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President's Message

My first purpose is to extend an invitation to attend the Australian Naval Institute's Annual General Meeting in the Military Theatre of the Australian Defence Force Academy at **1730 on Thursday 13 March**.

Only partly as an inducement for you to join us, the meeting will be followed, by kind permission of the Commandant and the President of the Mess Committee, by an **ANI Reception** at the ADFA Officers' Mess at **1830**. Apart from allowing members to socialise, we also intend this as a recruiting measure – please feel free to bring a potential ANI member as a guest. **PLEASE PUT THIS IN YOUR DIARY NOW!!**

If you are able to join us for the AGM and/or the start of year Reception, I would be very grateful if you could let my office know, via Lieutenant Commander Aaron Nye or Cynthia Kelly, on (02) 6275 6191, email Cynthia.Kelly@customs.gov.au

The AGM will have some important decisions to make and I think it vital that you have the opportunity to consider their rationale before we bring any proposal to the floor. The ANI Council have had the opportunity to consider our progress in relation to the Strategic Plan which we adopted in 2005. I can report that we believe that we have achieved some success, but that we think we need to do much better in three key areas, closely related.

The first, while we have considerably improved our equity very largely due to a generous program of sponsorship, is that the long term well being of the ANI demands a better balance between the financial support provided by our membership and that provided by our sponsorship program. The Council have adopted as a principle that the membership fees should be able to cover the basic annual commitments of the Institute which we do not regard as discretionary and which we regard as central to its continued existence. This would include, for example, the production and distribution costs of *Headmark*, our office costs, staging the annual Vernon Parker Oration and so on.

We also have agreed that the 'reserve' of equity of the Institute should, as a principle, equate to two years' expenditure and that, as we increase our activities, we should do so in such a way that our new calls on resources do not prevent the accompanying increase in equity. The Council is of the view that this principle should prevent a return to our parlous financial situation of 2000-2001. I should add that, at our current – but only our current – activity level, we are very close to achieving a two year reserve.

The second requirement is therefore that the membership fees need to be increased to achieve the appropriate balance. I attach a table of proposed fees. Several points may be made. The first is that this is the first increase in fees in seven years and will move the individual membership fee from $45 to $60. The second, and this is associated with our next area for improvement, is that we are providing for a junior membership fee, not only for full time students, but for persons of the rank of Lieutenant or below, of $40 (less than the current individual fee). We are also providing for a reduced fee to members who are fully retired from the work force. I should add that we are providing for multi-year membership for both categories and will have no concerns if a member should change status during that period. On the other hand, we will be happy to consider a return of fees if a member retires while holding a standard multi-year membership.

These fee increases will not themselves be enough to support our equity requirements. For its own sake, also, our third area of development needs to be an increase in individual membership. It stands currently at just over 300. The Council has set a target of 200 additional members over the next five years – requiring a net increase of 40 members a year.

President's Message continued on page 13>

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Front page photograph:
The crew of Collins Class Submarine, HMAS Collins conduct abandon ship drills alongside Fleet Base West.

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Sun Tzu's 'The Art of War': Its Relevance to Contemporary Maritime Strategy

BY COMMANDER M A RAZZAK

Sun Tzu (535 BC), a General under the *Emperor He Lu of Wu State* in China, wrote *The Art of War* in 490 BC. This legendary work first became known to the Western part of the world through its translation into French in 1782 AD. Since then, *The Art of War* has been in print in different languages around the world and studied beyond militaries to the political, diplomatic, business and intellectual circles. Sun Tzu's views are debated, researched and applied in war. "There is a legend that this little book was Napoleon's key to success and his secret weapon …. Certainly Napoleon used all of Sun Tzu to his own advantage to conquer most of Europe. It was only when he failed to follow Sun Tzu's rules that he was defeated."1 James Clavell was moved so much by the inner thoughts of the book that he stated, "I truly believe that if our military and political leaders in recent times had studied this work of genius, Vietnam could not have happened as it happened; we would not have lost the war in Korea (we lost because we did not achieve victory); …. and, in all probability, World Wars I and II would have been avoided – certainly they would not have been waged as they were waged; …"[2]

This superb book in 13 chapters is "… so encompassing that it almost seems to predict the emergence of air and space power when it says, metaphorically, "the expert on the attack strikes from out of the highest reaches of the heavens."[3] It is also acknowledged that this archetypal work of Sun Tzu is one of the most influential works in kinds and degrees in military theories and studies. Despite these facts, there remains a natural question; is this two and a half thousand years old philosophy based on Sun Tzu's soldiering experience relevant to contemporary maritime strategy, let alone naval strategy? A sceptical view tends to simmer as little reference of Sun Tzu is found in the studies of maritime strategy. In fact, Clausewitz is much referred in analysing the views of maritime strategists. For example, while evaluating Mahan's maritime strategic thoughts, Geoffrey Till wrote, "Essentially, Mahan built strategically on existing ideas about maritime activities, which were, as we have seen, largely tactical in their approach, and made some attempt to situate naval thinking in broader context of the strategic thinking represented by the likes of Clausewtiz and Jomini."[4] Any way, examinations of strategic visions and historical events in light of Sun Tzu's philosophy keeping in mind the thoughts of maritime strategists can help to find an answer to the question.

With this short introduction this essay aims to examine the relevance of Sun Tzu's *The Art of War* to contemporary maritime strategy. The effort begins with attempts to develop a relational concept between strategy and philosophy. Then it ascertains relational dynamism between the components of maritime strategy - both military and non military. Finally, the essay makes a comparative examination between *The Art of War* and components of maritime strategy with special reference to naval strategic elements.

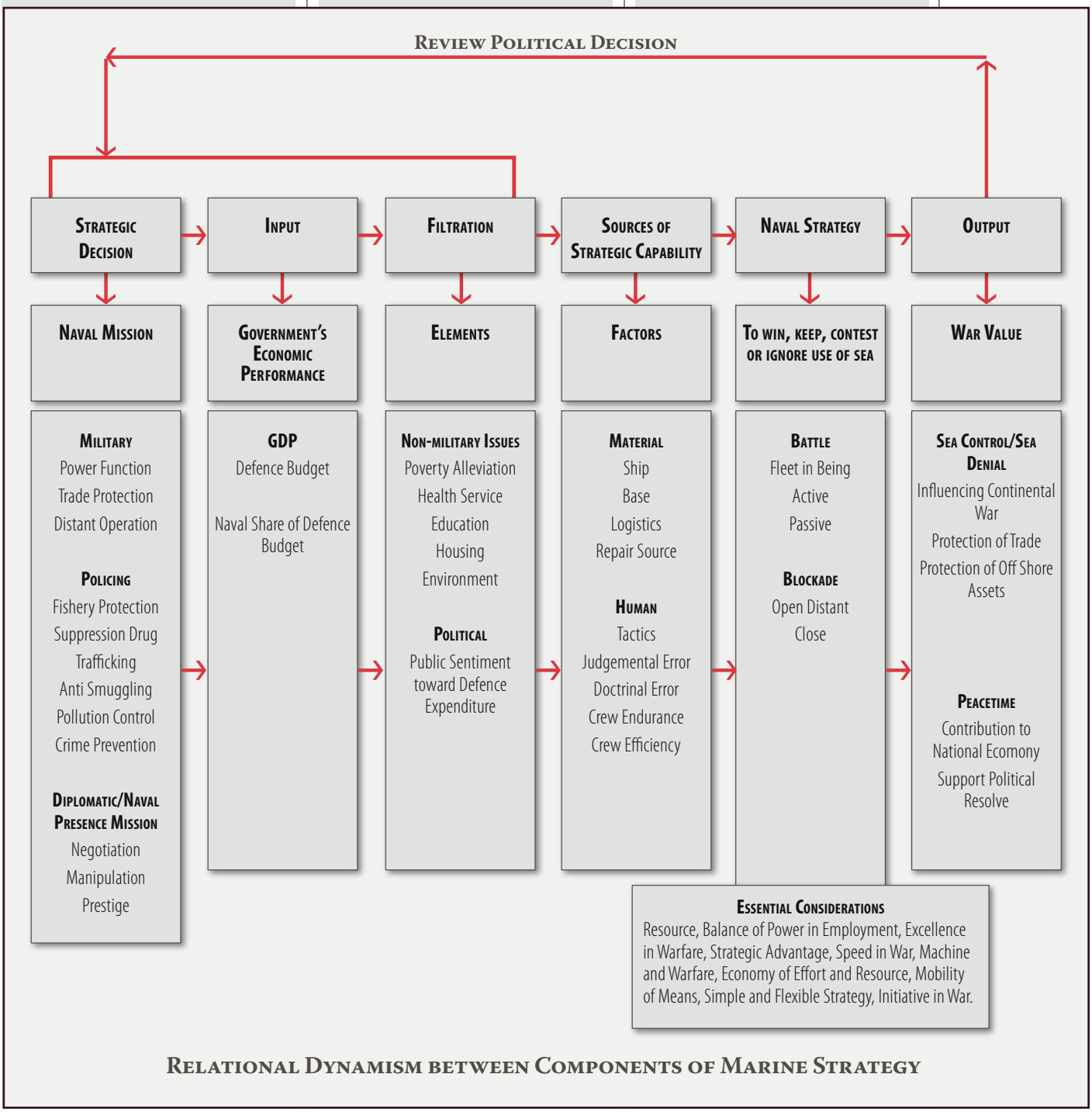
Strategy and Philosophy: A Relational Concept

"Strategy generally denotes the design and implementation of a plan for the coordinated employment of resources with the aim of attaining assigned objectives. Strategy links the objectives with the means to achieve such objectives in peace and in war."[5] According to the *Dictionary of Military and Associated Terms* (US Department of Defense 1987) strategy is "the art and science of developing and using political, economic, psychological, and military forces as necessary during peace and war, to afford the maximum support to policies, in order to increase the probabilities and favourable consequences of victory and to lessen the chances of defeat."[6] Liddell Hart defines strategy "as the art of allocating and employing military means in such a way that the ends of policy are achieved."[7] According to *Encyclopaedia Britannica*, "Strategy, in warfare, the science or art of employing all the military, economic, political and other resources of a nation to achieve the objects of war."[8]

Warfare, Sun Tzu described as 'art.' Clausewitz described, "… the art of war is the art of using the given means in combat; there is no better term for it than the *conduct of war*."[9] "The art is applied drawing on science, which is to say drawing on knowledge."[10] Knowledge increases through education. *The Art of War* imparts philosophical education for the orchestration of means to achieve military objective for a political end. Philosophy is "… the critical examination of the grounds for fundamental beliefs and analysis of the basic concepts employed in the expression of such beliefs. Philosophical inquiry is a central element in the intellectual history of many historical civilizations."[11]

The Art of War gives insight into the basic tenets of conducting wars. Strategy grows on those basics and modified with the changes in the ambient factors of peace and war.

On the other hand, such factors can influence little the philosophical sayings based on '*critical examination of the grounds for fundamental beliefs and analysis of the basic concepts.*' For example, Sun Tzu's *five factors (the way, heaven, earth, command and rules and regulations*) on 'Making Assessments' subtly suggests "to compare two sides in terms of above factors and appraise the situation accordingly." Then it is for the naval planners and commanders to evolve favourable strategy with flexible option as Sun Tzu said, "Having paid heed to my assessment of the relative advantages and disadvantages, the general must create a favourable strategic situation which will help bring the victory to fruition. By this I mean being flexible and making the most of the advantages to gain the initiative in war."[12] Similarly, *Attacking by Stratagem* does not say how to make an attack. It is rather an insight into targeting enemy objects and taking full advantage of it depends on command which, according to Sun Tzu, is a "matter of wisdom, integrity, humanity, courage, and discipline."



Relational Dynamism between Components of Marine Strategy

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Components of Maritime Strategy: Relational Dynamism

"Maritime strategy concerns the use of the sea for support of national or alliance policies in peace and war. Such strategy encompasses the maritime aspects of war as well as security in time of peace."[13] According to Julian Corbett, "By maritime strategy we mean the principles which govern a war in which the sea is a substantial factor. Naval strategy is but that part of it which determines the movements of the fleet when maritime strategy has determined what part the fleet must play in relation to the action of the land forces; …"[14] The definitions disclose three basic constituents of maritime strategy – objective, obtaining the means to achieve objective and principles governing the application of means. Maritime strategy in today's context is, therefore, rephrased as organizing, protecting, managing and securing the movements of national logistics over the oceans in response to conflicting demands of peace and war where political, economic, technological, social, psychological and (national) logistical and military factors are the components of warfare.

Above definitions and explanations unveil two fundamental divisions in maritime strategy, which are non-military and military aspects of the strategy. Non-military feature includes population, politics, ocean trade, technology, economy, maritime area, oceanography and maritime infrastructure. These are also the sources of military dimension of maritime strategy i.e. naval strategy. Naval strategy focuses on securing the interest in the use of the sea. Military and non-military components of maritime strategy succeed through mutual support. They are active simultaneously in peace and war, as it has been. Relational dynamism between the two divisions of maritime strategy and their components are shown in the flow diagram at the end of this article.

The Art of War and Components of Maritime Strategy: Comparative Examination

Resource Factor in Maritime Strategy.

Resource is the single most important component of maritime strategy and extremely contributory to its development and application. Resource of the state has a limit to spare for its forces. Economy of resource is critically important for sustainable force transformation and for providing sustenance to operations. Admiral Vern Clark hopes the US Navy to invest savings from *Sea Enterprise* in transforming the navy into the 21st Century.

War costs a nation hugely. "He who wishes to fight must first count the cost."[15] "In joining battle, seek the quick victory.... There has never been a state that has benefited from an extended war."[16] ".... if the campaign is protracted, the resources of the State will not be equal to the strain."[17] These philosophies indicate interactive relation among national resource, logistical strength and the balance of power. History also reveals that, "… victory went to the power best able to produce and organize materials and manpower for war."[18] During WWII, the US Navy had 67, 952 ships of all types on 30 June 1945 compared to 1099 on 30 June 1940.[19] On the other hand, Japan was unable to make good the losses she suffered during the course of the war. "Out of the total 451 surface warships and submarines in commission during the war, 332 had been sunk by the time Japan surrendered and only 37, or 8.2 percent remained operational."[20]

ADM Chuichi Nagumo, Japanese Navy

Balance of Power and Employment of Military Means.

Achieving maritime objectives through the employment of military resource demands the determination of balance of power. "Factors in the art of warfare are: First, calculations; second, quantities; third, logistics; fourth, the balance of power; and fifth, the possibility of victory. Calculations are based on terrain, estimates of available quantities of goods are based on these calculations, logistical strength is based on estimates of available quantities of goods, the balance of power is based on logistical strength, and the possibility of victory is based on the balance of power."[21]

The Battle of Atlantic during WW II was primarily a battle to draw, keep and contest the balance of power through the destruction/protection of logistics. For Axis German it was a battle to destroy 600,000 to 750,000 tons of British shipping per month for a year to force UK to sue for peace.[22] The Falklands War showed how the consideration for balance of power impacted the preparation for war. The *terrain* for the naval dimension of the Falklands War which can be referred to as "the fall of the land, the proximate distances, difficulty of passage, the degree of openness, and the viability of the land for deploying troops"[23] was

quite unfavourable to the UK leading to huge preparations to *draw the balance of power* in favour. Then, *keeping the balance in favour* went further into the superior application of combat power. It is both superior concentration and application of combat power that made the difference in the Pacific during WW-II, the Falklands War and the naval aspects of Arab-Israel Wars. It is a vital consideration for the successful employment of the US Navy's *Sea Power 21*. Hence, Sun Tzu's saying has relevance that *number alone confers no advantage.*[24]

Offence and Defence: The Resultant Value in Naval Warfare.

Sun Tzu's saying that the *possibility of victory lies in attack* is valid in naval warfare. In the history of naval warfare none emerged victorious without offensive actions. Sun Tzu also emphasized on defence to avoid defeat to achieve victory. "Being invincible lies with defense, the vulnerability of the enemy comes with the attack."[25] Offensive and defensive actions have complementary roles. "... Attack is the secret of defence; defence is the planning of an attack."[26] "In battle, there are not more than two methods of attack - the direct and indirect; yet these two in combination give rise to an endless series of manoeuvres."[27] Nagumo's ignorance of defence during the attack on Midway in 1942 severely affected Japanese Forces in the Pacific. After the first air attack on Midway, he concentrated more on offensive actions. Nagumo rearmed his torpedo bombers for ground attack, which were kept in defence against US surface forces. When Spruance's carriers were sighted, Nagumu was unable to launch immediate strike. On the other hand, Spruance's torpedo bombers caught Nagumo's carriers with ground bombers on deck and returning aircraft from Midway in the air. Further, evasion tactics enforced on Nagumo's forces by US torpedo bombers prevented him from launching aircraft on deck and also prevented him from recovering returning aircraft running out of fuel.[28] Japan's losses in the battle of Midway due to Nagumo's ignorance of defence were the beginning of an end.

Excellence in Warfare.

Wining a war is certainly a matter of excellence. Sun Tzu said, "... to win a hundred victories in a hundred battles is not the highest excellence; the highest excellence is to subdue the enemy's army without fighting at all."[29] The expression is explicitly relevant to maritime strategy affairs. "Since 1945 there has been one real naval war, half a dozen rather one-sided naval contributions to operations on land, and more than 200 political applications of limited naval force."[30] History of maritime strategy reveals that 'political application of limited naval force' achieved maritime objectives more than the recourse to naval engagements, which can be credited with the "highest excellence". Latest in the series of 'excellence' was the US securing Pakistan's support for its war on terror. Prior to the US invasion of Afghanistan after 9/11, US threat to employ naval power *to send Pakistan back to the Stone Age*, peacefully secured Pakistan's support.

Gaining Strategic Advantage.

Maritime history has many accounts of gaining strategic advantage through intelligent combination of ways and means. "For gaining strategic advantage (*shih*) in battle, there are no more than "surprise" and "straightforward" operations, yet in combination, they produce inexhaustible possibilities."[31] The strategic advantage that Japan gained through its surprising action against the USA on 7 December 1941 was short lived, yet, expanded Japanese influence over the South Pacific rapidly. Then, the combination of surprising actions and straightforward operations by the US forces across the Pacific resulted in the capitulation of Japanese Forces. The Indian Navy's (IN) innovative attack on Karachi Harbour in December 1971 and straightforward operations in the Bay of Bengal established IN dominance at sea. "Surprise and straightforward operations give rise to each other endlessly just as a ring is without a beginning or and end."[32] In today's technological environment straightforward operations may be difficult proposition but surprising action will remain an important element in maritime warfare. To achieve strategic advantage through *surprise*, a naval commander should consider innovation, speed and target prioritization.

Speed in Naval Warfare.

"War is such that the supreme consideration is speed", said Sun Tzu.[33] In narrower outlook it is the timing of an attack. In wider sense it is the *total speed of means of war*. Admiral Clark attached great importance to the need for *speed* for different components of *Sea Power 21*. Thinking of speed for strategic advantage should be viewed in whole system perspective. A ship's speed available for action should be viewed as the *total speed* of whole system aboard. A fleet's speed for action should also be looked at similar perspective. During the Gulf War of 1991, the US success in transporting 8.3 trillion kilogram war material in five months 8500 miles away from the mainland and subsequent quick victory is credited

Fleet Admiral Chester Nimitz with binoculars

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to *total speed*. In the context of current maritime asymmetric threat environment, speed is also critically important to tackle the fundamental problems for maritime forces operating in the littoral 'where the battle space is compressed into a much smaller spatial area, reaction time is less and manoeuvring space is limited.'[34]

Economy of Effort and Resource.

