively tardy participant in the study of military professionalism and ethics, and the development of engaging and relevant training, educational and development materials. Although it is probably true that, in this area, as in so many others, we ‘punch above our weight’, we are a long way behind our counterparts across the Pacific, most notably the Center for the Army Profession and Ethic at West Point (see [www.cape.army.mil](http://www.cape.army.mil)).

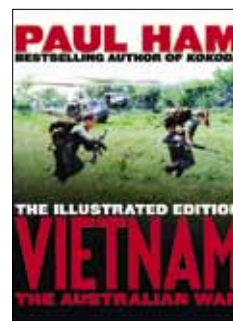
I commend this book to professional readers at all levels, and particularly senior leaders.



## *Vietnam: Australia's war*

Paul Ham  
Harper Collins Australia: Sydney, 2010  
ISBN: 978-0-7322-8237-0

Reviewed by Dr Richard Brook Connell, UNSW @ ADFA



*Vietnam: Australia's war* (illustrated edition)<sup>1</sup> is the first comprehensive history of Australia's involvement in the Vietnam conflict. Ham begins with a brief history of the country to provide context for his analysis and discussion of Australia's involvement that spanned the so-called Second and Third Vietnam Wars.<sup>2</sup>

His discussion then ranges widely. It includes the motives that underpinned Australia's commitment of troops, what the nature of the commitment was and how it evolved from the initial deployment of 'teams', the subsequent expansion of Australia's role to include the use of conventional forces, to the final exodus of advisers after the fall of Saigon. Ham concludes with an explanation of some of the consequences of the conflict for Australian veterans, whose contribution to the nation's security has not been adequately recognised by much of the public.

Ham approaches the military commitment holistically, placing it in its geopolitical, domestic political and social contexts. He uses a chronological framework to structure his general reportage. He then skilfully embeds in the framework numerous detailed anecdotes about particular battles (for example, Long Tan, Balmoral and Coral), people (such as Ted Serong and Ian Teague), and the political machinations associated with the troop commitment (for example, the deployment of troops in anticipation of a formal Vietnamese request rather than in response to one).

Ham does not purport to be objective in his interpretation of the facts. Indeed, he is openly biased towards those who fought in the war—and he shows a consistent disdain for the politicians he claims misled the public. He also criticises the media, which he maintains sensationalised bad news, for example, by over-reporting collateral damage. His most virulent criticism, however, is directed at the protest movement ('Australia's Viet Cong'). While he acknowledges that there were some genuinely pacifist members in the movement, he notes that its large left-of-centre component (who he refers to as 'international socialists') undermined domestic support for the war and even directly aided the National Liberation Front with monetary donations.

His analysis of how the allied war-fighting strategy evolved and why it failed in various phases is astute. He maintains that Diem's use of strategic hamlets to implement a counterinsurgency program did not work because it was not supported by the people who were wed to their ancestral land; and he recounts how the hamlets became infiltrated by the Viet Cong, creating a kind of war from within. He also criticises pacification for its haphazard and inconsistent implementation. How could the US espouse the importance of winning 'hearts and minds' on the one hand, he questions, while concurrently using massive indirect fire to fight a kinetic war?

In describing General Westmoreland's strategy of attrition (using search-and-destroy tactics), he asserts that the US misread North Vietnam's values and demographics and that this all but precluded success. More particularly, he maintains the US did not understand that Hanoi viewed the Viet Cong as an expendable source of manpower (North Vietnam's 'cannon fodder') and how it was willing to trade the lives of Viet Cong and the People's Army of Vietnam at whatever ratio was required to make the allied commitment unsustainable politically. Finally, he describes how 'Vietnamisation' suffered from a lack of resolve by the Vietnamese to make it work. He notes the indifference and indolence of the soldiers being trained, the poor quality of their leadership, and how these converged, resulting in a reluctance by the Army of the Republic of Vietnam to engage with the enemy.

Those familiar with the allied effort will recognise a number of commonalities in the errors made by Australia and the US in their prosecution of the war, which Ham highlights. While these are myriad, two are indicative.

The first deals with the public perception of the nature of the conflict. Ham explains how many Australians (and Americans) considered the National Liberation Front an enlightened home-grown movement, oriented towards the overthrow of an authoritarian and corrupt regime in Saigon, rather than an oppressive and brutal front for achieving Hanoi's goal of reunification. He implies that if the electorate had understood this, it might have given the allies more breathing space for pursuing 'Vietnamisation' and the possibility of a different outcome.