For the purpose of economy of resource and effort target prioritization is important. "… the best military policy is to attack strategies; the next to attack alliances; the next to attack soldiers; and the worst to assault walled cities."[35] An understanding of the philosophy helps prioritizing target and weighing relative benefit of targeting. During the attack on Pearl Harbor on 7 Dec 1941, "... Nagumo, fearing a counter attack, made a critical mistake by refusing to launch a third wave on the harbour's repair facilities and fuel installations, which would have destroyed Pearl as a base."[36] In the battle of Coral Sea (4-8 May 1942), Admiral Nimitz targeted the Japanese main invasion force destined for Port Moresby that could isolate Australia. He left the invasion of Tulagi and Louisiade unopposed. Although the battle ended in confusion and loss on either side, Allied forces could foil Japanese landing on Port Moresby.[37]

Mobility: Value in Naval Warfare.

Mobility is an essential component of maritime strategy. Napoleon's battles depended upon mobility. It is one of the things that Sun Tzu stresses.[38] Naval forces without mobility and manoeuvrability are ineffective and inefficient at sea. "Mobility assures manoeuvrability in tactics and flexibility to adjust to the changes. Speed in manoeuvre adds agility."[39] "Physical mobility directly affects the deployment of force. This is especially critical when the distances from the basing and staging area are long and the forces must be deployed at short notice."[40] The concept of mobility extends beyond the physical movement of forces. "The availability of highly mobile and effective means of *fire power* enhances the movement capabilities of one's forces… Mobility also means *communication*. Without reliable communication throughout the chain of command, firepower and speed of movement mean little."[41]

Simplicity and Flexibility in Maritime Strategy.

Simplicity and *flexibility* are essential attributes of maritime strategy and also found in the *principles governing wars*. Plans to achieve maritime objectives must be *simple and flexible*. Knowledge of the following *five essentials for victory*[42] together with factors on *'Making Assessments'* can produce simple and flexible maritime strategy.

a. He will win who knows when to fight and when not to fight.

b. He will win who knows how to handle both superior and inferior forces.

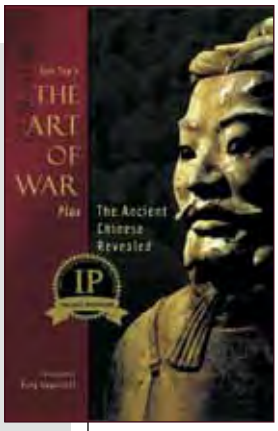
c. He will win whose army is animated by the same spirit throughout all its ranks.

d. He will win who, prepared himself, waits to take the enemy unprepared.

e. He will win who has military capacity and is not interfered with by the sovereign.

Initiative in Naval Warfare.

Initiative is the key to achieve objectives. Initiative originates from knowing the enemy and knowing one's self. Such knowledge enables a commander to fight a hundred battles without disaster.[43] "… what enables the wise sovereign and good general to strike and conquer, and achieve things beyond the reach of ordinary men, is *foreknowledge*."[44] In narrower concept *foreknowledge* is tactical in nature. In wider sense it includes enemy's military strategic information, national character and culture, economy and political resolve/vulnerability. Prior to Pearl Harbor disaster, Rear Admiral Kimmel asked his Fleet Intelligence Officer about the location of Japanese carriers. The officer replied that he did not know.[45] And the consequence of not knowing the enemy is known to the world. Contrarily *foreknowledge* of the Japanese forces enabled Nimitz to maintain the initiative and take the lead in the Pacific during the WW-II.



Concluding Remarks

This essay examined significant incidents from the contemporary maritime history and futuristic visions to find relevance of Sun Tzu's *The Art of War* to maritime strategy. Examinations revealed that despite being the work of Sun Tzu's soldiering experience, the relevance of *The Art of War* extends beyond land warfare into maritime warfare. It can guide invaluably to formulate, materialize and apply maritime strategy. Last but not the least; the fundamental concept for the US Navy's operational effectiveness – *Sea Strike, Sea Shield* and *Sea Basing* are found to be the expanded transformation of Sun Tzu's thoughts on *attack, defence and essentials for operational mobility* attributed to evolutionary changes in the international political set ups and technological advancement in a time span of 2500 years.

Commander Mohammad Abdur Razzak, BN, was commissioned into the Bangladesh Navy on 1 June 1984. He graduated from Defence Services Command and Staff College (DSCSC), Bangladesh and attended Naval War Course in Turkey in 1999-2000 and 2001-2002 respectively. He has had a number of papers published in Bangladesh Armed Forces Journal, Journal of Bangladesh Institute of International and Strategic Studies, Mirpur Papers (Journal of DSCSC), The Naval Review, UK and in the USA's Proceedings. He was the "Second Honourable Mention" winner in the International Navies Essay Contest 2000 organised by the US Naval Institute. Presently he heads the School of Logistics and Management, Bangladesh Navy.

(Endnotes)

11 Lieutenant Hewitt underwent RAAF pilot training in the same scheme as Kennedy. He later transferred to the RAAF, rising to the rank of air vice marshal. Sir Richard Williams, These are Facts; The Autobiography of Air Marshal Sir Richard Williams KB CB DSO (the Australian War Memorial and the Australian Government Publishing Service), Canberra, 1977, p. 144.

BIBLIOGRAPHY

Books

The Art of War by Sun Tzu, Edited and foreword by James Clavell, Hodder & Stoughton, London, 1981.

The Book of War (*Sun Tzu The Art of Warfare & Karl Von Clausewitz On War*), The Modern Library, New York, 2000.

Sunzi: *The Art of War* Sun Bin: *The Art of War*, Edited and translated into modern Chinese by Wu Rusong and Wu Xianlin, translated into English by Lin Wusum, Foreign Languages Press, China, 2001.

Carl Von Clausewitz, *On War*, Edited and Translated by Michael Howard and Peter Paret, Everyman's Library, UK, 1993.

Geoffrey Till, *Seapower A Guide for the Twenty-First Century,* Frank Cass Publisher, UK, 2004.

Richard Harding, *Sea Power and naval warfare, 1650-1830*, UCL Press, UK, 1999.

The Oxford Companion to the Second World War, Oxford University Press, New York, 1995.

International Military and Defense Encyclopedia, Vol-3 (pp.1131-1135) Vol-4 (pp. 1657-1662) and Vol-5 (pp.2573-2577), Brassey's (inc) USA, 1993.

The New Encyclopedia Britannica, 15th Edition, Volume-9 (p. 388), Volume-11 (p-305), USA, 1997.

Magazines/Journals

Cdr M A Razzak, Bangladesh Navy, 'Winds of Change Reshaping Principles of War', *The Naval Review*, UK, Vol. 94, No. 2, May 2006, pp. 124-131.

Richard Scott, 'Scourge of the Sea', *Jane's Defence Weekly*, Vol. 41, Issue No. 43, 24 October 2004, pp. 19-23.

The Art of War by Sun Tzu, Edited and foreword by James Clavell , Hodder & Stoughton, London, 1981, p. 11.

2 *The Art of War* by Sun Tzu, p. 7.

3 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), The Modern Library, New York, 2000, p. xxiii.

4 Geoffrey Till, *Sea Power A Guide for the Twenty-First Century*, Frank Cass Publishers, UK, 2004, p.40.

5 *International Military and Defense Encyclopedia*, Vol - 5, Brassey's (inc) USA, 1993, p. 2573.

6 *International Military and Defense Encyclopedia*, Vol - 5, p. 2574.

7 *International Military and Defense Encyclopedia,* Vol - 5, p. 2575.

8 *The New Encyclopedia Britannica,* 15th Edition, Volume-11, USA, 1997, p. 305.

9 Carl Von Clausewitz, *On War,* Edited and Translated by Michael Howard and Peter Paret, Everyman's Library, UK, 1993, p. 145.

10 Cdr M A Razzak BN, 'Winds of Change Reshaping Principles of War', *The Naval Review,* UK, Vol. 94, No. 2, May 2006, p. 124.

11 *The New Encyclopedia Britannica,* 15th Edition, Volume-9, 1997, p. 388.

12 *Sunzi: The Art of War Sunbin: The Art of War*, Edited and translated into modern Chinese by Wu Rusong and Wu Xianlin, translated into English by Lin Wusum, Foreign Languages Press, China, 2001. p. 7.

13 *International Military and Defense Encyclopedia,* Vol - 4, p. 1657.

14 *International Military and Defense Encyclopedia,* Vol - 4, p. 1658.

15 *The Art of War* by Sun Tzu, p. 19.

16 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 75.

17 The Art of War by Sun Tzu, p. 19.

18 Richard Harding, *Sea Power and Naval Warfare,* 1650-1830; UCL Press, UK, 1999, p. 3.

19 *The Oxford Companion to the Second World War,* Oxford University Press, New York, 1995, p. 1199.

20 *The Oxford Companion to the Second World War,* p. 626.

21 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 84.

22 *The Oxford Companion to the Second World War,* p. 63.

23 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 73.

24 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p.105.

25 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 83.

26 *The Art of War* by Sun Tzu, p. 27.

27 *The Art of War* by Sun Tzu, p. 32.

28 *The Oxford Companion to the Second World War*, p. 871.

29 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 79.

30 *International Military and Defense Encyclopedia*, Vol - 3, p. 1135.

31 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 85.

32 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 85

33 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p. 113.

34 Richard Scott, *'Scourge of the Sea', Jane's Defence Weekly*, Vol. 41, Issue No. 43, 24 October 2004, p. 22.

35 *The Book of War (Sun Tzu* The Art of Warfare & *Karl Von Clausewitz* On War), p.79.

36 *The Oxford Companion to the Second World War,* p. 872.

37 *The Oxford Companion to the Second World War,* pp. 271-272

38 *The Art of War* by Sun Tzu, p. 11.

39 Cdr M A Razzak Bangladesh Navy, 'Winds of Change Reshaping Principles of War', *The Naval Review,* pp. 128-129.

40 Milan Vego, Operational Warfare, USA, 2000, p.66.

41 Milan Vego, Operational Warfare, p.66.

42 *The Art of War* by Sun Tzu, p. 26.

43 *The Art of War* by Sun Tzu, p.8.

44 *The Art of War* by Sun Tzu, p.90.

45 *The Oxford Companion to the Second World War,* p. 870.

Admiral Raymond Spruance, USN and his Leadership Skills during the Pacific War

SUB-LIEUTENANT TOBY FREWIN

'Always calm, always at peace with himself, Spruance had that ability which marks the great captain to make correct estimates and the right decisions in a fluid battle situation.'
– Rear Admiral Samuel Eliot Morison[1]

Admiral Raymond Spruance was an extremely successful naval commander and was responsible for much of the success of the US's drive to victory across the Pacific in World War II. Spruance began the war as commander of a division of heavy cruisers, based at Pearl Harbor. His cruiser division formed part of a carrier task force commanded by Admiral Bill 'Bull" Halsey. But Spruance was destined for greater things. He was thrust into command of the carrier task group when Halsey fell ill, on the eve of the Battle of Midway. From there, Spruance served as chief of staff to the Pacific Commander-in-Chief, Admiral Chester Nimitz. He spent the last two years of the war commanding the US Fifth Fleet – 'the greatest and most powerful fleet in the history of the world.'[2] Following the war, Admiral Spruance served as Pacific Commander-in-Chief and President of the US Naval War College. After resigning from the US Navy, he spent three years as US Ambassador to the Philippines.

Significant Achievements and Failures

Admiral Spruance's conduct during the Pacific War was littered with significant achievements. Yet perhaps his greatest achievements could also be considered his greatest failures. This dichotomy arises from differing perceptions regarding crucial decisions he made in command of operations at the Battle of Midway and the Battle of the Philippine Sea. Each encounter saw crucial victory for the US Navy, but it is questioned whether Spruance's decisions failed to take full advantage of the situation and turn these battles into decisive, overwhelming triumphs.

At Midway, Spruance made a series of important decisions. However, some have been contested as being too conservative. The first of these was the timing of the launch of the first attack wave from his carriers. Spruance made the courageous determination to launch at the first available opportunity. He hoped to find the Japanese carriers unprepared and thus maximise surprise and reap the advantage of striking first. This plan was not without risk but depended upon Spruance being correct in his assessment of likely Japanese movements and disposition.[3] The ploy worked and three carriers were effectively destroyed.[4] There is some contention, however, whether to attack so early was, in fact, Spruance's plan. It is alleged that he intended delaying the first wave until the range to the enemy carriers was reduced.[5] This version of events sometimes alleges that it was Spruance's inherited chief of staff, Captain Miles Browning, who urged him to launch immediately.[6] As such, there remains a line of thought which credits Captain Browning with much of the success at Midway.

A second contentious decision was that made not to pursue Japanese forces on the first evening of the battle. Rather than pursue the crippled Japanese force, Spruance turned his ships away in the evening to avoid further engagements during the hours of darkness. He was criticised in some circles for not pressing home a perceived advantage after the day's action.[7] But Spruance's decision was based upon several factors including

his overarching mission – to minimise exposure of his fleet to attack while inflicting maximum damage upon the enemy,[8] what he knew of enemy forces in the area and the knowledge that the advantage of carrier superiority would not be realised in a night action. Further, there remained the possibility that there was an additional, untouched carrier in the Japanese force. The Japanese force was still superior numerically and in firepower and, without air cover, could only be effectively employed at night.[9] Such a night battle was indeed the intention of the Japanese forces and Spruance's action effectively thwarted any opportunity for the Japanese to glean any measure of success at Midway.

Similar controversy surrounded Spruance after the Battle of the Philippine Sea. However, history has not been kind enough to furnish a definitive verdict on whether his decisions were the best circumstances allowed. The naval battle occurred as a sideline to US landings on the Mariana Islands of Saipan, Guam and Tinian, in June, 1944. There, Spruance's primary mission revolved around protecting the Marines and their transports landing on the islands until they were well established.[10]

When the Japanese fleet was

known to be in the area, Spruance agonised over whether to seek out and attack the enemy, or to remain on station and provide protection to the amphibious landing.[11] In the final analysis, Spruance was convinced that the Japanese focus would be to attack the transports. Based upon this assumption and his interpretation that protecting this force was his primary duty, Spruance determined to remain near Saipan and let the enemy come to him. In short, then, he was prepared to 'risk his carriers before he would risk his transports.'[12]

The Americans still recorded a decisive victory as the Japanese carrier borne aircraft attack was decimated in what became known as the 'Marianas Turkey Shoot.' There was little damage to American assets but the Japanese fleet remained out of range of American aircraft and thus retired from the battle largely unscathed.[13] As such, it has been questioned whether Spruance was too conservative and should have taken offensive action to pursue the weakened Japanese Navy. This could have been accomplished within the parameters of protecting the landing but Spruance chose to focus his energies on the core of his mission. Certainly, to pursue the enemy would have involved greater risk but so much greater rewards could have been reaped. Based on this circumstance, calls were made for Spruance to be relieved from his position.[14] However, Spruance retained the support of Nimitz and the Chief of Naval Operations, Fleet Admiral King who reportedly told Spruance that he 'did a damn good job in the Marianas. No matter what other people tell you, your decision was correct.'[15]

Spruance as a Leader

Spruance's leadership style is perhaps personified largely in the titles used in literature written about him. Headings such as 'The Thinking Man's Admiral'[16] and 'The Quiet Warrior'[17] give a telling indication of the type of man and the type of leader he was.

As a leader, Spruance was not the type to inspire passion and affection in his charges. Indeed, Spruance struggled at times to communicate with others. He was inspirational almost exclusively due to the enormous ability he exhibited.[18] He maintained a façade of cool detachment[19] which saw him sometimes known among junior officers as 'Old Frozen Face.'[20] However, his status as a leader was evident in the respect and the loyalty afforded him. This was what he showed his men and they reciprocated. His command was always marked by 'dignity, tolerance, justice, professional competence, and quiet confidence.'[21]

It is instructive to compare Spruance with the style of his contemporary, Bull Halsey. Halsey was a colourful, bold and gregarious character, almost a polar opposite to Spruance. Halsey was aggressive to the point of impetuousness and audacity.[22] Halsey's impulsiveness meant that his staff was constantly on edge, wondering what would happen next. In contrast, Spruance always had detailed, up to the minute plans which guided everyone's actions.[23] It was said that Spruance's operations seemed to always go to plan – 'like well-planned drills.'[24] Throughout his career, Spruance maintained a quiet bridge, dealing with crises, large and small, efficiently, with minimal fuss and without raised voices.[25]

Spruance ensured he surrounded himself with the best people he could, and trusted them to perform their duties largely without his input or interference. He believed in maintaining only a small staff so that he could know each one well, including their strengths and weaknesses. Once satisfied in their abilities, Spruance delegated all detail to his subordinates. He believed in making very detailed plans but acknowledged that any plan could not foresee all possible circumstances. Therefore, Spruance empowered his officers to act on their own initiative with very brief orders, or no orders at all.[26]

Spruance also believed that a small staff would experience less internal friction. This theory was tested as two of his most senior commanders, Vice Admiral Kelly Turner and Marine Major General Holland Smith were both blunt, tactless, strong-willed and stubborn' and their relationship throughout the war was always explosive. [27] It was Spruance's calm diplomacy which allowed the two to work together.[28]

Spruance as a Subordinate

During the Pacific War, Spruance was not subordinate to many. To those he was, it is evident he was held in the highest regard. When Halsey was forced to surrender command prior to Midway, he did not hesitate to recommend Spruance. Spruance was perhaps an unlikely choice given that he was the commander of a cruiser division and hence arguably unqualified to command a carrier task group. But Halsey harboured no doubts about Spruance's ability, judgement and qualification for higher command.[29]

Nimitz had never served with Spruance before Midway but he knew of Spruance's reputation and character. Indeed, Spruance was already destined to be Nimitz's next chief of staff when Halsey made his recommendation. Nimitz did not hesitate, partly based upon his faith in Halsey's judgment, and partly due to his own knowledge of Spruance.[30] The Chief of Naval Operations, Admiral Ernest J. King did not need convincing either – Spruance was the only flag officer King admitted was smarter than he was, suggesting

Admiral Raymond Spruance, USN & his Leadership Skills during the Pacific War

Spruance's brain seemed to be 'composed of millions of computers.'[31] The faith Nimitz and King showed in Spruance was well rewarded by Spruance's performance, but it was not untested. However, neither man would entertain the slightest negative thought on Spruance while some called for him to be relieved following the Battle of the Philippine Sea.[32]

Place in History

There is a dichotomy in assessing Admiral Spruance's place in history. He was instrumental in the prosecution of the US's strategy in the Pacific and successfully commanded some of the largest actions in history. Yet Spruance remains one of the least known US commanders of the war. This is perhaps due largely to his modest, unassuming nature, purely professional conduct and disdain for publicity. [33] He was satisfied to know he had done his job well.[34]

During the war, the US Navy was empowered to promote four of its officers to the five-star rank of Fleet Admiral. The first three were easily determined but the last one was reduced to a choice between Halsey and Spruance. Both were rotating through the same role. If anything, Spruance's record during the war was superior. Yet Halsey received the promotion. There was some justification in that Halsey was the senior officer and began the war in more senior command than did Spruance. However, it has also been argued that his penchant for publicity may have made the difference. Spruance, in compensation, received the distinction of retaining full admiral's pay for the rest of his life where all others had their pay reduced upon retirement.[35] Numerous attempts have been made to have Spruance retrospectively promoted. Even now, US Senator Lugar advocates the posthumous award of the fifth star to Spruance.[36]

Regardless of recognition, Spruance's place in history is unarguable. Admiral Spruance's forces were some of the largest the world has seen and they fought some of the greatest naval and amphibious battles recorded. Yet he perhaps did not fit the prototypical perception of the great military leader. He was quiet, intellectual, serious and aloof. His leadership was not marked by infectious war cries or inspirational exhortations but rather a cerebral, rigorously methodical, logical and unemotional approach to warfare. He never sought public acclaim or glory – he was content to allow his achievements, ability, intellect and integrity to speak for him. Admiral Raymond Spruance stands as one of the greatest military leaders in history and his legacy is a testament to the qualities he exhibited.

These qualities inspired Nimitz to succinctly describe him thus: 'I have the highest regard for Admiral Spruance … He is a fine man, a sterling character and a great leader … Nothing you could say about him would be praise enough.'[37]

Sub-Lieutenant Toby Frewin, RAN

Toby Frewin was born in Adelaide and attended the Flinders University of South Australia, graduating in 2006 with a Bachelor of International Studies and a Bachelor of Laws. He joined the RAN in 2006 as an undergraduate, completing New Entry Officer Course and commencing Junior Warfare Officer Application Course in 2007.

Bibliography

Andidora, Ronald, *Iron Admirals: naval Leadership in the Twentieth Century* (2000).

Buell, Thomas, *The Quiet Warrior: A Biography of Admiral Raymond A. Spruance* (1987).

Forrestel, E.P., *Raymond A Spruance, USN: A Study in Command* (1966)

Greene, P., *Admiral Spruance and The Battle of Philippine Sea: A Brilliant Victory or a Bungled Opportunity?* (Core Course Essay, National War College, National Defense University, 1994) 9-10, at National Technical Information Service <http://www.ntis.gov/search/product.asp?ABBR=ADA440992&starDB=GRAHIST> at 14 April 07.

Lundstrom, John, 'Raymond A. Spruance: The Thinking Man's Admiral' in Jack Sweetman (ed), *The Great Admirals: Command at Sea, 1587-1945* (1997)

Morison, Samuel Eliot, *The Two Ocean War* (1963).

Potter, E.B., *Nimitz* (1982, 4th ed)

Wukovits, John, 'Admiral Raymond A. Spruance' in Stephen Howarth (ed), *Men of War: Great Naval Leaders of World War II*, (1992)

A Fifth Star for Admiral Spruance, Richard G. Lugar, United States Senator for Indiana <http://lugar.senate.gov/issues/military.html> at 14 April 2007.

President's Message Continued from page 3

(Endnotes)
1 Samuel Eliot Morison, *The Two Ocean War* (1963) 581.
2 Thomas Buell, *The Quiet Warrior: A Biography of Admiral Raymond A. Spruance* (1987) xxix.
3 E.P. Forrestel, *Raymond A Spruance, USN: A Study in Command* (1966) 43-5.
4 John Wukovits, 'Admiral Raymond A. Spruance' in Stephen Howarth (ed), *Men of War: Great Naval Leaders of World War II*, (1992), 158, 164.
5 Forrestel, above n 3, 45.
6 John Lundstrom, 'Introduction' to Thomas Buell, *The Quiet Warrior: A Biography of Raymond A. Spruance* (1987) xi.
7 Wukovits, above n 4, 165.
8 Forrestel, above n 3, 39.
9 John Lundstrom, 'Raymond A. Spruance: The Thinking Man's Admiral' in Jack Sweetman (ed), *The Great Admirals: Command at Sea*, 1587-1945 (1997) 458, 476.
10 Wukovits, above n 4, 171.
11 Buell, above n 2, 291.
12 Buell, above n 2, 295.
13 P. Greene, Admiral Spruance and *The Battle of Philippine Sea: A Brilliant Victory or a Bungled Opportunity?* (Core Course Essay, National War College, National Defense Univeristy, 1994) 9-10, at National Technical Information Service <http://www.ntis.gov/search/product.asp?ABBR=ADA440992&starDB=GRAHIST> at 14 April 07.
14 Ibid, 11.
15 Ibid, 13.
16 Lundstrom, *The Great Admirals*, above n 9, 458.
17 Buell, above n 2.
18 Ronald Andidora, Iron Admirals: *naval Leadership in the Twentieth Century* (2000) 92.
19 Andidora, above n 18, 92.
20 E.B. Potter, *Nimitz* (1982, 4th ed) 228.
21 Buell, above n 2, 47.
22 R. Andidora, above n 18, 158.
23 Wukovits, above n 4, 170.
24 Wukovits, above n 4, 168.
25 Buell, above n 2, 54-5.
26 Buell, above n 2, 245.
27 Buell, above n 2, 195.
28 Wukovits, above n 4, 169.
29 Buell, above n 2, 135.
30 Lundstrom, *The Great Admirals*, above n 9, 463.
31 Wukovits, above n 4, 160.
32 Greene, above n 13, 11-3.
33 Andidora, above n 18, 159.
34 Wukovits, above n 4, 160.
35 Buell, above n 2, 471-2.
36 *A Fifth Star for Admiral Spruance*, Richard G. Lugar, United States Senator for Indiana <http://lugar.senate.gov/issues/military.html> at 14 April 2007.
37 Forrestel, above n 3, 57.

We believe that this is practicable, provided that we can create additional interest in and enthusiasm for the ANI amongst younger members of the RAN. The Council is considering a number of initiatives (some inspired by our members of Council currently studying at ADFA) which we think may help 'do the trick' and I hope that they can be aired at the AGM.

Our view as Council is that we need to do even more to make the ANI attractive and something in which involvement is valued. Certainly, the range of activities over the last year, from our involvement in the King-Hall Naval History Conference, our sponsorship of Dr Eric Grove and the associated lecture program by him and Dr Gary Weir, our social activities in Canberra and Sydney, the Vernon Parker Oration by Mike Carlton and the Annual Dinner, as well as the recent Naval Warfare Seminar at HMAS WATSON indicate that we have got some runs on the board. Judging for the 2008-2009 Maritime Advancement Australia Award (currently set at $22,000 a year for two years through the sponsorship of the Australian National Centre for Ocean Resources and Security, Booz Allen Hamilton, Saab and EDS) is currently in progress and we expect to announce the winner on the last day of the Seapower Conference at Pacific 2008 on Thursday 31 January. This will be immediately after Chris Skinner, the 2006-2007 winner, has reported on his study of the impact of the COLLINS class project on the nation.

But all this is not enough. We believe that our web site needs further development to capitalise on the great work done by Geoff Lawes in bringing it into being, we think that *Headmark* needs to attract more contemporary articles and, just as important, we need to sustain a healthy program of seminars and activities.

I ask that you think about these issues and consider the way ahead. We intend to place the draft 2008-2013 Strategic Plan on the Website, together with the existing 2005-2010 Plan to give you a better idea of where we need to go, as well as where we have been.

Proposed Table of Fees and Charges

		1 year	2 years	3 years
Individual - Concession	Australia/ New Zealand	$40	$77.50	$112.50
	Asia Pacific	$55	$107.50	$157.50
	Rest of World	$62	$121.50	$178.50
Individual Member	Australia/ New Zealand	$60	$115	$167.50
	Asia Pacific	$75	$145	$212.50
	Rest of World	$82	$159	$233.50
Corporate Member	Australia /New Zealand	$60	$115	$167.50
	Asia Pacific	$75	$145	$212.50
	Rest of World	$82	$159	$233.50

Concession rates are available to: full time students, serving members of Lieutenant rank and below, and members aged 55 and older who have retired from the workforce.

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The Ship's Command Team & Network Centric Warfare

BY COMMANDER STEPHEN DRYDEN, RAN

The ADF's adoption of network-centric warfare (NCW) is driving the RAN's command and control future. Future technologies, particularly advances in information technology, will enable a more distributed command structure for the ADF, but it is critical to remember that command is, and will always remain, a human function.

A Marine and an Aussie soldier keep watch for non-friendly forces as part of exercise Talisman Saber 2007

The Navy Contribution to Australian Maritime Operations

In October 2005, naval personnel around the world remembered the Battle of Trafalgar; a naval battle that was fought in 1805. That we remember this event two hundred years later, stands as testimony to the great strategic victory that was won that day for the British nation.

Trafalgar was a brilliant victory. Eighteen French and Spanish ships of the line were captured without the loss of one English ship.[1] Britain gained undisputed control of the seas around her and the threat of invasion by France, a constant presence since the start of the Napoleonic War in 1803, was finally removed. Tactically a masterstroke of planning and execution, the sea battle also marked a strategic watershed that turned the tide of the war against France in England's favour. It was an empowering victory for Britain, and set the scene for the final victory against France achieved by Wellington at Waterloo in 1815. It was also the last major naval battle in the age of sail.

Trafalgar exemplifies the excellence of Nelson as a Commander; indeed, two hundred years later, it the victory for which he is most venerated. However, as great as Trafalgar was for Nelson, it was also a defining moment for his Commanding Officers and their respective Command Teams. Nelson aboard *Victory* did not win Trafalgar alone; it was the combined effect of a number of discrete Command Teams acting to achieve a common goal – the defeat of the combined Fleets of France and Spain – that carried the day.

There are those who like to believe that Network Centric Warfare (NCW) is new; certainly the technology in use tends towards the 'latest and greatest'. However, at Trafalgar we see an excellent example of the benefits to be gained by promoting the 'sensor-shooter-decision-maker' relationship. In other words, at Trafalgar, we have an example of NCW at its best, given the technology available at the time.

To briefly elaborate. The primary sensor was one's eyes; the shooter – the warships of the British Fleet, and the decision-makers, the respective Commanding Officers. The medium by which orders were communicated varied between signal flags and voice. Underpinning this system was a clear understanding of the Commander's intent; this having been communicated in person by Nelson to his Commanding Officers the evening prior aboard *Victory*. The final key to success was Nelson's trust of his Commanding Officers to then take the fight to the enemy, with the minimum of intervention by him. This use of mission command empowered his decision-makers to 'fight and win' even though he (Nelson) lay mortally wounded in the bowels of *Victory* for the majority of the battle.

Much of what happened that day at Trafalgar is relevant to the way we conduct NCW today.

Scope

This paper will initially discuss the current status of NCW within the Australian Fleet. Next, the paper will review the information needs of a ship's command team operating at the

1 Hibbert, C. 1994, *Nelson – A Personal History,* Penguin Group, England, p377

tactical/lower operational level. There will be an emphasis on an environment dominated by information networks and stove-piped systems. A review of the composition, role and responsibilities of a ship's command team will follow, emphasising the role of the Commanding Officer. Further discussion will cover the human dimension to decision-making, emphasising the importance of effective information management. The paper will conclude with a discussion on the challenges and opportunities provided to a ship's command team through the implementation of NCW in the maritime environment.

THE FLEET

In the maritime environment, it is fortunate that interaction and cooperation between naval, land and air forces, both domestic and foreign, has been occurring for many years. The maritime culture is one of cooperation, and hence the concept of interoperability has always been valued highly.

In achieving interoperability, navies have established information-sharing networks as a matter of course. Whilst the mediums used have varied in response to technological change, the requirement to share information within the 'sensor-shooter-decision-maker' relationship has remained constant. Hence, it can be argued that even in the earliest days of the Royal Australian Navy, the elements of NCW were present.

It can be stated with confidence that the RAN is steadily maturing towards a Fleet that is network enabled; able to operate effectively in a broad range of information enclaves, driven by a diverse range of missions and coalitions. The Australian Network Centric Warfare Roadmap, published in 2007, aims for a networked task group capability by 2011 and a fully networked Fleet by 2014. Defence Projects such as SEA1442 and Joint Project 2008 remain instrumental in the achievement of these goals, delivering critical communications and information systems (CIS) capability to Fleet units.

However, with this progress towards a networked maritime force in mind, the RAN Fleet has arrived at a cusp. The critical question is now how far the Fleet will embrace advanced IP networks for command & control, and just how much of the 'traditional' ways of communication, such as military messaging and tactical voice circuits, will be retained.

On the one hand, the Fleet is about to significantly expand its existing IP-based networks, with the introduction of leading edge capability such as Sub Net Relay (SNR) and wideband satellite communication capabilities in selected major fleet units towards the end of this year. Whilst this will initially be done in response to operational imperatives, the 'push' for a wider fielding of this capability will result.

On the other hand, there is this continual debate over what legacy CIS systems and procedures the RAN should and must retain. Driven by a powerful combination of factors such as interoperability, cost and conservatism, it is envisaged that fleet units in 2011 will operate in a CIS environment that reflects a combination of broadband IP-networks and the more traditional communications networks such as tactical voice and military messaging.

Complicating this is the knowledge that there is a significant difference between the left hand edge of CIS capability in the Australian fleet, and the right hand edge of capability. Whilst it would be unfair to compare, side-by-side, the CIS capabilities of a Patrol Boat to that of an upgraded Frigate, it is reasonable to compare the CIS capabilities of two frigates of the same class, or even that of two major fleet units. In these instances, both doctrinally and practically speaking, the roles and missions of the fleet units being compared are similar. Yet, as the situation currently stands, an upgraded Frigate such as HMAS *Sydney* is sailing with a disproportionately greater aggregate CIS capability than that of her sister *Adelaide* Class frigates. Likewise, HMAS *Arunta* will shortly be enjoying a significantly enhanced aggregate CIS capability to that of her sister ANZAC Class frigates.

So why is this so and where is this taking the Fleet?

Even though some may wish for a complex answer, the simple truth is that interoperability is the key driver. Even though the RAN is a medium navy in today's terms, interoperability has proven to be a key force multiplier for the Fleet. This explains why, when an Australian warship is earmarked for coalition operations, the system goes to great lengths (and expense) to ensure that the ship is able to play on the same field as the other participants. The influence of allied and regional naval CIS capability in spurring on the growth and development of our own organic communications capability cannot be overstated. Our embracing of NCW as a key warfighting enabler supports this statement.

As technology continues to advance, particularly in the field of information communications technology (ICT), the capacity of communications systems to convey, process and display information is also forging ahead. This empowers the NCW system; enabling an expansion of the tactical picture from horizons initially limited by one's vision to nowadays, horizons that are only limited by the storage capacity of one's track management database.

The RAN Fleet currently stands

at the base of a rapidly building wave called NCW. It is the tsunami of naval communications. The RAN Fleet's ability to ride this wave, which for reasons of interoperability and strategic relevance it needs to do, will be largely determined by two considerations. First, is the ability of key Defence ICT projects to deliver relevant CIS capability quickly and effectively. Whilst easy to state, this is particularly challenging when the dynamics of the ICT environment result in a technology refresh every eighteen months, and a major capability leap and/or an organisational change every three to five years. The second consideration is simpler. It is the ability to say 'No.' Just because a particular capability is new, or someone else is using it, doesn't mean that we should adopt it. The proliferation of stovepiped CIS capability within the Fleet attests to past practice in this regard.

The core of the future RAN Fleet is a networked-enabled, not network-dominated force. As we embrace NCW and introduce significant CIS capability into the Fleet, our focus must remain firmly on the 'fight and win' requirement. Inherent in this, is our continuing ability to interoperate with Joint, Allied and Coalition members, and to be seen as an equal player capable of taking the lead as required.

INFORMATION NEEDS IN THE MARITIME ENVIRONMENT

With the NCW construct in mind, it is posited there are two ways in which a warship can be viewed.

First, is that of a sleek, grey ship charging through the waves, battle ensign hoisted, displaying an impressive array of sensors and weapons that enable it to 'fight and win.' This view is arguably the most popular one, and emphasises the 'sensor-shooter' capabilities of a warship. As arguably the area that attracts the greatest public commentary, it is a view that is never far from the minds of us all.

The second view takes the approach that a warship is a critical node within an information-sharing network. The ship can be imagined as a telephone pole that has a myriad of interwoven cables extending from it; each cable receiving and transmitting a specific information exchange requirement. This view is the harder one to sell, least of all understand. It is hard to easily explain this view to the layman, particularly if one appreciates that each cable has its own specific security, bandwidth and shore infrastructure requirements, and each these factors has to be working in order for the 'cable' as a whole to work. When one further considers that the information capacity of each cable changes every eighteen or so months, the final result is indeed complex!

So what are the information exchange requirements of a warship? What information do the decision-makers aboard a Fleet unit need, in order to 'fight and win'?

The problem with discussing information exchange requirements is that no where has the decision-maker at sea, operating as part of the ship's command team, actually defined in both qualitative and quantitative terms, their information exchange requirements. I suggest there is much intuitive understanding of the subject, and certainly academic and scientific assessments have been conducted, but where, for example, is the prioritisation of a ship's Common Operating Picture (COP) when compared to the ship's RESTRICTED email system defined? Indeed, is this prioritisation between information exchange requirements static or dynamic?

The RAN hasn't tackled this subject with any degree of conviction or certainty; and with good reason. There is no Fleet CIS capability baseline; so there is nothing to measure existing CIS capability against. Does a unit have what it needs to 'fight and win', or is its organic CIS capability coming up short of 'expected' requirements? Likewise, there is no complete ownership or control of Fleet CIS capability by the Fleet; so access to essential enabling activity such as the provision of communications bearers eg SATCOM Satellites is determined by organisations external to the Fleet. Crucially, there is no defined boundary between the tactical information environment that the Fleet uses to 'fight and win' (the Maritime Tactical Wide Area Network) and the larger, and more corporate-orientated Defence Information Environment (DIE). Hence, issues such as security policy and practice, capability development, operational support and software configuration management are areas where two worlds collide!

It would be remiss, having raised the topic, to not attempt a reasoned answer to the information exchange requirement question. This paper posits that broadly speaking, there are four information exchange requirements for a ship's command team. These are:

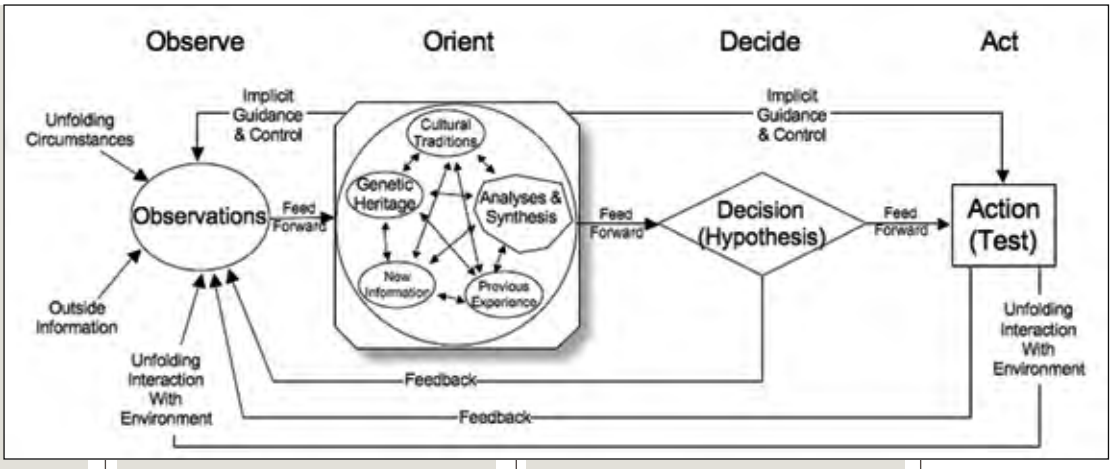
a. Information exchange between Corporate/Enterprise Systems eg personnel and logistic management information systems.

b. Information exchange in direct support of Operational Decision-making eg operational planning activities, command administration, links to higher command eg OPCON, Operational HQ

c. Information exchange in direct support of Tactical Decision-making eg force tactical manoeuvre, Common Operating Picture (COP), tactical C2, Indicators & Warning (I&W) intelligence

d. Information exchange that

The Ship's Command Team & Network Centric Warfare



supports Quality of Life (QoL) eg Satellite TV at sea, email, internet web browsing

Having broadly defined a ship's information exchange requirements, it is interesting to observe the following developments within the Fleet:

The greatest use of bandwidth stems from the Corporate / Enterprise information systems and QoL services. Similarly, the greatest driver for increased bandwidth is coming from the provision of QoL services.