The second was how the Defence departments of both Australia and the US had become emasculated by their governments and did not influence their thinking so much as reflect it. This resulted in a dysfunctional centralisation of policy implementation, such that much operational and tactical decision-making was political. In the extreme, this manifested itself in the US in the selection of bombing targets (and ordnance) in North Vietnam by President Johnson and his Secretary of Defense, Robert McNamara.

Some aspects of the shortcomings of Australia's mistakes in the conflict could have benefited from more thorough argumentation. For example, he suggests that Prime Minister Gorton did not articulate clear policy and, as a consequence, those in the Task Force did not have sufficient guidelines for conducting the fighting. Yet the US' objectives (and strategy), with which Australia's had to be congruent, changed substantially during the conflict. The US started with the objective of 'winning', yet this morphed over time to 'not losing', then finally and ambiguously to 'peace with honour'.

Any allied leader would have been hard pressed to explain how to interpret these changes to those tasked with implementing policy or, in fact, voters and other constituencies. Ham also states that Australia's Government was continually misled or misinformed by the US. However, he does not acknowledge that the US Government itself did not have a very good understanding of 'ground truth', as evidenced, for example, by its lack of foreknowledge of the many coups that occurred in the 1963-1965 period and how it was blindsided by the Tet offensive in 1968.

Ham also explores some of the differences in the Australian and US efforts that derived from means, values and culture, which might have been difficult, if not impossible, to reconcile and might have benefited from more explanation and argumentation. For example, the US overwhelmingly focused on achieving a short-term body count in its combat operations,

whereas the Australians sought to pacify the countryside, an acknowledged but low priority goal for the US. In elaborating this difference, Ham explains that the gradual infiltration and conversion of individual hamlets to the Government of Vietnam did not meet the short-term US war plan or its culturally-based desire for quick and positive results.

The difference in the warfighting tactics used by the US and the Australians provides another example. US infantry patrols used tracks and trails and made noise when patrolling to encourage the Viet Cong to ambush them. They would then call in massive indirect fire and reinforcements (the 'pile-on') to kill the attackers. Ham contrasts this reactive approach with the more proactive one taken by the Australian infantry. This incorporated lessons learned from Kokoda and Malaya and used deceit, stealth and restraint, relying on company and squad-sized formations to achieve results.

Although it is virtually inevitable that readers familiar with the conflict will find weaknesses in Ham's arguments, overall the book is an outstanding contribution to the history of Australia's longest war. *Vietnam: Australia's war* is unique in its broad-based coverage in terms of time and subject, and the mix of balanced objectivity and advocacy Ham brings to the subject. Perhaps the only missing element, which would have stretched the role of the historian, would have been the inclusion of some 'what if' questions? Ham identified some of the core problems with the Australian and US efforts. Could there have been a more positive outcome to the conflict had these been addressed? If so, which ones would have been most critical and what might the outcome have been?

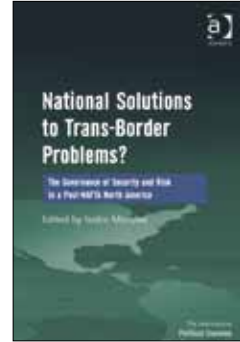
Ham was the recipient of the NSW Premier's Australian History Prize for this book. He drew extensively on interviews and archives, which should make the book of particular interest to historians. It also incorporates over 100 photos, many of which are iconic. Coupled with his colloquial writing style, the book should more broadly appeal to the casual reader who has been waiting for a work about the conflict that is written with a distinctly Australian perspective.

## NOTES

1. It is also available in a non-illustrated edition, published by Harper Collins in 2007.
2. The French post-World War 2 conflict is often referred to as the 'First Vietnam Conflict'

***National Solutions to Trans-Border Problems?  
The governance of security and risk  
in a post-NAFTA North America***

Isidro Morales (ed.)  
Ashgate: Farnham UK, 2011  
ISBN: 978-1-4094-0918-2



**Reviewed by Brigadier Chris Field, Australian Army**

Typically a human creation: ... [a border] is physically invisible, geographically illogical, militarily indefensible, and emotionally inescapable.