Failure to provide frequent and reliable connectivity for Corporate / Enterprise information systems directly impacts on the Command's ability to meet Navy and Defence governance and accountability requirements. These requirements are levied on the Ship's Commanding Officer and are mandatory.

Information exchange in support of operational and tactical decision-making largely uses Commercial-off-the-Shelf (COTS) solutions protected by MILSPEC information security systems and procedures. This introduces significant sustainment and obsolescence issues, given the ICT refresh dynamic and the tendency for commercial ICT providers to focus on provisioning current 'vogue' capability vice sustaining superseded technology.

There exists redundancy with respect to operational and tactical information exchange. However, this redundancy is provided by the retention of 'legacy' communication systems such as HF RATT and visual signalling.

Once a QoL service has been introduced, it is extremely difficult to either (i) remove the capability from the ship or (ii) fail to provide it on a continuous basis. Examples such as unclassified email and Satellite TV at Sea are pertinent. Indeed failure to provide reliable QoL services can impact negatively on retention and also receive Ministerial attention.

There is a saying that 'theory is often at odds to reality'. It is interesting to observe that much of the impetus for increased CIS capability within the Fleet is coming from the NCW focus. The provision of capability such as MASTIS – the Fleet's Wideband Satellite capability (approx 3MBps), has origins in improving the fleet's ability to operate within a networked environment. Ironically, however, the most immediate benefits delivered to the ships so fitted, has been substantially increasing the bandwidth assigned to the information exchange requirements of the Corporate / Enterprise information systems and to the QoL services. However, RAN units have satisfactorily performed CTG duties in the Persian Gulf with an aggregate bandwidth of 128kbps. Perhaps this could lead one to ponder exactly just how much bandwidth a ship actually needs to conduct NCW? Is it really as much as we believe?

THE SHIP'S COMMAND TEAM

It is a complex, but predictable picture that has been painted in this paper. There is a third dimension to NCW that arguably introduces a further complex, but less predictable factor into the NCW equation. This is the 'human dimension'.

Irrespective of its location, state of readiness, or mission, a Fleet unit is simultaneously a defence business unit, a warfighter, and an operational vessel. Each of these activities demands the constant attention of the ship's command team. The focus of decision-making must constantly shift from one fundamental activity to the next. In the words of one Commanding Officer, 'twenty four hours is a long time at sea.'

The complexity of the decision-making environment aboard a fleet unit is further compounded by cultural approaches to Command. Some Commanding Officers insist on reviewing all signals prior to despatch from a ship; others, delegate release authority to key decision makers within the command team. Some, are comfortable with key activities being planned and executed via emails; others, insist on military messaging to fulfil this function. Whatever the preference, one truism stands, the quantity of information being sent to and from a ship continues to increase; the majority of it being transparent to the Command.

The ship's command team comprises, broadly speaking, the Commanding Officer, the Heads of Department, and the Operations Officer. Invested in this team is the responsibility for the planning and execution of all activities involving the ship. Business activities and the

day-to-day running of the ship is typically the responsibility of the Heads of Department, answering to the Commanding Officer. The conduct of operational and tactical activities is vested in the Principal Warfare Officers (when borne), the Navigating Officer and the ship's Operations Officer; again answering to the Commanding Officer.

So how does NWC impact on this team? There are two separate effects.

First, is the previously mentioned expansion of information exchange supporting the Corporate/Enterprise information systems. This is a predictable consequence noting that these systems are generally the greatest users of the available bandwidth. The impact on the ship's command team is most immediately felt by the Commanding Officer and the respective Heads of Department; as the quantity of business related information being sent to and from the ship is increased. Gone forever are the days when the Command team only had to focus on administrative correspondence alongside in port. The contemporary environment requires constant attention to these issues, irrespective of the operational workload placed on the command team.

The second effect is the enhanced situation awareness being delivered to the ship's operations staff. Greater amounts of tactical data are now being passed into the ship's operations room, both pictorially and in text form. Additionally tactical voice circuits remain essential, so the contemporary PWO now has to listen, watch an increasingly complex and far ranging tactical picture, and type – often at the same time.

The combined effect can be seen in the Commanding Officer. The image of a Commanding Officer wearing anti-flash sitting in the Operations Room, headset on, clipboard and pen in hand, Head of Department hovering close by, is all too common. One is reminded of those ancient marble statues of Atlas, head and torso bowed, bearing the weight of the world upon his shoulders.

HMAS Tobruk's navigation officer Lieutenant Commander Anthony Allen gives orders to the bridge from *HMAS Tobruk's* bridge wing

Embarked forces conduct baton training during their transit to Exercise Talisman Sabre on *HMAS Manoora*

THE HUMAN DIMENSION TO DECISION-MAKING

Colonel John Boyd once stated, 'Machines don't fight wars. People do, and they use their minds.' A famous fighter pilot, and an individual renown for his great intellect, Colonel Boyd devoted considerable energy to understanding the mechanism of human decision-making. The most famous outcome of this was his OODA loop; a concept that Boyd only drew a little over a year before he died.

The OODA loop describes human decision-making in the context of four key activities: Observation, Orientation, Decision and Action. The OODA loop is depicted as follows:

This paper has already hinted to a key impact of NCW on a ship's command team. The increase in information flowing to and from a ship, and the requirement for this to be processed by the ship's command team, is significant. Relating this to Boyd's OODA loop, it can be deduced that without any further intervention or information filtering, the decision-making capability of the individual can reach maximum capacity.

As much as theory can be espoused, and acknowledged, it is essential that, as an organisation, changes in the way in which we communicate must occur. Recently, the RAN participated in Exercise Talisman Sabre, a combined exercise with the USN Seventh Fleet. To quote a senior communications officer aboard an Australian frigate, 'the quantity of information was horrendous.'

It is ironic that, in an era where

required reaction times to events are reducing, the quantity of information one is required to process is increasing. The words of that communications officer should resound in our collective minds as we embrace NCW in the Fleet.

CHALLENGES

The implementation of NCW in the maritime environment poses two key challenges to a ship's command team. They are (1) managing existing CIS capability and (2) the processes governing the delivery and management of information.

The NCW Roadmap 2007 details four key actions that will continue the ADF on the road to becoming a fully NCW force. Of the four, ranking second is:[2]

Establish the Network that will link engagement systems with sensor and command and control systems and provide the underlying information infrastructure upon which the networked force will be developed.

As this action indicates, a key activity is the delivery of new networks to the ADF that will enable the conduct of NCW.

The Fleet's experience with the management of the delivery of CIS capability is not strong. Factors such as the delayed delivery of communications capability into fleet units, capability that is incomplete due to poor project scoping, a proliferation of discrete CIS capability along FEG lines (aka stovepipes), and a lack of operator training has soured the experience at the ship level. Similarly, the increased demands being placed upon Ship's Command and Communications Teams has not been adequately catered for, as ship's scheme of complements continue to reflect a manning construct established, in some cases, in the early 1980's.

2 Commonwealth of Australia, NCW Roadmap 2007, p v

Able Seaman Air Technical Aircraft Travis Scrace, Able Seaman Air Technical Avionics Don Mason, ABATV David Broadhurst and ABATV Grant Rogers

It is crucial that these factors are addressed before new capability is delivered to ships. The Defence Capability Development Manual 2006 offers a robust framework for ensuring this occurs. In considering all the Fundamental Inputs to Capability (FIC)[3] in the project phase, capability will be delivered to the Fleet that is well-developed and cognisant of the impost placed in ship's companies at the time of delivery.

Likewise, the aim must be to deliver a common hardware and software solution across the Fleet. Whilst some variation may be required by platform type, pushing for a common equipment baseline minimises the raise, train and sustain requirements. The effect of this can not be overstated.

The second challenge, the delivery and management of information, is harder to solve.

Contemporary literature suggests that the human mind has the ability to comprehend up to 600 words a minute. The literature further states that the average person can read up to 250 words a minute, speak at 120 words a minute, and type at 35 – 50 words a minute. In a similar vein, the literature suggests that the human mind can take in an A4 sized picture in a quarter of a second; however the degree to which the information is comprehended is not clear.

3 There are eight FICs: Organisation; Personnel; Collective Training; Major Systems; Supplies; Facilities; Support; Command and Management

An Australian Black Hawk Loadmaster prepares to lower a soldier's equipment

The above indicates that the most efficient method of communicating information to a decision maker is by pictures, followed by reading text. The slowest method of communication is by typing.

In examining how NCW is conveying information to the decision-maker, it would appear that a combination of pictures and text is the most efficient. Perhaps one should question the prevalence of 'Chat' as a means of conducting tactical command and control, noting the limitations of typing when compared to that of using one's voice.

Whatever the solution adopted, it is essential to minimise the amount of information required to be processed by the decision maker. Placing this into the context of a ship, the imperative must remain on the delivery of the right information, at the right time, and to the right person. The intelligent limiting of information being delivered to the decision maker must then also optimise towards methods that promote rapid comprehension, such as text and pictures for information pull and voice for information push.

OPPORTUNITIES

The implementation of NCW in the Fleet offers great opportunities for the ship's command team. Enhanced situational awareness and improved decision-making will deliver more effective operational effects in the maritime battlespace.

The delivery of greater CIS capability into the Fleet, spurred on by the NCW requirement, is also delivering positive results to the Fleet. Greater bandwidth is now facilitating more effective business activities, improving the Quality of Life at sea, and is providing greater options for the conduct of operational and exercise planning and execution.

Provided that the widening gap in Fleet CIS capability is managed correctly, NCW will also deliver greater interoperability for our maritime forces. The ability to participate in combined and allied exercises or operations as a respected and equal player will be highly welcomed, both by the RAN as well as by our allies.

CONCLUSION

This paper examined the impact of NCW on the ship's command team. It posited that the implementation of NCW in the tactical maritime environment presents substantial challenges and opportunities for the ship's command team. It further posited that to fully capitalise upon the enhanced operational capability delivered by NCW, it is important to understand the human dimension to command decision-making. As a critical node in the 'sensor-shooter-decision-maker' system, the ship's command team must be able to operate effectively and efficiently in an environment dominated by information and multiple communications networks

The successful implementation of NCW into the Australian Fleet will rely on two key factors: the effective delivery and management of the enhanced CIS capability that NCW provides; and by ensuring that the human dimension to decision making is fully considered in the NCW construct.

The final word, given this paper's introduction, will be left with Admiral Lord Nelson, who said: 'My disposition cannot bear tame and slow measures.' 4 One can be quietly confident, as the Australian Fleet embraces NCW and improvements in decision making and operational effectiveness result, Nelson would be well pleased.

4 Jones, S & Gosling J., 2005, Nelson's Way – *Leadership Lessons from the Great Commander*, Nicholas Brealey Publishing, London, p56

Commander Stephen Dryden, RAN

Commander Dryden is a Surface Warfare and Communications specialist. He has held appointments as the CTG SCO/OPSO HMAS Brisbane, as a member of the Directing Staff at the PWO Faculty HMAS Watson, and as the Deputy Director Maritime Communications and Information Systems (N63). More recently, he was the Commissioning Executive Officer of the ANZAC Class frigate HMAS Ballarat. Graduating from the Australian Command & Staff Course in 2006, he commenced his current appointment as the Commander Fleet Communications (N6) at Fleet Headquarters in January 2007.

Bibliography

Commonwealth of Australia, *Australian Maritime Doctrine*, RAN Doctrine 1, Department of Defence, Canberra, 2000.
Commonwealth of Australia, *The Navy Contribution to Australian Maritime Operations*, RAN Doctrine 2, Department of Defence, Canberra, 2005.
Hibbert, C. 1994, *Nelson – A Personal History*, Penguin Group, England
Jones, S & Gosling J., 2005, *Nelson's Way – Leadership Lessons from the Great Commander*, Nicholas Brealey Publishing, London

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Royal Australian Navy Pilot Training & Aerial Hydrographic Surveying in the 1920s

DR TIM COYLE

Aviation in the Royal Australian Navy (RAN) began with the ordering of six Fairey IIID floatplanes in 1920 as 'Australian Naval Aircraft' to operate in the survey role. With the formation of the Royal Australian Air Force (RAAF) in 1921 the aircraft were transferred to the RAAF and based at Point Cook, Victoria. Although intended for operations from naval ships only one aircraft – attached to *HMAS Geranium* – was actually deployed in this role.[1]

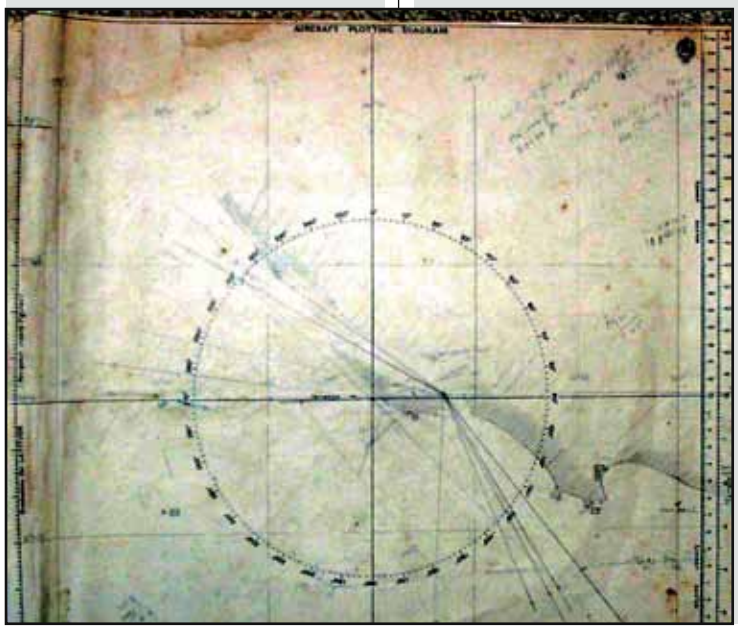
To staff the naval air arm, a small number of naval officers underwent pilot training with the RAAF at Point Cook. The aviation career of one of these officers, Lieutenant Vincent Edward Kennedy RAN, is illustrative of the short-lived naval pilot program of the 1920s, which culminated in the pioneering use of aircraft for RAN hydrographic surveying off the North Queensland coast.

Lieutenant Kennedy entered the RAN College at Jervis Bay in 1915 and, as was normal practice at the time, undertook his senior midshipman training in a Royal Navy ship, the battle cruiser *HMS Tiger*. In 1924 he underwent a naval observer's course at Point Cook and was appointed to the survey ship *HMAS Geranium* as observer in the Fairey IIID seaplane attached to the ship, which was operating on the Great Barrier Reef conducting hydrographic surveys for the preparation of maritime charts. The following year he volunteered for the 'Australian Fleet Air Arm', together with Lieutenants G.G. Carter and D. Ross, and undertook flying training and subsequent service with the RAAF until 1928 when he elected to remain in the RAN as an observer, rather than transfer to the RAAF as a pilot.[2]

Kennedy's flight training began on 2 February 1925 and he soloed on 23 March with a total flying time of 15 hours 10 minutes.[3] His first excursion from the confines of the Point Cook aerodrome occurred on 30 March when he flew as a passenger to Port Melbourne and return. A further flight to St Kilda and return on 9 June was also as a passenger in a formation flight. His first flight solo beyond the Point Cook aerodrome area was to Melbourne and return flying a DH9 on 4 September. This and subsequent flights required very little navigational expertise because of the prominent urban landmarks over which he flew. Two training flights comprised triangular courses Point Cook – Winchelsea – Geelong – Essendon – Point Cook, which were completed by the end of September.

Other flying serials included general aircraft handling comprising circuits and landings, forced landings, aerobatics and formation flying. Kennedy then began to train in military applications such as Lewis gun practice, photography, visual signalling and bombing. He underwent a photography test over the Point

Chart showing off-shore survey area by 101 Flight. The reconnaissance area lay between latitudes 20 and 21 degrees south. An advance base for two officers and seven airmen was established on St Bees Island, 100 miles from Bowen. St Bees Island is contained within the lowest of the three squares.[16]



Excerpt from Chart 2759a Australia Northern Portion, London, published at the Admiralty 28th December 1934.

Royal Australian Navy Pilot Training & Aerial Hydrographic Surveying in the 1920s

Cook airfield on 12 November and a visual signalling exercise with the light cruiser *HMAS Sydney* steaming in Port Phillip Bay the next day.

Supermarine Seagull III amphibian showing the amphibious features of flotation hull and retractable wheels by which the aircraft could be taxied from the Bowen beachfront into the sea.[10]

'Cloud flying', a rudimentary and inherently dangerous 'blind flying' technique, was undertaken as part of the flying training syllabus.[4] Approximately 90 minutes was practiced in several flights within the confines of the aerodrome.

Kennedy's 'air pilotage' test was the first navigation-based examination, and was conducted over three flights on 24 November in a DH9A. The first test comprised a flight of two hours duration at a height of 2000 feet on a course 'as required for test'. This flight was logged with Kennedy in command and accompanied by a Flying Officer Simpson. No detail of the route was provided. The second flight, 55 minutes at 2400 feet, with Kennedy flying solo, was carried out over the route Point Cook – Lake Durdiwham – Sunbury – Essendon. Kennedy landed at Essendon at 1520 but immediately took off for the return to Point Cook at 2000 feet with a 20 minute flight time.[5] The outward flight was a north-westerly track to Sunbury thence south-easterly to Essendon airfield. These flights were not geographically challenging because a road and railway intersected at Sunbury and Essendon airfield was similarly well-marked. The return flight had the advantage of the city of Melbourne and the western edge of Port Phillip Bay marking the route.

Kennedy's total aeronautical experience at the end of November 1925 was 119 hours, so the exercise would not have taxed his general flying skills despite his limited exposure to 'cross-country' flying. His total hours were accumulated through experience on five aircraft types: the Avro 504, the DH9, the DH9A, the Fairey IIID floatplane and the SE5A fighter. The Avro 504 was a twin-seat basic trainer on which pilots received elementary flying instruction and first soloed. The DH9 provided training in military skills such as gunnery and photography as well as familiarisation with a heavier, more advanced aircraft. Experience on the Fairey IIID was required for future seaplane flying on hydrographic operations; and the SE5A was a fighter aircraft used for aerobatics training. The requirement to convert onto each of these aircraft types required extra dual flying, solo tests and subsequent flying practice.[6]

Kennedy increasingly flew the Fairey IIID floatplane in navigation exercises in the Port Phillip Bay and Mornington Peninsula areas. Flights also comprised naval cooperation and military practice such as the 1 June 1926 'bombing Submarine J2'. Toward the latter part of World War I, trained observers carried out the military skills of reconnaissance, gunnery, bombing and signalling in multi-crewed aircraft; however, with the postwar disbandment of the observer category in the Royal Air Force and RAAF, pilots were required to be proficient in these skills. When the RAAF developed a maritime reconnaissance capability in the 1930s, these duties gradually reverted to the re-invigorated observer category.

On 20 August 1926 a crew of three, comprising Kennedy, a Lieutenant Carter and RAAF Corporal Haynes, departed Point Cook in a Fairey IIID for the RAN College at Jervis Bay, Australian Capital Territory – via Paynesville and Eden – to support naval exercises. The crew arrived at the college slipway on 22 August after a total flying time of six hours. In addition to the several exercises flown in support of RAN ships, such as observing the fall of main armament shot and carrying out dummy attacks on the ships, the crew undertook a two hour 45 minute reconnaissance from Jervis Bay to Port Hacking and return.[7] Port Hacking is located to the south of Botany Bay in the present Sydney metropolitan area. This return flight demonstrated the ability of a floatplane crew to reconnoitre an area of coastline to a radius of 90 nautical miles (nm) and return to base. In this context of maritime reconnaissance the aircraft could have alighted on Sydney Harbour, refuelled, and continued for a further 90 nm, thereby covering the approaches to Australia's premier naval and mercantile port.

Aerial Hydrographic Surveying

Following the 1925 government decision to construct a seaplane carrier for the RAN, a complementary requirement arose for suitable aircraft to operate from the ship. The type selected was the Supermarine Seagull III single-engined, wooden-hulled, biplane amphibian.

The aircraft arrived from the United Kingdom in mid-1926 and joined No. 101 (Fleet Cooperation) Flight commanded by Flight Lieutenant A. L. Hempel. The first three aircraft were assembled and transported to Bowen in north Queensland for hydrographic surveying duties, which had begun with the Fairey IIID seaplane in 1924. The survey flights began in September 1926 and continued until the end of 1928. Operations started and ended on the beach at Bowen with the Seagulls taxying into the water on their wheels before retracting them manually for take-off and lowering them at the

conclusion of the flight when returning to the beach.[8]

Two methods were employed on the aerial surveys. One involved sketching the reefs and islands from the air, which was a rapid means of initial surveying. This was followed by a small boat team, which refined the sketches and took depth soundings. The other method involved aerial photography in which, to fix the position of reefs in relation to each other, markers were dropped onto the reefs and photographed, ensuring that the markers appeared in both prints. Position fixing by both methods was carried out by the aircraft alighting on the water adjacent to the reefs and the observers taking sextant readings to measure angles from prominent shore geographical features.[9]

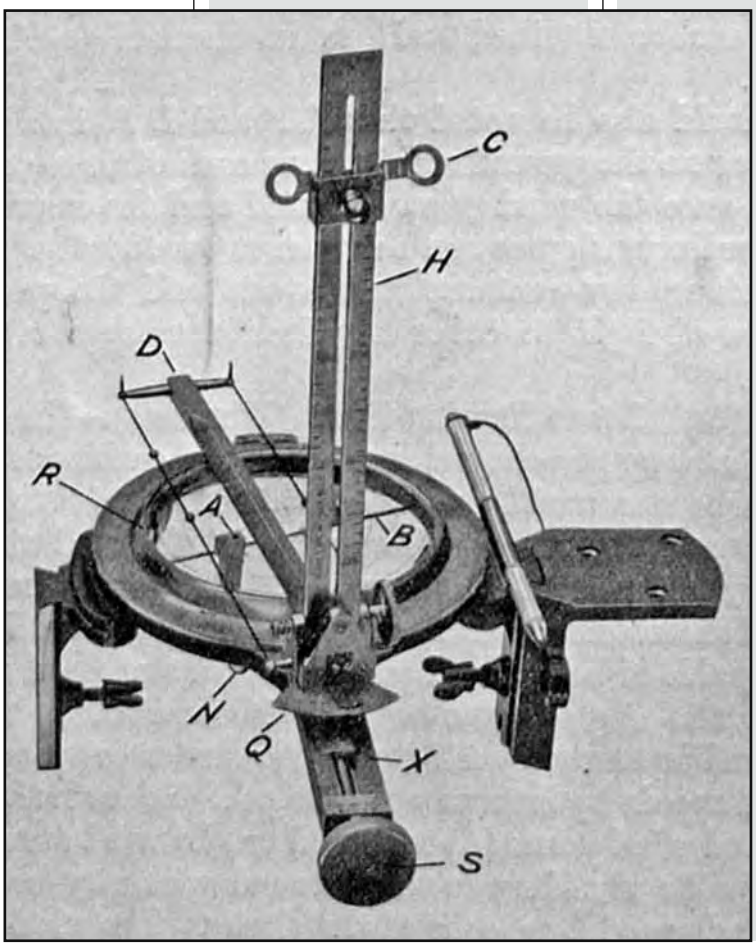
Pilots used an Aircraft Plotting Diagram (APD) to sketch details from which bearings and distances could be calculated. The APD featured a centrally printed compass rose and graduations for latitude along the left hand edge. The observer drew meridians of longitude and entered the latitude band for the area of operations. The features under survey were then sketched using the centre of the compass rose as a reference point.

Kennedy and Lieutenant J. E. Hewitt RAN began hydrographic operations on 27 September with a three hour 30 minute flight in Seagull A9-3 from Bowen to the Barrier Reef and return.[11] The flight took oblique photographs and carried out general reconnaissance. Flying then proceeded on a daily basis with flights of approximately three hours 30 minutes covering distances up to 100 nautical miles from Bowen surveying the many reefs in the vicinity of Hook, Cumberland and Holbourne Islands flanking the Whitsunday Passage, and proceeding as far as Flinders Passage. Sketching was the primary surveying method carried out on these flights.

On 18 March 1927 Hempel, Kennedy and an aircraftman left Bowen to fly south to take part in a series of RAAF ceremonial flights on the occasion of the opening of the provisional Parliament House in Canberra on 9 May by the Duke of York. A second Seagull was probably in company.[12] The route was coastal via Styx, Bundaberg, Brisbane, Port Macquarie to Pittwater, north of Sydney, thence inland to the RAAF base at Richmond where the aircraft arrived on 24 March after a total flying time of 17 hours. Two days later the aircraft took part in the escort for the battle-cruiser *HMS Renown* carrying the Duke and Duchess of York who were arriving for the opening of parliament ceremonies. Following some local air practice in the Sydney area, which included artillery cooperation, Hempel and Kennedy flew the Seagull to Point Cook departing 17 April and arriving four days later.

The Seagulls then returned to north Queensland to continue surveying. Kennedy in A9-4 arrived at Gladstone on 18 July and carried out a series of surveys until 8 August using the photographic technique along the reefs adjacent to Bunker Gap, Lady Elliot Island and the islands in the region of the Capricorn and Curtis Channels.

Kennedy flew back to Bowen and carried out photo reconnaissance flights in the previously-surveyed area until 2 December when he returned to Melbourne while Seagull surveying operations continued until the end of 1928. Kennedy's last flight as a pilot took place on 30 May 1928 when he did 50 minutes dual aerobatics practice in an Avro trainer. All his subsequent flying was as an observer operating from RAN cruisers, the seaplane carrier *HMAS Albatross* and Royal Navy aircraft carriers. He was seconded to the RN (July 1928 to January 1929 and May 1930 to May 1932) flying from the aircraft carriers HM Ships *Hermes* and *Glorious* respectively.

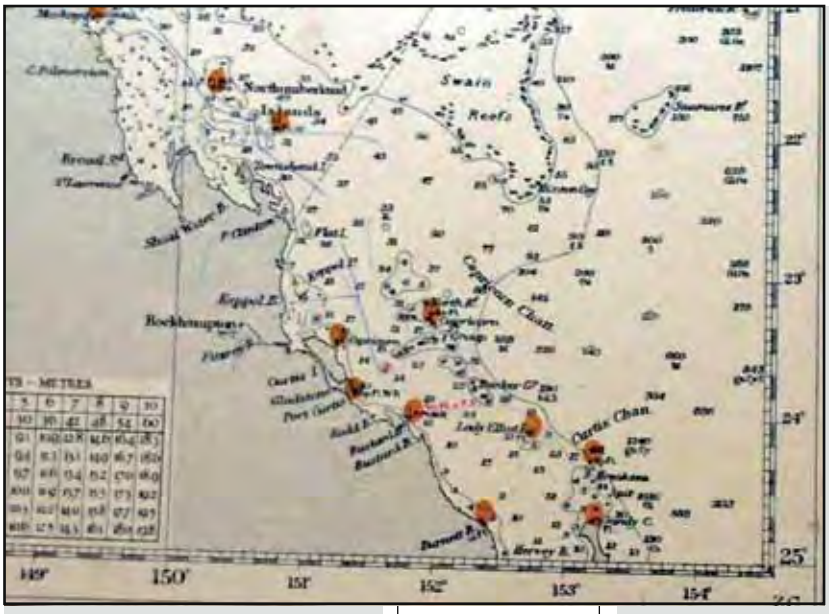


Wimperis Wind Gauge Bearing Plate for measuring drift angle by tail bearings.[22]

North Queensland Hydrographic flights in 1928

With the conclusion of the air support to the hydrographic effort in North Queensland, Lieutenant Hewitt, officer-in-charge of 101 (Fleet Cooperation) Flight, reported on the operations. In addition to the activity detailed in connection with Kennedy's attachment,

Royal Australian Navy Pilot Training & Aerial Hydrographic Surveying in the 1920s



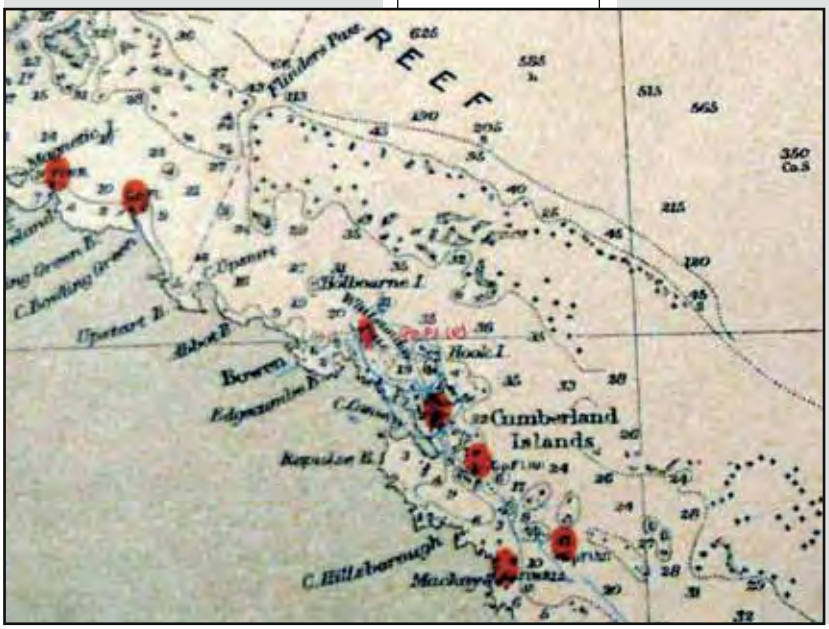
Excerpt from Chart 2759a Australia Northern Portion, London, published at the Admiralty 28th December 1934. Bowen is situated at 20 degrees south latitude, 148 degrees east longitude.

the Flight carried out a number of Outer Barrier Reef surveys that were pioneering in the use of aircraft and innovative techniques for hydrographic surveying.[13]

The area of the Reef to be surveyed comprised approximately 5000 square miles, to a distance of 45 miles off-shore. The object of the survey was to locate passages through the reef for naval defence and to mark the inner and outer reef edges for the compilation of a reconnaissance map showing the grouping and relative positions of the various reefs.[14]

The methods considered for the survey were mapping from vertical or oblique photographs and plotting from 'navigationally controlled aerial traverses'. Vertical photography was discounted because of the scattering of the reefs, the extremities of which could not be framed in single photographs, while no suitable oblique cameras were available. Therefore the previously untried navigationally-controlled traverse method was adopted which gave a relatively accurate representation of the reef shapes and positions. The procedure was to fly pre-determined compass courses as accurately as possible while the observer took bearings on prominent points of the reefs. The observer also plotted the courses and the bearings on charts, sketched the reefs and photographed them.[15]

In practice the traverse method provided mixed results for which the quality of the instruments used was blamed. Added to this was constant bad weather and initial unfamiliarity with the immediate area. Dead-reckoning navigation became progressively less accurate over 50 miles from the starting point of the flight as errors inherent in wind-finding, instrument errors and flying accuracies compounded, particularly if there were several course changes required for each flight.[17] To reduce the number of course changes, a series of 'control points' was established to serve as starting points for each traverse flight.[18]



Aircraft Plotting Diagram (APD) pencil sketch showing the coast between Port Fairy, Victoria, and Millicent, South Australia. APD printed by the Hydrographic Dept. of the Admiralty 25th March 1933, Kennedy papers.

Instruments used for the traverse flights were two Type 253 compasses (for pilot and observer), an 'aneroid' (altimeter), an air speed indicator (ASI), a Wimperis wind gauge bearing plate, a marine sextant and a chronometer.[19] These instruments were inadequate for the exacting standard of navigation required for the traverse surveying flights. The 253 compasses were non-aperiodic and would have been subject to turning errors.[20] Because of the lack of specialised equipment, the 'aneroids' and the ASI could not be calibrated for the local environment. Laboratory testing for the ASI was not available in Australia at that time and calibration in the field could only be carried out by flights upwind and downwind over a known distance.[21] Precise altitudes could not be flown because of the inaccurate calibration and also because the instrument dials were marked in units of 200 feet. While this was adequate for normal service flying, when precision height-holding was not necessary, the need for accuracy in the aerial survey application challenged the technology available at the time.

Hewitt estimated the errors in reef positions to average three miles, which could have been reduced by one-third with accurate instruments. He regarded the overall aerial survey method as carried out by 101 Flight

as insufficiently accurate to definitively fix reef positions for marine navigation, so more traditional surface surveying procedures were required to follow-up the aerial surveys to refine results.[23]

Lieutenant Commander Coyle has been an active naval reserve intelligence officer for 20 years. In his civilian employment he is an adviser to Government on international arms control issues. In August 2006 he submitted his PhD thesis on the history of air navigation in the RAAF.

(Endnotes)

1 Lieutenant R. M. Jones, 'Launching Air Arm', in *Navy Quarterly*, *Volume 2*, Number 2, (Autumn/Winter 1973, Department of the Navy and the Australian Government Publishing Service), p. 7

2 F. B. Eldridge, *A History of the Royal Australian Naval College*, (Melbourne, Georgian House for the Author, 1949), pp. 363 —364.

3 All references to Kennedy's flying career are taken from his log books. These comprise A.18 Royal Australian Air Force Flying Log Book with entries from 2 February 1925 to 30 May 1930 and Naval Observer's Log Book from 17 July 1930 to 26 November 1936. These log books are from the papers of the late Commander V. E. Kennedy RAN (Rtd.) via Rear Admiral Phillip Kennedy AO RAN (Rtd.).

4 'Cloud flying' was employed in early aircraft when pilots lost visual contact with the ground. Blind flying panels, which provided safer instrument flying, were introduced in the 1930s and comprised gyro-stabilised instruments such as the artificial horizon, vertical speed indicator, directional gyro and turn coordinator. Cloud flying consisted of the pilot listening to the 'singing' of the aircraft flying wires, which roughly indicated the attitude of the aircraft and its speed. These skills came naturally to pilots as their experience grew and, theoretically, they could tell whether the aircraft was climbing, diving or flying straight and level. In zero visibility, pilots presumed that by listening to the sound of the wires they could maintain the aircraft's correct attitude in cloud. This could be fatal, or at least startling, when the pilot broke through cloud and regained orientation.

5 'Lake Durdiwham' was not located in research for this study but was probably located near Sunbury. Current maps show a series of waterworks reservoirs north west of Sunbury.

6 The Avro 504 was equipped with an obsolete 'rotary' engine, which turned with the propeller. The engine revolutions could only be controlled by switching off the engine when descending. This took the form of 'blipping' the switch to control the descent by rapidly switching off and on to maintain flying speed and control. As no other RAAF aircraft used the rotary engine at this time it was necessary to convert onto a later type to continue training.

7 Aircraft observation of fall of shot was one of the first uses of aircraft in military operations, both in land and maritime operations. While shell splashes could be reasonably estimated by gunnery staff in warships' gunnery directors high on the masts in larger warships, aerial observations communicated by W/T provided an accurate cross-check.

8 Lieutenant R. M. Jones, pp. 7 —8.

9 Ibid, p. 8.

10 Ibid, p. 10.

11 Lieutenant Hewitt underwent RAAF pilot training in the same scheme as Kennedy. He later transferred to the RAAF, rising to the rank of air vice marshal. Williams, p. 144.

12 Kennedy operated A9-2 on 4 March and left Bowen in A9-1 on 18 March. It is likely the two aircraft flew in company to provide mutual support. Kennedy and Flying Officer Ross flew A9-2 on 26 March for the royal escort.

13 NAA File Series A9376, Control Symbol 97, Report on Air Survey of the Great Barrier Reef 1928 by No. 101 Flight RAAF. Hewitt's unsigned report was included as part of the overall report to the Naval Board by the commanding officer of the survey ship HMAS MORESBY.

14 Ibid. Hewitt's portion of the report comprised Appendix B of the MORESBY submission

15 Ibid, Appendix B, Section 3 Outline of Method.

16 Ibid. Appendix B, Section 2, Work Carried Out, Figure 1.

17 Ibid. Appendix B, Section 4 Actual Procedure.

18 Refer Figure 5. The 'major control points' were Tern Island, at the southern extremity of the area, Parker Reef, at the western edge, and Square Reef, which was the north-westerly extremity (not marked on chart), which was established by astronomical fixes by the 1927 survey flights. Six 'minor control points' were then required – three on the outer reef edge and three approximately half way between the inner and outer edges. These minor points were established by drawing a three-mile square area on the chart and a flight conducted from a major control point to the area and the position located by DR and by an astro position line taken by a marine sextant (if possible). Two further flights were then made from the other major control points to pass over this position so its position was fixed by three intersecting flights.

19 Control Symbol 97, Appendix B, Section 6, Instruments.

20 'Aperiodic' compasses, developed in 1918, eliminated the dangerous 'northern turning error' which occurred when an aircraft banked, causing the compass card to assume the same banked angle. This resulted in the compass needle appearing to turn in the direction of the turn and thus not continuing to point to magnetic north. The aperiodic compass rapidly returned the needle to north-pointing, when deflected, by 'damping' the compass system, which consisted of fine wires suspended in compass bowl liquid. For the surveying operations, the compasses were swung with the aircraft fully loaded in flying position with the engine running at cruising speed. Deviation on the cardinal points (north, south, east and west) and the quadrantal points (north-east, south-east, south-west and north-west) did not exceed two degrees. Control Symbol 97, Appendix B, Section 6, Instruments.

21 Control Symbol 97, Appendix B, Section 7, Errors. ASI readings had to be corrected for instrument errors and for the divergence of local temperature and pressure conditions from the international standard atmosphere, which in 1928 was a sea level temperature of 10 degrees centigrade and a pressure setting of 1013.2 millibars. With the application of these corrections the true air speed was obtained, which, in the operation under discussion, was set into the Wimperis instrument from which was extracted the wind component and the ground speed.

22 H.E.Wimperis, *Air Navigation*, D. Van Nostrand Company, New York, 1920, p. 54. A glass panel occupied the centre of the bearing plate and was marked by concentric circles corresponding to wind speeds by intervals of 10 mph. Beneath the glass a red-coloured wind point (A) was mounted on a wind arrow (B) which was slid so that the red spot could be set to any wind speed with reference to the circles. B was set into the wind ring (R) which was turned by a knob, N, so that it could be pointed in any direction relative to the bearing plate. A drift bar (D) was marked with speed and time scales and a bevelled edge for drawing drift lines on the bearing plate glass. It also had drift wires on either side which carried two sets of timing beads, one red and one black. D was pivoted at one end to a nut which was adjusted by handle S until the index pointed to the true air speed on scale X. The nut carried a quadrant drift scale (Q) over which the tail of D moved, the pointer indicated the drift angle. The height bar H was hinged at the base with slider C. C had two ring backsights for observing the drift against the 'V' foresight or along the drift wires of any object over which the aircraft had passed.