Marshall McLuhan  
Canadian Borderline Case, 1977

This book is a scholarly collection of essays examining the complex relationships, interactions and restrictions occurring between Canada, Mexico and the US. Importantly, *National Solutions to Trans-Border Problems* is not solely focused on the 1994 North American Free Trade Agreement (NAFTA), which eliminated 99 per cent of tariffs on goods and services covered by NAFTA, and has ‘surpassed the EU to become the largest [gross product] free trade area in the world’.<sup>1</sup> In three parts, the book questions and then explores national solutions to cross-border problems, a common approach to the governance of continental security and the governance of territorial borders.

For Australian security professionals, including members of the ADF, *National Solutions to Trans-Border Problems* is a useful addition to understanding how free-trade arrangements may enhance or detract from national security issues. Isidro Morales and a multidisciplinary group of 13 contributors explain, from three national perspectives, how NAFTA directly or indirectly influences policies, societies and economies. They also emphasise that free-trade arrangements are never static, with the requirement for trade arrangements to constantly adapt in connection with changing international and domestic circumstances.

Isidro Morales and the contributors employ the prism of NAFTA to broadly examine Canadian-Mexican-US relations, including governance, trade, security, terrorism, crime, narcotics, energy, migration, long-term economic development and trans-sovereign arrangements. Not all contributors see NAFTA as positive or sufficiently agile in creating new trade opportunities between the three nations. *National Solutions to Trans-Border Problems* offers ideas on how NAFTA and other free-trade agreements can be improved in the future.

Improvements recommended include the establishment of institutions for collective decision making in NAFTA. *National Solutions to Trans-Border Problems* emphasises that NAFTA has little ability to counter market imperfections and inequities, with NAFTA’s several technical working groups having almost no authority to create new rules or modify existing ones. The authors argue that NAFTA needs enhanced institutional oversight to ensure all three nations gain maximum benefit from free-trade arrangements. A counter view from the US is that institutional oversight is often code for the proliferation of ‘Brussels bureaucracy’, which arguably plagues the EU. A consistent, but not surprising, theme in the book is that national interests generally trump optimal and equitable free-trade agreements.

This requirement for additional institutional oversight for NAFTA led, in part, to the 2005 establishment of the 'Security and Prosperity Partnership of North America' (SPP). SPP linked, for the first time, 'economic performance with security concerns' for the three nations. SPP, described as a first-generation model, established trilateral working groups to examine, for example, energy, finance, agricultural and manufacturing markets, economic competition, transportation, health, bio-protection, security and e-commerce. One criticism of SPP is that it remains a top-down process and the participation of non-government actors remains marginal.

For many of the contributors to this book, security is inexorably linked to trade. They emphasise that NAFTA was not designed as a security platform but that the September 11 attacks on the US have required a re-examination of NAFTA's influence, partly via the SPP, on Canada-Mexico-US security arrangements. In Chapter 5, Stephen Clarkson argues that 9/11 shifted the North American continental discourse from economic integration and border disarmament to national security and border rearmament. This shift, including the post-9/11 'thickening of inner and outer borders', is an important concept for Australian security professionals to understand and apply within our own national context.

In Chapter 3, Isidro Morales emphasises that free-trade agreements, such as NAFTA, must adapt; otherwise, world trading systems will adapt around them. He cites the example of multinational corporations (MNC) where, as early as 1994, 'more than two-thirds of international transactions by MNCs were channelled not through foreign trade but by local sales done through their affiliates'. In other words, MNCs have created a network of [MNC] networks rather than the traditional arms-length competitive transactions involved in 'free trade'.

The concept of MNC networks adapting around existing state-to-state frameworks and agreements has significant implications for security professionals. Substituting adaptive actions by MNC networks with adaptive actions by criminal, terrorist or threat networks demonstrates to security professionals that constant analysis and reframing of security arrangements is required to fragment, counter and overcome agile, complex and determined enemies.

This book would be enhanced if a table of acronyms and abbreviations was included in order to assist readers in understanding this complex subject matter. Such a table is particularly important for readers outside North America, where terminology employed in the book may be more commonly understood.

*National Solutions to Trans-Border Problems* is part of the 'International Political Economy of New Regionalisms' series which 'presents innovative analyses of a range of novel regional relations and institutions'. For Australian security professionals, other titles of interest in this series may include *The Rise of China and the Capitalist World Order*, Li Xing (ed.); *China and the Global Politics of Regionalisation*, Emilian Kavalski (ed.); *Redefining the Pacific? Regionalism past, present and future*, Jenny Bryant-Tokalau and Ian Frazer (eds.); and *Asia Pacific and Human Rights: a global political economy perspective*, Paul Close and David Askew (eds.).