Method of Use: When established on a steady course the bearing plate was turned until the lubber mark (reference line) pointed to the course being steered. D was then turned until it was parallel to the earth drift which was noted by observing a ground object over which the aircraft had passed, or a smoke float if over water. A line was then drawn on the glass along the bevelled edge D. A new course was then turned onto, not less than 45 degrees from the line of the first course and the procedure was repeated. The intersection of the two lines gave the wind speed and direction (wind velocity) and drift.

The alternative method which only required one course, was to time the passage of a ground feature or smoke float from one timing bead to the other on D while viewing the object through the backsight C set to the correct altitude. This gave a timing run of half a mile. Timing could be by the red or black beads. If timing on the red beads the backsight was set to the red scale and vice versa if timing from the black beads. From the stop-watch reading in seconds, a mark was made on the glass opposite the red figure on the drift bar. This gave the wind velocity. The reading on the black scale of D against the mark gave the ground speed while the red scale gave the number of minutes to cover 30 miles.

23 Control Symbol 97, Appendix B, Section 7, Errors (f) Summary.

Whales and Active Sonar – Challenges & Opportunities

BY COMMANDER STEVE COLE, PHD, RANR

The extent to which marine mammals are affected by human-created underwater sound, particularly active sonar, has been a topic of growing public concern in recent years. This article explores the complex issues surrounding the effects of underwater sound on marine mammals and the importance the Royal Australian Navy (RAN) places on environmental management, to ensure long term access to vital offshore training areas.

Australia is fundamentally a maritime nation, potentially vulnerable to any efforts to block key trade and supply routes from above or below the sea. Maintaining a credible RAN anti-submarine capability remains important in a region that has seen significant growth in submarine forces. In addition, the increasing focus on littoral operations, linked partly to the need for maritime amphibious capabilities, means ships will need to operate in areas where conventional sonar technology is challenged by poor seawater transmission characteristics and complex sea floor structure. Modern conventional submarines are quieter through better design, and are therefore more challenging to identify by passive means. With no viable alternative technology, the RAN will continue to rely on a combination of passive and active sonar for detection of submarines. This requires regular and realistic sea-going training of personnel and maintenance of equipment to meet this complex and multi-faceted challenge.

Australian waters are populated or visited by around forty species of whales and dolphins, ranging in size from dolphins to the Blue Whale (up to 30 metres in length). Unlike other parts of the world, Australian marine mammal population levels are almost uniformly stable, or recovering, and are not under threat from human activity. Depletion of some species through whaling and other human causes such as pollution and by-catch has strengthened community resolve to ensure their protection. In parallel, development of a whale watching industry with prospects for employment and wealth generation in regional areas has highlighted the economic value of marine mammal conservation.

All marine mammals have adapted to use sound as a primary tool for communication, identification and hunting prey. As a result, any human activity that produces underwater sound has the potential to impact on or disrupt these vital communication processes. Underwater sound from RAN vessels can be emitted by explosives, ship and boat engines, underwater communication systems and active sonars.

The impact of sound disturbance on marine mammals can be manifested in a number of ways, including:

Australian waters are populated or visited by around forty species of whales and dolphins

- masking of important biological sounds (sounds of prey or communication with other members of the pod)
- changing behaviour (dive patterns, movement, abandonment of activities such as hunting prey)
- stress (fright, flight)
- physical injury to hearing mechanisms
- tissue damage leading to injury or death.

The scale of impact is a function of the source sound output level (loudness), transmission reflection and absorption

characteristics of the water column and sea floor, and distance from the source to the animal. Equally important is the auditory capability of the animal (can the species hear the transmission frequency?) and the animal's propensity to react to the sound (is it easily startled?). Scientists and regulators are particularly interested in managing 'biologically significant' sounds, specifically those that affect important activities such as feeding, breeding and migration.

Recent articles have highlighted the challenges faced by navies worldwide in dealing with these issues. For the RAN, the conduct of vital training activities in realistic conditions at sea is essential to maintaining necessary operational skills. Offshore training areas are concentrated close to the major fleet bases on the east and west coasts, to ensure ready access and minimise transit times between harbour and sea. These areas are also frequented by increasing whale populations. For example, the West Australian Exercise Area, west of Fremantle, is inhabited by various species, including Blue whales which feed in the Rottnest Trench in summer and autumn. Humpback whales migrate through the area twice each year between their winter breeding areas in the tropical north and summer feeding grounds in the waters of Antarctica. Beaked whales are also seen in deep offshore waters over summer. Increasing numbers of marine mammals can therefore be expected to be encountered in the area regardless of time of year, reinforcing the need for RAN exercise planners and individual ships, submarines and aircraft to remain alert to possible whale interactions.

Beaked whales are acknowledged as potentially threatened by underwater sound. A number of multiple strandings of beaked whales have occurred coincident with naval use of active sonar in the northern hemisphere, and once during a seismic survey of the Gulf of California. Of these events, strandings in the Canary Islands and a highly publicised stranding in the Bahamas have galvanised public and interest group attention to ensure that active sonar is used in a manner that avoids similar incidents in future.

In recent years the RAN sought to develop environmental management strategies that would be recognised as amongst the best in the world

Beaked whales are amongst the most poorly understood of all whale species. They are relatively small, elusive, generally do not congregate in large numbers, and their principal habitats often lie well offshore. Beaked whales have been observed in most southern waters of Australia from New South Wales to southwest Western Australia. They are unique in that they hunt for squid in deep continental slope waters, and are the deepest diving of all air breathing species, recorded at depths exceeding 2,000 metres, and able to breath-hold for periods in excess of a staggering 80 minutes. Scientific understanding of the physiology of beaked whales is poor, unsurprising when they are commonly exposed to pressures of over 200 atmospheres and significant oxygen deficits during a single dive.

The actual cause of these strandings remains unclear, but a number of theories have been suggested to explain a potential mechanism for injury. The most plausible of these imply a change in diving behaviour leading to symptoms of decompression sickness or induction of stress through a fright and flight response to the sound. The difficulties in understanding and managing these risks are compounded by recent evidence that beaked whales hear quite poorly at the frequencies used by naval anti-submarine sonars.

A stranding of melon headed whales during the 2004 Rim of the Pacific (RIMPAC) exercise off Hawaii influenced the US Navy to seek a permit to conduct sonar exercises during RIMPAC 06. This was granted by the US National Marine and Fisheries Service, though a subsequent court challenge by a US interest group resulted in a restraining order against the US Navy, citing 'overwhelming evidence' that active sonar can injure marine mammals. Subsequent negotiation saw the exercise proceed,

Whales and Active Sonar – Challenges & Opportunities

but with significant mitigation measures in place.

Despite lack of scientific consensus, circumstantial evidence surrounding some whale strandings is enough to suggest the need to manage the potential adverse impact of some types of active sonar. Indeed, the Australian Environment Protection and Biodiversity Conservation Act 1999 prescribes such a precautionary approach in cases where complete data is not available. The EPBC Act also focuses on critical habitat for each species, most importantly feeding, breeding and resting areas. These obligations formed the basis for the RAN developing appropriate mitigation standards to avoid adverse impacts on marine mammals.

Managing the potential for impact is challenging in an environment where the animals are mostly unseen, elusive, and have poorly understood physiology and behaviour. Some of the principal mechanisms available include separation of activities from known whale congregations in space and time (a planning function), detection and avoidance methods using observers, and management of transmissions to reduce received sound intensities to accepted levels where interactions are considered likely.

In recent years the RAN sought to develop environmental management strategies that would be recognised as amongst the best in the world, employing all of these mitigation techniques. Of particular note was the decision to adopt a consultative approach, ensuring that key government agencies, interest groups and the public had an opportunity to participate in the development of appropriate management strategies.

The Maritime Activities Environmental Management Plan (MAEMP) was progressively developed and finally implemented in 2005, to ensure that activities routinely conducted at sea are managed in a way that meets legislative obligations and community expectations, using a widely endorsed framework. The MAEMP has been designed with three levels of management:

- Planning Handbooks for some key training areas where a range of activities may be conducted simultaneously, to assist exercise planners in considering cumulative impacts and location specific issues.
- Planning Guides provide guidance on specific activities during the activity planning phase. Where necessary, both the Planning Handbooks and Guides recommend separation of an activity from a critical habitat.
- Procedure Cards provide specific guidance on individual activities, recognising the importance of managing activities in real time.

The MAEMP is widely acknowledged as amongst the most comprehensive and effective in use today, and has enhanced the RAN's reputation for proactive and innovative management of marine environmental issues. The MAEMP has also been well accepted by RAN personnel, who are keen to ensure that their responsibilities for environmental compliance and sustainable management are met.

However, uncertainties about marine mammals remain and there is a risk that overly precautionary measures and prescriptive management could impact unnecessarily on the RAN's training role at sea. In an effort to better understand the more vulnerable species, further scientific research into behaviour, population distribution and abundance is fundamental to ensuring effective mitigation measures and management practices are in place in key exercise areas.

Information on individual species including feeding, breeding and resting areas, dive profiles, as well as auditory responses and behavioural reactions to noise, and the longer term biological consequences of noise impact, are all crucial to understanding the potential impact of human activities on marine mammals. Some valuable research continues on a number of whale species, including Blue whales off the West coast, but beaked whale research in Australia is minimal.

The key point is that the RAN would be a direct beneficiary of such research. This justifies allocation of dedicated research funding targeted at key species which are considered most at risk from the effects of underwater noise. Better knowledge would provide greater confidence that appropriate management strategies and mitigation measures are devised to avoid causing unnecessary harm. There is also need for continued education within the RAN about managing potential whale interactions during training activities at sea.

The consultative and innovative approach used by the RAN in managing potential marine mammal interactions puts the Navy in a leading position, by demonstrating that meeting necessary environmental compliance standards is possible without undue impact on training. Further research will help to minimise any regulatory constraints placed on activities at sea, and ensure that maximum value is obtained by conducting necessary training under realistic conditions. By maintaining its edge as leader in this field, the RAN can continue to demonstrate that both the environment and the Service can be winners.

This article originally appeared as a Semaphore periodic publication from the Sea Power Centre - Australia.

HMAS Collins (foreground) rendezuous with HMAS Waller (left) and HMAS Rankin. Collins Class Submarines, HMAS Rankin, HMAS Waller and HMAS Collins transitting in formation through Gage Roads, Cockburn Sound.

Images from Euripides

DR DAVID STEVENS

One of the more remarkable Australian operations at the beginning of the First World War took place not on the battlefield but within our national shipyards. When, on 3 August 1914, Prime Minister Joseph Cook informed Great Britain that Australia was anxious to send an expeditionary force, 20,000 strong, to any destination desired, little thought had actually been given to the question of how to transport the men and all their equipment. On 5 August the Australian Naval Board was forced to ask the military authorities whether the Board was needed to prepare a scheme for taking up ships, and if so from what ports, and to carry what numbers, what arms and what horses?

A first task was to prepare a list of all ships in port or approaching the Australian coast, which would allow for their inspection and measurement by a Naval Transport Officer. Conversion plans were prepared as soon as a vessel had been assessed as suitable, so that once her current cargo had been discharged fitting out could begin immediately. Modification work entailed the gutting of all passenger accommodation, and included the addition of galleys, latrines, hospitals, troop deck fittings and horse stalls. To save time and expense the main features were standardised, but still required major changes to each ship's electrical and water systems. Speed of conversion grew with experience, and by June 1915 it was found possible to equip fully a transport for 1,500 troops in just 60 hours.

The largest of the 28 steamships initially requisitioned was *Euripides*, an Aberdeen White Star vessel of 15,000 tons. Given the official number 'A.14', she was one of three transports to be fitted out in Brisbane. When completed on 18 September 1914 *Euripides* had berths for 136 officers, 2204 other ranks and stalls for 20 horses. Nevertheless, with the whereabouts of several German warships uncertain, authorities were unwilling to risk the troopships until they could assemble a sufficiently powerful naval escort. *Euripides* did not embark her first troops at Sydney until 19 October, with lighters used to ferry the troops from Circular Quay. Few onboard knew where they were going, but the scale of the undertaking was obvious to all.

Euripides made a quick passage of the Bight, and after waiting for the remainder of what was now known as Convoy 1 to assemble, sailed from Albany on 1 November. There were 38 transports in all, with *Euripides* leading the 3rd Division comprising the fastest vessels. The four escorting cruisers provided great comfort, and eight days later, one of them, HMAS *Sydney*, destroyed the German light cruiser SMS *Emden* off the Cocos Islands. Banjo Patterson, accompanying the first troop contingent as a war correspondent, 'could hardly believe that Australia's first naval engagement could have been such a sensational win.'

For all the excitement of Convoy 1, the later voyages were usually quite routine, and to keep the troops fit and occupied required significant organisation. The Commanding Officer of the Fifth Light Horse Regiment described the 'intensive training' carried out during Convoy 2's 42-day passage:

> A certain part of the regiment was detailed to look after the horses, and the remainder underwent systematic instruction. Special attention was given to the training of non-commissioned officers. During the voyage the various examinations …were held, and shortly before the termination of the voyage those men who had shown greatest merit were appointed to non-commissioned rank. Regular courses of lectures were given to and by officers. Musketry, including practices at landscape targets were given special attention.[1]

A record send off from the population of Melbourne. Motor launches packed with well-wishers would also accompany the departing transports.

Pillow fighting competition.

The Transport Branch of the Navy Department eventually arranged for the requisition of 74 transports and, over the course of the War, 44 convoys would carry some 337,000 men and 27,000 horses from Australia to

1 Brigadier-General L.C. Wilson and Captain H. Wetherell, *History of the Fifth Light Horse Regiment*, Motor Press, Sydney, 1926, p. 14,

Euripides

the battlefields of the Middle East and Europe.[2] None of those carried was ever lost to enemy action while on passage. In all it was a remarkable demonstration of the mobility of resources conferred by Allied sea power. The accompanying photos were taken by a crewmember of *Euripides* and provide an insight into life onboard.

2 G. Tregarthen, *Sea Transport of the AIF*, Naval Transport Board, undated.

Troop transport voyages from Australia made by *Euripides* 1914-1918

Embarkation Port	Convoy	Sailing Date	Officers	NCOs	Men	Nurses	Total
Sydney	1	19/10/14	73	115	2081		2269
Melbourne	6	8/5/15	66	86	2052		2204
Sydney	13	2/11/15	26	63	2057		2146
Melbourne	20	4/4/16	31	69	2018	10	2128
Sydney	24	9/9/16	26	53	1433	7	1519
Melbourne	24	11/9/16	14	20	584		618
Fremantle	24	17/9/16			1		1
Melbourne	30	18/3/17	3	1	1		5
Sydney	35	31/10/17	42	77	1944	7	2070
Sydney	39	1/5/18	14	13	480		507
Totals			295	497	12651	24	13467

The Roman Catholic service.

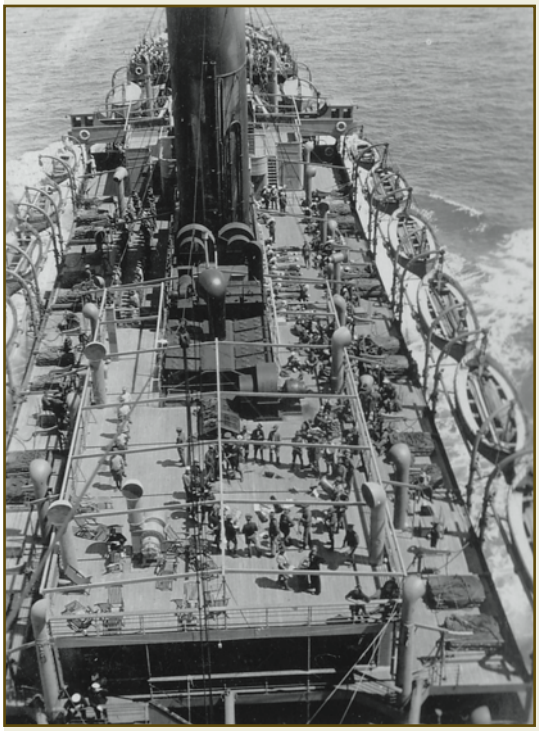
Teatime.

David Stevens is the Director of Strategic and Historical Studies within the Sea Power Centre - Australia. He has written many articles on naval historical and strategic subjects and is the author or editor of a number of books, most recently Sea Power Ashore and in the Air.

A lecture.

Pictorial

Images from Euripides



The view from the mainmast of Euripides when underway

The censors at work on the transport's mail.

Mouth Organ Band.

No. 4 Sea Transport Section AAMC.

Washing Day.

The Orderly Room.

Pay Day for the 11th Reinforcements of the 3rd Battalion.

Disembarkation at Suez.

For those personnel unused to the big ocean swells, the voyage could be unpleasant. Seasick soldiers sleeping on the upper-deck.

A game of draughts.

Innoculations.

Submarine drill. The greatest threat to the transports came from German U-boats and once in dangerous waters life vests were worn at all times.

Loyal leader earned respect

BY MIKE FOGARTY

REAR ADMIRAL Bill Dovers was a Royal Australian Navy officer who commanded many ships and much respect during his 43-year career.

His service ranged from wartime service in the Atlantic, the Mediterranean, the Indian and the Pacific to Korea, the Malayan Emergency and the Malaysian Confrontation.

He was the first senior RAN officer to command the Royal Malayan Navy and his final appointment was as the flag officer commanding the East Australia area. He possessed qualities that benefit a nation: service, loyalty, leadership, example, responsibility and duty. He was a fine seaman who earned respect through his deeds, had a genuine concern for the welfare of his sailors, and survived a court martial.

William John Dovers, who has died at 89, was born at Eastwood, the oldest of seven children of George Dovers – a surveyor who went to the Antarctic with Douglas Mawson's 1911-14 expedition – and his wife, Ursula. Dovers went to school in Wollongong, then to North Sydney Boys High and in 1932, at 14, joined the Royal Australian Naval College as a cadet. He had a brief time there as cadet-captain but was demoted when he was caught smoking.

He had a good academic record and excelled at sports, later becoming captain of the Navy rugby team and the Victorian interstate side.

Dovers swayed like real sailors should and smoked throughout his career. He also liked a Scotch.

He graduated as a midshipman in 1935 and did sea training with the Royal Navy in the Mediterranean. Back in Australia, just before the war, Marjorie Ray Thorpe – known as Ray – was thrown from her horse and landed at his feet. Despite his long absences at sea, they married during the war.

At the outbreak of World War II, Dovers was serving on HMAS *Canberra*. He joined HMAS *Nestor* in 1941. In December the *Nestor* destroyed the German submarine *U-127* with depth charges, the first sinking of an enemy submarine by an Australian warship.

The following year, Dovers joined HMAS *Quickmatch* as its first lieutenant and served in the Burma campaign, co-operating with the British Far East fleet. In 1944 he returned to Flinders Naval Depot and headed the Officers' Training School until early 1945. He then got his first sea command, as an acting lieutenant-commander, on HMAS *Swan*.

He was awarded the Distinguished Service Cross "for outstanding courage, skill and initiative while serving on HMAS *Swan* in operations in the Far East which covered the bombardment of Tarakan, Wewak, Labuan and Balikpapan and the attack on Lingayen Gulf, Aitape and Wewak". He was later awarded the CBE.

After the war Dovers commanded seven Australian warships from 1945 to 1965 – *Swan, Barcoo, Gladstone, Arunta, Voyager, Sydney* and *Supply*. He also served in non-command billets, on HMAS *Bataan* and *Australia*, and ashore was posted to the Royal Australian Naval College at *Flinders*, the Navy Office in Melbourne, the Royal Naval College at Greenwich and the Royal Australian Naval College at HMAS *Creswell*.