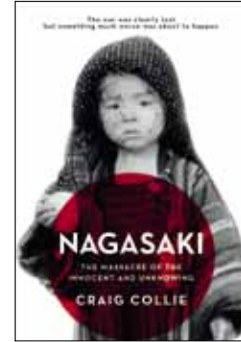
## NOTES

1. NAFTA accounts for 30 per cent of US trade. Mexico's global exports would have been about 50 per cent lower and foreign direct investment would have been about 40 per cent less without NAFTA.

## *Nagasaki: living in the shadow of the bomb*

Craig Collie  
Allen & Unwin: Sydney, 2011  
ISBN: 978-1-7422-7289-1

Reviewed by Robert S. Bolia, Office of Naval Research Global,  
Tokyo, Japan



Sixty-six years after the atomic bombs were dropped on Hiroshima and Nagasaki, the events and their aftermath still have the power to captivate and repel. The names of these two cities evoke neither their historic pasts nor the vibrant municipalities that have arisen out of the ashes, but only the bombs, mushroom clouds, a post-apocalyptic landscape, the dead and the dying, and the plight of the *hibakusha* (explosion-affected people). It is therefore not surprising when a new book appears on the subject. Indeed, Charles Pellegrino's *The Last Train from Hiroshima* appeared only last year. But it should raise at least one question: what is this book's unique contribution to the literature?

The experience of being bombed has been aptly and heartbreakingly described by *Toyofumi Oruga* in *Letters from the End of the World* and Takashi Nagai in *The Bells of Nagasaki*, both first-person accounts. John Hersey's eloquent *Hiroshima* was the first book in English to put a human face on the experiences of the *hibakusha*. Even Pellegrino's account, although widely discredited for his failure to check his facts, affords a novel perspective—that of an unfortunate few who were victims of both atomic bombings.

What then does Craig Collie have to offer in his *Nagasaki: living in the shadow of the bomb*? To be honest, this is not easy to figure out. Collie, known for his co-authorship of *The Path of Infinite Sorrow*, which documents the Kokoda campaign from a Japanese perspective, did have access to Japanese survivors, whose stories had perhaps not been told in the West before. But it is not clear that their experiences differ significantly from previously-published accounts.

He does hint in the afterword that the purpose of the book is to tell the story of what people in Nagasaki were doing in the three-day gap between the bombing of Hiroshima and Nagasaki, hence the book's title. Yet there are problems with this interpretation. First, it is hard to argue that the residents of Nagasaki were living 'in the shadow of the bomb', given that most of them were not even aware of its existence. Second, if this is the goal of the work, it would seem that Collie should have given it more focus.

Instead, he includes a lot of extraneous information, much of which is only superficially covered, such as irrelevant details about Oppenheimer, a needless note about time zones (it doesn't matter what time it was in Japan when the ship Harry Truman was on arrived in Virginia) and more details about the Soviet advance in Manchuria, rather than about the Manhattan Project or how the bomb actually worked. Indeed, given the recent events in Fukushima and the reporting about them in the press, it is clear that most readers would know next to nothing about nuclear physics. Collie does raise the usual issues—the legitimacy of the targets, whether the bomb contributed to the war's end, etc—but does not really draw any meaningful conclusions.

Surprisingly, there is very little follow-up. For example, he writes almost nothing about radiation sickness and its after-effects, arguably one of the most interesting and frightening aspects of the use of atomic weaponry. He also has little to say about the Nagasaki of today, nor the many memorials that honour the victims of the bomb, nor the museum that describes its effects. Ironically, he chooses to focus on *Bockscar*, the plane that dropped the bomb, which he says drifted into obscurity in a museum in Dayton, Ohio. Although not displayed as prominently as the *Enola Gay* in Washington, I would argue that the National Museum of the US Air Force, which receives more than a million visitors annually—about the same number as the Imperial War Museum in London—hardly constitutes obscurity.

Collie is a good writer and *Nagasaki: living in the shadow of the bomb* is a very readable book. It's just unclear who the intended audience is. If you were only going to read one book about the atomic bombs, this probably shouldn't be it. On the other hand, if you had already read a detailed account on the bombing of Hiroshima and wanted to learn about Nagasaki, this should do the trick.