After a year on the *Voyager*, Dovers was chosen to command the Royal Malayan Navy, in the newly formed Malayan Federation, for 2½ years. His uncompromising integrity and political neutrality served him well in the new country and he deftly managed smooth relations with his hosts and their former imperial power.

In 1962 Dovers returned to sea to command HMAS *Sydney*, a time marked by tragedy. In 1963 five young officers from the ship drowned during a training exercise. A court martial found Dovers guilty of neglect of duty and he was reprimanded. However, a naval board review found the verdict faulty and quashed it.

In 1964 Dovers was selected for the year-long imperial defence course in London, which all but assured his promotion to rear admiral. In 1965 he became the deputy chief of naval personnel and in 1967 was made rear admiral and was also director of joint services plans. In 1969 he was awarded his CBE, and from 1971 to 1973 was flag officer commanding the Australian fleet.

Disappointed not to head the Royal Australian Navy, he accepted that there were always more deserving men than positions available. His final appointment was as the flag officer commanding the East Australia area from 1973, which he held until his retirement in 1975. He then spent eight years as the chief project officer of the planned Australian Defence Force Academy.

In retirement he supported the local arts and followed rugby. His golf handicap improved to five and he played 18 holes twice a week. He and Ray were also active with the Salvation Army's Red Shield charity.

William Dovers is survived by his children, Sandra and William, and their families. Ray died in 2005.

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Australia's Secret War – Ship Repairs

BY HAL G.P. COLEBATCH

SHIP REPAIRS

"Fit for treasons, stratagems and spoils."
- Shakespeare, The Merchant of Venice

When Kanimbla went to sea to proof-fire the gun, spending about two hours outside Sydney Harbour, the riggers came too. For this they got about £100 danger money, (at a time when soldiers were getting five shillings a day). Mr Douglas-Brown believed this was the reason for the strikes.

In November, 1943, the auxiliary cruiser *HMS Kanimbla*, originally a peace-time passenger-liner, was taken in hand at Sydney's Garden Island dockyard for conversion into *HMAS Kanimbla*, a landing ship. This involved altering the armament and installing 25 landing-craft to be lowered from special davits. In the ship's new role the gun-armament was to be primarily anti-aircraft, the largest gun being a 4-inch high-angle gun mounted aft.

Lieutenant Archie Douglas-Brown RANR(S) was a peace-time Merchant Service sea-officer. He had joined *Kanimbla* as senior watch-keeping officer and later became First Lieutenant. According to Mr Douglas-Brown, the dockyard riggers went on strike and refused to hoist the gun onto the ship from the dock. This was eventually done by officers in *Kanimbla* with previous mercantile experience rigging slings, and, when the gun was aboard, fixing it to the deck-mounting themselves. The dockyard riggers also refused to splice the lifting-falls for the landing barges (the cables by which the barges were raised and lowered).

When *Kanimbla* went to sea to proof-fire the gun, spending about two hours outside Sydney Harbour, the riggers came too. For this they got about £100 danger money, (at a time when soldiers were getting five shillings a day). Mr Douglas-Brown believed this was the reason for the strikes.

The ship was fumigated with cyanide at about the same time, and an armed guard was posted to keep people off till the cyanide fumes had cleared. There was another strike over this. Mr Douglas-Brown commented:

> We knew they wanted to get aboard and get at the sailors' lockers and steal cigarettes. We couldn't prove it was the dockyard workers, but cigarettes had been stolen while we were alongside, and the sailors, who were issued with them, had no reason to steal from each other. Of course, they were also a black-market currency. [1]

Another of *Kanimbla's* crew, Mr F. E. Thornton, wrote to the *West Australian* on 20 May, 1995, giving further details of strikes while *Kanimbla* was being refitted:

> In 1943 *Kanimbla* berthed at Sydney to be refitted from an armed merchant cruiser to a landing ship.
>
> Every available space below deck had previously been stacked with 44-gallon drums, empty and sealed, in order to help keep the ship afloat should serious damage occur while at sea. They were to be removed and replaced by bunks for troops. The waterfront workers went on strike leaving this work to be done by the ship's crew.
>
> Later we moved to Cockatoo Island to be rigged out with 25 landing barges. Before this work was completed the workers again went on strike ... *Kanimbla* eventually went to sea - and war - leaving the ship's crew to finish the jobs.[2]

Mr Keven Johnson recalled that another Australian warship, Patrol Vessel HMAML (motor launch) Q1358, in which he served, was blacklisted by Sydney dock-workers in July, 1944. These vessels were about 80 feet long and generally armed with a 20-mm gun, a 0.5inch heavy machine-gun, two medium machine-guns and depth-charges. They served in a variety of theatres:

> I am serving on the "Australia Remembers" committee and am very keen to promote remembrance of the war-effort carried out by the great majority of decent, hard-working loyal civilians at home ... But I will not assist in any project which involves "wharfies" or "dockyard mateys."
>
> They were a disgrace to the Australian nation during the war and we will remember them so.
>
> These individuals used to come aboard, cadge and steal our cigarettes, ration coupons, and, above all, our valuable instruments etc. required to maintain and service our equipment while serving in operational areas.
>
> They used to sit in the mess-decks, especially on Saturdays, do no work and listen to the races on our service sets, and, if refused, find an excuse to declare us "black." For this arduous duty they were paid double time, which was more than we received in a fortnight. We had to detail a man to follow them around watching every movement to safeguard our gear.
>
> Their delaying and loafing tactics were renowned and if we tried to speed up the process by doing any work ourselves whilst in dockyard hands, the

ship would also be declared "black." This is how these parasites backed Australia's fighting forces. As for being left without shipments of food and ammunition, that's another saga.

Ask any sailor if these stories are correct.

The ship involved in the above was HMA Harbour Launch Q1358, a patrol boat carrying a crew of two officers, two petty officers and seven ratings, and the approximate date was July, 1944.

We were "blacklisted" on two other occasions during our refit at about the same period. We sailed overseas as soon as we completed our "running up" and sea-trials.

Blacklisting Number One occurred when our skipper commenced prizing up a gun-platform which was not required and was considered dangerous - the gunners preferred to move around on the plain deck. Our skipper became exasperated why a dock-yard matey arrived to inspect and remove the platform. He sat down and lit a cigarette and proceeded to gaze at the project for about 10 minutes. Then he rose reluctantly to his feet, took a saw from his bag and cut a small section out of the platform. He then resumed the sitting position with a cigarette as the exertion of the last task appeared to have exhausted him.

Another ten minutes of gazing spell-bound at the platform brought about enough recovery to enable him to resume his feet and repeat the process. The Skipper, witnessing this little charade, said to me: "Get a crowbar!" This I did and he then proceeded to prize the platform out of the deck. The dockyard matey was aghast and picked up his tools and departed. A foreman later advised that owing to our heinous crime we were blacklisted.

Blacklisting Number Two occurred when, after finishing at the Garden Island dockyard we returned to *HMAS Rushcutter* (the motor launch base) to be slipped and painted. The dockyard mateys wanted extra money for fares as they had a little further to travel to work. When they met resistance to this they manufactured a motive for walking off the job by claiming that a "docker" had painted the wrong part of the hull. This is where I found out what a "docker" was. Apparently a "docker" paints below the water-line and a "painter" paints above the waterline. Apparently the offending "docker," whether by accident or design, painted above the water-line, hence supplying a good reason for walking off the job.[3]

Well-known West Australian writer and journalist C. R. Chambers served during the war at sea as a Navy sick-berth attendant. Mr Chambers recalled:

> In 1945 the *Tribal*-class destroyer *Arunta* was in dock in Sydney, being refitted for the planned recapture of Singapore. In the sick-bay a dock-side metal worker was refitting a two-gallon electric urn to the metal wall. The inch steel band around the urn had to be joined by a gutter bolt and a small wooden block between two of its flanges - so he stopped and waited for a carpenter.
>
> The block was there but he couldn't fit it. He was very much in my working way so I sent him on a fictitious journey up forward on the pretext that he might get a cup of tea and in two minutes I had the job completed. A Naval nurse, I figured, could handle a metal bolt and a bit of wood. He returned and complained bitterly that I might have brought the whole dockyard out on strike.[4]

Ean McDonald joined the Royal Australian Naval Reserve in 1938 as an Ordinary Signalman and was called up at the beginning of the War. He was commissioned during the war and retired from the Navy in 1946. He remained an active member of the Naval Reserve after the war with the rank of Lieutenant-Commander, well remembered by many who passed through the Fremantle Port Division as "the Gunnery Bloke."

Ean qualified as a Master Mariner in 1988, and lectured on maritime subjects as well as writing a text-book on celestial navigation. He was also for a time a Perth City Councillor. The following, published here with Mr McDonald's permission, is from his memoir *Flip-Side War*. It is a detailed account of what appear to have been typical methods of obstructing and disrupting the functioning of Australian Naval ships.

> I have no doubt that many ex-servicemen would have tales similar to mine of union disruption, delay and even of servicemen fighting union men for the very right to fight for their country.
>
> In Brisbane in 1944 we

I have no doubt that many ex-servicemen would have tales similar to mine of union disruption, delay and even of servicemen fighting union men for the very right to fight for their country.

Australia's Secret War –Ship Repairs

It did not occur to them that apart from the once or twice the Japs managed to land a few shells in harbourside suburbs, the war reached Sydney only in the newsreels.

had just completed a refit of *HMAS Shepparton* [a *Bathurst*-class corvette/ mine-sweeper] after many months of pathfinding for our troops battling their way doggedly but successfully along New Guinea's jungle coasts.

We were anxious to get back to our job of helping them do theirs.

As a last fling before leaving I, as Executive Officer of the ship, had organised a Saturday night dance for our ship's company. We had the Hall and Band and 100 young service girls happily lined up for a fun night before we sailed again for the front early on Monday morning.

Our ship had been emptied of all but essential food stores and now had to be re-stocked for the months. Truckloads of replenishing stores arrived on the wharf as we lay alongside on Saturday morning. But there was a catch.

We had been instructed that we could not touch the stuff on the wharf. It had to be delivered to our ship's gangway be a great tram of wharfies, who by 8 a.m. were standing about glaring at us. Our boys could only take delivery at the gangways.

Sailors lined the side as the wharfies began, but they were a delicate lot. We soon realised that they could only handle one light biscuit tin or one small crate of beans at a time. They queued at the trucks and, ever so slowly, gently and deliberately, began to collect the small bundles, stroll ten metres and deposit the stores at our side, whereupon our blokes raced off with them to the ship's stores.

By 10 a.m. we had put away about one hundred pieces and had more than a thousand to go, so it became clearly apparent that the job was, at that rate, going to take till well after midnight.

That was fine for wharfies on Saturday double time, extending to triple time after lunch, but no good for sailors looking forward to their last social event for months.

About 10.15, I sought out the Major Domo wharfie man as he sat heavily, smoking, on a barrel.

"I'd like you to get your chaps moving faster, please. We have other jobs to do and other commitments for later today."

"Oh yeah? No deal, mate. Can't strain my boys. Goin' as fast as they're s'posed to."

"So," said I, "Let me tell you that if this stuff is not aboard by mid-day, I'll turn my chaps onto the wharf to get it."

"Can't do that, mate. We'll strike."

"Your problem, Mister," I replied, and told my fellows of the situation.

At that he heaved himself up on a truck to harangue his team on Rights for Workers and Capitalist Attitudes of Naval Officers, and the whole loading operation stopped dead.

At noon I took the plunge and freed my boys who swarmed ashore to the trucks, and the crates and boxes began to move aboard at a highly-satisfactory rate.

A few wharfies tried to muscle in but we had a few of our own good fist-men who made no bones about their intentions. The bossman Wharfie shouted abuse at us, threatening a full waterfront strike by first thing Monday.

"Go ahead, friend," beamed I, "We'll be back to our war by then."

The stores were all aboard by three that afternoon. The wharfies all went to the pub, and our dance was a ball ...

Mr McDonald described in detail the deliberate go-slow and harassment tactics employed by dockyard workers when working on refitting warships. The following extract from his manuscript has been somewhat abridged.

After each year or so of intense activity in forward areas we came down to Australia again for a refit.

We were scheduled to go alongside the various specialist dockyards for about five weeks. The whole period would be one of turmoil as the ship underwent major overhaul, repair and renovation ... Part of our remaining ship's company would be set to outloading stores, emptying compartments needing access for repairs. Supposedly dangerous ammunition would go first onto barges sent down from Goat Island. The fact that we lived comfortably with it all our days did not go down with the "Dockies," who first would not come near the ship until it was clear of everything remotely explosive and declared fully "safe" by their shop stewards.

It did not occur to them that apart from the once or twice the Japs managed to land a few shells in harbourside suburbs,

the war reached Sydney only in the newsreels.

When all was cleared for them to go aboard, the droves of dockies swarmed in bringing their cut lunches so they could strew the second-hand pie-crusts, paper bags and worn-out apple-cores all about our once-tidy ship.

They loved draping miles of electric cables about our decks, always laid to cause most people to trip over them. That at least created an air of busyness. They left their welding generators running noisily to prove that they were around or had been recently.

Their dirty paws systematically mauled everything with reach. Their greasy boots smeared our living decks. Their filthy overalls smudged our chairs and sofas. Our cabins became pig-sties. They even joked about that. Officers were known as "Pigs" anyway.

The whole period was one of strain for us. Dockyard workers ... never cleaned up their off-cuts or grease-spots or rubbish from their meals. They cared not that we had to go half a mile ashore to have a decent wash, and had to eat cold food while they kept our galley too filthy to use.

I could be at my cabin desk about 9 am. trying to do some paper-work, when a typical sequence would begin.

A dockie electrician and his little mate would barge straight in with not so much as a knock, muttering about a wire needed across my cabin. He'd glare at the bulkhead on one side and mutter to his off-sider: "Can't run a wire through here, Charlie Mate. Needs a five eight 'ole. Tell you what! We'll have a cuppa and you can run orf and get a fitter."

They would plump down on your cabin lino, pull open their crib baskets, open some comics and pour themselves a mugful of tea. They'd quaff a sandwich or two and scatter the crusts and wrappers all about.

After half an hour the mate would go off to find a fitter, who, with his mate, would join the others in lounging about the cabin reading everything in sight including your own mail.

The fitter would send his mate off to the store with a note and on his return with a drill and a stores docket to be signed by someone, the fitter would screechingly drill a small hole in the steel bulkhead. By then it would be their tummy-rumbling time and they would all disappear for an hour or two.

After lunch there would be a conference among the electricians about sizes and lengths of wire, and off would go the mate to get it. They would then poke the wire through the small hole and drape the wire across the cabin, effectively barring access to it, so you would go away and find a barrel on the deck to use as a temporary work-desk.

It would then be afternoon tea-time and the munching of more sandwiches, taking of more tea and spreading of more remains would add to the mess already lying on your deck.

By about 3 p.m.. the wire would be screwed in place along a duct on the deck-head of the cabin and, lo and behold! The electrician would mutter to his mate that they would need another hole to get through the other side. By that time in the afternoon it would be too late to expect any reasonably-motivated dockyard matey to waste time finding another busy fitter, so away they would go to sign off in time to catch the knock-off bell.

At 9 am the next day, after a further conference, it would be decided to get another fitter to drill the final hole and by about lunchtime the job would be done, completed, finished. now you could not expect any respectable dockie to move off to another job after lunch, so the afternoon, or most of it, would be spent sitting down munching the remainder of sandwiches and a banana or two. Very satisfactory rubble, banana skins. Devouring of a magazine or two, deep debate on the state of the war ... would take up a reasonable amount of time. Then by about 3 there would be just enough time for these fellows to stroll up to sign off for the day.

On good days for them, a job would run on after three and their pay would begin to rate time and a half.

It would take two full days of real time to run a light wire across two and a bit metres of any cabin. Over all of that time the cabin was practically uninhabitable and filthy ... each day we had ourselves and our sailors feverishly trying to keep the ship clean after the expert messers on our decks ... They were getting about 15 times the pay of the sailor who went off to fight for them ... We

On good days for them, a job would run on after three and their pay would begin to rate time and a half.

Australia's Secret War –Ship Repairs

finally decided, with requisite Admiral's Office agreement, that we preferred to sail [and] leave some minor repairs for our own shipboard staff to tackle.

Clean-up commenced, stores began to come aboard. Finally the Boatswain's Mate went round piping: "Ammunition Ship will take place on Thursday. All parties will muster on the wharf at 0800 Thursday morning. All leave after 20.00 on Friday is cancelled. Leading Hands to muster in the galley flat at 16.00 today for instructions."

By this action we generated another problem. Dockies would promptly be called to a stop-work meeting to confer on the question of whether they could possibly work on a ship with live ammunition on board. Of course not! *Unless they were paid more.*

From the moment the ammunition barges even looked like touching the ship the dockies would gather on the wharf to negotiate their rates of pay for their "Danger Money." For days before that they had been slowing down jobs like drilling little holes so they would be sure to have some reason to come aboard after the ammunitioning began when their rates went up by doubling.

Another trick was to delay our trials so they would take place off Sydney on a Saturday or Sunday with consequent repeated doublings of their pay rates, to a level approaching that of the Prime Minister. The war debt grew as the government puzzled about overruns to its budget, and the very dockies' children were committed to pay for it all for the next generation.

"Danger" did not stop the dockies coming on trips like that. They came in droves to "finish off" some minor repair that took them half an hour. The rest of the day they picnicked on our deck spreading more of their refuse but letting papers blow away into the sea. "Danger" did not stop them smoking and chucking butts about our decks ... [5]

Mr Philip Archer served in the RANR as a Telegraphist (No. H1376). He recalled an incident when he offered to give a workman assistance during the refitting of a ship in early 1942 - the period of major invasion threat.

I was aboard *HMAS Doomba* [an 800-ton auxiliary minesweeper] as she refitted at Mort's Dock, Balmain, early in 1942, and making my way ashore along the waists I saw a workman holding an object up with one foot while he attempted to weld it to the bulkhead. So I offered to hold it up for him.

He looked most uneasy but put the work down and looked around, then ran back quickly and welded it while I supported it. He explained that had he been seen employing non-union assistance the ship could quite easily have been "blacked."[6]

Notes:

(1) Interview, Perth, 17 May, 1994.
(2) Letter, *West Australian*, 20 September, 1995.
(3) Letter, 15 May, 1995.
(4) Letter, 9 September, 1994.
(5) Ean McDonald, *Flip-Side War*, Unpublished Manuscript, made available by Mr McDonald, Perth, September, 1994. since published by Hesperian Press, Perth.
(6) Letter, 2 May, 1996.

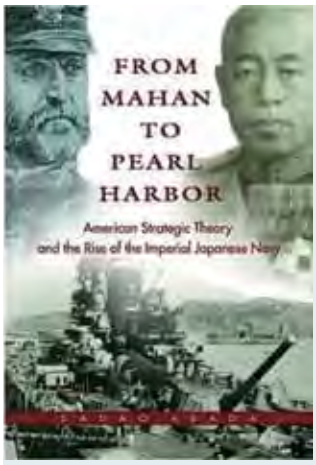
Hal G.P. Colebatch has an MA in History/ Politics and a PhD in Political Science and is the author of several books as well as many articles in The Australian, Quadrant, The American Spectator etc. His book Blair's Britain was chosen as a Book of the Year in the London Spectator. His latest book is Steadfast Knight: a life of Sir Hal Colebatch (Fremantle Arts Centre Press, WA). This is an extract from his unpublished book Australia's Secret War.

Visions from the Vault

Operation Crossroads, August 1946, UN representatives

At 33 seconds after 0900 on 1 July 1946 the United States exploded its fourth atomic bomb, an air-burst, over a selection of 90 target ships anchored in Bikini Atoll. This first post-war explosion, Test Able, was followed by Test Baker on 25 July which generated even greater interest because the bomb was detonated underwater. The main purpose of the tests was to ascertain the effect of the atomic bomb against naval vessels in order to gain information on possible changes in ship design, spacing of tactical formations at sea, and berthing of ships in port. The sole Australian government observer was Commander S.H.K. Spurgeon, RAN, the Australian Naval Attache in Washington. Seen in this picture second from the right in the middle row, Spurgeon was one of 21 UN representatives invited to the tests by the US State Department and embarked in USS *Panamint*, an amphibious flagship. *Panamint* was stationed some 21 miles away from the target array during the first test and at about half that distance during the second. Once levels of radioactivity were declared safe, Spurgeon was able to make a first hand inspection of the damage caused among the target vessels. His report back to Australia makes interesting reading, for it was a time when many analysts were questioning the future relevance of navies. The atomic tests, Spurgeon concluded, had raised many problems, but had not made navies obsolete: 'They will not lose their function until the sea is no longer a highway in war. It is certain that this traffic on the sea must continue for a long time, we must protect that traffic, and therefore we must if necessary fight on the sea. No practical substitute for the warship has yet appeared for the defence of trade. If there is to be atomic warfare, naval warfare will not be exempt from it. As the weapons change in the new atomic age, ships and tactics of naval warfare must also surely change.'

Book Reviews



From Mahan to Pearl Harbor: The Imperial Japanese Navy and the United States

by Sadao Asada,
US Naval Institute Press, 2006,
xii, 385 pages, tables, notes,
bibliography, index,
ISBN 1-55750-042-8,

Price for non-USNI members
US$36.95.

Anyone who believes that military history is neither fascinating nor important, or who professes to be uninterested in war (when indeed war may well be interested in them) should be offered this book to read. Sadao Asada is a distinguished Japanese practitioner of diplomatic-naval history, trained at Yale, and a longstanding authority on inter-war Japanese-American relations, recently retired from Doshisha University in Kyoto. In this book, with meticulous scholarship, and utilizing new Japanese as well as American archival sources, he traces the tragic story of the Imperial Japanese Navy's drift to war with the United States over a period of forty years. An absorbing and cautionary tale, it will be appreciated by specialist naval and lay readers alike. It forms a bookend with Marder's volumes on the British and Imperial Japanese Navies.

This is a study in strategic ideas, in naval policy and politics, and their combined impact upon war planning, international relations, and ultimately the history of a large part of the world. In short, Asada's central theme is how a generation of Japanese naval officers –encouraged by several key gurus amongst their number - became obsessed with Mahan's ideas of decisive fleet action, with belief in an inevitable conflict with the United States, and with the imagined feasibility of a short, sharp and victorious Pacific war. He begins by placing Mahan in the context of Japanese-American relations early in the century (Mahan's advice to the President of the Naval War College on War Plan Orange in 1911, emphasizing the use of Guam as a forward base, was eerily prescient and is still relevant a century later). Asada then deals with the seminal intellectual and professional contacts between the two navies (there was in fact an idea, which never materialized, for Mahan to teach at the Japanese Naval Staff College). He takes the reader through the inter-war naval conferences, the events of the 1930s, the opportunity for southward Japanese advance created by the European war, the American embargo, and the coming of the Pacific war.

There is also an intriguing chapter on 'Men, Organization, and Strategic Visions' in the Japanese Navy between 1931 and 1941, charting the roles of key groups and individuals, their strategic ideas, and their roles in service and national politics. Here groupthink, factionalism, inter-service rivalry, and mediocre middle management triumphed over senior individuals and breadth of vision. Navy Minister Yoshida almost single-handedly opposed the Navy's drive to war, suffering a physical and nervous collapse in 1940. Yamamoto, Combined Fleet Commander, was famously forced to fight the protracted war he did not want and knew he could not win. Nomura, the pro-American admiral and friend of Franklin Roosevelt, called out of retirement to serve as ambassador to Washington, was white-anted by the Japanese Naval bureaucracy in his efforts to prevent war – a war which he warned would involve Japan in fighting both the United States and the British Empire. Asada concludes that the Imperial Japanese Navy suffered a progressive breakdown of leadership, rendering it unrecognizable from the traditionally Anglophile and outward-looking force which had won at Tsushima. How deeply Western and international influences had truly penetrated into Japanese naval culture is still, however, perhaps a matter for debate. This implies a further question, not quite addressed explicitly in this book, as to how far the IJN fell under the influence of Mahan and how far it adapted him to its own political and cultural needs.

The major historical lesson of this book is what happens when dogma replaces strategic thinking. Dogma was inherent in Mahan's ideas (which were actually a brief for just one kind of sea power), but it was also in the eye of the beholder, as Asada shows. The US Navy predicted the course of the War far better than the IJN, and was less enslaved in practice by the Mahanian battlefleet view. The way it fought in the Pacific displayed all the classical flexibility of naval power in warfare, and in this sense was reminiscent of the campaigns of the Royal Navy between 1793 and 1815.

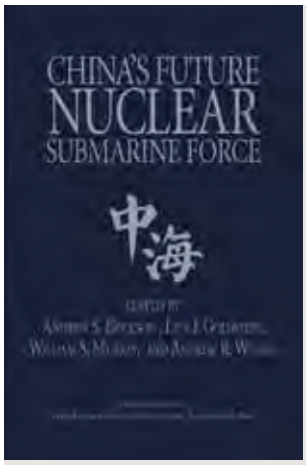
Mahan's influence is often blandly cited in discussions of early twentieth century navalism. This book is an actual case study of the role of strategic ideas in helping to shape military

reality. Part of its intellectual merit is the exploration of interrelated themes: human, ideological, political and economic. Naval and diplomatic history are intimately related for a host of reasons. This book, with its respect for context, represents the best type of both.

This is also a topical book in the light of current great power rivalries in East Asia and the Pacific. China is not, unlike Japan, an archipelagic nation. Neither does it possess the Samurai warrior tradition. Its ultimate strategic aims may still be evolving. Comparisons between Imperial Japan and the PRC cannot be simple or crude. But China remains a potentially revisionist power challenging American influence in the Pacific, is seeking blue water naval capability under the influence of Mahanian ideas, and has an ongoing concern to secure national energy resources. There may well be lessons here for current students of the Asia-Pacific.

There are few, if any, better examples in military history of transgressing the Clausewitizian principle of knowing how to end a war you start than the story of Japanese naval policy prior to 1941. Put another way, in dealing with the delicate issues of international politics and possible war, be careful what you want. The fact that we are hauntingly aware of the outcome of this story makes it none the less readable. It seems to enhance its dramatic impact. This is also a handsomely produced volume. Recommended.

Reviewed by Dr John Reeve, Osborne Fellow in Naval History, UNSW@ ADFA.



China's Future Nuclear Submarine Force

Edited by Andrew S. Erickson, Lyle J. Goldstein, William S. Murray, and Andrew R. Wilson
US Naval Institute Press, 2007
412 pages, notes, index, bibliography

ISBN-13: 978-1-59114-326-0
Price: US$40.50

In his recent address to the 17th National People's Congress, President Hu Jintao made statements of *rapprochement* towards Taiwan highlighting a desire for peaceful integration of the island into the mainland's political structures. China's economic and multidimensional security interests have evolved to the point that any conflict over Taiwan is no longer worth the societal cost. The mainland's extensive maritime trade and rapid coastal development have seen a complete reneging on Mao's once 'Third Front' and reclamation of Taiwan strategies. Accordingly, a readjustment of our understanding of China's future plans now requires commentators to move away from viewing the People's Liberation Army Navy (PLAN) within the Taiwan Straits security paradigm and to analyse the broader strategic needs of China and how a navy can meet these ends.

China's Future Nuclear Submarine Force is a compilation of essays by a variety of academics and former USN officers discussing the growth in this element of China's naval force structure. The editors have chosen to divide the articles into five broad categories:

1. the wider context of China's nuclear submarine development,
2. its dimensions and capabilities,
3. discussion of current and future operations,
4. assessment of Cold War lessons learnt, and
5. implications for the US.

The perspective this book provides is a valuable contribution to this field. Even though China is aiming to maintain a large, predominantly diesel submarine fleet of Russian Kilo Class (SSK) submarines, an understanding of China's nuclear submarines' role in the PLAN provides some clarity in analysing China's immediate and future strategic ends. This is because these submarines are very expensive and resource intensive platforms, and their cost is therefore correlative with China's strategic vision. The submarines' primarily sea denial capability indicates that China is seeking sea power with a defensive posture, while still maintaining an aggressive stance. Both of China's developing type 093 Shang Class (SSN) and 094 Jin Class (SSBN) submarine models are deemed to possess significant attack capabilities which are mainly geared toward surface units, with the long range SSBN also able to project a threat of nuclear strike against the coast of an enemy state. Thus, these boats have a strong deterrent focus in the maritime environment. In addition to the issue of Taiwan, this capability

allows China to contest broader maritime areas such as the Spratlys. Several of the articles describe how these assets will be able penetrate the first island chain of Japan, Taiwan and the Philippines to challenge the US in the deep Pacific as well as in the Indian Ocean. Part of the meta-narrative of this text is that these boats are almost giving China, notwithstanding their limitations in exercising sea control, a blue-water capability without a Carrier Fleet.

The authors discuss how the utility of submarines can be assessed from several perspectives. Firstly there is the historical approach whereby the usefulness of submarines was demonstrated in previous Taiwan Strait crises, when US fleets were kept at bay by PLAN submarines patrolling the area. Then there is the security umbrella approach, in which it is argued that recent harassment of Chinese shipping by the US in the Persian Gulf has spurred China's desire to develop capabilities that can protect long range maritime shipping interests. Thirdly there is the doctrinal approach. In this context, it is submitted that China is focused on developing new and unique approaches to warfare. Moving away from the dominant US thinking about war, the PLAN is trying to establish its own understanding of sea power which draws heavily on the writings of Gorshkov as well as on those of indigenous strategists.

An important factor to consider when dealing with the Communist State is that, whereas during the Cold War when a country fell under the influence of the Soviet Union this generally involved denying American commerce access to that nation, China, by contrast, does not seek any such deprivation. China is seeking to influence nations, not dominate them, and it is more than happy to share markets with the US. Direct conflict over Taiwan or proxy conflicts, such as occurred in Korea and Vietnam, are therefore no longer in either party's national interest. In this sense, while it may be useful to look for lessons learnt from the expansion of Soviet nuclear submarine fleets and to compare them with China's expansion, as discussed in the article by Lowenthal, the political and military implications are starkly different. This makes the military relationship between the two powers primarily one of espionage and manoeuvre, a relationship in which nuclear submarines play a vital role.

One obstacle that this text encounters is that whenever one is dealing with matters of strategic affairs, the open source dilemma inevitably exists. Firstly, many of the factors, technologies and strategies of states are shrouded in secrecy. This is compounded by the fact that the silent service is amongst the most secretive institutions a state can possess. Several of the commentators in this compilation address this matter in highlighting the point that no external analyst truly understands China's current strategy. Intelligence-wise, Mahnken points out that in the year preceding the writing of his article, the US intelligence agencies were caught unaware of twelve military developments in China. It is also saliently noted in the text that no open source photos exist of any of China's SSN or SSBN platforms. Notwithstanding these limitations, this volume provides an uncannily insightful and well argued set of essays on the strategic, military, technological and political value of China's emerging nuclear submarine fleet.

One of the great aspects of this collection is that the contributors have used their expertise in Chinese to bring a range of local sources into the English discourse on the subject. This makes this text indispensable to the student of maritime strategy seeking to grasp the relationship between the world super power and its nascent rival. Even though China does not publish official data on such topics, there is a growing amount of strategic literature emerging from the mainland, which is allowing foreign commentators to test their opinions on China's role in the world.

In the opening paper, McVaden highlights the fact that China has recently held combined exercises with the UK, France, Russia, Australia, India and Pakistan. In addition to McVaden's contribution, McDevitt's and Erikson's & Wilson's articles provide an acknowledgement of China's diverse relationships with countries other than the US. But there is no analysis of these partnerships in any of these articles. It is this reviewer's assertion that this range of relationships demonstrates that China's strategic position in the world should not be analysed purely from a US perspective and that, if anything, this is the major shortcoming of this text. While it is a USNI publication, a broader examination of China's place in the world from other perspectives could provide a more contextualised understanding of Chinese naval strategy. China's relationship with countries in the Indian Ocean and Malacca Strait are not mentioned, nor is there discussion of possible pipelines through the Middle East or the Caspian Sea to supply China's energy needs and how these may affect the use of nuclear submarines. Further, the relationship with Myanmar and the Maldives, in terms of Chinese strategic bases for some of these submarines, is not even mentioned.

These omissions may be due to the fact that all of the authors have some affiliation with the US Naval War College and so it would seem that this is primarily a text for students of that school with a strong focus on China's Asia-Pacific interests. One can forgive these oversights as merely providing the paradigm for the text rather than being illustrative of any major shortcoming. As it stands, *China's Future Nuclear Submarine Force* is an authoritative set of essays on this subject for an English speaking audience. Without doubt it is part of a growing body of seminal works that are opening up the debate between the US and China on naval affairs and it therefore comes recommended by this reviewer.

Reviewed by Lieutenant Michael Paes RAN

Thinking of Making a Contribution?

Style Notes for Headmark

In general, please present your work with the minimum of formatting.

Paragraphs:

Don't indent, and leave left justified. Separate paragraphs by one line. Single spacing only. Use one space only after stops and colons.

Conventions:

Use numbers for 10 and above, words below. Ship names use italics in title case; prefixes such as *HMAS* in capitals and italics. Book and Journal titles use italics.

Use single quotation marks for quotations. Do not use hyphens for any rank except Sub-Lieutenant.

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Adler, Bill (Ed.) *Letters from Vietnam*. New York: EP Dutton and Co., 1967.

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Australian Associated Press. "Army admits mistakes in SAS investigation". 17 February, 2004. <http://www.asia-pacific-action.org/southseast asia/easttimor/netnews/2004/end_02v3.htm#Army%20admits%20mistakes%20in%0SAS%20investigation>

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Do not embed graphs or figures in your text without sending a separate file as well. If supplying photographs use a minimum of 300 dpi. We are keen on colour images but will use greyscale if necessary. We are able to scan prints if necessary, but request a self-addressed stamped envelope for return – please insure adequately if necessary.

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Editorial considerations:

The Editor reserves the right to amend articles where necessary for the purposes of grammar correction, and to delete tables or figures for space considerations.

Australian Naval Institute Events Program

Event	Date	Location	Comments/Contact
JANI AGM 1730 followed by Reception in the Officers Mess 1830	13 March 2008	ADFA Military Theatre	For more details of ANI events visit the website: www.navalinstitute.com.au

HMAS Maryborough is the newest Armidale Class Patrol boat to enter service in the Royal Australian Navy, recently commissioning in Brisbane

ANI On-line: A guide to the new website.

Our new website is now on-line! In addition to the features available on the previous site, the new site also features a library of past journals, a discussion forum, a news section and member list. This short guide is designed to help you take full advantage of the new features.

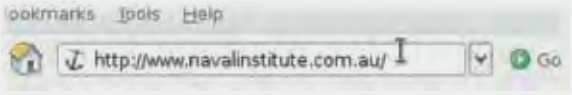

Figure 1

Obtaining an account

In order to access the new features of the site you must have a user account for the website. If you have a current subscription to the ANI, navigate to the website www.navalinstitute.com.au using your web browser (figure 1), click the "Members Login" menu item (figure 2), then click the link to download an application form. Fill in the form, then fax or post it to the ANI Business Manager. Once your account has been created, you will receive an email that outlines your member ID and password.

Figure 2

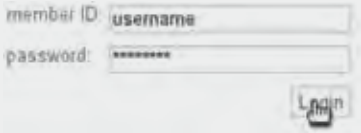

Figure 3

Logging in to your account

Once you have your account details, you are ready to login and access the new features of the site. In order to login, navigate to the website (figure 1) and click the "Members Login" item (figure 2). Enter your member ID and password as they were provided to you, then click the "Login" button. The case of the member ID and password are important: i.e. "CaSe" and "case" are considered entirely different words by the authentication system. Each letter of the password will appear as a single "*" to prevent others from seeing your password as you type. If you have entered your details correctly, you will be presented with the news page. The grey status bar at the top notifies you of the account you are using (figure 4). You are now able to access all of the new features of the site.

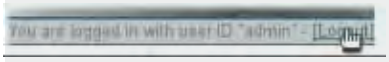

Figure 4

Logging out of your account

In order to protect your identity and to prevent malicious use of your account by others, you must log out of the site when you are finished browsing. This is especially important on public computers. In order to log out, click the "Logout" link in the grey status bar (figure 4).

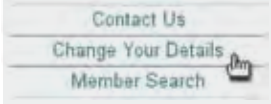

Figure 5

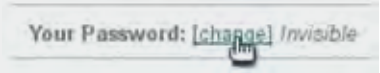

Figure 6

Changing your details

When your account is created, only your member ID and password are stored in the system for privacy reasons. However, you may provide other details that are visible to other ANI members. In order to change your details, login and click the "Change Your Details" menu item (figure 5). Then select the "change" link (figure 6) next to either your personal details or password. Change the text appropriately and click the "save" button (figure 7).

The personal information that you provide will be visible to other members of the ANI but will be hidden from members of the general public. You may provide as much or as little detail as you wish but none of the fields are compulsory. However, you may not change your member ID as it is the link between the on-line database and our off-line records.

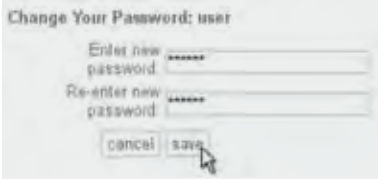

Figure 7

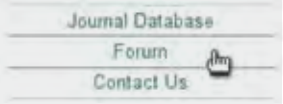

Figure 8

Participating in the forum

In order to post topics and replies in the discussion forum, first login and click the "Forum" menu item (figure 8). Then select a forum that you would like to view by clicking its "View Topics" button (figure 9). Select a topic that you would like to read by clicking its "View this topic" link (figure 10). If you are not interested in any particular topic, you may add your own by clicking the "Add New Topic" button (figure 10). Similarly, once you are viewing a topic, you may post a reply by clicking "Add New Post". Fill in the heading and body of your reply and click the "Submit" button to add your reply to the topic. If you change your mind while writing your reply, you may click the "Cancel" button and your reply will not be added to the topic.

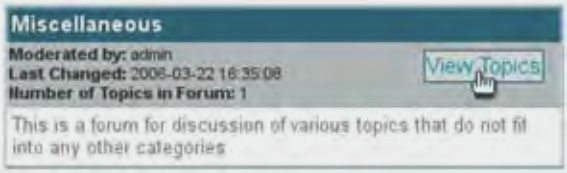

Figure 9

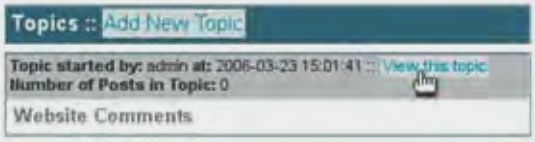

Figure 10

Further questions

If you have specific questions regarding website features or even a feature request, post a topic in the "Website Questions" forum and a site administrator will reply. Otherwise, happy browsing!

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